PUBLIC MEETING SCHEDULE
UNIVERSITY OF NEBRASKA

FRIDAY, FEBRUARY 7, 2020

9:00 a.m.
Topic: Legislative Update *(15 minutes)*
Presenter: Senator Jim Scheer, Speaker of the Legislature

9:15 a.m.
ACADEMIC AFFAIRS COMMITTEE PRESENTATIONS
Topics: Showcasing Student Accomplishments *(60 minutes)*
Presenters: Nicole Kent, University of Nebraska at Kearney
Sonoor Majid, University of Nebraska-Lincoln
Sumit Kar and Tyler Kambis, University of Nebraska Medical Center
Carly Cameron, University of Nebraska at Omaha

10:15 a.m.
BUSINESS AFFAIRS COMMITTEE PRESENTATIONS
Topic: Review 2018-2019 Audit Financial Statements *(10 minutes)*
Presenter: Chris J. Kabourek, Vice President for Business and Finance | CFO

10:30 a.m.
BOARD OF REGENTS MEETING
- KUDOS Awards Presented

UNIVERSITY OF NEBRASKA FACILITIES CORPORATION MEETING – Election of Officers

NOTICE OF MEETING

Notice is hereby given that the Board of Regents of the University of Nebraska will meet in a publicly convened session on Friday, February 7, 2020, at 10:30 a.m. in the board room of Varner Hall, 3835 Holdrege Street, Lincoln, Nebraska.

When so posted, the full agenda for the meeting will be available for inspection in the office of the Corporation Secretary of the Board of Regents, Varner Hall, 3835 Holdrege Street, Lincoln, Nebraska, or at https://nebraska.edu/regents/agendas-minutes

A copy of this notice will be delivered to the Lincoln Journal Star, the Omaha World-Herald, the Daily Nebraskan, the Gateway, the Antelope, the Kearney Hub, the Lincoln office of the Associated Press, members of the Board of Regents, and the President's Council of the University of Nebraska.

Dated: January 31, 2020

Carmen K. Maurer
Corporation Secretary
Board of Regents
University of Nebraska

AGENDA
THE BOARD OF REGENTS
OF THE UNIVERSITY OF NEBRASKA
Varner Hall, 3835 Holdrege Street
Lincoln, Nebraska 68583-0745
Friday, February 7, 2020
10:30 a.m.

I. CALL TO ORDER

II. ROLL CALL

III. APPROVAL OF MINUTES AND RATIFICATION OF ACTIONS TAKEN ON DECEMBER 19, 2019

IV. KUDOS
Jacqueline Hankins, University of Nebraska Medical Center
Keristiena Dodge, University of Nebraska at Omaha
Jeffrey Culbertson, University of Nebraska-Lincoln
Steven Klein, University of Nebraska at Kearney

V. SUCCESSION OF CHAIR; ELECTION OF VICE CHAIR

VI. RESOLUTIONS

VII. HEARINGS

VIII. PUBLIC COMMENT

The Standing Rules of the Board provide that any person who gives 24 hours' notice to the Corporation Secretary of the Board may speak to any item that is not on the agenda. In addition, any person may appear and address the Board of Regents on any item on the agenda for this meeting. Each person will be given up to five minutes to make his or her remarks. Public comment will be limited to a period of 30 minutes.

IX. UNIVERSITY CONSENT AGENDA

A. ACADEMIC AFFAIRS

University of Nebraska

1. President's Personnel Recommendations Addendum IX-A-1
2. Approve the amendments to RP-5.2.1 (attached) of the *Policies of the Board of Regents* (the "*Policies*") related to Admission Standards Addendum IX-A-2
3. Approve the amendments to RP-5.8.5 (attached) of the *Policies of the Board of Regents* (the "*Policies*") related to undergraduate Regents Scholarships Addendum IX-A-3

B. BUSINESS AFFAIRS

University of Nebraska

1. Accept the audited financial statements of the University of Nebraska and related entities Addendum IX-B-1
2. Approve amendments to the Audit, Risk, and Compliance Committee Charter Addendum IX-B-2

X. UNIVERSITY ADMINISTRATIVE AGENDA

A. ACADEMIC AFFAIRS

University of Nebraska at Kearney

1. Approval is requested to create a Master of Arts in Public Communication in the Department of Communication in the College of Arts and Sciences at the University of Nebraska at Kearney Addendum X-A-1

University of Nebraska-Lincoln

2. Approval is requested to establish the Nebraska Governance and Technology Center to be primarily housed in the College of Law, but with initial partnerships in the College of Business and College of Engineering at the University of Nebraska-Lincoln Addendum X-A-2

University of Nebraska Medical Center

3. Approval is requested to create a departmental structure in the College of Allied Health Professions at UNMC to include the creation of three departments and the renaming of one existing department Addendum X-A-3

University of Nebraska

4. Approve the award of Honorary Degrees and Awards [Please note: this item may be voted on after the Closed Session] Addendum X-A-4

B. BUSINESS AFFAIRS

University of Nebraska at Kearney

1. Approve an Agreement with Enrollment Advisory Group, LLC for International Student Recruitment Addendum X-B-1

University of Nebraska-Lincoln

2. Approve the Intermediate Design with Scope Change and Budget Increase for Outdoor Track Replacement at UNL Addendum X-B-2

University of Nebraska

3. Approve the Program Statement for the renovation of Nebraska Hall on the UNL campus to house the Enterprise Technology Services and Data Solutions team Addendum X-B-3
4. Approve master pricing agreements with DataVizion LLC and GovConnection Inc. to provide equipment and related services for campus backbone and data center network solutions Addendum X-B-4

C. FOR INFORMATION ONLY

1. University of Nebraska Strategic Planning Framework Addendum X-C-1
2. University of Nebraska Strategic Framework Accountability Measures Addendum X-C-2
3. Calendar of establishing and reporting accountability measures Addendum X-C-3
4. University of Nebraska Strategic Dashboard Indicators Addendum X-C-4
5. Board of Regents agenda items related to the University of Nebraska Strategic Framework Addendum X-C-5
6. None. The proposed amendments of the Standing Rules of the Board of Regents are presented for information only in accordance with the requirements of Section 7.2 of the Standing Rules and Section 1.11 of the *Bylaws of the Board of Regents.* Approval of these amendments will be considered for the Regents' meeting on April 17, 2020. Addendum X-C-6

D. REPORTS

1. Quarterly Personnel Reports for the period July through September 2019 Addendum X-D-1
2. Strategic Framework Metrics: Need-Based [1-a-iii] and Merit-Based [3-b-ii] Financial Aid, Graduation Rates [1-b-iii], Faculty Diversity [2-a-iii] Addendum X-D-2

3. Annual Tenure Density Report Addendum X-D-3
4. Tuition Variances Addendum X-D-4
5. Renaming the Bachelor of Science (BS) in Grazing Livestock Systems to the Bachelor of Science in Grassland Systems in the Center for Grassland Studies in the College of Agricultural Sciences and Natural Resources at the University of Nebraska-Lincoln (UNL) Addendum X-D-5
6. Report of Bids and Contracts Addendum X-D-6
7. Quarterly Report of Gifts, Grants, Contracts and Bequests Addendum X-D-7
8. Naming of Ameritas Virtual Reality Dental Experience Hub within the Clinical and Virtual Simulation Laboratory at the UNMC College of Dentistry Addendum X-D-8
9. Strauss Performing Arts Center Phase 2 Addendum X-D-9
10. Quarterly Status of Capital Construction Projects Addendum X-D-10

XI. ADDITIONAL BUSINESS

IX. UNIVERSITY CONSENT AGENDA

A. ACADEMIC AFFAIRS

University of Nebraska

1. President's Personnel Recommendations Addendum IX-A-1

2. Approve the amendments to RP-5.2.1 (attached) of the *Policies of the Board of Regents* (the "*Policies*") related to Admission Standards Addendum IX-A-2

3. Approve the amendments to RP-5.8.5 (attached) of the *Policies of the Board of Regents* (the "*Policies*") related to undergraduate Regents Scholarships Addendum IX-A-3

B. BUSINESS AFFAIRS

University of Nebraska

1. Accept the audited financial statements of the University of Nebraska and related entities Addendum IX-B-1

2. Approve amendments to the Audit, Risk, and Compliance Committee Charter Addendum IX-B-2

The President's Personnel Recommendation
Meeting Date: February 7, 2020

New Appointment
University of Nebraska-Lincoln
Elizabeth Spiller, Executive Vice Chancellor for Academic Affairs (Special) Academic Affairs, Professor (Continuous) English; effective 3/23/2020, $427,500, FY, 1.00 FTE.

Shari Veil, Dean (Special) College of Journalism and Mass Communications, Professor (Continuous) College of Journalism and Mass Communications; effective 7/1/2020, $230,000 FY, 1.00 FTE.

TO:	The Board of Regents	Addendum IX-A-2
	Academic Affairs	
MEETING DATE:	February 7, 2020	
SUBJECT:	Amend RP-5.2.1 of the *Policies of the Board of Regents* (the "*Policies*") related to Admission Standards	
RECOMMENDED ACTION:	Approve the amendments to RP-5.2.1 (attached) of the *Policies of the Board of Regents* (the "*Policies*") related to Admission Standards	
PREVIOUS ACTIONS:	September 16, 2016 – The Board approved the amendment to RP-5.2.1. Admission Standards, Section 3. "Performance Requirements."	
	January 16, 1993 – The Board of Regents approved the University of Nebraska admission standards.	
EXPLANATION:	The proposed *Policies of the Board of Regents* (the "*Policies*") modifications are designed to modernize the University of Nebraska admission standards.	
	RP-5.2.1.3c. Some high schools in Nebraska and in many other states no longer calculate a student's class rank. As such, a cumulative grade point average (GPA) of 3.0 has been proposed as a new option, among one of three performance requirements, a student must meet to seek admission.	
	RP-5.2.1.4a has been updated to include admission requirements and expectations of students who apply to the Nebraska College of Technical Agriculture.	
	RP-5.2.1.4b has been updated to remove archaic language, clarify special admissions considerations, and allow campuses to admit students with special requirements to complete coursework and participate in academic and student success programming.	
	RP-5.2.1.4c. Transfer students with 24 or more credit hours of transferrable credit have shown a likely capacity to succeed at the University of Nebraska. The proposed language removes the requirement that such students will be expected to have completed core coursework as referenced in RP-5.2.1.2 as a condition of admission. Each campus will determine how deficiencies will be satisfied.	
	These revisions have been reviewed by the Academic Affairs Committee.	
SPONSOR:	Susan M. Fritz Executive Vice President and Provost	

RECOMMENDED: 

Walter E. Carter, President
University of Nebraska

DATE: January 10, 2020

Amendment to the *Policies* of the Board of Regents of the University of Nebraska:

RP-5.2.1 Admission Standards

1. Overview of Entrance Requirements

   Entrance requirements have been divided into two sections described in detail below. ~~The first deals with core course requirements.~~ In addition to being graduates of an accredited high school, or equivalent, ~~all~~ students planning to matriculate at UNK, UNL and UNO must take a core of selected high school courses spread over a number of disciplines. Additionally, these students are required to meet performance criteria by being in the top half of their graduating class or meet certain performance criteria, based on scores on national examinations or a cumulative high school GPA. The entrance requirements incorporate a process for admitting students who do not meet one or more of the admission criteria, yet show promise of academic success.

2. Core Course Requirements

   a. English - 4 units - All units must include intensive reading and writing experiences. Innovative interdisciplinary courses and courses in speech and journalism may be substituted if they include substantial amounts of reading and writing.

   b. Mathematics - 3 units - Algebra I, algebra II and geometry.

   c. Social Studies - 3 units - One unit drawn from American and/or world history; one additional unit drawn from history, American government, and/or geography; and a third unit drawn from any social science discipline.

   d. Natural Sciences - 3 units - At least two units selected from biology, chemistry, physics, and earth sciences. One of the above units must include laboratory instruction.

   e. Foreign Language - 2 units - Both units must be in the same language. Students who are unable to take two years of foreign language in high school may still qualify for admission. Such students will be required to take two semesters of foreign language at the University of Nebraska. These students are still required to complete 16 units of academic courses for admission.

   f. Additional Academic Requirements - 1 unit

      For UNK and UNO, unit can be chosen from any academic discipline.

      For UNL, must be a Mathematics unit that builds on a knowledge of algebra. It is not required that all students take a trigonometry or pre-calculus course for their fourth unit of mathematics. Other mathematics courses that build on two years of algebra (courses in statistics or discrete mathematics for example) may be taken to satisfy this requirement.

   g. Total Units - 16 total units required - A unit is a Carnegie Unit, comprising high school study for a period of one year. Equivalent requirements or competencies may be substituted, with the approval of the appropriate University campus.

3. Performance Requirements

   In addition to meeting the above core course requirements, students seeking admission to UNK, UNL or UNO~~the University on any campus~~ shall:

   a. Be ranked in the 50th percentile or higher of their graduating class in an accredited high school; or

b. Have received an ACT composite score of 20 (enhanced) or greater, or its SAT equivalent as determined by the Executive Vice President and Provost; or

c. Have earned a minimum of 3.00 cumulative high school GPA at the conclusion of their sixth semester of high school or later.

4. Admission of Students

Students seeking admission to any campus of the University will have their academic records reviewed. These reviews will result in one of the following decisions:

a. Assured Admission of Students. High school graduates who meet the above criteria (successful completion of the 16 units of core courses and satisfaction of the performance requirement) will be assured of admission as an undergraduate to UNL, UNO, or UNK.

High School graduates, or students who have completed their General Education Diploma (GED), who also have submitted ACT, SAT, Accuplacer, or ASSET scores, will be assured admission to the Nebraska College of Technical Agriculture (NCTA). Direct enrollment to college-level courses at NCTA will depend upon an assessment of student academic preparedness.

b. Admission of Students on the Basis of Special Merit. Applicants who do not qualify for assured admission by meeting all entrance criteria will automatically be considered for full admission to the University on the basis of special merit. The process by which these students are considered and admitted to a given campus is the responsibility of that particular campus. However, each campus will assure that the process will make provisions for a variety of circumstances, including allowance for the special consideration to be given to: non-traditional students; returning adult students; students educated at home schools; students who do not meet the required performance criteria but who have performed at a high level of accomplishment towards the conclusion of their high school careers ~~(sometimes called "late bloomers")~~; students who can provide evidence of special talents, such as outstanding musical performers; those with unique educational experience or career achievements; students from low socioeconomic backgrounds; first-generation college students; students graduating from high schools who have not historically sent a significant number of students to four-year institutions of higher education; and students who have meaningful experience gained from working with individuals from diverse backgrounds~~, etc~~. Such students will be encouraged to provide evidence of their ability to do university level work. ~~In addition, special consideration will be given to members of under-represented groups who present evidence of being able to succeed. Such applications will be considered by University admissions personnel of the cognizant campus following policies and procedures established by the appropriate faculty committees.~~ It must be emphasized that students once admitted through this process will be considered fully admitted and will not be considered by the University to have a provisional status. However, some students may be admitted with requirements ~~have~~to complete specific ~~University~~ courses and use academic support and student success programming to compensate for having not completed all of the required core courses, performance requirements or equivalent educational attainments. It is anticipated that no more than 25 percent of the first-time traditional freshman students would be admitted on the basis of special merit ~~in this way~~.

c. Admission of Transfer Students. Students who transfer to the University of Nebraska with 24 or more credit hours of transferrable coursework will not be ~~expected~~required to have met the core course requirements, either in high school or in their previous postsecondary studies~~, unless exempted by the campus~~. ~~Those who do not fully meet these requirements may still qualify for admission on the basis of special merit.~~ Each

campus will determine how deficiencies in the prior record of these students will be ~~made up~~satisfied.

d. Deferred Admissions. Some students may need additional preparation prior to attending the University of Nebraska. These students will have their admission deferred and will be encouraged to attend another postsecondary institution, such as NCTA or a community college, in order to deal with deficiencies identified in their prior academic preparation.

Reference: BRUN, Minutes, 58, pp. 12-15 (January 16, 1993).
BRUN, Minutes, 74, p. 32 (September 16, 2016).

TO:	The Board of Regents	Addendum IX-A-3
	Academic Affairs	
MEETING DATE:	February 7, 2020	
SUBJECT:	Amend RP-5.8.5 of the *Policies of the Board of Regents* (the "*Policies*") related to undergraduate Regents Scholarships	
RECOMMENDED ACTION:	Approve the amendments to RP-5.8.5 (attached) of the *Policies of the Board of Regents* (the "*Policies*") related to undergraduate Regents Scholarships	
PREVIOUS ACTION:	January 18, 2003 – The Board approved the policy on Criteria for Renewal of Undergraduate Regents Scholarships.	
EXPLANATION:	The proposed amendments are designed to modernize the *Policies* in three areas:	

1) Expected Credit Hour Completion. The University of Nebraska is committed to encouraging full time undergraduate students to complete their studies within four years. Given the typical 120 credit hour degree, progress towards graduation within four years is accomplished by taking at least 30 credit hours each academic year. Regents Scholars now would be expected to successfully complete 30 credit hours per academic year and at least 12 credit hours each fall and spring semester.

2) Maximum Credit Hours for Award. On September 9, 2011, the Board of Regents mandated (RP-5.1.4) that all undergraduate degree programs be capped at 120 credit hours—exceptions had to be approved by the Provost, or in certain cases, the Board of Regents. Regents Scholarship recipients who would have been impacted by this change have since graduated or are no longer covered by the program. Tuition remission now will be capped at the number of credits required by the student's degree program (typically 120 credit hours but higher for a few select majors). This proposal would lower the maximum credit hour award from 135 hours.

3) Transferability. The University of Nebraska encourages students to find a campus that best meets their needs. As such, Regents Scholarships may be transferred between campuses as long as students meet specific renewal criteria. This proposal allows a one-time transfer between two campuses.

These revisions have been reviewed by the Academic Affairs Committee.

SPONSOR:	Susan M. Fritz Executive Vice President and Provost

RECOMMENDED: 

Walter E. Carter, President
University of Nebraska

DATE: January 10, 2020

Amendment to the *Policies* of the Board of Regents of the University of Nebraska:

RP-5.8.5 Undergraduate Regents Scholarships *

1. Criteria for Renewal

   a. Regents Scholarships may be awarded as one-year scholarships or as multi-year renewable scholarships.

   b. Multi-year Regents Scholarships will be renewed for those full time students ~~(~~successfully completing ~~12~~30 credit hours or more per academic year and no less than 12 credit hours ~~in~~during each ~~of~~ fall and spring semester~~s~~, including nine or more hours graded on the regular A+ through F scale ~~[~~(i.e. not counting P/NP or P/F~~]~~) who:

      EITHER

      1) Have maintained a cumulative GPA that meets or exceeds a GPA chosen by their campus (in the range of 3.25 - 3.5)

      OR

      2) Have a percentile rank in their College that is at or above the equivalent campus-wide percentile rank derived from the campus GPA referred to in 1) above. (This rank is expected to be in the range of 70th to 75th percentile.)

   c. Students ~~who receive~~receiving Regents ~~s~~Scholarships, who continue to meet all eligibility requirements, will ~~receive~~be awarded tuition remission for ~~a total of 135 hours of classes, or for a period of five years, or until receipt of a bachelor's degree, whichever comes first~~the minimum number of credit hours required to attain their baccalaureate degree, as such number is determined by RP-5.1.4 (usually 120 hours). No such remission assistance shall be provided to the student in excess of five academic years.

   d. Each campus will have a process that will allow students to justify reduced credit hour attainment and/or appeal a decision not to renew their Regents Scholarship. A campus may permit a student who loses a Regents Scholarship to petition to reacquire it once, on the occasion when their cumulative GPA has risen to the level required for renewal for current scholarship holders.

2. Transfer of Regents Scholarships between Campuses

   a. The recipient must use the award at the original awarding campus for the first academic year.

   ~~b.~~ 1) To qualify for an award transfer when the same major (degree objective) is available on both the original and transfer campuses, ~~T~~the recipient must meet the initial award criteria of the campus to which they are transferring and the criteria for continuation of ~~the~~their award at the original awarding campus ~~to qualify for transferring the award~~.

2) To qualify for an award transfer when the discipline (degree objective) sought by the recipient is not available at the original awarding campus, the student need only meet the renewal criteria of the original awarding campus.

~~c.~~ ~~The discipline (degree objective) sought by the recipient must not be available at the original awarding campus.~~

~~d~~b. An award can transfer only one time ~~and only for one academic year~~. The amount that can transfer is the lesser of:

1) An amount equal to the dollar level based on credit hours the recipient completed the preceding academic year (two semesters) calculated at the tuition rate of the original awarding campus for the new academic year.

OR

2) An amount equal to the dollar level based on the number of hours required to attain ~~the 135 hour~~ a bachelor degree pursuant to RP-5.1.4 (usually 120 credit hours)~~maximum~~ calculated at the tuition rate of the original awarding campus for the new academic year.

~~e~~c. The original awarding campus must approve and transfer award funds to the new campus. The new campus may choose to supplement a transfer award up to full tuition, unless the full tuition is less at the new campus.

~~f~~d. The recipient of a transfer award must meet eligibility requirements of the new campus to continue the award for a subsequent academic year. The new campus is responsible for these subsequent-award remissions.

~~g~~e. Specific cases of hardship or exception to these transfer policies will be considered on an individual basis by the appropriate campus officers.

* Professional and Graduate Regents Scholarships will be determined by each campus.

Reference: BRUN, Minutes, 64, p. 87 (January 18, 2003).

TO:	The Board of Regents	Addendum IX-B-1
	Audit, Risk and Compliance Committee	
MEETING DATE:	February 7, 2020	
SUBJECT:	Financial Statements and related Auditors' Report for the University of Nebraska	
RECOMMENDED ACTION:	Accept the audited financial statements of the University of Nebraska and related entities	
PREVIOUS ACTION:	January 25, 2019 - The Board of Regents accepted the audited financial statements of the University of Nebraska for the year ended June 30, 2018.	
EXPLANATION:	This item seeks acceptance of the following audited financial statements of the University of Nebraska and related entities for the year ended June 30, 2019: Basic Financial Statements Master Trust Indenture University Technology Development Corporation University of Nebraska Facilities Corporation Nebraska Utilities Corporation Schedule of Expenditures of Federal Awards These reports can be accessed at the following link: https://nebraska.edu/offices-policies/business-finance/accounting-finance These financial statements come to the Board with the approval of the Audit Committee.	
SPONSORS:	Chris J. Kabourek Vice President | CFO Walter E. Carter, President University of Nebraska	
RECOMMENDED:	Paul Kenney, Chair Audit, Risk and Compliance Committee	
DATE:	February 6, 2020	

TO:	The Board of Regents	Addendum IX-B-2
	Business Affairs	
MEETING DATE:	February 7, 2020	
SUBJECT:	Amendments to Audit, Risk, and Compliance Committee Charter	
RECOMMENDED ACTION:	Approve amendments to the Audit, Risk, and Compliance Committee Charter	
PREVIOUS ACTION:	March 29, 2019 – The Board of Regents approved an amendment to the Audit, Risk, and Compliance Committee Charter.	
EXPLANATION:	In 2003, the Board of Regents reinstituted its Audit Committee. This action demonstrated the clear commitment of the Board to support constantly improving business practices, policies and reporting structures, bolster accountability, foster intra-University coordination and cooperation, and provide appropriate oversight for an institution with the scope and reach of the University of Nebraska. One of the first acts of the Audit Committee was to develop a charter. This action, if approved, amends the charter, a copy of which is attached to clarify the Committee's responsibility for oversight of internal control, risk, compliance and standards of conduct. The modifications remove dispute resolution language which is more appropriate to the engagement letter and inserts new language from the model Committee charter developed by the Institute of Internal Auditors (IIA). Through incorporating these changes, which are in alignment with *International Professional Practices Framework* by the IIA, the Committee will gain additional assurances in discharging its oversight role and in making the University more efficient and effective through a strengthened, independent internal audit function. This change in the charter comes to the Board with the recommendation and approval of the Audit, Risk, and Compliance Committee.	
PROJECT COST:	None	
SOURCE OF FUNDS:	Not applicable	
RECOMMENDED:	Paul Kenney, Chairperson Audit, Risk, and Compliance Committee	
DATE:	February 6, 2020	

CHARTER OF THE AUDIT, RISK AND COMPLIANCE COMMITTEE OF THE UNIVERSITY OF NEBRASKA

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Purposes of the Audit, Risk and Compliance Committee

The purposes of the Audit, Risk and Compliance Committee (the "Committee") are to provide advice and guidance to~~assist~~ the Board of Regents regarding~~with~~ the oversight of (i) the integrity of the University of Nebraska's (the "University") financial statements, (ii) the University's compliance with laws and regulations (iii) the independent auditors' qualifications and independence, (iv) the performance of the University's internal audit function, (v) the accounting and financial reporting processes of the University ~~and audits of the University's financial statements~~ (vi) the University's Risk Management process, including fraud risk management (vii) the code of conduct, (viii) the governance structure and, (ix~~viii~~) the internal control processes. The function of the Committee is oversight.

The management of the University is responsible for the preparation, presentation, and integrity of the University's financial statements. Management is responsible for maintaining appropriate accounting and financial reporting principles and policies, a code of conduct and internal controls and procedures that provide compliance with accounting standards and applicable laws and regulations. Management is also responsible for developing a fraud risk management program.

The independent auditors for the University are accountable to the Board of Regents and shall provide the Committee all communications required by generally accepted auditing standards; however, the Committee has the sole authority and responsibility to retain and terminate the University's independent auditors.

Duties and Responsibilities of the ~~Audit~~ Committee

The following are the duties and responsibilities of the Committee:

Independent Auditors

1. The sole authority to appoint, compensate, retain, oversee and terminate all independent auditors.

2. The sole authority to pre-approve all terms of and fees for audit services, audit-related services, tax services, and other services to be performed for the University by any independent auditors.

3. Ensure that the independent auditors prepare and deliver with each engagement letter a written statement (an "Auditors' Statement") describing: the independent auditors' internal quality-control procedures; any material issues raised by the most recent internal quality-control review or peer review of the independent auditors, or by any inquiry or investigation by governmental or professional authorities, within the preceding five years, respecting one or more independent audits carried out by the independent auditors, and any steps taken to deal with any such issues; and (to assess the independent auditors' independence) all relationships between the independent auditors and the University, including each non-audit service provided to the University. The Committee shall discuss with the independent auditors any relationships or services disclosed in the independent Auditors' Statement that may impact the quality of independent audit services or the objectivity and independence of the University's independent auditors.

4. Review the independent auditors' of the University-wide financial statements audit plan prior to the commencement of the audit and discuss audit scope, staffing, locations, reliance upon management, and internal audit and general audit approach.

5. Review and evaluate the qualifications, performance, and independence of the independent auditors, including an evaluation of the lead partner of the independent auditors and an evaluation of whether the independent auditors' quality controls are adequate and whether the provision of permitted non-audit services is compatible with maintaining the auditors' independence. The Committee's evaluation of the independence of the independent auditors shall be made with respect to applicable standards of independence set forth in any applicable laws, regulations, or financing standards. The Committee shall consider the opinions of management and Internal Audit and Advisory Services in its evaluation.

6. Ensure the appropriate rotation of the lead (or coordinating) audit partner having primary responsibility for the audit and the audit partner responsible for reviewing the audit. Consider, whether, in order to assure continuing auditor independence, there should be a change of the audit firm itself.

7. Receive and act upon any report from the independent auditors regarding internal control deficiencies and any response from management thereto.

8. Approve any non-audit services by any independent auditors.

~~*Dispute Resolution*~~

~~Any dispute or claim arising out of or relating to audit services provided hereunder, or any other audit or attest services provided by or on behalf of the Auditor or any of its subcontractors or agents to the University or at their request, shall be submitted first to non-binding mediation (unless either party elects to forego mediation by initiating a written request for arbitration) and if mediation is not successful within 90 days after the issuance by one of the parties of a request for mediation then to binding arbitration in accordance with the Rules for Non-Administered Arbitration of the International Institute for Conflict Prevention and Resolution then in effect ("CPR Arbitration Rules"). Any issue concerning the extent to which any dispute is subject to arbitration, or any dispute concerning the applicability, interpretation, or enforcement of these dispute resolution procedures) including any contention that all or part of these procedures is invalid or unenforceable, shall be governed by the Federal Arbitration Act and resolved by the arbitrators. By operation of this provision, the parties agree to forego litigation over such disputes in any court of competent jurisdiction.~~

~~Mediation, if selected, may take place at a location to be designated by the parties using Mediation Procedures of the International Institute for Conflict Prevention and Resolution, with the exception of paragraph 2 (Selecting the Mediator). All mediation and arbitration shall take place in Lincoln, Nebraska. The arbitration panel shall have no power to award non-monetary or equitable relief of any sort except as provided in CPR Rule 13 (Interim Measures of Protection). Damages that are inconsistent with any applicable agreement between the parties, that are punitive in nature, or that are not measured by the prevailing party's actual damages shall be unavailable in arbitration or any other forum. In no event, even if any other portion of these provisions is held to be invalid or unenforceable, shall the arbitration panel have power to make an award or impose a remedy that could not be made or imposed by a court deciding the matter in the same jurisdiction.~~

~~Either party may seek to enforce any written agreement reached by the parties during mediation, or to confirm and enforce any final award entered in arbitration, in any court of competent jurisdiction. Notwithstanding the agreement to such procedures, either party may seek equitable relief to enforce its rights in any court of competent jurisdiction.~~

Internal Audit and Advisory Services

The Director of Internal Audit and Advisory Services (CAE) shall report administratively to the President and functionally to the Audit, Risk and Compliance Committee of the Board of Regents. All Internal Audit and Advisory Services (IAAS) staff shall report to the

CAE. The CAE is responsible for hiring, evaluating, promoting and determining the salary of all IAAS staff. The CAE shall inform the Chair of the Committee of any position changes. The President of the University shall appoint, evaluate, promote, change the pay or duties or dismiss the CAE with the approval of the Committee Chairperson.

9. Review and approve the University internal audit function, including the Internal Audit Charter and the proposed annual Audit Plan. The CAE shall develop an Annual Report, including an ~~single~~ Audit Plan, for the University as a whole.

10. Annually the Audit Committee Chairperson shall review the performance and compensation of the CAE with the President.

11. Review the budget, any changes in plan, performance relative to the Audit Plan, or organizational structure, and qualifications of the University internal audit function, as needed. The Committee should also consider internal audit's conformance to professional standards.

~~11.~~12. Ensure that IAAS has an external quality assurance review every five years and review the results thereof.

~~12.~~13. Understand the review of internal controls and significant reports prepared by Internal Audit together with management's response and follow-up to these reports.

Financial Reporting Principles and Policies; Internal Audit Controls and Procedures

~~13.~~14. Advise management, the University internal audit function and the independent auditors that they are expected to provide to the Committee a timely analysis of significant financial reporting issues and practices.

~~14.~~15. Meet separately and on a periodic basis with management, the CAE and the independent auditors.

~~15.~~16. Meet with management, the independent auditors, and, if appropriate, the CAE to do the following:

a. Discuss the scope of the annual audit;

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b. Discuss any significant matters arising from any audit, including any audit problems or difficulties, and execution of response to audit findings;

c. Discuss any audit problems or difficulties the independent auditors encountered in the course of the audit, including any restriction on their activities or access to requested information and any significant disagreements with management, and management's responses thereto;

d. Review the form of opinion the independent auditors propose to render to the Board of Regents;

e. Discuss, as appropriate, any major issues regarding accounting principles and financial statement presentations, including any significant changes in the University's selection or application of accounting principles, and major issues as to the adequacy of the University's internal controls and any special audit steps adopted in light of material control deficiencies;

f. Discuss and consider the integrity of the University's financial reporting guidelines, policies, and controls governing the process by which management and the relevant departments of the University assess and manage the University's financial reporting preparation.

g. Discuss the University's major risk exposures and the steps management has taken to monitor, control, and report such exposures.

h. Review significant findings prepared by the independent auditors and the University's internal audit functions together with management's responses thereto.

~~16.~~17. Review management's analysis of significant financial reporting issues and practices prior to the issuance of the financial statements.

18. Consider the effectiveness of the University's internal control system, including information technology security and control.

~~17.~~

Compliance Oversight

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~~18.~~19. Assist the Board of Regents with oversight of the University's compliance with laws and regulations. This includes requiring management to inform the Committee regarding the system(s) for monitoring compliance with laws and regulations and the results of any significant investigations.

~~19.~~20. Obtain regular updates from management and the General Counsel regarding compliance matters.

~~20.~~21. Establish procedures for the receipt, retention, and treatment of complaints received by the University regarding fraud, accounting, internal accounting controls, or auditing matters, and the confidential, anonymous submission by University employees of concerns regarding questionable accounting or auditing matter.

22. Review ~~the~~ Management's process for communicating the legal and ethical standards of conduct to the University's personnel and for monitoring compliance therewith.

~~21.~~

Reporting and Recommendations

23. Review and reassess the adequacy of the Committee's charter as necessary.

~~22.~~24. The CAE will collaborate with the Chairperson to establish a work plan to ensure that the responsibilities of the Committee are scheduled and will be carried out.

~~23.~~25. Prepare and report to the Board of Regents (i) with respect to such matters as are relevant to the Committee's discharge of its responsibilities, and (ii) with respect to such recommendations as the Committee may deem appropriate. The report to the Board of Regents may take the form of an oral report by the chairperson of the Committee or any other member of this Committee designated by the Committee to make this report.

Meetings

The Committee shall meet no less frequently than once each fiscal quarter to discuss with management the annual audited financial statements and quarterly financial statements, as applicable. Meeting agendas will be prepared and provided in advance to members, along with appropriate briefing materials. The Committee should meet separately periodically with management, the CAE and the independent auditors to discuss any

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matters that the Committee or any of these persons or firms believe should be discussed privately. The Committee may request any officer or employee of the University, of the University's General Counsel's Office or independent auditors to attend a meeting of the Committee or to meet with any members of, or consultants to, the Committee. Members of the Committee may participate in a meeting of the Committee by means of conference call or similar communications equipment by means of which all persons participating in the meeting can hear each other. The Committee shall maintain minutes of meetings of the Committee.

Quorum

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The quorum for the audit committee will be a majority (3) of the members (5).

Resources and Authority of the Audit Committee

The Committee shall have the resources and authority appropriate to discharge its duties and responsibilities, including the authority to select, retain, terminate, and approve the fees and other retention terms of special or independent counsel, accountants or other experts, as it deems appropriate. The Committee may be vested with other specific powers and authority by resolution of the Board of Regents. The University shall provide for appropriate funding, as determined by the Committee, for payment of (i) compensation to the independent auditors for the purpose of rendering or issuing an audit report, (ii) compensation to any advisors employed by the Committee, and (iii) ordinary administrative expenses that are necessary or appropriate for carrying out the duties of the Committee.

Performance Self-Evaluation

~~24.~~26. The Committee may perform a review and evaluation, as necessary, of the performance of the Committee. The Committee shall conduct such evaluations and review in such manner as it deems appropriate.

27. Annually confirm to the Board that all responsibilities outlined in the Committee Charter have been carried out.

~~25.~~

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Risk Assessment

28. The Committee shall receive, at least annually, at a meeting of the Committee, from the President and Chancellors, the University and campus risk assessments, respectively. The Committee may also request reports from

management addressing the risk ~~–~~issues identified (including fraud), as necessary.

~~26.~~

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Financial Expert

~~27.~~29. The method of designating elected Regents to the Audit Committee may not always result in there being a "financial expert", as defined by Sarbanes-Oxley, on the Committee. As a result, the Committee may by a majority vote appoint a financial expert. This person will:

a. Be in the judgment of the Committee independent of the University;
b. Be willing to serve on a voluntary basis (with only expenses paid on the same basis as the Board of Regents) for an initial term through December 31, of the year in which such person was appointed, with a maximum of two additional terms of two years, as an ex-officio, non-voting member and participate in Committee affairs;
c. Receive all information that goes to the Committee and have access to information and personnel similar to other members of the Committee;
d. Once appointed, serve the full term. They may only be removed by expiration of their term, absence from more than two meetings in a calendar year, a majority vote of the Board of Regents or voluntary resignation;
e. Offer advice and counsel to the Committee to fulfill the financial expert attributes;
f. Sign and abide by a confidentiality, non-disclosure agreement, approved by the General Counsel regarding information received in these efforts; and
g. Meet the five financial expert attributes designated by Sarbanes-Oxley:
    1. An understanding of GAAP, Government Auditing Standards and financial statements;
    2. The ability to assess the general application of such principles in connection with the accounting for estimates, accruals and reserves;
    3. Experience preparing, auditing, analyzing or evaluating financial statements that present a breadth and level of complexity of accounting issues which are comparable to the University's financial statements;
    4. An understanding of internal controls and the procedures for financial reporting; and
    5. An understanding of committee functions.

Disclosure of Charter

This Charter shall be made available on the University's website.

Amendment

Any amendment or other modifications of this charter shall be made and approved by the Board of Regents.

Adopted April 24, 2009
Revised December 2, 2010
Revised March 2, 2012
Revised July 18, 2013
Revised April 10, 2015
Revised June 1, 2017
Revised March 29, 2019
Proposed for February 6, 2020

X. UNIVERSITY ADMINISTRATIVE AGENDA

A. ACADEMIC AFFAIRS

University of Nebraska at Kearney

1. Approval is requested to create a Master of Arts in Public Communication in the Department of Communication in the College of Arts and Sciences at the University of Nebraska at Kearney Addendum X-A-1

University of Nebraska-Lincoln

2. Approval is requested to establish the Nebraska Governance and Technology Center to be primarily housed in the College of Law, but with initial partnerships in the College of Business and College of Engineering at the University of Nebraska-Lincoln Addendum X-A-2

University of Nebraska Medical Center

3. Approval is requested to create a departmental structure in the College of Allied Health Professions at UNMC to include the creation of three departments and the renaming of one existing department Addendum X-A-3

University of Nebraska

4. Approve the award of Honorary Degrees and Awards [Please note: this item may be voted on after the Closed Session] Addendum X-A-4

B. BUSINESS AFFAIRS

University of Nebraska at Kearney

1. Approve an Agreement with Enrollment Advisory Group, LLC for International Student Recruitment Addendum X-B-1

University of Nebraska-Lincoln

2. Approve the Intermediate Design with Scope Change and Budget Increase for Outdoor Track Replacement at UNL Addendum X-B-2

University of Nebraska

3. Approve the Program Statement for the renovation of Nebraska Hall on the UNL campus to house the Enterprise Technology Services and Data Solutions team Addendum X-B-3

4. Approve agreements with DataVizion LLC and GovConnection Inc. to provide equipment and related services for campus backbone and data center network solutions Addendum X-B-4

TO:	The Board of Regents	Addendum X-A-1
	Academic Affairs	
MEETING DATE:	February 7, 2020	
SUBJECT:	Creation of a Master of Arts (MA) in Public Communication in the Department of Communication in the College of Arts and Sciences at the University of Nebraska at Kearney (UNK)	
RECOMMENDED ACTION:	Approval is requested to create a Master of Arts in Public Communication in the Department of Communication in the College of Arts and Sciences at UNK	
PREVIOUS ACTION:	None	
EXPLANATION:	The proposed Master of Arts (MA) in Public Communication is designed to prepare students to take specialized knowledge (in areas such as healthcare, political science, agriculture, etc.), synthesize complex topics, and persuade target audiences using modern mass media and public relations strategies. Communicating expert knowledge to broader audiences is a vital part of most outreach and public service programs. The degree will be offered entirely online to serve students who are employed and/or place-bound; it primarily will be designed to serve professionals who are looking to advance in their careers. Students may opt to complete a practicum or write a thesis. These options will allow them to tailor the degree to their own professional/academic goals. The program prepares students to learn how to lead outreach programs within their chosen disciplines, yet offers the flexibility to prepare students for a Ph.D. program. This proposal has been approved by the Council of Academic Officers and the Executive Graduate Council. This proposal also has been reviewed by the Academic Affairs Committee.	
PROGRAM COST:	$17,000 for Year 1; $85,000 over five years	
SOURCE OF FUNDS:	Tuition and fees	
SPONSORS:	Charles Bicak Senior Vice Chancellor for Academic and Student Affairs Douglas Kristensen, Chancellor University of Nebraska at Kearney	
RECOMMENDED:	/s/ Susan M. Fritz Executive Vice President and Provost	
DATE:	January 10, 2020	

Public Communication

Master of Arts Degree (M.A.)
University of Nebraska at Kearney

Submitted by: Drs. Ralph Hanson, Richard Mocarski, Nanette Hogg and Chuck Rowling

Descriptive Information:

Name of institution proposing the program: University of Nebraska at Kearney
Name of master's degree proposed: Public Communication
Degree to be offered graduates of the program: Master of Arts Degree
Other programs offered in the field at UNK:

- Organizational and Relational
- Communication Comprehensive – BS
- Sports Communication – BA
- Sports Communication – BS
- Minor in Professional Communication
- Advertising and Public Relations – BA
- Advertising and Public Relations - BS
- Minor in Advertising and Public Relations

Administrative units for the program: Department of Communication
Proposed delivery site: Online program through University of Nebraska at Kearney
Proposed date of initiation: Upon final approval by CCPE
Date approved by governing board: Pending
Additional faculty/resources necessary to initiate program: None
New coursework needed to initiate program: All courses have already been approved
CIP Code: 09.0499

Description and Purpose of the Proposed Program

Public Communication is communication with a goal and specific audience in mind. To be an effective public communication practitioner, one must be able to translate domain-specific knowledge into lay-terms and to package information into persuasive discourse. In other words, the study of Public Communication is interested in understanding how to translate information from jargon specific terms to lay terms. The program spans the breadth of communication as a field, equipping students with techniques from public relations, theory from communication studies, an understanding of audience and publics from rhetorical studies, the use and impact of media from journalism and media studies, and more.

The proposed Master of Arts in Public Communication is designed to prepare students to translate domain-specific knowledge for lay and targeted audiences and to reach the intended audiences effectively in the most impactful and efficient ways possible. Students will learn how to take specialized knowledge (health, political science, etc.) and communicate that knowledge to larger publics. Communicating expert knowledge to broader audiences is a vital part of most outreach and public service programs. Students will learn how to utilize mass media and public relations strategies to synthesize and persuade publics about knowledge in their particular area of specialization. They also will learn how to become critically engaged and process mass media messages.

As the world becomes both more complex and more integrated, there is greater need for professionals who understand how to wield communication tools to reach desired audiences and, essentially, translate jargon-laden messages for greatest impact. The need for this type of skill set is best illustrated by looking toward the rise of health communication, political communication, and science communication. In these domains, it is imperative that there are professionals who have domain-specific knowledge and skills. This program will help create stronger organizations through individuals gaining the skills to better carry out their jobs and enhance their careers.

Many current Master of Arts programs throughout the country focus solely on Strategic Communication skills. We believe that these programs produce professionals who will always see end goals in terms divorced from the content they represent, often homogenizing messages. Our vision for Public Communication is to work with content experts so that they can craft nuanced and detailed messaging in an effective manner.

This Master in Public Communication will primarily be designed to serve professionals who are looking to advance in their careers. Presumably these kinds of students will come to the program with some level of professional experience and expertise. The program will be designed to help students learn how to utilize what they know from their corner of the world and to engage the public. The program will do this by requiring students to take core classes that will familiarize students with foundational concepts of communication theory and research. Students will build on this foundational knowledge by choosing classes that relate to their area of expertise. Finally, students will take classes focused on building specific skills for translating expertise to the public.

Students will have two degree completion options. They may opt to complete a practicum or write a thesis. These options will allow students to tailor the degree to their own professional/academic goals. The program prepares students to learn how to lead outreach programs within their chosen discipline yet offers the flexibility to prepare students for a Ph.D. program.

The Master of Public Communication will be offered entirely online. This will serve students who are currently working in a career or are place-bound. The Communication Department at UNK has an extensive record of offering online courses. Additionally, the Communication Department at UNK has the faculty to offer this program. Minimal resources will be required to get the program started.

Proposed Curriculum

Students will gain experience working with various field specific tools and apply these, along with their other knowledge, to their practicum experience or thesis. The curriculum is situated in such a way as to ensure students will have a grounding in theory, method, and media literacy as well as specialized knowledge in one or more content areas.

Students will have the option to complete their degree with a practicum or thesis. The core and course categories are the same across all options. All students will take the following courses:

Core & Media Literacy (3 required courses)

SPCH 899P: Communication Theory
JMC 860P: Mass Media and Society

Choice of *one* research methods course:
*SPCH 883: Qualitative Research Methods
*SPCH 881: Quantitative Research Methods

Specialization (choose 2 courses)

*JMC 831: Critical Approaches to Media
*SPCH 804: Health Communication
*SPCH 841: Science Communication
*SPCH 826: Social Movements and International Media
SPCH 852P: Advanced Organizational Communication
PSCI 884P: Media and Public Policy
SPCH 845P: Diffusions of Innovations
HIST 848: Readings in American History (special topics class must have consent of adviser)
*JMC 835: International Media and Society
PSCI 883: Political Communication

Skills (choose 2 courses)

*JMC 801: Social and Emerging Media
*SPCH 803: Strategic Communication
SPCH 851P: Leadership Communication
*JMC 802: Media Technology and Narrative
MGT 820: Management and Communication
PSCI 865: Campaigns and Elections
SPCH 855P: Communication Training and Consulting

Elective – Student will choose 3 additional courses in the curriculum

In addition to the required curriculum, students will choose one of the following options to complete the degree.

1. *Practicum Option*
    a. Students will enroll in 6 credits of SPCH 875: Practicum (Prerequisite of SPCH 899P and SPCH 883 or SPCH 881)
    b. Students will connect their graduate curriculum to professional experience in an effort to demonstrate an ability to apply coursework within an organization. Students will develop a completion paper that explains accomplishments in the practicum experience and connects these accomplishments to the graduate curriculum. Students will present their practicum findings to faculty.

2. *Thesis Option*
    a. Students will enroll in 6 credit hours of SPCH 876: Thesis (Prerequisite of SPCH 899P and SPCH 883 or SPCH 881**)**
    b. In conjunction with their adviser, students will prepare a research project based on graduate coursework. The student's adviser and two additional graduate faculty

will comprise the student's Thesis Committee. The committee will assemble for an oral defense of the thesis.

Admission Criteria

Admission to the Public Communication MA program is based on undergraduate GPA, resume, letter of intent, and letters of recommendation. An applicant interested in pursuing an MA in Public Communication should:

1. Meet the requirements for admission set forth by the Office of Graduate Studies
2. Submit official college/university transcript showing the conferment of a Bachelor's degree with an overall GPA of 2.75* or higher on a 4.0 GPA scale
3. Submit two letters of recommendation
4. Submit a letter of intent that describes the applicant's interests and goals in obtaining a degree in Public Communications
5. Submit a professional resume

*Students with an undergraduate GPA lower than 2.75 may still be considered for the program based on their other strengths. These students will be conditionally admitted for the first semester and must achieve a 3.0 GPA to be fully admitted to the program. Conditional approval will be considered for students who have especially strong work history, letters of recommendation, and/or students whose undergraduate GPA in the major is markedly higher than their overall GPA.

International students will be required to meet the minimum TOEFL score of 213 on the computerized test and 550 on the paper test.

Plan for Degree Completion

Students will be admitted to the program three times a year: Fall, Spring, and Summer terms. The Public Communication program is thirty-six (36) credit hours and can be completed in two (2) years. The final six (6) hours of the program will be completed either through practicum or thesis hours. Students must complete 21 hours to take SPCH 875 and SPCH 876 and have passed SPCH 899P and SPCH 883 or SPCH 881.

Courses will be offered strategically depending on student need. As the program grows for the first few years, these strategic offerings will maximize the number of students taking a single course which will allow for fewer courses to be offered at any one time. A tentative course rotation is below.

	Core & Media Literacy	Specialization	Skills
Fall Year 1	SPCH 883 (Quant) & JMC 831 (Crit Media)		SPCH 803 (Strat Comm)
Spring Year 1	SPCH 899 (Com Thry)	SPCH 852 (Ad Org C	SPCH 851 (Lead Comm)
Summer Year 1		SPCH 804 (Health Com)	SPCH 855 (Com Train)
Fall Year 2	SPCH 881 (Qual) & JMC 860 (MM&Soc)	JMC 801 (Social M)	JMC 802 (Media Tech)
Spring Year 2	SPCH 899 (Comm T) & JMC 835 (Int. Media)	SPCH 852 or SPCH 845 (Diffusion)	SPCH 851 (Lead Comm)
Summer Year 2		SPCH 841 (Sci Comm)	PSCI 883 (Pol Comm)
Fall Year 3	SPCH 883 (Quant)	SPCH 826 (Soc Mov.)	SPCH 855 (Com Train)
Spring Year 3	SPCH 899 (Com The)	SPCH 852 (Ad Org C)	SPCH 851 (Lead Comm)
Summer Year 3	JMC 831 (Crit Media)		

Program Policies

All UNK Graduate School policies must be complied within the pursuit of the MA in Public Communication. Additionally:

1. Students must be admitted unconditionally into the program prior to completing more than six (6) hours of the Public Communication coursework.
2. Students must maintain a 3.0 GPA to remain in good standing in the program.
3. Thesis or Practicum hours may not be completed until students have completed 21 hours and have passed SPCH 899P and SPCH 883 or SPCH 881.

Accreditation and Assessment

Assessment metrics already exist for the undergraduate Communication degrees. Assessment data will be gathered in SPCH 875 or SPCH 876. Both the practicum and thesis require a written research paper. Practicum presentations and thesis defenses will be evaluated by faculty and used for assessment purposes as well. The assessment will be conducted by the department's graduate committee formed by three members of the department's graduate faculty. This assessment will be aligned with measuring whether the program is achieving the goals listed below in this section.

The course of study offered by the UNK Public Communication program provides students with the theoretical knowledge, research skills, and practical applicability to conscientiously and competently advance in their career. A study conducted by Burning Glass Technologies in 2015 examined 40,000 position advertisements across a variety of careers, and found that the number one baseline skill that employers search for are communication skills. The UNK Public Communication program will focus on helping students build these skills. The program will achieve this through ensuring that course content (and the structure of the curriculum in general) challenges students to excel in one or more of the goals below.

Goal #1: UNK Public Communication graduates are effective at communicating specialized knowledge to the public. Review Criteria (to be developed later in conjunction with UNK assessment)

Goal #2: UNK Public Communication graduates understand how to critically analyze and improve communication practices both internally and externally in organizations. Review Criteria (to be developed later in conjunction with UNK assessment)

Goal #3: UNK Public Communication graduates are skilled at using the tools of persuasion to achieve organizational goals. Review Criteria (to be developed later in conjunction with UNK assessment)

Goal #4: UNK Public Communication graduates understand how to apply theory to both critically examine organizational communication and make changes that improve the efficiency, effectiveness end ethics of communication within organizational Review Criteria (to be developed later in conjunction with UNK assessment)

Review Criteria

A. Centrality to Role and Mission of the Institution

UNK Mission*: The University of Nebraska at Kearney is a public, residential university committed to be one of the nation's premier undergraduate institutions with excellent graduate education, scholarship, and public service.*

UNK Vision Statement: *The University of Nebraska at Kearney will achieve national distinction for a high quality, multidimensional learning environment, engagement with community and public interests, and preparation of students to lead responsible and productive lives in a democratic, multicultural society.*

The purpose of the Public Communication Master's Program is to meet the demands for communication practitioners who can work with the lay public and the specialty public of their choice to move the conversations in these complex areas forward. As articulated by Bernadette Bensaude-Vincent (2001) in regard to the scientific and medical communities, while "mediator[s] or translator[s]" were once adequate for bridging the gap between the lay public and these disciplines, the 20th and 21st century have continued to expand the gap between publics where now these publics are living "in two different worlds" (p. 108). The increased specialization of fields is evident across all the identified areas of emphases in the proposed program (Health, Science, Politics, Media, Public Relations). This program will equip students with the tools to move beyond mere translation, propelling graduates to be active participants in nuanced conversations between specialist and lay persons.

Additionally, the program in Public Communication fits squarely within the UNK vision as it utilizes a multidimensional learning environment by leveraging scholars from multiple disciplines; requiring students to become versed in theory, method, practice, and tools; and offering students the opportunity to demonstrate their mastery either within the industry of their choosing (through practicum) or through an academic demonstration (e.g. thesis). This program also provides opportunity for engagement with the community and public interests through

community partners during the practicum and the central mission of the program to build knowledge and skill-sets that allow graduates to engage with multiple publics.

B. Evidence of Need and Demand

Need for the Program: The 2018 *Factual Look at Higher Education in Nebraska* provides some relevant information about the demand and growth potential for a distance education graduate program in communication. A few particularly relevant data points are below:

1. Distance education graduate programs have been increasing in popularity. In 2012 33.4% of graduate students were classified as exclusively distance education. In 2016 that percentage had increased to 43.3%. In that same time frame, exclusively distance undergraduate students only increased from 13.6% to 14.1% (2.7).

2. The program would greatly serve Nebraska residents. In 2016, 48.4% of graduate distance education students were in the same state as the institution granting the degree (2.7).
3. Graduate enrollment has been growing. Between 2006-2017, statewide graduate enrollment increased 29.4% while undergraduate enrollment increased 2% (2.2)

4. The kind of students that the Master of Public Communication is targeting (mid-career professionals) is a growing segment of graduate education. Graduate enrollments within the independent sector increased 59.9%from 2007-2017 and part-time graduate enrollments increased 25.6% in that same time period (2.2)

Currently, there are only a few Public Communication Master's programs in the country including Colorado State University (CSU). The program at CSU is a more generalist program akin to our proposal. However, CSU's program is on-campus only and offers a Master of Science. It appears that many of the students are focused on agricultural communication.

This degree also will prepare graduates to pursue and advance in careers that will allow graduates to sustain themselves. According to the National Bureau of Labor Statistics, the average median annual wage for Media and Communication Occupations is $57,530, which is higher than the annual median wage of $38,640. Additionally, The Nebraska Department of Labor, projects growing demand over the next 7 years for jobs that graduates will be prepared for. The following table shows the increase in projected job demand in Nebraska from 2016 – 2026 in relevant jobs.

Career	2016	2026	Increase	%Change
Public Relations Specialist	2,225	2,427	202	9
Human Resources Specialist	4,430	4,896	466	10.5
Training and Development Specialist	2,561	2,935	374	14.6
Advertising and Promotions Manager	87	95	12	9.2
Public Relations and Fundraising Managers	1,019	1,125	106	10.4
Total	**10,322**	**11,478**	**1,160**	

Demand for the Program: The demand for the proposed program exists as employers increasingly privilege communication skills. In a 2014 study generated by Hart Research Associates, 400 employers who belong to organizations with at least 25 employees (at least 25 of those employees have an associate or bachelor's degree) were surveyed. Participants were asked about which learning outcomes were most important to employees. First and third on the list were "The ability to effectively communicate orally" and "The ability to effectively communicate in writing" with 85% and 82% of employers reporting these learning outcomes as "very important" (p. 4). The annual Job Outlook Report conducted for the National Association of Colleges and Employers found that the most important skill/quality that employers were looking for in employees is the "Ability to verbally communicate with persons inside and outside the organization."

Communication skills are important to employers, which in turn means they are imperative to employees. A Master's degree in Public Communication would be attractive to people in the workforce who were looking to make a difference in their organizations. The focus on Public Communication makes the program even more attractive, since it focuses not only on organizational inward facing communication skills, but outward facing skills as well. Included with the proposal are letters of support from area businesses and potential students to qualitatively demonstrate the kind of potential students who will be served by this program.

C. Required Resources

Faculty and Staff Resources: No new faculty positions will be required to offer this program. This proposal has the support of the Dean of the College of Arts and Sciences and the Dean of Graduate Studies. Additionally, it has the support of the Communication Department's graduate faculty. Currently, the Communication Department has eight graduate faculty (Dr. Nanette Hogg, Dr. Ralph Hanson, Dr. Fletcher Ziwoya, Jacob Rosdail, Dr. Richard Mocarski, Dr. Mary Harner, Dr. Akbar Javidi, and Dr. Sonja Bickford). Dr. Tiffani Luethke is a new tenure track assistant professor hire for the 2019/2020 academic year and should obtain graduate faculty status before Fall 2020. The department also has clearance to hire another additional tenure-track communication assistant professor for the 2020/2021 academic year. With these individuals, the department can support the addition of a graduate program with the current faculty and resources. This program will utilize graduate courses already being offered in the Department of Communication and in other departments (Political Science, History, and Management).

The program will require one graduate assistant for the first two years of the program. If numbers warrant, a second graduate assistant will be needed in year three and beyond. Graduate assistants will teach sections of JMC 100 and SPCH 100, thereby releasing faculty to teach graduate courses. The Dean of Graduate Studies will provide a graduate assistant for the first two years. Additional graduate assistants will be funded through the funds generated by the online funding model.

eCampus is a multi-functional unit on the UNK campus that is devoted to providing leadership, services, support, resources, and accessibility in online and blended education at both the undergraduate and graduate level. The eCampus team includes instructional designers, a video specialist, a marketing team, advisers, online coordinators, and communication experts. The instructional designers assist faculty with the design and development of online courses by matching teaching strategies with pedagogy and technology solutions. The marketing team

consults with administration, faculty, and staff to develop and implement strategies for increasing online enrollment, including recruitment plans, social media management, and research. They also are responsible for outreach to prospective and current online students, including lead nurturing, student advising, and monitoring, and analyzing the impact of online programs. The video specialist develops and implements educational classroom technology and video production. eCampus will provide administrative staff in the form of an online coordinator. The online coordinator will assist in processing paperwork and programmatic duties including recruiting, marketing, and technology updates.

Physical Resources: The Public Communication Master's Degree will be an online program. There will be no physical facilities necessary beyond the infrastructure that is already in place.

Instructional Equipment and Informational Resources: The Department of Communication already has a healthy relationship with eCampus. The eCampus team provides instructional design and marketing staff for online programs. There is no need for additional resources beyond an enhanced marketing plan that will be supported using existing eCampus resources.

Budget Predictions for the first five years. The proposed program will require minimal financial commitment. No new faculty lines are needed. A graduate assistant will be provided by the Office of Graduate Studies for the first two years and eCampus will provide an online program coordinator to assist with administrative and advising duties.

Projected revenues and expenses for a more thorough explanation are attached.

D. Avoidance and Unnecessary Duplication

Statewide: There are no other similar programs statewide. Further, we have no interest in duplicating what is already offered within the system since both UNL and UNO already provide highly reputable graduate programs in Communication.

University of Nebraska-Lincoln
UNL offers an MA in *Communication Studies* in two primary areas of study: Interpersonal, Family and Intergroup Communication and Rhetoric and Public Culture. These programs are geared toward understanding how communication works in relationships and how persuasion and ideology function in mass communication. The proposed program is not scoped to overlap with this program.

The *College of Journalism and Mass Communications* offers various graduate programs, but of interest, the *Integrated Media Communications* focuses on advertising and public relations industries. UNL's Integrated Media Communication program is designed to "Sharpen your advertising and Public Relations skills in today's rapidly changing media environment." This program is aimed at advertising and PR professionals, aiming to enhance their skills for these fields. This program is closely related to commercial communication. UNK has long supplied courses for students enrolled in the program with a partnership dating back to 2013. UNK was asked to contribute courses to make up for missing online options at UNL; this is documented in part by a memorandum of understanding dated Feb. 24, 2014. The MA in Public Communication is not targeting Advertising/Public Relation professionals; instead it is targeting experts in diverse fields who may have some of these responsibilities but for whom these are not their primary duties.

Finally, UNL offers an MA in Journalism that aims to "Enhance your professional skills by mastering how to produce and analyze news and information across the latest media platforms." Again, this program is targeting a different audience, journalist, than the MA in Public Communication, which is targeting professionals in a variety of disciplines who have content expertise but need to be able to translate and disseminate this content expertise for a lay audience.

Agricultural Leadership, Education and Communication offers graduate degrees in Leadership Education (MS) and Human Sciences with Specialization in Leadership Studies (Ph.D.). Leadership Education provides academic study and support to people in a variety of disciplines focusing on leadership (leadership studies, training and development, extension education, and postsecondary teaching). The MA in Public Communication will have leadership as part of the curriculum, but leadership is not at its core. Instead, public communication practitioners will leverage leadership techniques to be impactful communicators, but they are communicators first and foremost. They will be critical thinkers and analyzers, as well as translators and communicators. Additionally, the MA in Public Communication does not focus on Agricultural issues.

Lastly, UNL also offers a certificate in Public Relations, which has the same differentiation as described above.

University of Nebraska – Omaha

UNO also offers a well-respected *Communication*, MA program, but the curriculum emphasizes a broad theoretical knowledge of speech and mass communication. This is a fairly traditional graduate program that not only advances students in their careers, but is an excellent preparation for doctoral education. Students can choose from a variety of specializations: convergence journalism, service-learning, instructional communication, conflict mediation, and American Democracy. Public communication is not included in the options. Public Communication students will encounter more skill-based classes and the focus will be broader than the disciplines of the UNO program. The UNO program is also delivered as an on-campus program rather than online, so we are not direct competitors.

The Master of Arts in Public Communication program at the University of Nebraska at Kearney will be distinctly different from what our educational partners offer at UNL and UNO. The focus on Public Communication will set UNK apart from our educational partners. The proposed Public Communication M.A. at UNK will be professionally oriented and aimed at working adults looking to find ways to contribute to organizations they likely already belong to. Our graduates will be equipped to act as translators between their own organizations and publics. We are instead aiming to teach theory to help mid-career professional build and cultivate professional skills to advance in their organizations and to better serve their communities. We are also offering this as a completely online delivered program. The proposed program is distinctly different than the aforementioned programs.

Programs in contiguous states: Colorado State has a Communication Studies graduate program, but it is not available in an entirely online format. The proposed graduate program at UNK will be completely online reaching more students in a comfortable learning environment, accommodating convenience and flexibility that can be used for improved technical skills and career advancement.

E. Consistency with the Comprehensive Statewide Plan for Postsecondary Education

The proposed program is consistent with the Statewide Plan for Postsecondary Education. The program is an attempt to properly leverage the potential of the Department of Communication at UNK in service to the State of Nebraska and its citizens. It has been designed to be efficient and effective. The program takes care to avoid unnecessary duplication of other programs. Additionally, as an online program it will allow students from across the state and beyond to benefit from its existence. Below are specific ways in which the proposed program is consistent with the statewide plan for postsecondary education.

Meet the Educational Needs of the Students: The UNK Public Communication program clearly aligns with the needs of Nebraska students. The online component meets the goal to "ensure that access to higher education institutions' programs and services is not restricted by factors such as geographic location, economic status, age, culture, disability, color, national origin or gender." The program is accessible and does not require residency. It will provide skills that students need in order to advance in their careers and to have impact in their communities. The faculty teaching in the program are well established and have the necessary experience and education to deliver high quality instruction to students of the proposed program.

Meet the Needs of the State: Additionally, the program will meet the needs of the state by providing "graduates with the skills and knowledge needed to succeed as capable employees and responsible citizens." The skills taught in this program are the essential skills that employers need. The letters of support included in this proposal clearly show this. The focus on critical media literacy also empowers students to be responsible citizens. Additionally, the Public Communication Master's Program at UNK clearly meets the goal "Higher education in Nebraska will be effective in meeting the needs of students and the state, will be efficient in its expenditure of the state's resources." The program requires very little additional expenditure of resources since the department already offers many online courses. It will be a self-sufficient program.

Meeting Educational Needs through Partnerships and Collaborations: The program will require a high degree of collaboration given that this is a professional degree. The departments of Marketing, Political Science, and History will offer elective courses for the program. The Department of Communication currently has good relationships with several area businesses where we frequently place interns and graduates. The practicum option will require students to apply what they have learned to an existing organization. Additionally, many of the classes in the curriculum come from other departments on campus which will encourage interdisciplinary collaboration.

Statewide Facilities Plan: The program is offered entirely online, so it will require minimal resources and no additional facilities. Additionally, the Communication Department can support this program with current faculty.

Off-Campus and Graduate Program Plans: Finally, the Comprehensive Statewide Plan for Postsecondary Education states that "off-campus programming, in particular, provides an important educational service to place-bound students within its geographic service area" (7-29). Given that this degree will be offered online, it will fit well into the Nebraska statewide plan for UNK. The statewide plan also explains that new Master's degrees are to be developed "when a definite need exists and UNK has demonstrated the capacity-including fiscal, human and

physical resources-to meet that need" (7-29). This need clearly exists since there is no program that offers this particular degree in an online format.

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CRANE TRUST

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Wood River, NE 68883
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f. 308.384.7209
cranetrust.org

TO: Department of Communication
ATTN: Dr. Mary J. Harner, Dr. Benjamin Myers
MEMO: Public Communication Master's Program

Dear Colleagues,

I am writing in support of the Public Communication Master's Program proposed for the University of Nebraska at Kearney. I recently chaired the *13th Platte River Basin Ecosystem Symposium* held in Wood River, Nebraska, which included an interactive workshop to determine research and management needs. Participants determined that one of the greatest impediments to conservation success on the river was communicative success. We as a conservation community need to better understand the impacts of our messaging on general audiences and improve its efficacy to protect the Platte River. Scientific methods have continued to advance, becoming less interpretable to the general public. Concurrently, faith has dwindled in our public institutions, including academia. Now more than ever there is a need for professionals who can clearly, honestly, and accurately talk about complex systems like the environment while using plain language. We are missing translational middle-persons to help foster fruitful conversations in the public sphere regarding scientific advances. For instance, the scientific community has been very ineffective in communicating the risks of global climate change to the general public. The Public Communication Master's Program has the potential to train students to address challenges in conservation and beyond. Thank you for fielding this letter. Please feel free to contact me with any questions.

Kind Regards,

10-18-18

Andrew J. Caven
Lead Biologist
Crane Trust
6611 W Whooping Crane Drive
Wood River, NE 68883
cranetrust.org
acaven@cranetrust.org
Cell: (605)-252-8007
Office: (308)-384-4633x6

SCORR MARKETING

October 15, 2018

Re: University of Nebraska at Kearney – Public Communications Master's Program

To Whom It May Concern,

I am writing in favor of the University of Nebraska at Kearney's opportunity for a Public Communications Master's Program. SCORR Marketing is the leading marketing and communications firm in the health sciences industry. We are a global partner for organizations around the world involved in research, development and commercialization of biopharmaceutical and device products and the delivery of health care products and services. SCORR currently employs 60 team members across the United States.

SCORR has a long-standing relationship with the University of Nebraska at Kearney and values the high quality, multidimensional students they produce, with over 45% of our employees possessing a degree from UNK. The addition of the Public Communications Master's program and the curriculum presented in this course will allow SCORR to hire students trained with additional specialized knowledge on how to communicate internally, as well as externally with clients. The students will have the opportunity to gain valuable experience during their studies; experience that will be a significant asset in ensuring professional and goal-oriented communications with our clients.

A core value of SCORR Marketing is to set the bar high through offering expert advice and hiring highly qualified team members. A Public Communications Master's program would allow us easier access to those qualified team members who meet that core competency. For these reasons, and many more, I believe this program at the University of Nebraska at Kearney would be of great interest to me as a hiring manager for a marketing communications firm. If you have any questions regarding this recommendation or SCORR Marketing, please contact me.

Sincerely,

Carrie Whiting
Human Resources Director
(308) 237-5567

2430 Marshall Ave
Kearney, NE 68847
308-236-7483
questions@HollmanMedia.com

HOLLMAN MEDIA, LLC

October 10, 2018

To Whom It May Concern:

I enthusiastically write this letter in support of the implementation of a Public Communication Master's Program at the University of Nebraska at Kearney. If given enough time and paper, I could easily produce binders of essays that speak to the need of such a program. But given that my support is already evident, I will limit myself to just a few important points from the perspective of an owner, founder, and executive of an established company in Central Nebraska.

1. As a manager, I look for employees who can communicate well. This is hands down the most coveted skill that I look for when hiring. I am not unique. Peers within my industry and other industries lament that it is difficult to hire employees who can communicate exceptionally well.
2. We managers, and our organizations, are just as guilty of breeding ineffective communication. Within my own organization, communication problems held our progress down for years until we learned how to manage and operate our business with communication in mind. This process is teachable and learnable. We just didn't understand it while we had the problems. It took an outsider to point it out. I feel that a Communication Master's Program will help equip students to become experts in helping organizations overcome these common challenges.
3. Every non-profit board I served on over the years had communication problems. In my mind, communication was always our organizations' biggest weakness. This includes both internal communications as well as public-facing communications. The two work in tandem. I fully support a program that teaches students the theories and practices needed to help organizations communicate effectively internally and publically.
4. Many of our clients are media clients (TV, radio, etc.). One would think they are experts at communication. They are not. I see a real need in the media for more communication experts.
5. Our company is hired to help other companies communicate online, both through social networks and through other conduits. In some ways, communication online is new and unique. In other ways, the same gaps remain. Regardless, it is often difficult for us lay people to make that distinction. We need help.

While this is not a comprehensive list of reasons for establishing a Communication Master's Program, any one of the items on the list is reflective of a real gap and a real opportunity for the proposed program. The technology conduits through which communication is delivered will evolve indefinitely, and we can never be sure what the future holds; however, communication itself will always be relevant and unrivaled in importance. The need for understanding, improving, and implementing better communication will never diminish. How do we do that? This type of program will bring those answers to light for its students so that they can go out and help businesses like mine. Please support it. I do.

Sincerely,

Travis J. Hollman
President

Haley Pierce
Kearney, NE 68845
402.380.8694
pierceha@lopers.unk.edu

November 12, 2018

Ben Myers
Chair, Department of Communication
The University of Nebraska at Kearney

Dr. Myers,

It is my understanding the Communication Department is considering offering a Masters of Arts in Public Communication, and I wanted to write in support of this program.

Many students in our department and others major in Organizational and Relational Communication, Journalism, Advertising and Public Relations, Political Science, Sports Administration, and related fields with intentions of working on the communication side of these industries. An advanced degree in Public Communication would afford them greater professional opportunities and allow them to more quickly work as an effective communicator in their field. Indeed, I believe the areas of specialization offered in this program are critically important to students, their goals, and their career paths.

Personally, I intend to pursue an advanced degree after graduation. As a Journalism and Political Science student, this program would allow me to effectively work as a lobbyist, campaign manager, or political director. I know I am not the only undergraduate student with interests in taking communication skills to a specialized field.

Moreover, I cannot stress enough the benefits of such a program to the department and campus. As a student diplomat, I've observed prospective students who are apprehensive of choosing a university that can't offer them an advanced degree in their field. This was a concern for myself in choosing a school too. Additionally, our university has a strong e-campus presence, and this program would only contribute to it. As urbanization continues to affect our campus, I expect this online degree to attract students from across the region looking to further their career.

Offering a Master's degree in Public Communication is an opportunity to improve the department, e-campus, UNK, and students' educations. I hope it is treated as such.

Regards,

Haley R. Pierce

Haley Pierce

610 W 25th St
Kearney, NE 68845
savan2014@gmail.com
(308) 991-7358

October 11, 2018

To whom this may concern,

I am writing this letter to relay my excitement for the prospective Public Communication Master's Program at the University of Nebraska at Kearney. As a potential student of this program, I can't help but think of an immense list of benefits for its graduates.

If you look at every field, department, and career, it is obvious that effective communication is a key factor to success, whether you are a school bus driver or CEO of a Fortune 500 company. Messages come into our lives sporadically on a daily basis and it is of utmost importance in this day and age to know how to critically decipher them.

Personally, I would enroll in this program to equip myself with the knowledge to effectively convey messages to people in and around my chosen field, nonprofit organizations. Those of us who have passions for integrating with people must know the theories behind the processes of organizational communication and the ethics that accompany them. Though being a millenial inherently allows me to be technology-inclined, my generation seems to be lacking general communication skills. This tool on my belt would easily magnify my abilities as a leader, organizer and community developer.

A career field such as nonprofit organizations could utilize students of this program to launch outreach programs, grow funding, and achieve interorganizational precision. Public Communication graduates will be able to implement strategies regarding the organization's mission in a manner that literally and figuratively "speaks" to the public.

A master's degree in Public Communication might be the best decision for someone like myself to pursue. I would be able read messages critically and speak back with integrity, backed by an education in theory, methods, and specialization. Thank you for your time and I hope you consider this program for those of us who wish to improve communication within our world.

Sincerely,

Savannah High

Savannah High

Jessica Moser
Kearney, NE 68845
308.660.5715
moserjd@lopers.unk.edu

November 16, 2018

Ben Myers
Chair, Department of Communication
The University of Nebraska at Kearney

Dr. Myers,

It has come to my attention that the Communication Department is considering offering a Masters of Arts in Public Communication, and I wanted to write in support of this program.

An advance degree in Public Communication would afford many students in our department greater professional opportunities and enable them to grow as communicators in their chosen fields. It is my belief that the areas of specialization offered in this program would highly benefit students and help them to achieve their goals and prospective careers.

As a Journalism and English student who is interested in pursuing an advanced degree after graduation, this program would help me to take communication skills into other fields. I doubt if I am the only undergraduate student that would be interested in taking communication skills into a specialized field.

In addition, offering a Master of Arts in Public Communication can have immense benefits for both the department and the campus as a whole. There are many potential students who are leery of choosing a university who can't offer them an advanced degree in their field. There are also many students who have gotten their bachelor's degree here at UNK and now want to get an advanced degree who have to go elsewhere to find it.

This program would be an asset to the department and UNK as a whole.

Regards,

Jessica Moser

November 16, 2018

Dr. W. Benjamin Myers
Department of Communication, Chair
University of Nebraska at Kearney
2504 9th Ave.
Kearney, NE 68849

Dear Dr. Myers:

I write on behalf of myself, a senior student at the University of Nebraska at Kearney (UNK) majoring in Organizational & Relational Communication, in support of the proposal for a new Public Communication Masters of Arts Degree (M.A.) at UNK. I strongly support this proposal because I truly believe in providing students, myself being one of those students, with a variety of excellent options to further their education after obtaining their undergraduate degree.

I arrived at UNK my freshman year as a biology major in hopes of one day attending medical school. However, I soon realized I was not in the right area of study. I moved over to the Communication Department and have never looked back since. I have continuously been an avid participant in all of my undergraduate courses, I was on the UNK Forensics Team for 2 years, I do undergraduate research within the Communication Department, and have been involved in the UNK Lambda Pi Eta Honor Society since I moved over the Communication Department – I am currently serving as President. I cannot begin to explain what this department, the professors, and the extra curricular activities have done for my as a student and as a young woman.

I've never questioned that one day I'd further my education by obtaining my Master's Degree because of my passion for learning and my love for communication. When told about the possibility of UNK obtaining a 2-year online Master's Degree in Public Communication, I was ecstatic! I have a strong interest in health communication and public communication and have always believed I would obtain my Master's Degree in an area encompassing both of these studies. This program provides that possibility and so much more.

In conclusion, I know the quality of academics at UNK is absolutely excellent and would be honored to be a student within this program. I strongly support this program proposal and believe it would be only beneficial to prospective students looking to further their education.

Sincerely,

Brittany Hanzlik
Organization & Relational Communication
Senior, University of Nebraska at Kearney
hanzlikbl@lopers.unk.edu

TABLE 1: PROJECTED EXPENSES - NEW INSTRUCTIONAL PROGRAM
UNK Master of Arts in Public Communication

	(FY2021 Year 1		(FY2022) Year 2		(FY2023) Year 3		(FY2024 Year 4		(FY2025) Year 5		**Total**
Personnel	**FTE**	Cost	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost	**Cost**
Faculty											
Professional											
Graduate Assistants[1]	0.5	$17,000	0.5	$17,000	0.5	$17,000	0.5	$17,000	0.5	$17,000	$85,000
Support Staff											
Benefits											
Subtotal	0.5	$17,000	0.5	$17,000	0.5	$17,000	0.5	$17,000	0.5	$17,000	$85,000
Operating											
Operating and Supplies											
Equipment											
Library/Information Resources											
Subtotal											$0
Total Expenses		$17,000		$17,000		$17,000		$17,000		$17,000	**$85,000**

[1] One graduate assistant will be required for curricular support and outreach in years one and two. If enrollments warrant, a graduate assistant will be required in years three through five.

TABLE 2: PROJECTED REVENUES - NEW INSTRUCTIONAL PROGRAM
UNK Master of Arts in Public Communication

	(FY2021) Year 1	(FY2022) Year 2	(FY2023) Year 3	(FY2024) Year 4	(FY2025) Year 5	**Total**
Reallocation of Existing Funds						
Required New Public Funds						
1. State Funds						
2. Local Tax Funds (community colleges)						
Tuition and Fees[1] # of students - 5, 15, 25, 35, 45	$31,320	$93,960	$156,600	$219,240	$281,880	$783,000
Other Funding						$0
Total Revenue	$31,320	$93,960	$156,600	$219,240	$281,880	$783,000

[1] Indicates tuition and fees based on an average of 18 credit hours per academic year [$348 ($302 Online Graduate Tuition) + $35 (Online Course Fee) + $11 (Technology Fee)].

Projection is for 5 students the first year, 10 new students the second year and 10 new students each year thereafter. Each of these students would be completing a total of 36 credit hours to complete the program with an average of 18 credits per academic year totalling $6,264 per year. This is based on $348 per credit hours for online tuitition including the following: $35 Online Course Fee, and $11 Technology Fee. The projection shows the program growing by an additional 10 new students each year and assumes that each student will progress through the program in a traditional manner, completing the degree in 2 years. This is a conservative estimate based on in-state tuition rates, although it is fully expected there will be out-of-state students in the program.

TO:	The Board of Regents	Addendum X-A-2
	Academic Affairs	
MEETING DATE:	February 7, 2020	
SUBJECT:	Establishment of the Nebraska Governance and Technology Center at the University of Nebraska-Lincoln (UNL)	
RECOMMENDED ACTION:	Approval is requested to establish the Nebraska Governance and Technology Center to be primarily housed in the College of Law, but with initial partnerships in the College of Business and College of Engineering at UNL	
PREVIOUS ACTION:	None	
EXPLANATION:	Innovative and emerging technologies are of vital and increasing importance for both Nebraska and the nation. Such technologies offer great potential to continue the improvements to the quality of life and individual wellbeing that defined the 20th century. They also pose some of the greatest challenges that our country has ever faced – from reshaping the relationships between individuals and their communities and those between state and federal government, to contributing to the erosion of critical norms of civility. The purpose of the Nebraska Governance and Technology Center is to establish a novel, interdisciplinary, research program at the University of Nebraska to study the relationship between technology, society, and government, with a goal of understanding the challenges that changing technology creates for legal institutions, and how those institutions can adapt to changing technology. The Nebraska Governance and Technology Center will produce a cohort of in-residence faculty and a cohort of students initially across the colleges of Law, Business, and Engineering, as well as a cohort of faculty across the policy-focused legal academy, all of whom study the relationship among technology, business, society, and government on a transdisciplinary basis. The University of Nebraska Foundation will receive a five-year $5.5 million private grant to establish this Center on behalf of the College of Law, which will include faculty with teaching obligations in, and students from, the Colleges of Business, Engineering, and Law. Additional external funding is likely to continue this important work beyond this initial gift. This proposal has been reviewed by the Council of Academic Officers; it also has been reviewed by the Academic Affairs Committee.	
PROGRAM COST:	$507,321 for Year 1; $4,989,529 over five years	
SOURCE OF FUNDS:	University of Nebraska Foundation funds	

SPONSORS:	Richard E. Moberly Interim Executive Vice Chancellor and Chief Academic Officer Ronnie D. Green, Chancellor University of Nebraska-Lincoln
RECOMMENDED:	/s/ Susan M. Fritz Executive Vice President and Provost
DATE:	January 10, 2020

January 9, 2020

Susan Fritz, Executive Vice President and Provost
University of Nebraska
3835 Holdrege Street
Lincoln, NE 68588

Dear Susan,

This letter replaces a similar letter addressed to David Jackson, Interim EVP, dated November 4, 2019, by which I forwarded materials relating to a proposal to formally establish the Nebraska Governance and Technology Center (previously referred to as the NU Governance and Technology Center). The program will be primarily housed in the College of Law, but with initial partnerships in the Colleges and Business and Engineering.

The Center will focus on the relationship among technology, business, society, and government related to the multidisciplinary issues surrounding the development, commercialization, and regulation of new technologies.

This proposal has the approval of the Vice Chancellor for Research and Economic Development, faculty and deans from the Colleges of Law, Engineering and Business, and the Academic Planning Committee. The Office of the Executive Vice Chancellor will support the future hiring priorities as outlined in the proposal and approves the use of vacant faculty funding for tenure-line faculty beginning in FY25, if necessary. This proposal has my approval and I am requesting you approve it as well.

Sincerely,

Ronnie D. Green, Ph.D.
Chancellor

c: Jennifer Clarke, Chair, Academic Planning Committee
Richard Moberly, Interim Executive Vice Chancellor
Kathy Farrell, Dean, College of Business
Lance Perez, Dean, College of Engineering
Gus Hurwitz, Co-Director, Space-Cyber-Telecommunication Program, College of Law
Mike Zeleny, Associate to the Chancellor and APC Secretary
Renee Batman, Assistant Vice Chancellor
Suzi Tamerius, Project Coordinator
Karen Griffin, Coordinator of Faculty Governance

University of Nebraska-Lincoln
New Academic Center

Academic Centers include bureaus and institutes

I. Descriptive Information

Name of Institution Proposing New Center
University of Nebraska-Lincoln
Name of Proposed Center
Nebraska Governance and Technology Center
Name of the Programs (majors) Involved
This Center will be primarily housed in the College of Law, with faculty and student engagement from the Colleges of Business and Engineering.
Other Programs Offered in this Field by Institution
No other programs currently offered at the University of Nebraska engage in the research or programming contemplated by this Center.
Administrative Unit(s) for the Proposed Center *[e.g. college, school, division, etc.]*
College of Law
Physical Location, if applicable
College of Law
Date Approved by the Governing Board
[leave blank]
Proposed Date the Center will be Initiated
Academic Year 2020-21 / Upon Approval

II. Review Criteria

A. Purpose and Context for the Center

Regulation of innovative and emerging technologies is of vital and increasing importance for both Nebraska and the nation. Such technologies offer great potential to continue the improvements to the quality of life and individual wellbeing that defined the 20th century. They also pose some of the greatest challenges that our country has ever faced – from reshaping the relationships between individuals and their communities and those between state and federal government, to contributing to the erosion of critical norms of civility.

The purpose of the Nebraska Governance and Technology Center is to establish a novel, interdisciplinary, research program at the University of Nebraska to study the relationship between technology, society, and government, with a goal of understanding the challenges that changing technology creates for legal institutions, and how those institutions can adapt to changing technology. The lodestone for this focus is that we have transitioned from an era of traditional regulation to one of governance – that is, from an era in which law, policy, and technology operate in discrete, independent, silos to one in which each necessarily depends upon

and affects the others. In an era of governance, laws and regulation cannot be enacted without careful understanding of how they impact technology and innovation; nor can novel technologies be developed without thought being given to how those technologies affect policy and society.

In this setting, traditional approaches to regulation – and especially traditional models of prescriptive, command-and-control regulation by centralized authority – are ill-equipped to address the challenges created by, or to promote the benefits promised by, modern technology. New approaches to regulation are needed: this Center's goal is to explore those approaches, and to inject consideration of them into ongoing research through the technology policy research community.

The Nebraska Governance and Technology Center will produce a cohort of in-residence faculty and a cohort of students initially across the colleges of Law, Business, and Engineering, as well as a cohort of faculty across the policy-focused legal academy, all of whom study the relationship among technology, business, society, and government on a transdisciplinary basis. The initial focus on the Colleges of Law, Business, and Engineering derives from an understanding of these three disciplines as complementary "legs of a stool" in the development, commercialization, and regulation, of new technologies. The issues that fall within the scope of the Center, however, touch on many other fields. As the Center grows, it is expected that its collaborations will expand beyond these initial three Colleges to engage with a wide range of faculty and students from across the University.

The NU Foundation will receive a five-year $5.5 million private grant to establish this Center on behalf of the College of Law, which will include faculty with teaching obligations in, and students from, the Colleges of Business, Engineering, and Law. Additional external funding is likely to continue this important work beyond this initial gift.

B. Centrality to UNL Role and Mission

The Center will facilitate collaborative research and teaching on regulation of emerging and innovative technologies – issues of significant importance to constituencies in nearly every college at the University. On any given day, the front page of any newspaper is dominated by stories that touch on the subject matter of this Center – and the academic study of which requires interdisciplinary resources that the University currently lacks. This Center will better equip University faculty and students to research, change, and work within the confines of our contemporary society, with benefits that redound to the University's research and teaching missions.

C. Relationship of the proposal to the NU Strategic Framework

This Center supports several elements of the NU Strategic Framework. In general, it would develop research and teaching capabilities that the University currently lacks that are of significant importance at the international, national, regional, state, and local level. In so doing, it will increase the University's research profile and strengthen our academic programs in areas that are of significant economic, social, and political importance to the state and beyond. The Center has five years of initial external funding so is established at minimal cost to the University, and operates in an area with significant potential for ongoing external funding.

D. Consistency with the Comprehensive Statewide Plan for Post-Secondary Education

This Center supports and enhances several of the Statewide Plan for Post-Secondary Education's major goals. Technology has come to affect almost every area of modern life – across economic, social, and political dimensions. Given technology's broad impacts, it is unsurprising that a Center designed to study these impacts has the potential to have significant impacts across many areas touched upon by the Statewide Plan.

In general, the Center will facilitate important work that is not currently feasible at the University and that has international, national, regional, state, and local impacts. This includes both high-impact interdisciplinary research that will raise the University's research profile as well as the development of novel interdisciplinary

classes and other student opportunities. These academic programs will benefit the University and state both through workforce and economic development as well as by equipping students to be more sophisticated participants in areas of significant social and political discourse. Any course would be developed following standard university procedure, housed within an existing academic department, and approved as necessary by the College of Law Curriculum Committee and Faculty, Undergraduate Curriculum Committee, or Graduate Council.

E. Evidence of Need and Demand

The challenges created by changing technology are not limited to any one field – let alone to the expertise of any one College or Department. Relevant questions range from how and whether we should (or even can) regulate technology to how engineers should think about technological risk and design new technological systems that have the potential to disrupt existing social, political, and legal norms. Along these two dimensions, a small number of law schools around the country have developed, or are developing, programs that bring together law and engineering faculty. This program also brings in the College of Business, to understand the economic and business reality of changing technology – all technology is developed and commercialized against a complex economic and compliance background.

No one of these disciplines is able to study the questions at the heart of this Center without concerted engagement from the others.

Similarly, students working in these areas are entering an inherently interdisciplinary field. There is significant recognition today that those developing (and who have developed) contemporary technology benefit from broader perspectives and need to understand the legal and regulatory systems that their technologies may potentially disrupt. In turn, lawyers and policy makers need to understand the economic and business realities that affect the viability of commercialization and adoption of technologies that engineers are developing. And, business makes up a third leg of this stool.

In addition, establishment of this Center will create a focal point for this sort of work at the University. This will allow it to be a hub both for external and internal collaboration. There is significant research and commercial interest in endeavors such as this. Establishing this program as a Center will amplify the program's ability to secure ongoing external support and develop future partnerships. And as those connections grow, having been established as a Center will allow this program to develop further collaborations with other Colleges and Departments across the University.

F. Organizational Structure and Administration

The Center will be housed within the College of Law and will involve faculty from other Colleges and Departments. At its initial scale achieved in Year 3 the Center will involve the faculty director, who will be a tenured faculty member in the College of Law; a total of two tenure-line faculty (future hires); a non-tenure track researcher or visiting faculty member; and two staff members, an Executive Director and a Communications and Events coordinator. The tenure-line faculty will be housed within the College of Law, though the two new lines will have partial teaching and research responsibilities in other Colleges. The faculty will be hired through the ordinary faculty hiring process, requiring law faculty approval, with input from other Colleges as appropriate for each line's teaching responsibilities.

The Center will be led by a faculty-level Director (Associate Professor and current co-Director of the Space, Cyber, and Telecom Law Program, Justin (Gus) Hurwitz) and a non-faculty Executive Director, who will be responsible for day-to-day operations and programmatic development and implementation decisions. Decisions relating to hiring, significant budgetary decisions, and those affecting University faculty and staff will be supervised by the Dean of the College of Law.

In its first year, the Center will stand up an outside academic advisory board made up of recognized academic and other leaders with expertise relevant to the Center's mission. These individuals will be asked to provide guidance to the program and will be tasked with conducting periodic reviews of the program, including the five- to seven-year reporting requirement to the Board of Regents.

G. Partnerships with Business

No partnerships with business are currently contemplated through this Center. These are, however, fields with significant academic engagement from the technology and communications business communities. It is reasonable to anticipatable that these communities will seek out the Center for various forms of partnership – and that these opportunities will include opportunities for engagement between firms operating at the state and national level.

H. Collaborations with Higher Education Institutions External to the University

There is a small but vibrant community of legal scholars working in these fields, and a significantly smaller number of law schools engaged with them. This Center has the potential to be a significant hub for these issues within the legal academy. Professor Hurwitz, the Center's initial faculty director has a history of significant engagement with this community.

This Center also has significant opportunity for engagement across the broader academy. Few, if any, programs currently exist that bring together law, business, and engineering perspectives to study the interplay between regulation and technology. This Center will likely create significant opportunity for external collaboration.

I. Constituencies to be Served

This Center will study issues of broad economic, social, and political importance. It will do this both through a faculty-focused and a student-focused programs. The faculty focused programs include facilitating collaborations through regular workshops, conferences, and research roundtables. These events, especially in the earlier years of the program, will consciously endeavor to incubate interdisciplinary interactions between faculty across the University. The student-focused programs will include an interdisciplinary research seminar and other future classes. These classes are consciously intended to develop a new cohort of graduate-level students that will have fundamentally interdisciplinary approach to thinking about the role of technology in contemporary society.

J. Anticipated Outcomes, Significance, and Specific Measures of Success

Intended Impacts: The goal of the Center is to foster the neutral interdisciplinary study of the relationship between regulation and changing technology – with the ultimate goal of developing identifiable faculty and student cohorts engaged with this work as a new field of study growing out from interdisciplinary fields. Programmatically, this includes the production of scholarship, both directly by individual faculty and indirectly by hosting events such as conferences, roundtables, and workshops that influence broader scholarship, as well as the establishment of novel classes, both advanced undergraduate and graduate level and other student-focused academic programs. These student-focused programs will engage with professional, graduate, and advanced undergraduate students, generally drawing from the same (and, in principle, additional) academic units and disciplines as those from which the Center will draw faculty engagement.

Measures of Success: Successful implementation of the Center would be demonstrated in several ways, including:

- Faculty productivity and engagement in the subject matter of the Center. This includes successful progression through academic ranks by faculty associated with the Center, production of scholarship and other research activity by faculty affiliated with the Center, and widespread engagement with

the Center's work.

- Successful conferences and roundtables organized and hosted by the Center. The Center contemplates hosting 2-4 research-focused events each year, hosted at the University or elsewhere. These events will typically bring 15-30 researchers together to present and share research on subjects relating to the Center's work, and should involve both a core cohort of faculty who regularly participate in these events as well as a regular inflow of new faculty. In the earlier years of the Center, success of these programs will be established primarily by virtue of them happening; in later years success will be established by their influence on the production of scholarship relating to the Center's mission.

- Participation in workshops and other visiting speakers. The Center will also establish a new workshop series and host other visiting speakers. The workshop series will be a forum for faculty both in residence and at other academic institutions to share their work relating to the mission of the Center, both to bring their ideas to the Center and to engage with Center-affiliated faculty in the further development of those ideas. In addition, the Center will bring in multiple speakers each year to engage with students on topics designed to promote student engagement and interest in careers and research related, or cognate, to the Center's mission.

- Interdisciplinary academic programming. By its third year, Center faculty will be teaching at least one, interdisciplinary, Center-related class – a student research seminar, bringing together students from Business, Engineering, and Law – in addition to other classes related to the Center's mission.

- Faculty engagement. The Center's initial scope calls for a faculty director (a tenured faculty member in the College of Law), two new tenure-line faculty, and a non-tenure track research or visiting faculty member. In addition, it contemplates 10-15 in-residence affiliated faculty from the University and another 5-15 non-resident affiliated faculty. All affiliated faculty – and especially those at the University – are expected to have regular engagement with the Center's work and programs.

- Student engagement. The Center is also intended to have significant student engagement. This includes students engaging both through classes as well as through a student fellows program.

Timetable and Evaluation: Implementation of the Center will occur over several years, so its evaluation should be approached accordingly.

- First two years: The Center's primary goals over its first two years will be to start developing (primarily in-residence) faculty and student engagement, including substantial progress in hiring two tenure-line faculty and the non-tenure track research or visiting faculty member, developing an initial cohort of in-residence faculty affiliates, and to begin the Center's programming, including hosting 1-3 conferences or roundtable-style events each year and the development of the Center's workshop series. In addition, the Center will begin establishing a nationally-recognized brand through engagement with other faculty and conferences hosted across the country.

- Years three and four: In its third and fourth year, the Center should be "hitting its stride," building on the programs developed and normalized in its first two years and beginning to operate at scale. In addition, by year three the Center should begin teaching at least one Center-specific class drawing an interdisciplinary cohort of students.

- Years five and beyond: By the fifth year of operation, the Center should be operating at scale as a nationally-recognized research program and with ongoing faculty student and faculty interest and engagement. By this point, the Center should be identifying sources of ongoing external support and funding to ensure continued future operations.

- Evaluation: In its first year, the Center will establish an outside academic advisory board comprising recognized academic and other leaders with expertise relevant to the Center's mission. Among other things, this board will be tasked with providing an annual review and assessment of the Center's operations. In addition, the Center will undergo a periodic, 5 to 7-year, review through the University and reported to the Board of Regents.

K. Potential for the Center to contribute to Society and Economic Development

The importance of the Center's mission is largely self-evident: over the past century – and especially since the advent of the transistor and modern computers – technology has reshaped society and will continue for the foreseeable future. Understanding how and whether we can or should regulate these technology or the changes that that they drive is incredibly important to society. Interdisciplinary research initiatives such as this Center are necessary to study these questions. To date, there has been remarkably little work of any significance done in these areas, precisely because it is exceptionally difficult to overcome the inertia of existing disciplinary institutional designs in order to engage in meaningful interdisciplinary work.

Subject matter within the scope of the Center's mission includes, for instance: regulation of online platforms; freedom of speech and democratic principles online; the role of technology in contemporary politics and journalism; equal access to online and information resources; cybersecurity; regulation of distributed and non-centralized infrastructure; cryptocurrencies and banking regulation; regulation of technologies designed to be, or that are otherwise, difficult to regulate; regulation of agricultural technology; algorithmic and machine learning–based regulation; effects of disruptive technologies (e.g., synthetic biology, nanotechnology, IoT) on social, economic, and legal institutions; regulation of biotechnology.

Importantly, the goal of the Center is not to produce expertise in any one of these areas. Rather, it is to produce a cohort of faculty and students with a generalized expertise that is needed to engage in all of them – and, in particular, to do so by identifying and answering questions that would not be recognized by researchers with narrow expertise in any one of them.

L. Adequacy of Resources:

1. Faculty/Staff

At its initial scale, the Center will comprise three core tenure-line faculty (tenure homes in the College of Law), a non-tenure track research or visiting faculty member, and two staff members. In addition, over its first two years the Center will develop a cohort of faculty affiliated engaged with the Center's work from across the University, visiting faculty, and post-docs and similar positions.

The tenure-line faculty will be housed in the College of Law, and will include Associate Professor Justin (Gus) Hurwitz (faculty director) and two future hires initially funded through the Center. The non-tenure track research or visiting faculty member will be housed in the College of Law, or in the Center. In the case of a non-tenure track research faculty member housed in the Center, an MOU with an academic department will be in place regarding evaluation and promotion.

The Director's administrative stipend and a course buyout, as well as the full salary and benefits for the new faculty and staff lines will be funded by the private donations for up to five years, or as long as external funding sources remain soluble. The two new tenure-track faculty lines will be permanently budgeted and paid for jointly by the Colleges of Law, Business, and Engineering, most likely beginning in the sixth year (2023-2024). Each line will have teaching obligations in the Colleges of Law, Business or Engineering and will have research and service obligations typical of tenure-line faculty. The teaching apportionment will be agreed on by the college deans and department chairs in business and engineering through an MOU at the time of hire, which can be reevaluated as needed. The annual teaching assignments will be determined by the department chairs or College of Law dean, based on what has been agreed on in the MOU.

The search for the first new tenure-track faculty position was authorized by Executive Vice Chancellor Donde Plowman in May 2019 and is underway. The position is slated to start in the 2020-2021 academic year, subject to approval of the Center by UNL's Academic Planning Committee, the University of Nebraska Board of Regents, and the Nebraska Coordinating Commission for Postsecondary Education.

The Center staff will include an Executive Director and a Communications and Events Coordinator. The Executive Director will be reassigned from current duties in the Space Law program, upon creation of the Center and with approval by Human Resources and Institutional Equity and Compliance. The search for a communications and events coordinator will commence upon approval of the Center by the Board of Regents and the Nebraska Coordinating Commission for Post-secondary Education. Both positions will be fully funded by private donations for five years.

In addition, the Center includes private funding to support stipends for affiliated faculty and for occasional visiting faculty and post-docs.

2. Physical Facilities and Equipment

No additional physical facilities are needed. The Center will be housed in existing space at the College of Law. Private funding will cover modest renovations for the current space, estimated at $15,000. Any additional equipment beyond computers for new hires will be provided as in-kind support by the College of Law.

3. Budget Projections *[includes Table 1 and Table 2]*

In addition to the faculty, staff, visiting faculty, post-doc, and affiliated faculty stipends, the private funding will support an annual general operating budget, and the cost for equipment and space renovations. The operating budget includes the costs associated with center activity such as the seminars, workshops, conference, research, guest speakers, and general support of the operations and daily activities. Additional details are outlined in Tables 1 and 2.

Justin (Gus) Hurwitz

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703-405-9624 — ghurwitz@unl.edu

Curriculum Vitae
rev.20190801 - short

EMPLOYMENT

U. Nebraska College of Law
Associate Professor of Law — Aug 2018 – Present
Co-Director, Space, Cyber, and Telecom Program — Jan 2017 – Present
Assistant Professor of Law — June 2013 – Aug 2018

U. Pennsylvania Law School — July 2011 – June 2013
Fellow (post-doc), Center for Technology, Innovation and Competition

George Mason University Antonin Scalia Law School — Jan 2011 – June 2011
Visiting Assistant Professor

United States Department of Justice, Antitrust Division — 2007-2010
Telecom & Media Section, Trial Attorney

Los Alamos National Lab, Computer & Computational Sciences
Graduate Technical Researcher — May 2003 – Dec 2004
Undergraduate Technical Researcher — Feb 2002 – May 2003

EDUCATION

University of Chicago Law School — J.D., June 2007
Fellowships & Journals: MVP2 Law and Economics Fellowship; John M. Olin Law and Economics Student Fellowship; Chicago Journal of International Law

George Mason University, Economics Department — M.A., May 2011

St. John's College, Annapolis, MD, and Santa Fe, NM — B.A., May 2003
Awards: Best Original Mathematics Paper, 2003; Outstanding Contributions to the College Community, 2003; Best Solution to an Analytical Mathematics Problem, 2001; Best Solution to a Geometrical Mathematics Problem, 2001

AFFILIATIONS & APPOINTMENTS

International Center for Law and Economics, Academic Affiliate — 2013 – 2017
Director, Law & Economics Programming — 2018 – Present

NYU School of Law, Program Affiliate Scholar — 2018 – Present
Classical Liberal Institute

Antonin Scalia Law School, Visiting Fellow — 2017 – Present
National Security Institute

American Enterprise Institute, Visiting Fellow — 2013 – 2017
Center for Internet, Communications, & Technology Policy

TEACHING

Administrative Law, Cyberlaw, Cybersecurity, Law & Economics, Principles of Regulation, Torts, Telecommunications Law and Policy, US & EU Internet and Telecom Law

SELECT SCHOLARLY PUBLICATIONS

Law Reviews and Legal Journals

- *Post-Cartesian Antitrust*, NEB. L. REV. (forthcoming 2019) (symposium).
- *Madison and Shannon on Social Media*, BUS., ENTREPRENEURSHIP, & TAX L. REV. (forthcoming 2019) (symposium).
- *McGeveran's* The Duty of Data Security*: Not the objective duty he wants, Maybe the subjective duty we need*, 109 MINN. L. REV. HEADNOTES 139 (2019).
- Chevron*'s Political Domain: W(h)ither Step Three?*, 68 DEPAUL L. REV. 615 (2019).
- *Telemarketing, Technology, and the Regulation of Private Speech*, 84 BROOK. L. REV. 1 (2019).
- *Big Tech's Big-Time, Big-Scale Problem*, CATO POLICY REPORT 1 (May/June 2018) (with Geoff Manne).
- *Fake News's Not-So-Real Antitrust Problem: Content Remains King,* 13 ANTITRUST CHRON. (Dec. 19, 2017).
- *Cyberensuring Security*, U. CONN. L. REV. (2017) (symposium).
- *Encryption^{Congress} mod (Apple + CALEA)*, 30 HARV. J. LAW & TECH. 355 (2017).
- *Blacklining The FCC's Editorial Privilege*, 23 MICH. TELECOM & TECH. L. REV. 149 (2016).
- *Data Security and the FTC's UnCommon Law,* 101 IOWA L. REV. 955 (2016).
- *The Practical Power of the Commission's UMC Statement,* 11 ANTITRUST CHRON. (Nov. 30, 2015).

- *Net Neutrality: Something Old; Something New*, 2015 MSU L. REV. 665 (2015) (symposium).
- Chevron *and the Limits of Administrative Antitrust*, 76 U. PITT. L. REV. 209 (2014).
- *Administrative Antitrust*, 21 GMU L. REV. 1191 (2014) (symposium).
- *Trust and Online Interaction*, 161 U. PA. L. REV. 1579 (2013) (competitively selected symposium).
- *Network Neutrality and Neighbor Billing*, 11 VA. J.L. & TECH. 9 (2006).

Book Chapters

- *Classical Liberalism and the Problem of Technological Change* in THE CAMBRIDGE HANDBOOK OF CLASSICAL LIBERAL THOUGHT (Todd Henderson, ed., Cambridge 2018) (with Geoff Manne).
- *Telecommunications Competition Law vs. Policy in the United States* in COMPETITION LAW IN TELECOMMUNICATIONS MARKETS: KEY REGULATORY CHALLENGES (Sandra Marco Colino, ed, Wolters 2018).
- *Satellite Harmful Interference: A US Perspective* in HARMFUL INTERFERENCE IN REGULATORY PERSPECTIVE: LEGAL RULES FOR INTERFERENCE-FREE RADIO COMMUNICATION (Mahulena Hoffman, ed., Ashgate 2016).

Books in Progress

- *Cybersecurity: An Interdisciplinary Problem* (with Derek Bambauer and David Thaw).

Technical Journal/Periodical/Conference

- Gus Hurwitz and Wu-chun Feng, Peer-reviewed Research Note, *Analysing MPI Performance over 10-gigabit Ethernet*, 65 J. PARALLEL AND DISTRIBUTED COMPUTING 1253 (2005).
- Gus Hurwitz and Wu-chun Feng, Invited Article, *End-to-End Performance of 10-Gigabit Ethernet on Commodity Systems*, 24 IEEE MICRO 10 (2004).
- Wu-chun Feng, Gus Hurwitz, et al., Invited Paper, *Optimizing 10-Gigabit Ethernet for Networks of Workstations, Clusters, and Grids: A Case Study*, PROC. 15TH SUPERCOMPUTING (2003).
- Gus Hurwitz and Wu-chun Feng, Peer-reviewed Paper, *Initial End-to-End Performance Evaluation of 10-Gigabit Ethernet*, PROC. 11TH HOT INTERCONNECTS CONF. (2003).
- Mark K. Gardner, et al., Peer-reviewed Paper, *Online Monitoring of Computing Systems with MAGNET*, PROC. 3RD IEEE/ACM SYMP. CLUSTER COMPUTING AND THE GRID (2003).
- Les Cottrell, et al. [first author, second line], Peer-reviewed Paper, *High Performance Wide Area Network Testbed: Experiences and Results,* PROC. CONF. FOR HIGH ENERGY PHYSICS 2003 (2003).

Publications omitted from this CV

- Practice-related publications, such as comments to federal agencies, legal briefs, whitepapers
- Popular press publications, such as op-eds
- Blogging and other short-form publications, such as with *AEIdeas*, *TechPolicyDaily*, and *Truth on the Market*

CONFERENCES & OTHER EVENTS ORGANIZED

- Co-Organizer, inaugural Cybersecurity Law and Policy Scholars Conference, 5/2020.
- Organizer, inaugural Governance and Technology Conference, 4/2020.
- Organizer, *Annual Lincoln Telecommunications Conference*: 3/2020, 4/2019, 4/2018, 3/2017, 10/2016.
- Co-Organizer, *Nebrooklyn Law & Technology Jr. Scholars Workshop*: 3/2019, 2/2018, 2/2017, 3/2016, 12/2014, 11/2013.
- Co-Organizer, *FCC-AEI-UNL Conference on Regulating the Evolving Broadband Ecosystem*, 9/2014.

KEYNOTES, TESTIMONY, FEATURED SPEAKER, &C (20+) (OMITTED FROM THIS CV)

OTHER ACADEMIC PRESENTATIONS, CONFERENCES, COLLOQUIA, &C (100+) (OMITTED FROM THIS CV)

PRESS APPEARANCES, QUOTES, &C (80+) (OMITTED FROM THIS CV)

AWARDS & RECOGNITION

Nebraska College of Law, *Ray H. Bunger Memorial Award for Excellence*	2019
National Law Journal, *Cyber Security & Data Privacy Trailblazer*	2015
U. of Pennsylvania Law Review, Symposium Scholar, *The Evolving Internet*	2012
US DOJ Libraries, *Recognition for Contributions to Legal Scholarship*	2010
Jones Day, Swope Antitrust Writing Competition.	2007
Federal Lab Consortium, *Award for Excellence in Technology Transfer*	2005 (team)
R&D Magazine, R&D 100, *Award for technologically significant innovation*	2004 (team)
Los Alamos National Lab, *Recognition for 10GbE Innovations*	2004 (team)
IEEE & ACM, SuperComputing Bandwidth Challenge, *Sustained Bandwidth Award*	2003 (team)
Guinness Book of World Records, *Internet2 Land Speed Record*	2003 (team)
Los Alamos National Lab, *Recognition for Internet2 Work*	2003 (team)
Internet2 consortium, Internet2 Land Speed Record, *Single & Multiple Stream Class*	2003 (team)

TABLE 1: PROJECTED EXPENSES - NEW ORGANIZATIONAL UNIT
Nebraska Governance and Technology Center

	(FY 2021*) Year 1		(FY 2022) Year 2		(FY 2023) Year 3		(FY 2024) Year 4		(FY 2025) Year 5		Total [6]
Personnel	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost	**Cost**
Faculty [1]	0.5	$77,760	2.5	$325,944	3.5	$476,653	3.5	$488,569	3.5	$500,783	$1,869,709
Non-teaching staff: Professional [2]	1.0	$109,920	1.0	$112,668	1.0	$115,485	1.0	$118,372	1.0	$121,331	$577,776
Graduate Assistants	1.0	$24,641	0.0	$0	0.0	$0	0.0	$0	0.0	$0	$24,641
Non-teaching staff: Support	0.0	$0	1.0	$78,050	1.0	$80,001	1.0	$82,001	1.0	$84,051	$324,103
Subtotal	2.5	$212,321	4.5	$516,662	5.5	$672,139	5.5	$688,942	5.5	$706,165	$2,796,229
Operating											
General Operating [3]		$265,000		$385,200		$482,700		$507,700		$507,700	$2,148,300
Equipment [4]		$15,000		$10,000		$5,000		$0		$0	$30,000
New or Renovated Space [5]		$15,000		$0		$0		$0		$0	$15,000
Library/Information Resources		$0		$0		$0		$0		$0	$0
Other		$0		$0		$0		$0		$0	$0
Subtotal		$295,000		$395,200		$487,700		$507,700		$507,700	$2,193,300
Total Expenses		$507,321		$911,862		$1,159,839		$1,196,642		$1,213,865	**$4,989,529**

* Year 1 expenses may include some of the start-up expenditures in FY20 if the Center is approved prior to the end of the FY20.

[1] Includes Faculty Director, two new tenure-track faculty, and visiting and/or non-tenure track research faculty; includes salary and benefits, and 2.5% annual increase.

[2] Executive Director; includes salary and benefits and 2.5% annual increase.

[3] Includes center activity for seminars, workshops, conference, research, and guest speakers and general support of operations and daily activities.

[4] Computers for new hires.

[5] Existing space in the College of Law will be utilized. Modest renovations to accommodate the center is planned.

[6] Assumes annual inflation of personnel salaries and wages of 2.5%.

TABLE 2: PROJECTED REVENUES - NEW ORGANIZATIONAL UNIT
Nebraska Governance and Technology Center

	(FY 2021) Year 1	(FY 2022) Year 2	(FY 2023) Year 3	(FY 2024) Year 4	(FY 2025) Year 5	Total
Reallocation of Existing Funds						
Required New Public Funds						
1. State Funds						
2. Local Funds						
Tuition and Fees [1]						
Other Funding						
Earnings from three funds established by private donors [2]	$1,100,000	$1,100,000	$1,100,000	$1,100,000	$1,100,000	$5,500,000
Total Revenue [3]	$1,100,000	$1,100,000	$1,100,000	$1,100,000	$1,100,000	$5,500,000

[1] No tuition and fee revenues will be assigned to the Center. The modest tuition revenue from courses will be assigned to the student's college or faculty member's college, per standard university procedure or as committed to in an MOU between the partnering colleges.

[2] Earnings from three funds established by private donors.

[3] Revenues are not expected to match expenses, but funds received from the gift in the early years will continue to support the Center's work in ongoing years.

TO:	The Board of Regents	Addendum X-A-3
	Academic Affairs	
MEETING DATE:	February 7, 2020	
SUBJECT:	Creation of a Departmental Structure in the College of Allied Health Professions (CAHP) at the University of Nebraska Medical Center (UNMC)	
RECOMMENDED ACTION:	Approval is requested to create a departmental structure in the College of Allied Health Professions at UNMC to include the creation of three departments and the renaming of one existing department	
PREVIOUS ACTION:	July 22, 2016 – The renaming of the Division of Radiation Science Technology Education to the Department of Medical Imaging and Therapeutic Sciences in the UNMC College of Allied Health Professions was reported to the Board of Regents. January 30, 2015 – The Board approved the transition of the School of Allied Health Professions to the College of Allied Health Professions at UNMC. October 6, 1972 – The Board approved the establishment of the School of Allied Health Professions within the UNMC College of Medicine.	
EXPLANATION:	The College of Allied Health Professions (CAHP) proposes to reconfigure its organizational structure to more closely align with that of other UNMC colleges. The CAHP proposes to designate the unit of "department" as the primary organizational unit, and consolidate existing and future health professions education and other degree programs within a departmental structure. Since its transition to a college in 2015, the CAHP has experienced programmatic growth leading to increases in enrollment (13.5%), personnel (15%), and extramural funding (11%). The new organizational structure will ensure effective and efficient operations, including but not limited to, communication, strategic planning, fiscal planning and management, staffing, coordination, research development and planning, and governance. The departmental structure also will position the CAHP for future projected growth. The determination of the constituent programs of a given department will be based on related areas of curricular content and clinical responsibilities. The CAHP proposes creating the following departments: • Department of Clinical, Diagnostic, and Therapeutic Sciences (renamed from the Department of Medical Imaging and Therapeutic Sciences) • Department of Medical Sciences • Department of Health Sciences and Rehabilitation • Department of Health Professions Education, Research, and Practice	

	This proposal has been reviewed by the Council of Academic Officers; it also has been reviewed by the Academic Affairs Committee.
PROGRAM COST:	$30,000 for Year 1; $150,000 over five years
SOURCE OF FUNDS:	College of Allied Health Professions auxiliary funds and salary cost savings
SPONSORS:	H. Dele Davies Senior Vice Chancellor for Academic Affairs Jeffrey P. Gold, Chancellor University of Nebraska Medical Center
RECOMMENDED:	/s/ Susan M. Fritz Executive Vice President and Provost
DATE:	January 10, 2020

PROPOSAL FOR THE CREATION OF A DEPARMENTAL STRUCTURE
College of Allied Health Professions
University of Nebraska Medical Center

I. DESCRIPTIVE INFORMATION

The name of the institution proposing the program: University of Nebraska Medical Center (UNMC)

Administrative Unit for the new Departments: College of Allied Health Professions (CAHP)

Date approved by governing board: Pending

Date of implementation: Proposed date of implementation July 1, 2020

Description & purpose of proposed units:
In accordance with continuous quality improvement principles, and in response to significant growth since transitioning to a college in 2015, the CAHP proposes to reconfigure its organizational structure to more closely align that of other UNMC colleges (see Appendix A). The CAHP proposes to designate the unit of "department" as the primary organizational unit, and consolidate existing and future health professions education and other degree programs within a department structure.

The determination of the constituent programs of a given department will be based on both related areas of curricular content and clinical responsibilities (see Table 1). The CAHP proposes creating the following departments:

- Department of Clinical, Diagnostic, and Therapeutic Sciences
- Department of Medical Sciences
- Department of Health Sciences and Rehabilitation
- Department of Health Professions Education, Research, and Practice

The Department of Medical Imaging and Therapeutic Sciences, currently the only existing department in the CAHP, will be renamed the Department of Clinical, Diagnostic, and Therapeutic Sciences in accordance with the guidelines noted above.

The new organizational structure will ensure effective and efficient operations, including but not limited to, communication, strategic planning, fiscal planning and management, staffing, coordination, research development and planning, and governance. The departmental structure also will position the CAHP for future projected growth.

Table 1. Proposed CAHP Departments with Constituent Health Profession Education Programs (or functional areas)

Department of Clinical, Diagnostic, and Therapeutic Sciences	Department of Medical Sciences	Department of Health Sciences and Rehabilitation	Department of Allied Health Professions Education, Research, and Practice
Cardiovascular Interventional Technology	Clinical Perfusion	Physical Therapy	Master's Program in Health Professions Teaching and Technology
Computed Tomography	Cytotechnology	Occupational Therapy	Existing & new CAHP interprofessional coursework & degree programs
Diagnostic Medical Sonography	Genetic Counseling		Distance Education/NU Online programs
Magnetic Resonance Imaging	Medical Nutrition		
Medical Laboratory Science	Physician Assistant		
Radiation Therapy			
Radiography			

II. REVIEW CRITERIA

A. Centrality to Role and Mission of the Institution

The College of Allied Health Professions is one of six health profession education colleges at UNMC. The mission of the CAHP is to prepare a highly qualified allied health workforce to serve Nebraska, the region and the world, and to contribute to the ongoing advancement of knowledge in the allied health fields. The CAHP is integral to UNMC's mission to lead the world in transforming lives to create a healthy future for all individuals and communities through premier educational programs, innovative research and extraordinary patient care.

As the CAHP continues to grow in educational offerings, enrollment, research funding, and personnel, the departmental structure will enable and ensure effective and efficient operations. The department structure will engage more individuals in collaborative decision-making, and proposes to:

- Improve public awareness, branding, and student recruitment
- Improve efficiency (promote standardization to the extent permitted by accreditation)
- Enhance decision making, including strategic planning and fiscal planning and management
- Enhance leadership development & succession planning
- Provide greater opportunities for shared curriculum/IPE
- Enhance faculty recruitment
- Enhance the opportunity for funding (grant & philanthropic)

- Enhance engagement between program directors (promote innovation & adoption of best practices)
- Facilitate faculty development and mentoring
- Facilitate space planning

B. Consistency with the Comprehensive Statewide Plan for Postsecondary Education
Creating a departmental structure is consistent with the vision and major statewide goals outlined in the Nebraska Coordinating Commission for Postsecondary Education *Comprehensive Statewide Plan for Postsecondary Education (Plan)* (https://ccpe.nebraska.gov/sites/ccpe.nebraska.gov/files/COMP%20PLAN-updated%20October%202018.pdf). Promoting the efficiency and effectiveness of the CAHP across all of its functions will allow the CAHP to participate in the achievement of the major statewide goals for postsecondary education outlined in the *Plan*, particularly the goals associated with meeting the needs of students, meeting the needs of the state, and building exemplary institutions.

C. Evidence of Need and Demand
Since its transition to a college in 2015, the CAHP has experienced growth in enrollment, programs, personnel, and extramural funding. The CAHP has added a new master's degree program in health professions teaching and technology and two new health professions education programs in genetic counseling and occupational therapy. In addition, the CAHP has plans to expand enrollment in its existing diagnostic medical sonography and clinical perfusion programs.

According to the UNMC Education Master Plan (revised March 2019), in Fall 2018 the CAHP had a total enrollment of 631 students, including students on the Omaha and Kearney campuses and students enrolled in distance education programs. This represents a 13.5% increase in total enrollment from 2015. The CAHP projects a growth in total enrollment by 2025 to 887 students, representing an almost 60% from 2015 enrollment. In comparing FY 2015 to FY 2019, the CAHP also experienced an approximate 15% increase in employees and an 11% increase in research expenditures. The CAHP has budgeted for an additional approximately 8.25 FTE for the new occupational therapy education program, to be added over the next two to three years.

As noted above, the proposed departmental structure will ensure both the effectiveness and efficiency of current operations, and position the CAHP for success as it continues its anticipated growth trajectory. A draft proposal to reconfigure the organizational structure was developed by the CAHP administration and program directors, and subsequently reviewed by all members (faculty and staff) of the CAHP. Feedback was incorporated into a final proposal that was approved by the CAHP Leadership Council in June 2019.

D. Adequacy of Resources
No new state funding is required to create the departmental structure for the CAHP (see Table 2). Each of the four departments will have a designated department chairperson (TBD). Existing CAHP auxiliary funds will be used to provide special appointment administrative stipends for the newly created positions of department chairperson at the projected amount of $7500/chairperson/fiscal year. Additionally, some future cost savings are anticipated resulting from shared staffing efficiencies within departments (see Table 3).

In summary, the College of Allied Health Professions at UNMC is recommending approval of the following:

1. Creation of the Department of Clinical, Diagnostic, and Therapeutic Sciences by renaming the existing Department of Medical Imaging and Therapeutic Sciences as the Department of Clinical, Diagnostic, and Therapeutic Sciences

2. Creation of the Department of Medical Sciences

3. Creation of the Department of Health Sciences and Rehabilitation

4. Creation of the Department of Allied Health Professions Education, Research, and Practice

Appendix A

UNMC Colleges Departmental Structures & Names

College of Dentistry	College of Medicine	College of Nursing	College of Pharmacy	College of Public Health
Surgical Specialties	22 Medical Specialty Departments • Anesthesia • Dermatology • Emergency Medicine • Family Practice • Internal Medicine • Medical Genetics • Neurology • Neurosurgery • OB/GYN • Ophthalmology • Oral & Maxillofacial Surgery • Orthopaedics • Otolaryngology • Pathology • Pediatrics • Physical Medicine & Rehabilitation • Plastic Surgery • Psychiatry • Radiation Oncology • Radiology • Surgery • Urology	Omaha	Pharmacy Practice & Science	Biostatistics
Dental Hygiene		Lincoln	Pharmaceutical Science	Epidemiology
Growth & Development		Kearney		Health Promotion, Social & Behavioral Health
Adult Restorative		West Nebraska		Environmental, Agriculture & Occupational Health
Oral Biology		Northern Nebraska		Health Services Research & Administration

TABLE 2: PROJECTED EXPENSES - NEW ORGANIZATIONAL UNIT
UNMC College of Allied Health Professions Departmental Structure

	(FY 2020-21) Year 1		(FY 2021-22) Year 2		(FY 2022-23) Year 3		(FY 2023-24) Year 4		(FY 2024-25) Year 5		**Total**
Personnel	**FTE**	Cost	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost	**Cost**
Faculty [1]											
Non-teaching staff: Professional											
Graduate Assistants											
Non-teaching staff: Support											
Subtotal	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	$0
Operating											
General Operating											
Equipment											
New or Renovated Space											
Library/Information Resources											
Other [2]		$30,000		$30,000		$30,000		$30,000		$30,000	$150,000
Subtotal		$30,000		$30,000		$30,000		$30,000		$30,000	$150,000
Total Expenses		$30,000		$30,000		$30,000		$30,000		$30,000	$150,000

[1] Faculty holding existing positions will be provided an administrative stipend for the special appointment as department chair.

[2] Additional Other Expenses: Administrative stipends at $7,500 each for four department chairs.

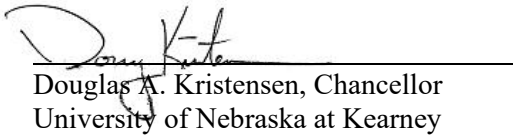
TABLE 3: PROJECTED REVENUES - NEW ORGANIZATIONAL UNIT
UNMC College of Allied Health Professions Departmental Structure

	(FY 2020-21) Year 1	(FY 2021-22) Year 2	(FY 2022-23) Year 3	(FY 2023-24) Year 4	(FY 2024-25) Year 5	**Total**
Reallocation of Existing Funds [1]	$30,000	$23,750	$17,500	$17,500	$17,500	$106,250
Required New Public Funds						
1. State Funds						
2. Local Funds						
Tuition and Fees						
Other Funding						
Salary Cost Savings [2]	$0	$6,250	$12,500	$12,500	$12,500	$43,750
Total Revenue	$30,000	$30,000	$30,000	$30,000	$30,000	$150,000

[1] CAHP Auxiliary Funds; redistribution of funds will have no impact on students, faculty, or programs.

[2] Anticipated cost savings through efficiencies of program support staff supporting multiple programs within department.

TO:	The Board of Regents	Addendum X-A-4
	Academic Affairs	
MEETING DATE:	February 7, 2020	
SUBJECT:	Honorary Degrees and Awards	
RECOMMENDED ACTION:	Approve the award of Honorary Degrees and Awards [Please note: this item may be voted on after the Closed Session]	
PREVIOUS ACTION:	The Board of Regents approved the current policies for awards found in the *University of Nebraska Board of Regents Policies* under RP-1.5.1 through RP-1.5.5.	
EXPLANATION:	None	
PROJECT COST:	None	
SOURCE OF FUNDS:	None	
SPONSOR:	The Board of Regents Committee on Honorary Degrees and Awards	
RECOMMENDED:	Walter E. Carter, President University of Nebraska	
DATE:	January 10, 2020	

TO:	The Board of Regents	Addendum X-B-1
	Business Affairs	
MEETING DATE:	February 7, 2019	
SUBJECT:	Agreement with Enrollment Advisory Group, LLC. For International Student Recruitment	
RECOMMENDED ACTION:	Approve an Agreement with Enrollment Advisory Group, LLC. for International Student Recruitment	
PREVIOUS ACTION:	None	
EXPLANATION:	In order to sustain and grow student enrollment, UNK requests approval to enter into an agreement with Enrollment Advisory Group, LLC. (EAG) to recruit full-time international undergraduate students. Since the amount paid to EAG is contingent upon the success of their international student recruitment strategies, campus officials pursuant to Nebraska law desire to use the Board of Regents meeting structure to accommodate the public notice and signature requirements under Neb. Rev. Stat. § 73-204, requiring any contingent fee contract reasonably anticipated to result in the payment of contingent fees in excess of $25,000 per year to be executed by the highest executive officer upon 30 days' notice to the public. The contract is a three (3) year term. Terms of the agreement provide EAG an upfront marketing fee to support staffing commitments in key markets. Key markets include India, South and Southeast Asia, the Middle East and North Africa. Currently, the majority of UNK international students come from Japan, China, and South Korea. UNK pays EAG a fee equal to 25% of the First and Second Year Tuition, and 20% the Third and Fourth Year. This item has been reviewd by the Business Affairs Committee.	
PROJECT COSTS:	$41,500 Annually $320,000 3-Year Projected Revenue Sharing	
SOURCE OF FUNDS:	International Tuition Revenues	
SPONSOR:	Jon C. Watts Vice Chancellor for Business and Finance	
RECOMMENDED:	 Douglas A. Kristensen, Chancellor University of Nebraska at Kearney	
DATE:	January 10, 2020	

ENROLLMENT ADVISORY GROUP
GLOBAL SOLUTIONS

REPRESENTATION AGREEMENT

This Representation Agreement ("Agreement") is entered into as of the ___ day of February, 2020 (the "Effective Date") by and among **THE BOARD OF REGENTS OF THE UNIVERSITY OF NEBRASKA**, a public body corporate of the State of Nebraska and governing body of the University of Nebraska at Kearney, a public university duly organized and existing under the laws of the State of Nebraska located at 2504 9th Avenue, Kearney, NE 68849 (hereinafter referred to as "Institution") and **ENROLLMENT ADVISORY GROUP, LLC**, a Massachusetts limited liability company located at 94 Red Hawk Drive, Cranston, RI 02921, hereinafter "EAG", individually referenced as "Party" and collectively referenced as "Parties."

WHEREAS, the Institution is a public university operating in Nebraska which is accredited by the Higher Learning Commissions (HLC) and which awards baccalaureate and master's degrees; and

WHEREAS, EAG is actively engaged in the recruitment of qualified international students who are interested in pursuing post-secondary educational opportunities in the United States; and

WHEREAS, the Institution wishes to expand its ability to recruit international undergraduate and graduate students; and

WHEREAS, EAG has an experienced team of international student recruitment professionals who have established relationships in many countries; and

WHEREAS, EAG and the Institution wish to establish a strategic alliance through which EAG, working with its established network of international recruiters, will recruit students interested in pursuing an undergraduate or graduate education in Nebraska to the Institution;

NOW, THEREFORE, in consideration of the promises and agreements set forth herein, the Parties agree as follows:

1. The Program.

(a) The Institution hereby retains EAG to mobilize its network of international agents to recruit students to attend the Institution as described in Exhibit A (the "Program"). Any services, functions, responsibilities, activities or tasks that are not specifically described in this Agreement or in Exhibit A, but that are reasonably required for the proper performance and delivery of the Program and that are a necessary or inherent part of such Program, as customarily performed by EAG in the ordinary course of its business, shall be deemed to be implied by and included within the scope of the Program, except to the extent of any limitations set forth in this Agreement.

(b) EAG agrees that in performing and providing the Program under this Agreement, it shall (i) allocate the performance of the Program to sufficient personnel with appropriate experience, knowledge and competence, (ii) conduct itself in a professional manner and in accordance with generally accepted standards of care,

diligence and methods used in connection with the provision of similar services in the higher education industry, and (iii) comply with applicable international, federal and state laws and regulations and the applicable standards, policies and procedures of any governmental authority or educational agency and Institution policies and standards with respect of the Program and to the conduct of the activities contemplated hereby, including without limitation those of the U.S. Department of Education, The Higher Learning commission and the Nebraska State Higher Education Agency (collectively, "Applicable Law"). EAG shall have complete discretion to supervise and manage its employees and third-party contractors providing the Program; provided, however, EAG shall, upon reasonable request of Institution, remove an employee or third-party contractor from providing Program services to Institution. Institution shall have the right to ensure that the Program, whether provided by EAG or through a third-party contractor, are being undertaken in accordance with Applicable Law and the performance standards specified in this Agreement.

(c) Representations Regarding Accreditation. In performing the Services, EAG shall not represent to a prospective student, student recruitment channels or other third party that Institution possesses any institutional or programmatic accreditation other than accreditations that Institution states it possesses in its then current catalog and nothing in this Agreement will allow Institution, its affiliates, agents, or employees to claim for itself or infer any accredited status other than that held by Institution.

(d) Institution shall retain sole responsibility and authority over all Core Academic and Admissions Functions set forth on Exhibit C, attached hereto and incorporated herein, relating to Institution, including but not limited to, determination of course and program content, establishment of the number of student enrollments to Institution, establishment of admissions and scholarship criteria, standards of academic progress, assessment and the award of all academic credentials. Any functions, responsibilities, activities or tasks that are not specifically described in this Agreement or in Exhibit C, but that are reasonably required for the proper performance and delivery of the Core Academic and Admissions Functions and that are a necessary or inherent part of such functions, as customarily performed by Institution in the ordinary course of its business, shall be deemed to be implied by and included within the scope of the Core Academic and Admissions Functions hereunder, except to the extent of any limitations set forth in this Agreement.

(e) Institution shall be responsible for preparation and issuance of all required Department of Homeland Security forms and documents necessary for accepted international students to apply for student visas, including I-20 forms, and will provide reasonable assistance for international students to maintain student visa status in the United States.

2. Term of Agreement. The initial term of this Agreement shall be for three (3) years from the Effective Date (the "Initial Term"). This Agreement may be extended by the Institution for two (2) additional one (1) year periods upon written mutual agreement by both Parties with written notice at least ninety (90) days prior to the expiration of the then current term of the Agreement (the "Renewal Term"). Collectively the Initial Term and Renewal Term shall be referred to as the "Term." During the Term, the Parties shall annually review this Agreement and in good faith determine whether it is appropriate or desirable to amend or modify the terms and conditions of this Agreement, including the Program provided by EAG hereunder.

3. Ethical Standards. EAG shall abide by NAFSA's Statement of Ethics for International Educators. As such, EAG agrees:

(a) Student welfare is the first priority;

(b) Culturally sensitive and ongoing communication with prospective students is essential;

(c) Accuracy, honesty and accountability with partners, prospective students and enrolled students are hallmarks of ethical promotion and retention;

(d) Trained recruiters, marketers, advisers and others must be aware of ethical issues and be trained to act responsibly in the recruitment and retention process; and

(e) This is a non-exclusive agreement and Institution can appoint other recruiters as it may choose in any country or area.

4. Foreign Corrupt Practices Act. EAG represents, warrants, and undertakes that it will comply with all applicable anti-bribery laws and regulations, including, without limitation, the U.S. Foreign Corrupt Practice Act of 1977, as amended, or the U.K. Bribery Act of 2010, as amended, and shall not cause the Institution nor its employees to be in breach of any applicable anti-bribery laws. Without limiting the generality of the foregoing, in performing the Program under this Agreement, neither EAG nor any of its officers, directors, employees, agents or other representatives will pay, offer or promise to pay, or authorize the payment of, any money, or give or promise to give, or authorize the giving of, any services or anything else of value, either directly or through a third party, to any official or employee of any governmental authority or instrumentality, or of a public international organization, or of any agency or subdivision thereof, or to any political party or official thereof, or to any candidate for political office, or to any other entity, person or entity, corruptly for the purpose of (a) influencing any act or decision of that person in his/her official capacity, including a decision to fail to perform his/her official functions with such governmental agency or instrumentality or such public international organization, or such political party, or any other entity, person, or entity, or to perform such functions improperly, (b) inducing such person to use his/her influence with such governmental agency or instrumentality or such public international organization or such political party, or any other entity, person or entity to affect or influence any act or decision thereof, (c) obtaining, or retaining business, or (d) securing any improper advantage. EAG warrants and promises that neither it nor any of its officers, employees, directors or agents has made, prior to the date of this agreement, any offer, payment, promise, gift or authorization of the sort described

herein. EAG will immediately notify Institution if, at any time during the Term of this Agreement, EAG's circumstances, knowledge or awareness changes such that EAG would not be able to certify the representations and warranties set out above.

5. Education Records; Accreditation and Licenses.

(a) EAG acknowledges that in connection with the Program, it may have access to Education Records (as defined below) of students who participate in programs offered by Institution or EAG (collectively, "Institution Students"). EAG agrees that to the extent that it maintains Education Records, it shall maintain such Education Records in accordance with the requirements of the Family Educational Rights and Privacy Act, as amended ("FERPA"), the Gramm-Leach Bliley Act, as amended ("GLBA), and any other applicable laws, regulations or accrediting agency standards applicable to the privacy or confidentiality of such Education Records of Institution Students. Without limiting the foregoing, EAG agrees that:

(i) It is subject to the requirements of 34 C.F.R. § 99.33(a) governing the use and redisclosure of personally identifiable information from Education Records;

(ii) It shall not disclose or allow access to personally identifiable information from an Education Record of any student enrolled in Institution without prior written consent of the eligible student (as defined in 34 C.F.R. § 99.3), except as permitted by law; and

(iii) To the extent that Institution discloses personally identifiable from Education Records to EAG under this Agreement, EAG's officers, employees, and agents shall use and shall have access to the information only for the purposes for which the disclosure is made. Pursuant to FERPA requirements, all records or Institution Students, regardless of whether maintained directly by Institution, EAG, or by other entities, remain the property of Institution. EAG agrees to access and use the Education Records of Institution Students only for legitimate and lawful educational purposes, pursuant to Institution's FERPA policy, and further agrees to return or destroy such Educational Records of Institution Students immediately upon the written request of Institution. As used herein, "Education Records" means all such records described by 34 C.F.R. § 99.3 maintained by, for or on behalf of Institution, including without limitation, any record, file, data or other information concerning any student's financial information protected under GLBA.

(b) The Parties have set forth the terms, conditions and responsibilities in this Agreement in the good faith belief that they are fully in compliance with all legal and accreditation requirements generally applicable to Institution and specifically applicable to International Students; provided, however, in the event that Institution reasonably determines that the performance of any particular service by EAG is in violation of such legal or accreditation requirements, or creates a third party servicer

relationship, the Parties agree that such service shall be promptly modified to the extent reasonably necessary to secure continued compliance with such legal and accreditation requirements. Upon such determination, Institution and EAG shall negotiate in good faith to modify this Agreement so as to effect the original intent of the Parties to this Agreement as closely as possible in a mutually acceptable manner in order that the transactions contemplated by this Agreement are accomplished as originally contemplated to the greatest extent possible and in order to achieve, to the greatest extent possible, the same overall economic, financial and business arrangement contemplated hereunder and in order to ensure that the Parties realize and achieve the benefit of their bargain as set forth in this Agreement.

6. Exchange of Information. Parties acknowledge that a free exchange of information between them will be required for the Program to be effective. Subject to Applicable Law and the confidentiality provisions set forth in this Agreement, each Party agrees to promptly provide the other Party with any information that may be reasonably requested related to the operation of the Program. While maintaining compliance with all federal, state and Institution policies and regulations including FERPA, the Institution will keep EAG apprised of the success of students enrolled through the Program. The Institution will provide EAG staff members with requested information concerning the monitoring of recruited international students of the Program through the admissions process while complying with all federal, state and Institution policies and regulations.

7. Applicant Decisions and Scholarship Awarding. The Institution governs all admissions and/or scholarship decisions for EAG applicants. EAG is responsible for accurately communicating the Institution's admissions and/or scholarship criteria to prospective students and third-party agencies.

8. Performance Based Compensation. Except for the agreed upon annual marketing expense allowances to be provided to EAG by the Institution described below, the Institution will not be required to make any payments to EAG until EAG has successfully recruited students who have enrolled in the Institution. EAG acknowledges that it will be compensated for its services according to the success-based fee model set forth in Exhibit B (the "Commission"). EAG will be responsible for all of the costs incurred by EAG to mobilize its international agent network on behalf of the Institution and to operate the Program including all travel costs, commissions to be paid to any international agents in the EAG network and its own legal fees and expenses.

Marketing expense allowance payment schedule:

Due on or prior to:	Amount
Thirty (30) calendar days after the Effective Date	$41,500
February 1, 2021	$41,500
February 1, 2022	$41,500

These marketing expense allowances are non-refundable. EAG will provide the Institution proof of expenses associated with the stated marketing expense allowance by December 31st for the preceding year.

9. Institution Marketing and Communication.

(a) The Institution will support the Program and EAG's international student recruitment activities on behalf of the Institution by providing, at no cost to EAG, marketing materials and literature in English that may be used by EAG and its agent network. In the event that EAG will produce written materials referencing the Institution, EAG will ensure such materials meet Institution's marketing and branding requirements. Any such materials must be approved by Institution prior to publication, online or print.

(b) The Institution will provide EAG with access to its campus and reasonable local support to allow for campus visits by prospective students and by EAG's agents. The Institution will provide EAG staff with an Institution email address for the limited purpose of communicating to prospective students and registering for in-market college fairs. The EAG staff with Institution emails will comply with all applicable Institution policies. These email addresses and accounts remain under the control of the Institution at all times and can be accessed, monitored and suspended at any time as deemed necessary by the Institution without the prior consent or notice to EAG.

10. Use of Marks. The Institution is the sole owner of all right, title, and interest to all Institution information, including the Institution's name, logo, acronym, trademarks, trade names, and copyrighted information, unless otherwise provided, including all associated goodwill (collectively, "Institution Property"). The Institution hereby grants to EAG a limited, non-exclusive license to use certain Institution Property, solely in connection with Institution marketing and communication and in accordance with established Institution branding guidelines. EAG shall not use the Institution's Property in a manner that states or implies that the Institution endorses EAG or EAG's products and/or services. It is understood that the Institution retains the right to review and approve in advance all uses of such intellectual property in its sole discretion. This approval shall not be unreasonably withheld.

Upon expiration or termination of this Agreement for any reason, EAG agrees to immediately cease further use of Institution Property and all rights granted to EAG in this Agreement shall revert to the Institution.

11. Institution Articulation Agreements. The Institution will support the Program and EAG's international student recruitment activities on behalf of the Institution through the development of articulation agreements with foreign institutions of higher education for its academic programs. EAG will present the Institution with opportunities for consideration for articulation agreements which will be reviewed and approved by the Institution in its sole discretion.

12. Status of Employees. Whenever EAG utilizes its employees to perform services pursuant to the Program, such employees shall at all times remain subject to the direction and control of EAG and Institution shall have no liability to such persons for their welfare, salaries, fringe benefits, legally required employer contributions and tax obligations by virtue of the relationships established under this Agreement. Notwithstanding the preceding sentence, employees of EAG present on Institution's campus shall be subject to Institution's policies, accessible athttp://www.unk.edu/about/compliance/policies.php. Upon

written request of Institution, EAG will provide job descriptions of its employees who perform services pursuant to the Program on the Institution's campus.

13. Independent Contractor. EAG is an independent contractor and is solely responsible for maintenance and payment of insurances and the like that may be required by federal, state or local law with respect to any sums paid. EAG has no authority to bind or commit the Institution to any agreement or obligations. The terms of this Agreement are not intended to cause any of the Parties to become a joint employer for any purpose.

14. Representation and Warranties. EAG hereby represents and warrants to Institution, as of the date hereof, that:

(a) EAG is a corporation, duly organized, validly existing and in good standing under the laws of the State of Massachusetts and qualified to do business in the State of Nebraska;

(b) EAG has taken all necessary corporate action to authorize the execution, delivery and performance of its obligations under this Agreement, which action has not been superseded or modified, and this Agreement constitutes the legal, valid and binding obligation of EAG, enforceable in accordance with its terms;

(c) the execution, delivery and performance of this Agreement by EAG does not violate (i) its articles of incorporation, bylaws, or any action of its Board of Directors; (ii) any material contract to which it is a party; or (iii) any law, rule, regulation, order, writ, judgment, injunction, decree or determination affecting it or any of its properties; and

(d) no authorization or approval (other than those already obtained) or other action by, and no notice to, or filing with, any Governmental Authority, Educational Agency or other regulatory body is required on or before the date hereof for the due execution, delivery and performance by EAG of this Agreement.

15. Termination.

(a) The Parties may terminate this Agreement by mutual consent at any time.

(b) This Agreement shall automatically terminate:

i) Upon the bankruptcy or dissolution of EAG;

ii) Upon the bankruptcy or dissolution of Institution; or

iii) In the event that any Governmental Authority or Educational Agency shall have issued an order or ruling or taken any other action restraining, enjoining or

otherwise prohibiting the transactions contemplated by this Agreement or any related agreement.

(c) Either EAG or Institution may terminate this Agreement in the event of a material breach by the other Party of any terms hereof if such breach shall not have been cured within thirty (30) days after written notice of the breach is delivered to the defaulting Party or, if such breach requires more than thirty (30) days to cure, if such cure is not commenced within thirty (30) days and thereafter diligently prosecuted, but in no event shall the cure period extend beyond ninety (90) days ("Termination for Cause").

16. Teach Out Obligations. In the event of termination of this Agreement, then in each case the following will apply:

(a) Institution will continue to provide all Core Academic and Admissions Functions until all international students then enrolled in the educational programs of Institution pursuant to the Program as of the termination date have completed their respective programs (the "Teach Out Period"). Except as may be required by Applicable Law, Institution will not have any obligations to continue to satisfy its obligations under this section with respect to any student(s) who fail to make satisfactory academic progress (as defined under standards applicable to or adopted by Institution) during the Teach Out Period and in no event will the Teach Out Period exceed five (5) years from the date of termination.

(b) Each Party will cooperate with all reasonable requests for information or records by the other Party subject to Applicable Law and the provisions of this Agreement related to Confidential Information.

17. Payment Following Termination. The Institution acknowledges and agrees that EAG is expected to incur significant costs to operate the Program and to recruit international students on behalf of the Institution and agrees that the termination or expiration of this Agreement for any reason will not limit EAG's entitlement to receive the full amount of compensation set forth in Exhibit B for any student recruited by EAG to attend the Institution prior to the date of the termination or expiration of this Agreement. For the purpose of interpreting this section, a student will be considered to be a student who was recruited by EAG if that student was enrolled at or accepted for admission to the Institution on the time of the termination or expiration of this Agreement, or if that student had submitted an application to the Institution at that time and is enrolled by the Institution within one year following the date of that application.

18. No Guaranty of Success. Parties agree and understand that the recruitment of international students is subject to competitive factors and can be influenced by economic, political and regulatory factors that are beyond the control of EAG. EAG will use reasonable continuing efforts to recruit international students for enrollment at the Institution but does not guarantee the number of students that will be recruited to the Institution in any academic year.

19. Confidential Information and Privacy Notice. Each Party agrees that all information and documents (whether financial, technical or otherwise) obtained by it or by any of its employees or agents pursuant to the terms and provisions of this Agreement which are not generally publicly available shall remain the property of the disclosing Party and shall not be used or relied upon for any purpose other than connection with the operation of the Program and that all such information and documents shall be kept confidential and shall not be disclosed to any person or entity by the receiving Party without the prior written approval of the disclosing Party. Without limiting the foregoing definition and to the extent allowed by law, the Parties agree that the identity of the agents in the EAG network of international agents is confidential and proprietary information of EAG, it being understood that Institution is a public institution, and, as such, is subject to the Nebraska Open Records Act, Neb. Rev. Stat. §§ 84-712 et seq., and that Institution's obligations under this Act supersede its obligations under this Agreement. Each Party to this Agreement will secure the written consent to the confidentiality terms set forth in this section from any person who is not an employee, partner, member or shareholder of such Party prior to disclosing any such information to that party and those parties will be bound by the confidentiality provisions set forth herein as though an original party to this Agreement (provided that this requirement will not apply to attorneys and other professional advisors who are subject to a duty to keep such information confidential). Each Party agrees to act reasonably and promptly to prevent and/or to correct the violation of the confidentiality provisions set forth in this Agreement by its employees and agents. Both Parties will abide by laws established to protect the security of personally identifiable information or sensitive personally identifiable information, including General Data Protection Requirements (GDPR). The Parties agreement regarding compliance with GDPR is attached hereto and incorporated herein as Exhibit D. Each Party to this Agreement agrees that the confidentiality provisions set forth in this section of this Agreement will survive the termination or expiration of this Agreement.

20. Agreed Upon Restrictions on Competition. EAG is granted nonexclusive permission to represent Institution to recruit qualified international students, except as otherwise described herein. Nothing in this Agreement will prevent the Institution from advertising for and directly recruiting international students. The Institution can continue working with established third-party agents with whom the Institution has agreements which are attached hereto and incorporated herein as Exhibit E. If the Institution finds a third-party agent who it would like to work with after the Effective Date of this contract, the Institution will first ensure that the respective agent is not already established with EAG. If the agent is already in partnership with EAG, the Institution will not form a relationship with this agent.

21. Indemnification; Obligation to Correct. EAG shall jointly and severally indemnify, defend and hold harmless Institution and its Regents, directors, trustees, managers, officers, employees, agents, affiliates, successors and permitted assigns (collectively, "Institution Indemnified Parties") from and against all liabilities, losses, damages, claims, demands, causes of action, deficiencies, taxes, fines, costs and expenses, interest, awards, judgments and penalties actually incurred by them and arising out of or by virtue of or resulting from any of the following:

(a) Any material breach of any representation, warranty, or agreement made or to be performed by EAG pursuant to this Agreement (whether such Program services are performed by EAG or an affiliate of EAG);

(b) Any breach of any covenant made or to be performed by EAG pursuant to this Agreement; and

(c) The reasonable cost to the Institution Indemnified Parties of enforcing this indemnity against EAG. Without limitation of any other rights and remedies available at law or equity, in the event of any breach of this Agreement by EAG with respect any error or defect in the provision of any of the Program services, EAG shall, at Institution's request, correct such error or defect or re-perform such Program service in a timely manner and at the reasonable expense of EAG.

22. Insurance. EAG shall, at EAG's sole cost and expense, obtain and maintain the minimum insurance coverages set forth below. By requiring such minimum insurance, Institution shall not be deemed or construed to have assessed the risk that may be applicable to EAG under this Agreement. EAG shall assess its own risks and, if it deems appropriate and/or prudent, maintain higher limits and/or broader coverages. EAG is not relieved of any liability or other obligations assumed or pursuant to this Agreement by reason of its failure to obtain or maintain insurance in sufficient amounts, duration, or types. Any carrier providing coverage shall have a minimum A.M. Best's Insurance Guide rating of "A-VII."

Coverages:

1. Commercial General Liability coverage of at least $1,000,000 per occurrence and $2,000,000 in the annual aggregate. Coverage to include:

   a. Premises and operations
   b. Personal injury/advertising injury
   c. Products/completed operations
   d. Liability assumed under an insured contract (including tort liability of another assumed in a business contract)
   e. Independent contractors

2. Automobile Liability – coverage to include:

   a. Owned vehicles
   b. Leased vehicles
   c. Hired vehicles
   d. Non-owned and employee non-owned vehicles
   e. Personal injury protection (where applicable)

3. Workers' Compensation and Employers' Liability:

   a. EAG shall name the Institution and its regents, officers, employees, agents, and volunteers as Additional Insureds. All policies must be written on a primary basis, non-contributory with any other insurance coverages and/or self-insurance carried by Institution. All policies must contain a waiver of subrogation clause. A certificate of insurance evidencing all coverages required is to be provided at least five (5) business

days prior to the inception date of this Agreement. Policies may not be non-renewed, cancelled, or materially changed or altered unless thirty (30) days advance written notice is provided to the Institution.

23. Notices. All notices, consents, approvals, demands, requests or other communications required or permitted to be given under any of the provisions of the Agreement will be in writing and will be sent to the person(s) and address(es) set forth below via certified mail, hand delivery, overnight courier, facsimile transmission (to the extent a facsimile number is set forth below), or email (to the extent an email address is set forth below). All such notices shall be effective when received.

Institution:
University of Nebraska Kearney
Attn: Tim Burkink
2124 Warner Hall
2504 9th Avenue
Kearney, Nebraska 68849

With Copy To:
University of Nebraska Kearney
Office of Business Services
2124 Warner Hall
2504 9th Avenue
Kearney, Nebraska 68849

EAG:
Kenneth DiSaia, President
Enrollment Advisory Group
94 Red Hawk Drive
Cranston, RI 02921

24. Fair Labor Standards. Pursuant to Nebraska Revised Statutes § 73-102, EAG states that it is complying with, and will continue to comply with, fair labor standards in the pursuit of its business and in the execution of the Agreement and that fair labor standards shall be maintained for the term of the Agreement.

25. Work Status Verification. EAG and its subcontractors shall use a federal immigration verification system to determine the work eligibility status of new employees physically performing services with the State of Nebraska pursuant to Neb. Rev. Stat. §§ 4-108 to 4-114 as amended.

26. Excluded/Debarred Contractors. EAG certifies and warrants that it has not been debarred, suspended, or declared ineligible as defined in the Federal Acquisition Regulation (FAR) 48 C.F.R. Ch.1 Subpart 9.4. EAG also certifies that EAG, its partners, directors, officers, employees, licensees, subcontractors or agents have not been excluded, debarred, or otherwise ineligible to participate in the Federal health care programs pursuant to 42 USC § 1320a-7. This shall be an ongoing certification and warranty during the term of the Agreement and EAG shall immediately notify Institution of any change

in the status of the certification and warranty set forth in this section. If EAG becomes excluded from Federal health care program participation or placed on the Consolidated List of Debarred, Suspended, and Ineligible Contractors, the Agreement may be terminated immediately, for cause, by Institution. If any partners, directors, officers, employees, licensees, subcontractors, personnel or agents of EAG become excluded from Federal health care program participation, such individual shall be removed from participating in this Agreement immediately. Failure by EAG to remove such excluded individual immediately shall provide Institution the right to terminate the Agreement immediately for cause.

27. Equal Opportunity. This contractor and subcontractor shall abide by the requirements of 41 CFR 60-1.4(a), 60-300.5(a) and 60- 741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity or national origin. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability or veteran status.

28. Nondiscrimination. In accordance with the Nebraska Fair Employment Practice Act, Neb. Rev. Stat. §48-1122, EAG agrees that neither it nor any of its subcontractors shall discriminate against any employee, or applicant for employment to be employed in the performance of this Agreement, with respect to hire, tenure, terms, conditions or privilege of employment because of the race, color, religion, sex, disability, or national origin of the employee or applicant.

29. Nebraska Taxpayer Transparency Act. Pursuant to Nebraska's Taxpayer Transparency Act (Neb. Rev. Stat. §84-602.01, as may be amended), the Institution is required to provide the Nebraska Department of Administrative Services with a copy of each contract that is a basis for an expenditure of state funds, including any amendments and documents incorporated by reference in the contract. Copies of all such contracts and documents will be published by the Nebraska Department of Administrative Services at www.nebraskaspending.gov. It shall be the sole responsibility of EAG to notify the Institution of any requested redactions to such contracts and documents under Neb. Rev. Stat. 84-712.05(3) at the time of execution.

30. Right to Audit. EAG shall maintain documentation for all charges against Institution under the Agreement. The books, records and documents of EAG, insofar as they relate to services performed or money received under the Agreement, shall be maintained for a period of three (3) full years from the date of the final payment, and shall be subject to audit, at any reasonable time and upon reasonable notice, by Institution or its duly appointed representatives. These records shall be maintained in accordance with generally accepted accounting principles.

31. Whole Agreement. The whole agreement of the Parties is set forth in this Agreement and the Parties are not bound by any agreements, understandings or conditions otherwise than are expressly set forth herein. No changes, alterations, amendments, modifications or waivers of any of the terms or provisions hereof shall be valid unless the same is in writing and signed by the Parties.

32. Counterparts and Execution. This Agreement may be executed in one or more counterparts any or all of which shall constitute one and the same instrument. Signatures sent via facsimile or

transmitted electronically via an electronic document image will be binding to the same extent as an original signature.

33. Assignment. This Agreement is non-assignable and non-transferrable. Any attempt by either Party to assign its obligations hereunder shall be void.

34. Governing Law and Forum. This Agreement shall be governed by the laws of the State of Nebraska without giving effect to its conflicts of laws provisions. Any legal actions brought by either Party hereunder shall be in the District Court of Lancaster County, Nebraska.

35. Headings/Captions Interpretation. The captions or headings of the sections of this Agreement are inserted only as a matter of convenience and for reference and are not part of this Agreement nor do they in any way define, limit or describe the scope or intent of the particular sections to which they refer nor, shall they control or affect the meaning or construction of any of the terms or provisions of this Agreement. Parties have had the opportunity to review this Agreement with competent counsel prior to its execution and both Parties are deemed to have contributed equally to the drafting on this Agreement. Neither this Agreement nor any particular provision of this Agreement will be interpreted in favor of or against the interests of a Party based upon the identity of the person who drafted this Agreement or any particular provision of this Agreement.

[SIGNATURE PAGE TO FOLLOW]

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement on the dates set forth below. This Agreement is final and binding upon the Parties from and after the Effective Date. The Parties agree that an electronically transmitted facsimile signature will be accepted as an original signature.

ENROLLMENT ADVISORY GROUP, LLC

By: _____
Kenneth DiSaia, President
Date: _____

THE BOARD OF REGENTS OF THE UNIVERSITY OF NEBRASKA

By:_____
Walter E. Carter, Jr., President
Date:_____

Attest:_____
Carmen K. Maurer
Corporation Secretary

EXHIBIT A

Description of the Program

Services. The Program will include services reasonably determined by EAG from time to time to be necessary to introduce the Institution to international students in order to meet such international student enrollment targets as may be provided by EAG to the Institution from time to time. At a minimum, services to be provided by EAG will include:

1. EAG's international recruiters will provide 18 weeks of active visibility for the Institution in the countries in which they operate. Between Fall 2018 and Spring 2019, these countries included: Antigua and Barbuda; Bahamas; Barbados; Bermuda; Brazil; Canada; China; Dominican Republic; Ecuador; El Salvador; Guatemala; Honduras; India; Indonesia; Jamaica; Japan; Kuwait; Mexico; Morocco; Nepal; Panama; Saudi Arabia; Singapore; South Korea; St. Lucia; St. Maarten; Taiwan; Trinidad and Tobago; United Arab Emirates; and Vietnam. EAG's visibility may vary within recruiting seasons depending on market interest and/or visa approval rates. EAG team members who are executing this visibility include EAG's President, Executive VP of Operations, and International Recruiters. Activities include high school and college fairs/presentations, agency visits (training and applicant follow-up) and EducationUSA and Consulate Office visits.

2. EAG has established regional operations offices in Morocco, India, Nepal, China and Taiwan. Members of EAG's team within these offices provide in-country market visibility including, but not limited to, agent training and high school and college presentations as well as participation in third-party education fairs. Team members in these offices also follow-up with students and agencies regarding application statuses.

3. EAG will seek out government scholarship programs which could be potential matches for the Institution. Many of these government scholarship programs require minimum scholarship commitments from the receiving institution.

4. EAG will work with its third-party list providers to promote the Institution's academic programs. The third-party list agencies which EAG works with currently have lists of between 500,000 and 1.2 million names. EAG has relationships with these companies and these companies are compensated by EAG on a "pay for performance" basis.

5. EAG will promote partnerships and/or articulations between the Institution and overseas colleges and universities. The Institution will make final determination whether an articulation will be executed.

6. EAG will participate in networking events to build its third-party agent network and meet with existing third-party agents at these events. Events may include AIRC, NAFSA, ICEF, etc.

7. The Institution will have the benefit of EAG's established third-party agencies at all times during the term of this Agreement (not limited to the periods of active visibility described above) and EAG will continue to invest in the development of its third-party agent network.

8. EAG will assign a dedicated Account Manager who will serve as a link between the Institution and EAG's third-party agents. The Account Manager will also follow-up with EAG's international applicants on behalf of the Institution and assist with all steps in the enrollment process after students are accepted.

9. Through its web page dedicated to providing resources for agencies, EAG will provide a description of the Institution's programs and share links to the Institution's online digital materials to ensure consistency and accuracy of messaging in market. EAG will also publish links to the Institution's online applications. EAG will provide information in its online Agency Handbook about the Institution's application procedures and requirements, required documentation, current tuition, fees and other costs associated with attending as well as the necessary paperwork for the Institution to process an I-20.

EAG will not:

1. Engage in any dishonest practices, including suggesting to a prospective student that they can come to the U.S. on a student visa with a primary purpose other than full-time study.

2. Facilitate applications for students who do not comply with visa requirements.

3. Make any representations or offer any guarantees to students about whether they will be granted a student visa.

4. Engage in false or misleading advertising or recruitment practices.

5. Make any representations or offer any guarantees or promises to prospective students about specific courses, programs, or majors they will be able to take or enroll in, or scholarship or financial assistance.

6. Make any overt or implied claim or representation, or offer any guarantees or promises, to prospective students with respect to individual employment following the completion of any Institution program.

7. Contest admission decisions or placement recommendations into degree programs by Institution.

8. Make any representations or offer any guarantees or promises to prospective students concerning any individual students' projected ESL progress beyond materials provided by Institution.

9. Collect any money from students on behalf of Institution for the payment of tuition and fees or any other purpose. Institution shall bill and collect all tuition and fees for any students recruited by EAG, either directly from the student or from the relevant third-party sponsor.

10. Recruit, or expect to receive tuition payment for, any student who is a citizen or permanent resident of the United States.

11. Request additional compensation, outside of relevant and appropriate student commissions, for any purpose, including but not limited to marketing, advertising, visiting campus, or personnel expenses incurred in the performance of this Agreement.

EXHIBIT B

Program Commission

Compensation – Undergraduate students. Except for the annual marketing allowances, the Institution will not make any payments to EAG at the onset of the Program. The payments that the Institution will make to EAG will be based on the following fee model for undergraduate student recruitment:

- The Institution will pay EAG a pre-determined percentage (described herein) of gross tuition revenue over a period of time not to exceed four years for each entering cohort's first, second, third and fourth year as described in this Exhibit A. Furthermore, a Full-Time Undergraduate Student shall be defined as a student enrolled in a minimum of twelve (12) credit hours for each fall and spring semester of the then current year.

    - First Year Tuition Revenue means the then current non-resident gross tuition amount (excluding mandatory fees) for the first two (2) semesters of the first year of the Full-Time Undergraduate Student's enrollment at the Institution.

    - Second Year Tuition Revenue means the then current non-resident gross tuition amount (excluding mandatory fees) for the first two (2) semesters of the second year of the Full-Time Undergraduate Student's enrollment at the Institution.

    - Third Year Tuition Revenue means the then current non-resident gross tuition amount (excluding mandatory fees) for the first two (2) semesters of the third year of the Full-Time Undergraduate Student's enrollment at the Institution.

    - Fourth Year Tuition Revenue means the then current non-resident gross tuition amount (excluding mandatory fees) for the first two (2) semesters of the fourth year of the Full-Time Undergraduate Student's enrollment at the Institution.

    - With the exclusion of awarded scholarships, the Institution will not apply discounting to EAG international students in the undergraduate Program.

    - EAG is responsible for all payments made to EAG third-party agencies upon enrollment of their respective students.

Method and Timing of Payment – Undergraduate Students.

- The Institution will pay EAG a fee equal to 25% of the First and Second Year Tuition Revenue for each student in the Program immediately following the conclusion of the add/drop date (traditionally four weeks after the semester start date) of the then current semester.

- The Institution will pay EAG a fee equal to 20% of the Third and Fourth Year Tuition Revenue for each student in the Program immediately following the conclusion of the

add/drop date (traditionally four weeks after the semester start date) of the then current semester.

- The Institution will not be responsible for any fee for tuition revenue beyond each student's Fourth Year Tuition Revenue.

- Payments will be adjusted if a student drops out or reduces course load based on the Institution prorated refund schedule as amended:
  - First week of the semester = 100% tuition/fee refund
  - Second week of the semester = 75% tuition/fee refund
  - Third week of the semester = 50% tuition/fee refund
  - Fourth week of the semester = 25% tuition/fee refund
  - After the fourth week of the semester, no tuition/fee refund will be issued to the student with the exception of classes that do not follow this four week schedule as stated within the Institution's refund schedule: http://www.unk.edu/offices/student_accounts/refunds.php.

- The entire EAG fee shall be payable after the fourth week of the semester or after the student's funds are cleared by Institution, whichever is later. Any fee and payment adjustments due to tuition/fee adjustments of classes that do not follow the aforementioned four-week schedule will be reconciled between EAG and the Institution. Any reconciliations will be made to the following semester's EAG fee payment and at the termination of this Agreement.

- No commission is payable by Institution in relation to the recruited student unless EAG has submitted an invoice and all supporting documentation with respect to the amount requested in the invoice. The invoice must contain the family name and given student names and the academic program the student is enrolled in. The invoice must be on EAG letterhead and the letterhead must include the current address, telephone, fax, and email details of EAG.

Compensation – Graduate students. Except for the annual marketing allowances, the Institution will not make any payments to EAG at the onset of the Program. The payments that Institution will make to EAG will be based on the following fee model for graduate student recruitment:

- The Institution will pay EAG a pre-determined percentage (described herein) of gross tuition revenue over a period of time not to exceed two years for each student's first and second year. Furthermore, a Full-Time Graduate Student shall be defined as a student enrolled in a minimum of nine (9) credit hours for each fall and spring semester of the then current year.

  - First Year Tuition Revenue means the then current non-resident gross tuition amount (excluding mandatory fees) for the first two (2) semesters of the first year of the Full-Time Graduate Student's enrollment at the Institution.

- Second Year Tuition Revenue means the then current non-resident gross tuition amount (excluding mandatory fees) for the first two (2) semesters of the second year of the Full-Time Graduate Student's enrollment at the Institution.

- With the exclusion of awarded scholarships, the Institution will not apply discounting to EAG international students in the undergraduate Program.

- EAG is responsible for all payments made to EAG third-party agencies upon enrollment of their respective students.

Method and Timing of Payment – Graduate Students.

- The Institution will pay EAG a fee equal to 25% of the First and Second Year Tuition Revenue for each student in the Program following the conclusion of the add/drop date (traditionally four weeks after the semester start date) of the then current semester.

- The Institution will not be responsible for any fee for tuition revenue beyond each student's Second Year Tuition Revenue.

- Payments will be adjusted if a student drops out or reduces course load based on the Institution prorated refund schedule as amended:
  - First week of the semester = 100% tuition/fee refund
  - Second week of the semester = 75% tuition/fee refund
  - Third week of the semester = 50% tuition/fee refund
  - Fourth week of the semester = 25% tuition/fee refund
  - After the fourth week of the semester, no tuition/fee refund will be issued to the student with the exception of classes that do not follow this four week schedule as stated within the Institution's refund schedule: http://www.unk.edu/offices/student_accounts/refunds.php.

- The entire EAG fee shall be payable after the fourth week of the semester or after the student's funds are cleared by Institution, whichever is later. Any fee and payment adjustments due to tuition/fee adjustments of classes that do not follow the aforementioned four-week schedule will be reconciled between EAG and the Institution. Any reconciliations will be made to the following semester's EAG fee payment and at the termination of this Agreement.

- No commission is payable by Institution in relation to the recruited student unless EAG has submitted an invoice and all supporting documentation with respect to the amount requested in the invoice. The invoice must contain the family name and given student names and the academic program the student is enrolled in. The invoice must be on EAG letterhead and the letterhead must include the current address, telephone, fax, and email details of EAG.

Compensation – English Language Institute students. Except for the annual marketing allowances, the Institution will not make any payments to EAG at the onset of the Program. The payments that the Institution will make to EAG will be based on the following fee model for English Language Institute (ELI) student recruitment:

- The Institution will pay EAG a pre-determined percentage (described herein) of the ELI Program Fee for as long as the student is actively enrolled in the English Language Institute as described in this Exhibit A.

- With the exclusion of awarded scholarships, the Institution will not apply discounting to EAG international students in the undergraduate Program.

- EAG is responsible for all payments made to EAG third-party agencies upon enrollment of their respective students.

Method and Timing of Payment – English Language Institute.

- The Institution will pay EAG a fee equal to 25% of the ELI Program Fee for each student in the Program immediately following the conclusion of the add/drop date (traditionally four weeks after the semester start date) of the then current semester.

- Payments will be adjusted if a student drops out or reduces course load based on the Institution prorated refund schedule as amended:
  - First week of the semester = 100% tuition/fee refund
  - Second week of the semester = 75% tuition/fee refund
  - Third week of the semester = 50% tuition/fee refund
  - Fourth week of the semester = 25% tuition/fee refund
  - After the fourth week of the semester, no tuition/fee refund will be issued to the student with the exception of classes that do not follow this four week schedule as stated within the Institution's refund schedule: http://www.unk.edu/offices/student_accounts/refunds.php.

- The entire EAG fee shall be payable after the fourth week of the semester or after the student's funds are cleared by Institution, whichever is later. Any fee and payment adjustments due to tuition/fee adjustments of classes that do not follow the aforementioned four-week schedule will be reconciled between EAG and the Institution. Any reconciliations will be made to the following semester's EAG fee payment and at the termination of this Agreement.

- No commission is payable by Institution in relation to the recruited student unless EAG has submitted an invoice and all supporting documentation with respect to the amount requested in the invoice. The invoice must contain the family name and given student names and the academic program the student is enrolled in. The invoice must be on EAG letterhead and the letterhead must include the current address, telephone, fax, and email details of EAG.

EXHIBIT C

Core Academic and Admissions Functions

The following is a list of the "Core Academic and Admissions Functions" to be provided by Institution:

1. Educate EAG about Institution, its admissions requirements and procedures, and to answer questions and assist in the admissions process as requested.

2. Communicate changes to policy and procedures and the Academic Programs.

3. Assist the EAG team to access information about visa requirements and the process of visa application. This includes informing the International Recruitment Partner of the legal or regulatory conditions for visa requirements and of any changes to those requirements promptly after becoming aware of any such changes.

4. Provide EAG with sufficient promotional material to continuously and actively recruit students.

5. Process all completed applications received, except that Institution is under no obligation to accept any prospective student referred by EAG.

6. Admit students recruited by EAG who meet Institution's admission requirements.

EXHIBIT D

This Data Protection Addendum ("**Addendum**") forms part of the Master Services Agreement ("**Principal Agreement**") between: (i) Enrollment Advisory Group, LLC ("**Vendor**") acting on its own behalf and as agent for each Vendor Affiliate; and (ii) the Board of Regents of the University of Nebraska, by and on behalf of the University of Nebraska at Kearney ("**Company**") acting on its own behalf and as agent for each Company Affiliate.

The terms used in this Addendum shall have the meanings set forth in this Addendum. Capitalized terms not otherwise defined herein shall have the meaning given to them in the Principal Agreement. Except as modified below, the terms of the Principal Agreement shall remain in full force and effect.

In consideration of the mutual obligations set out herein, the parties hereby agree that the terms and conditions set out below shall be added as an Addendum to the Principal Agreement. Except where the context requires otherwise, references in this Addendum to the Principal Agreement are to the Principal Agreement as amended by, and including, this Addendum.

1. Definitions

1.1 In this Addendum, the following terms shall have the meanings set out below and cognate terms shall be construed accordingly:

1.1.1 "**Applicable Laws**" means (a) European Union or Member State laws with respect to any Company Personal Data in respect of which any Company Group Member is subject to EU Data Protection Laws; and (b) any other applicable law with respect to any Company Personal Data in respect of which any Company Group Member is subject to any other Data Protection Laws;

1.1.2 "**Company Affiliate**" means an entity that owns or controls, is owned or controlled by or is or under common control or ownership with Company, where control is defined as the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of an entity, whether through ownership of voting securities, by contract or otherwise;

1.1.3 "**Company Group Member**" means Company or any Company Affiliate;

1.1.4 "**Company Personal Data**" means any Personal Data Processed by a Contracted Processor on behalf of a Company Group Member pursuant to or in connection with the Principal Agreement;

1.1.5 "**Contracted Processor**" means Vendor or a Subprocessor;

1.1.6 "**Data Protection Laws**" means EU Data Protection Laws and, to the extent applicable, the data protection or privacy laws of any other country;

1.1.7 "**EEA**" means the European Economic Area;

1.1.8 "**EU Data Protection Laws**" means EU Directive 95/46/EC, as transposed into domestic legislation of each Member State and as amended, replaced or superseded from time to time, including by the GDPR and laws implementing or supplementing the GDPR;

1.1.9 "**GDPR**" means EU General Data Protection Regulation 2016/679;

1.1.10 "**Restricted Transfer**" means:

1.1.10.1 a transfer of Company Personal Data from any Company Group Member to a Contracted Processor; or

1.1.10.2 an onward transfer of Company Personal Data from a Contracted Processor to a Contracted Processor, or between two establishments of a Contracted Processor,

in each case, where such transfer would be prohibited by Data Protection Laws (or by the terms of data transfer agreements put in place to address the data transfer restrictions of Data Protection Laws) in the absence of the Standard Contractual Clauses to be established under section [6.4.3 or] 12 below;

1.1.11 "**Services**" means the services and other activities to be supplied to or carried out by or on behalf of Vendor for Company Group Members pursuant to the Principal Agreement;

1.1.12 "**Standard Contractual Clauses**" means the contractual clauses set out in Annex 2, amended as indicated (in square brackets and italics) in that Annex and under section 13.4;

1.1.13 "**Subprocessor**" means any person (including any third party and any Vendor Affiliate, but excluding an employee of Vendor or any of its sub-contractors) appointed by or on behalf of Vendor or any Vendor Affiliate to Process Personal Data on behalf of any Company Group Member in connection with the Principal Agreement; and

1.1.14 "**Vendor Affiliate**" means an entity that owns or controls, is owned or controlled by or is or under common control or ownership with Vendor, where control is defined as the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of an entity, whether through ownership of voting securities, by contract or otherwise.

1.2 The terms, "**Commission**", "**Controller**", "**Data Subject**", "**Member State**", "**Personal Data**", "**Personal Data Breach**", "**Processing**" and "**Supervisory Authority**" shall have the same meaning as in the GDPR, and their cognate terms shall be construed accordingly.

1.3 The word "**include**" shall be construed to mean include without limitation, and cognate terms shall be construed accordingly.

2. Authority

Vendor warrants and represents that, before any Vendor Affiliate Processes any Company Personal Data on behalf of any Company Group Member, Vendor's entry into this Addendum as agent for and on behalf of that Vendor Affiliate will have been duly and effectively authorized (or subsequently ratified) by that Vendor Affiliate.

3. Processing of Company Personal Data

3.1 Vendor and each Vendor Affiliate shall:

3.1.1 comply with all applicable Data Protection Laws in the Processing of Company Personal Data; and

3.1.2 not Process Company Personal Data other than on the relevant Company Group Member's documented instructions unless Processing is required by Applicable Laws to which the relevant Contracted Processor is subject, in which case Vendor or the relevant Vendor Affiliate shall to the extent permitted by Applicable Laws inform the relevant Company Group Member of that legal requirement before the relevant Processing of that Personal Data.

3.2 Each Company Group Member:

3.2.1 instructs Vendor and each Vendor Affiliate (and authorises Vendor and each Vendor Affiliate to instruct each Subprocessor) to:

3.2.1.1 Process Company Personal Data; and

3.2.1.2 in particular, transfer Company Personal Data to any country or territory,

as reasonably necessary for the provision of the Services and consistent with the Principal Agreement; and

3.2.2 warrants and represents that it is and will at all relevant times remain duly and effectively authorised to give the instruction set out in section 3.2.1 on behalf of each relevant Company Affiliate.

3.3 Annex 1 to this Addendum sets out certain information regarding the Contracted Processors' Processing of the Company Personal Data as required by article 28(3) of the GDPR (and, possibly, equivalent requirements of other Data Protection Laws). Company may make reasonable amendments to Annex 1 by written notice to Vendor from time to time as Company reasonably considers necessary to meet those requirements. Nothing in Annex 1 (including as amended pursuant to this section 3.3) confers any right or imposes any obligation on any party to this Addendum.

4. Vendor and Vendor Affiliate Personnel

Vendor and each Vendor Affiliate shall take reasonable steps to ensure the reliability of any employee, agent or contractor of any Contracted Processor who may have access to the Company Personal Data, ensuring in each case that access is strictly limited to those individuals who need to know / access the relevant Company Personal Data, as strictly necessary for the purposes of the Principal Agreement, and to comply with Applicable Laws in the context of that individual's duties to the Contracted Processor, ensuring that all such individuals are subject to confidentiality undertakings or professional or statutory obligations of confidentiality.

5. Security

5.1 Taking into account the state of the art, the costs of implementation and the nature, scope, context and purposes of Processing as well as the risk of varying likelihood and severity for the rights and freedoms of natural persons, Vendor and each Vendor Affiliate shall in relation to the Company Personal Data implement appropriate technical and organizational measures to ensure a level of security appropriate to that risk, including, as appropriate, the measures referred to in Article 32(1) of the GDPR.

5.2 In assessing the appropriate level of security, Vendor and each Vendor Affiliate shall take account in particular of the risks that are presented by Processing, in particular from a Personal Data Breach.

6. **Subprocessing**

6.1 Each Company Group Member authorises Vendor and each Vendor Affiliate to appoint (and permit each Subprocessor appointed in accordance with this section 6 to appoint) Subprocessors in accordance with this section 6 and any restrictions in the Principal Agreement.

6.2 Vendor and each Vendor Affiliate may continue to use those Subprocessors already engaged by Vendor or any Vendor Affiliate as at the date of this Addendum, subject to Vendor and each Vendor Affiliate in each case as soon as practicable meeting the obligations set out in section 6.4.

Vendor shall give Company prior written notice of the appointment of any new Subprocessor, including full details of the Processing to be undertaken by the Subprocessor. If, within 10 business days of receipt of that notice, Company notifies Vendor in writing of any objections (on reasonable grounds) to the proposed appointment neither Vendor nor any Vendor Affiliate shall appoint (nor disclose any Company Personal Data to) the proposed Subprocessor except with the prior written consent of Company.

6.3 With respect to each Subprocessor, Vendor or the relevant Vendor Affiliate shall:

6.3.1 before the Subprocessor first Processes Company Personal Data (or, where relevant, in accordance with section 6.2), carry out adequate due diligence to ensure that the

Subprocessor is capable of providing the level of protection for Company Personal Data required by the Principal Agreement;

6.3.2 ensure that the arrangement between on the one hand (a) Vendor, or (b) the relevant Vendor Affiliate, or (c) the relevant intermediate Subprocessor; and on the other hand the Subprocessor, is governed by a written contract including terms which offer at least the same level of protection for Company Personal Data as those set out in this Addendum and meet the requirements of article 28(3) of the GDPR;

6.3.3 if that arrangement involves a Restricted Transfer, ensure that the Standard Contractual Clauses are at all relevant times incorporated into the agreement between on the one hand (a) Vendor, or (b) the relevant Vendor Affiliate, or (c) the relevant intermediate Subprocessor; and on the other hand the Subprocessor, or before the Subprocessor first Processes Company Personal Data procure that it enters into an agreement incorporating the Standard Contractual Clauses with the relevant Company Group Member(s) (and Company shall procure that each Company Affiliate party to any such Standard Contractual Clauses co-operates with their population and execution); and

6.3.4 provide to Company for review such copies of the Contracted Processors' agreements with Subprocessors (which may be redacted to remove confidential commercial information not relevant to the requirements of this Addendum) as Company may request from time to time.

6.4 Vendor and each Vendor Affiliate shall ensure that each Subprocessor performs the obligations under sections 3.1, 4, 5, 7.1, 8.2, 9 and 11.1, as they apply to Processing of Company Personal Data carried out by that Subprocessor, as if it were party to this Addendum in place of Vendor.

7. Data Subject Rights

7.1 Taking into account the nature of the Processing, Vendor and each Vendor Affiliate shall assist each Company Group Member by implementing appropriate technical and organizational measures, insofar as this is possible, for the fulfilment of the Company Group Members' obligations, as reasonably understood by Company, to respond to requests to exercise Data Subject rights under the Data Protection Laws.

7.2 Vendor shall:

7.2.1 promptly notify Company if any Contracted Processor receives a request from a Data Subject under any Data Protection Law in respect of Company Personal Data; and

7.2.2 ensure that the Contracted Processor does not respond to that request except on the documented instructions of Company or the relevant Company Affiliate or as required by Applicable Laws to which the Contracted Processor is subject, in which case Vendor shall to the extent permitted by Applicable Laws inform Company of that legal requirement before the Contracted Processor responds to the request.

8. **Personal Data Breach**

8.1 Vendor shall notify Company without undue delay upon Vendor or any Subprocessor becoming aware of a Personal Data Breach affecting Company Personal Data, providing Company with sufficient information to allow each Company Group Member to meet any obligations to report or inform Data Subjects of the Personal Data Breach under the Data Protection Laws. Such notification shall as a minimum:

8.1.1 describe the nature of the Personal Data Breach, the categories and numbers of Data Subjects concerned, and the categories and numbers of Personal Data records concerned;

8.1.2 communicate the name and contact details of Vendor's data protection officer or other relevant contact from whom more information may be obtained;

8.1.3 describe the likely consequences of the Personal Data Breach; and

8.1.4 describe the measures taken or proposed to be taken to address the Personal Data Breach

8.2 Vendor shall co-operate with Company and each Company Group Member and take such reasonable commercial steps as are directed by Company to assist in the investigation, mitigation and remediation of each such Personal Data Breach.

9. Data Protection Impact Assessment and Prior Consultation

Vendor and each Vendor Affiliate shall provide reasonable assistance to each Company Group Member with any data protection impact assessments, and prior consultations with Supervising Authorities or other competent data privacy authorities, which Company reasonably considers to be required of any Company Group Member by article 35 or 36 of the GDPR or equivalent provisions of any other Data Protection Law, in each case solely in relation to Processing of Company Personal Data by, and taking into account the nature of the Processing and information available to, the Contracted Processors..

10. Deletion or return of Company Personal Data

10.1 Subject to sections 10.2 and 10.3, after cessation of any Services involving the Processing of Company Personal Data and upon Company's request, Vendor and each Vendor Affiliate shall promptly delete and procure the deletion of all copies of those Company Personal Data.

10.2 Subject to section 10.3, Company may in its absolute discretion by written notice to Vendor after the Cessation Date require Vendor and each Vendor Affiliate to (a) return a complete copy of all Company Personal Data to Company by secure file transfer in such format as is reasonably notified by Company to Vendor; and (b) delete and procure the deletion of all other copies of Company

Personal Data Processed by any Contracted Processor. Vendor and each Vendor Affiliate shall comply with any such written request within 60 days of request by Company.

10.3 Each Contracted Processor may retain Company Personal Data to the extent required by Applicable Laws and only to the extent and for such period as required by Applicable Laws and always provided that Vendor and each Vendor Affiliate shall ensure the confidentiality of all such Company Personal Data and shall ensure that such Company Personal Data is only Processed as necessary for the purpose(s) specified in the Applicable Laws requiring its storage and for no other purpose.

10.4 Vendor shall provide written certification to Company that it and each Vendor Affiliate has fully complied with this section 10 within 60 days of request by Company.

11. Audit rights

11.1 Subject to section 11.2, Vendor and each Vendor Affiliate shall make available to each Company Group Member on request all information necessary to demonstrate compliance with this Addendum, and shall allow for and contribute to audits, including inspections, by any Company Group Member or an auditor mandated by any Company Group Member in relation to the Processing of the Company Personal Data by the Contracted Processors.

11.2 Information and audit rights of the Company Group Members only arise under section 11.1 to the extent that the Principal Agreement does not otherwise give them information and audit rights meeting the relevant requirements of Data Protection Law (including, where applicable, article 28(3)(h) of the GDPR).

12. Restricted Transfers

12.1 Subject to section 12.3, each Company Group Member (as "data exporter") and each Contracted Processor, as appropriate, (as "data importer") hereby enter into the Standard Contractual Clauses in respect of any Restricted Transfer from that Company Group Member to that Contracted Processor.

12.2 The Standard Contractual Clauses shall come into effect under section 12.1 on the later of:

12.2.1 the data exporter becoming a party to them;

12.2.2 the data importer becoming a party to them; and

12.2.3 commencement of the relevant Restricted Transfer.

12.3 Section 12.1 shall not apply to a Restricted Transfer unless its effect, together with other reasonably practicable compliance steps (which, for the avoidance of doubt, do not include obtaining consents from Data Subjects), is to allow the relevant Restricted Transfer to take place without breach of applicable Data Protection Law.

12.4 Vendor warrants and represents that, before the commencement of any Restricted Transfer to a Subprocessor which is not a Vendor Affiliate, Vendor's or the relevant Vendor Affiliate's entry into the Standard Contractual Clauses under section 12.1, and agreement to variations to those Standard Contractual Clauses made under section 13.4.1, as agent for and on behalf of that Subprocessor will have been duly and effectively authorized (or subsequently ratified) by that Subprocessor.

13. General Terms

Governing law and jurisdiction

13.1 Without prejudice to clauses 7 (Mediation and Jurisdiction) and 9 (Governing Law) of the Standard Contractual Clauses:

13.1.1 the parties to this Addendum hereby submit to the choice of jurisdiction stipulated in the Principal Agreement with respect to any disputes or claims howsoever arising under this Addendum, including disputes regarding its existence, validity or termination or the consequences of its nullity; and

13.1.2 this Addendum and all non-contractual or other obligations arising out of or in connection with it are governed by the laws of the country or territory stipulated for this purpose in the Principal Agreement.

Order of precedence

13.2 Nothing in this Addendum reduces Vendor's or any Vendor Affiliate's obligations under the Principal Agreement in relation to the protection of Personal Data or permits Vendor or any Vendor Affiliate to Process (or permit the Processing of) Personal Data in a manner which is prohibited by the Principal Agreement. In the event of any conflict or inconsistency between this Addendum and the Standard Contractual Clauses, the Standard Contractual Clauses shall prevail.

13.3 Subject to section 13.2, with regard to the subject matter of this Addendum, in the event of inconsistencies between the provisions of this Addendum and any other agreements between the parties, including the Principal Agreement and including (except where explicitly agreed otherwise in writing, signed on behalf of the parties) agreements entered into or purported to be entered into after the date of this Addendum, the provisions of this Addendum shall prevail.

Changes in Data Protection Laws, etc.

13.4 Company may:

13.4.1 by at least 30 (thirty) calendar days' written notice to Vendor from time to time make any variations to the Standard Contractual Clauses (including any Standard Contractual Clauses entered into under section 12.1), as they apply to Restricted Transfers which are subject to a particular Data Protection Law, which are required, as a result of any change in, or decision of a competent authority under, that Data Protection Law, to

allow those Restricted Transfers to be made (or continue to be made) without breach of that Data Protection Law; and

13.4.2 propose any other variations to this Addendum which Company reasonably considers to be necessary to address the requirements of any Data Protection Law.

13.5 If Company gives notice under section 13.4.1:

13.5.1 Vendor and each Vendor Affiliate shall promptly co-operate (and ensure that any affected Subprocessors promptly co-operate) to ensure that equivalent variations are made to any agreement put in place under section 6.4.3; and

13.5.2 Company shall not unreasonably withhold or delay agreement to any consequential variations to this Addendum proposed by Vendor to protect the Contracted Processors against additional risks associated with the variations made under section 13.4.1 and/or 13.5.1.

13.6 If Company gives notice under section 13.4.2, the parties shall promptly discuss the proposed variations and negotiate in good faith with a view to agreeing and implementing those or alternative variations designed to address the requirements identified in Company's notice as soon as is reasonably practicable.

13.7 Neither Company nor Vendor shall require the consent or approval of any Company Affiliate or Vendor Affiliate to amend this Addendum pursuant to this section 13.5 or otherwise.

Severance

13.8 Should any provision of this Addendum be invalid or unenforceable, then the remainder of this Addendum shall remain valid and in force. The invalid or unenforceable provision shall be either (i) amended as necessary to ensure its validity and enforceability, while preserving the parties' intentions as closely as possible or, if this is not possible, (ii) construed in a manner as if the invalid or unenforceable part had never been contained therein.

IN WITNESS WHEREOF, this Addendum is entered into and becomes a binding part of the Principal Agreement with effect from the date first set out above.

Board of Regents of the University of Nebraska, by and on behalf of the University of Nebraska at Kearney

Signature _____

Name _____

Title _____

Date Signed _____

Enrollment Advisory Group, LLC

Signature _____

Name _____

Title _____

Date Signed _____

ANNEX 1: DETAILS OF PROCESSING OF COMPANY PERSONAL DATA

This Annex 1 includes certain details of the Processing of Company Personal Data as required by Article 28(3) GDPR.

Subject matter and duration of the Processing of Company Personal Data

The subject matter and duration of the Processing of the Company Personal Data are set out in the Principal Agreement and this Addendum.

The nature and purpose of the Processing of Company Personal Data
The Personal Data Processed will be determined by Vendor and may, for example, include Company's students recruited to Company by Vendor.

The types of Company Personal Data to be Processed
The Personal Data Processed will be the Personal Data uploaded to Vendor's platform and will include student first name, last name, email address, street address, city, state (if applicable), country of citizenship, academic program, agency name, agency code, inquiry date, inquiry source, application date, degree level, funnel stage (stage in admissions process), entry term, high school name, scholarship amount, decision released date, international indicator, I-20 tracking.

The categories of Data Subject to whom the Company Personal Data relates
The Personal Data Processed under this DPA is the Personal Data controlled by Company that is processed by Vendor in order for Vendor to provide the Services to Company under the Agreement.

The obligations and rights of Company and Company Affiliates

The obligations and rights of Company and Company Affiliates are set out in the Principal Agreement and this Addendum.

ANNEX 2: STANDARD CONTRACTUAL CLAUSES

[*These Clauses are deemed to be amended from time to time, to the extent that they relate to a Restricted Transfer which is subject to the Data Protection Laws of a given country or territory, to reflect (to the extent possible without material uncertainty as to the result) any change (including any replacement) made in accordance with those Data Protection Laws (i) by the Commission to or of the equivalent contractual clauses approved by the Commission under EU Directive 95/46/EC or the GDPR (in the case of the Data Protection Laws of the European Union or a Member State); or (ii) by an equivalent competent authority to or of any equivalent contractual clauses approved by it or by another competent authority under another Data Protection Law (otherwise).*]

[*If these Clauses are not governed by the law of a Member State, the terms "Member State" and "State" are replaced, throughout, by the word "jurisdiction".*]

Standard Contractual Clauses (processors)

For the purposes of Article 26(2) of Directive 95/46/EC for the transfer of personal data to processors established in third countries which do not ensure an adequate level of data protection [*This opening recital is deleted if these Clauses are not governed by the law of a member state of the EEA.*]

[*The gaps below are populated with details of the relevant Company Group Member:*]

Name of the data exporting organization:

Address:

Tel.: _____; fax: _____; e-mail: _____

Other information needed to identify the organization

……
(the data **exporter**)

And

[*The gaps below are populated with details of the relevant Contracted Processor:*]

Name of the data importing organization:

Address:

Tel.: _____; fax: _____; e-mail:_____

Other information needed to identify the organization:

……
(the data **importer**)

each a "party"; together "the parties",

HAVE AGREED on the following Contractual Clauses (the Clauses) in order to adduce adequate safeguards with respect to the protection of privacy and fundamental rights and freedoms of individuals for the transfer by the data exporter to the data importer of the personal data specified in Appendix 1.

Background

The data exporter has entered into a data processing addendum ("DPA") with the data importer. Pursuant to the terms of the DPA, it is contemplated that services provided by the data importer will involve the transfer of personal data to data importer. Data importer is located in a country not ensuring an adequate level of data protection. To ensure compliance with Directive 95/46/EC and applicable data protection law, the controller agrees to the provision of such Services, including the processing of personal data incidental thereto, subject to the data importer's execution of, and compliance with, the terms of these Clauses.

Clause 1

Definitions

For the purposes of the Clauses:

(a) *'personal data', 'special categories of data', 'process/processing', 'controller', 'processor', 'data subject'* and *'supervisory authority'* shall have the same meaning as in Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data; [*If these Clauses are governed by a law which extends the protection of data protection laws to corporate persons, the words "except that, if these Clauses govern a transfer of data relating to identified or identifiable corporate (as well as natural) persons, the definition of "personal data" is expanded to include those data" are added.*]

(b) '*the data exporter'* means the controller who transfers the personal data;

I *'the data importer'* means the processor who agrees to receive from the data exporter personal data intended for processing on his behalf after the transfer in accordance with his instructions and the terms of the Clauses and who is not subject to a third country's system ensuring adequate protection within the meaning of Article 25(1) of Directive 95/46/EC; [*If these Clauses are not governed by the law of a Member State, the words "and who is not subject to a third country's system ensuring adequate protection within the meaning of Article 25(1) of Directive 95/46/EC" are deleted.*]

(d) *'the subprocessor'* means any processor engaged by the data importer or by any other subprocessor of the data importer who agrees to receive from the data importer or from any other subprocessor of the data importer personal data exclusively intended for processing activities to be carried out on behalf of the data exporter after the transfer in accordance with his instructions, the terms of the Clauses and the terms of the written subcontract;

I ‘*the applicable data protection law*’ means the legislation protecting the fundamental rights and freedoms of individuals and, in particular, their right to privacy with respect to the processing of personal data applicable to a data controller in the Member State in which the data exporter is established;

(f) *‘technical and organisational security measures’* means those measures aimed at protecting personal data against accidental or unlawful destruction or accidental loss, alteration, unauthorised disclosure or access, in particular where the processing involves the transmission of data over a network, and against all other unlawful forms of processing.

Clause 2

Details of the transfer

The details of the transfer and in particular the special categories of personal data where applicable are specified in Appendix 1 which forms an integral part of the Clauses.

Clause 3

Third-party beneficiary clause

1. The data subject can enforce against the data exporter this Clause, Clause 4(b) to (i), Clause 5(a) to I, and (g) to (j), Clause 6(1) and (2), Clause 7, Clause 8(2), and Clauses 9 to 12 as third-party beneficiary.

2. The data subject can enforce against the data importer this Clause, Clause 5(a) to I and (g), Clause 6, Clause 7, Clause 8(2), and Clauses 9 to 12, in cases where the data exporter has factually disappeared or has ceased to exist in law unless any successor entity has assumed the entire legal obligations of the data exporter by contract or by operation of law, as a result of which it takes on the rights and obligations of the data exporter, in which case the data subject can enforce them against such entity.

3. The data subject can enforce against the subprocessor this Clause, Clause 5(a) to I and (g), Clause 6, Clause 7, Clause 8(2), and Clauses 9 to 12, in cases where both the data exporter and the data importer have factually disappeared or ceased to exist in law or have become insolvent, unless any successor entity has assumed the entire legal obligations of the data exporter by contract or by operation of law as a result of which it takes on the rights and obligations of the data exporter, in which case the data subject can enforce them against such entity. Such third-party liability of the subprocessor shall be limited to its own processing operations under the Clauses.

4. The parties do not object to a data subject being represented by an association or other body if the data subject so expressly wishes and if permitted by national law.

Clause 4

Obligations of the data exporter

The data exporter agrees and warrants:

(a) that the processing, including the transfer itself, of the personal data has been and will continue to be carried out in accordance with the relevant provisions of the applicable data protection law (and, where applicable, has been notified to the relevant authorities of the Member State where the data exporter is established) and does not violate the relevant provisions of that State;

(b) that it has instructed and throughout the duration of the personal data processing services will instruct the data importer to process the personal data transferred only on the data exporter's behalf and in accordance with the applicable data protection law and the Clauses;

I that the data importer will provide sufficient guarantees in respect of the technical and organisational security measures specified in Appendix 2 to this contract;

(d) that after assessment of the requirements of the applicable data protection law, the security measures are appropriate to protect personal data against accidental or unlawful destruction or accidental loss, alteration, unauthorised disclosure or access, in particular where the processing involves the transmission of data over a network, and against all other unlawful forms of processing, and that these measures ensure a level of security appropriate to the risks presented by the processing and the nature of the data to be protected having regard to the state of the art and the cost of their implementation;

I that it will ensure compliance with the security measures;

(f) that, if the transfer involves special categories of data, the data subject has been informed or will be informed before, or as soon as possible after, the transfer that its data could be transmitted to a third country not providing adequate protection within the meaning of Directive 95/46/EC; [*If these Clauses are not governed by the law of a Member State, the words "within the meaning of Directive 95/46/EC" are deleted.*]

(g) to forward any notification received from the data importer or any subprocessor pursuant to Clause 5(b) and Clause 8(3) to the data protection supervisory authority if the data exporter decides to continue the transfer or to lift the suspension;

(h) to make available to the data subjects upon request a copy of the Clauses, with the exception of Appendix 2, and a summary description of the security measures, as well as a copy of any contract for subprocessing services which has to be made in accordance with the Clauses, unless the Clauses or the contract contain commercial information, in which case it may remove such commercial information;

(i) that, in the event of subprocessing, the processing activity is carried out in accordance with Clause 11 by a subprocessor providing at least the same level of protection for the personal data and the rights of data subject as the data importer under the Clauses; and

(j) that it will ensure compliance with Clause 4(a) to (i).

Clause 5

Obligations of the data importer

The data importer agrees and warrants:

(a) to process the personal data only on behalf of the data exporter and in compliance with its instructions and the Clauses; if it cannot provide such compliance for whatever reasons, it agrees to inform promptly the data exporter of its inability to comply, in which case the data exporter is entitled to suspend the transfer of data and/or terminate the contract;

(b) that it has no reason to believe that the legislation applicable to it prevents it from fulfilling the instructions received from the data exporter and its obligations under the contract and that in the event of a change in this legislation which is likely to have a substantial adverse effect on the warranties and obligations provided by the Clauses, it will promptly notify the change to the data exporter as soon as it is aware, in which case the data exporter is entitled to suspend the transfer of data and/or terminate the contract;

I that it has implemented the technical and organisational security measures specified in Appendix 2 before processing the personal data transferred;

(d) that it will promptly notify the data exporter about:

(i) any legally binding request for disclosure of the personal data by a law enforcement authority unless otherwise prohibited, such as a prohibition under criminal law to preserve the confidentiality of a law enforcement investigation,

(ii) any accidental or unauthorised access, and

(iii) any request received directly from the data subjects without responding to that request, unless it has been otherwise authorised to do so;

I to deal promptly and properly with all inquiries from the data exporter relating to its processing of the personal data subject to the transfer and to abide by the advice of the supervisory authority with regard to the processing of the data transferred;

(f) at the request of the data exporter to submit its data processing facilities for audit of the processing activities covered by the Clauses which shall be carried out by the data exporter or an inspection body composed of independent members and in possession of the required professional qualifications bound by a duty of confidentiality, selected by the data exporter, where applicable, in agreement with the supervisory authority;

(g) to make available to the data subject upon request a copy of the Clauses, or any existing contract for subprocessing, unless the Clauses or contract contain commercial information, in which case it may remove such commercial information, with the exception of Appendix 2 which shall be replaced by a summary description of the security measures in those cases where the data subject is unable to obtain a copy from the data exporter;

(h) that, in the event of subprocessing, it has previously informed the data exporter and obtained its prior written consent;

(i) that the processing services by the subprocessor will be carried out in accordance with Clause 11;

(j) to send promptly a copy of any subprocessor agreement it concludes under the Clauses to the data exporter.

Clause 6

Liability

1. The parties agree that any data subject, who has suffered damage as a result of any breach of the obligations referred to in Clause 3 or in Clause 11 by any party or subprocessor is entitled to receive compensation from the data exporter for the damage suffered.

2. If a data subject is not able to bring a claim for compensation in accordance with paragraph 1 against the data exporter, arising out of a breach by the data importer or his subprocessor of any of their obligations referred to in Clause 3 or in Clause 11, because the data exporter has factually disappeared or ceased to exist in law or has become insolvent, the data importer agrees that the data subject may issue a claim against the data importer as if it were the data exporter, unless any successor entity has assumed the entire legal obligations of the data exporter by contract of by operation of law, in which case the data subject can enforce its rights against such entity.

   The data importer may not rely on a breach by a subprocessor of its obligations in order to avoid its own liabilities.

3. If a data subject is not able to bring a claim against the data exporter or the data importer referred to in paragraphs 1 and 2, arising out of a breach by the subprocessor of any of their obligations referred to in Clause 3 or in Clause 11 because both the data exporter and the data importer have factually disappeared or ceased to exist in law or have become insolvent, the subprocessor agrees that the data subject may issue a claim against the data subprocessor with regard to its own processing operations under the Clauses as if it were the data exporter or the data importer, unless any successor entity has assumed the entire legal obligations of the data exporter or data importer by contract or by operation of law, in which case the data subject can enforce its rights against such entity. The liability of the subprocessor shall be limited to its own processing operations under the Clauses.

Clause 7

Mediation and jurisdiction

1. The data importer agrees that if the data subject invokes against it third-party beneficiary rights and/or claims compensation for damages under the Clauses, the data importer will accept the decision of the data subject:

   (a) to refer the dispute to mediation, by an independent person or, where applicable, by the supervisory authority;

(b) to refer the dispute to the courts in the Member State in which the data exporter is established.

2. The parties agree that the choice made by the data subject will not prejudice its substantive or procedural rights to seek remedies in accordance with other provisions of national or international law.

Clause 8

Cooperation with supervisory authorities

1. The data exporter agrees to deposit a copy of this contract with the supervisory authority if it so requests or if such deposit is required under the applicable data protection law.

2. The parties agree that the supervisory authority has the right to conduct an audit of the data importer, and of any subprocessor, which has the same scope and is subject to the same conditions as would apply to an audit of the data exporter under the applicable data protection law.

3. The data importer shall promptly inform the data exporter about the existence of legislation applicable to it or any subprocessor preventing the conduct of an audit of the data importer, or any subprocessor, pursuant to paragraph 2. In such a case the data exporter shall be entitled to take the measures foreseen in Clause 5 (b).

Clause 9

Governing Law

The Clauses shall be governed by the law of the Member State in which the data exporter is established.

Clause 10

Variation of the contract

The parties undertake not to vary or modify the Clauses. This does not preclude the parties from adding clauses on business related issues where required as long as they do not contradict the Clause.

Clause 11

Subprocessing

1. The data importer shall not subcontract any of its processing operations performed on behalf of the data exporter under the Clauses without the prior written consent of the data exporter. Where the data importer subcontracts its obligations under the Clauses, with the consent of the data exporter, it shall do so only by way of a written agreement with the subprocessor which imposes the same obligations on the subprocessor as are imposed on the data importer under the Clauses. Where the subprocessor fails to fulfil its data protection obligations under such written agreement

the data importer shall remain fully liable to the data exporter for the performance of the subprocessor's obligations under such agreement.

2. The prior written contract between the data importer and the subprocessor shall also provide for a third-party beneficiary clause as laid down in Clause 3 for cases where the data subject is not able to bring the claim for compensation referred to in paragraph 1 of Clause 6 against the data exporter or the data importer because they have factually disappeared or have ceased to exist in law or have become insolvent and no successor entity has assumed the entire legal obligations of the data exporter or data importer by contract or by operation of law. Such third-party liability of the subprocessor shall be limited to its own processing operations under the Clauses.

3. The provisions relating to data protection aspects for subprocessing of the contract referred to in paragraph 1 shall be governed by the law of the Member State in which the data exporter is established.

4. The data exporter shall keep a list of subprocessing agreements concluded under the Clauses and notified by the data importer pursuant to Clause 5 (j), which shall be updated at least once a year. The list shall be available to the data exporter's data protection supervisory authority.

Clause 12

Obligation after the termination of personal data processing services

1. The parties agree that on the termination of the provision of data processing services, the data importer and the subprocessor shall, at the choice of the data exporter, return all the personal data transferred and the copies thereof to the data exporter or shall destroy all the personal data and certify to the data exporter that it has done so, unless legislation imposed upon the data importer prevents it from returning or destroying all or part of the personal data transferred. In that case, the data importer warrants that it will guarantee the confidentiality of the personal data transferred and will not actively process the personal data transferred anymore.

2. The data importer and the subprocessor warrant that upon request of the data exporter and/or of the supervisory authority, it will submit its data processing facilities for an audit of the measures referred to in paragraph 1.

On behalf of the data exporter:
[*Populated with details of, and deemed signed on behalf of, the data exporter:*]
Name (written out in full):
Position:
Address:
Other information necessary in order for the contract to be binding (if any):

Signature…….

On behalf of the data importer:
[*Populated with details of, and deemed signed on behalf of, the data importer:*]
Name (written out in full):
Position:
Address:
Other information necessary in order for the contract to be binding (if any):

Signature…….

APPENDIX 1 TO THE STANDARD CONTRACTUAL CLAUSES

This Appendix forms part of the Clauses and must be completed and signed by the parties The Member States may complete or specify, according to their national procedures, any additional necessary information to be contained in this Appendix

Data exporter
The data exporter is:
[TO BE COMPLETED]

Data importer
The data importer is:
[TO BE COMPLETED]

Data subjects
The personal data transferred concern the following categories of data subjects:
[TO BE COMPLETED]

Categories of data
The personal data transferred concern the following categories of data:
[TO BE COMPLETED]

Special categories of data (if appropriate)
The personal data transferred concern the following special categories of data:
[TO BE COMPLETED]

Processing operations
The personal data transferred will be subject to the following basic processing activities:

[TO BE COMPLETED]

DATA EXPORTER

[*Populated with details of, and deemed to be signed on behalf of, the data exporter:*]
Name:……
Authorised Signature ……
DATA IMPORTER

[*Populated with details of, and deemed to be signed on behalf of, the data importer:*]
Name:……
Authorised Signature ……

APPENDIX 2 TO THE STANDARD CONTRACTUAL CLAUSES

This Appendix forms part of the Clauses and must be completed and signed by the parties.

Description of the technical and organisational security measures implemented by the data importer in accordance with Clauses 4(d) and 5(c):

[TO BE COMPLETED]

EXHIBIT E

Third Party Agents with whom the Institution has agreements:

Agents Sent to EAG	Country
Angels Immigration	India
ATM English	China
Boston Chinese Student Services Center	China
Dallas Kenny & Associates/Global Education Consulting	Japan
Dolphin Ed Consultancy	Nepal
Hong Huo Lun Education Center	China
Human International Universities & Colleges	Japan
Mahabir Pun	Nepal
MidAmerican Universities International Exchange (MAUI)	International
National Collegiate Network	Japan
Newcom Education	China
Professional Education Consultancy	Nepal
SAGIP Education Consultancy	Nepal
Shenyang Intl Exchange Centre for Education	China

Additional Agents	Country
Abacus Overseas Ed Advisors	India
American Language Institute	India
APUS Ed & Consulting	Vietnam
Cresthall Education Consults	Nigeria
Deon Stewart (Alum)	Bahamas
Edwise International LLP	India
En Sha International Educational Station	International
Global Education Partnership Consulting	China
Global Opportunities	India
H E Success Ltd.	China
Helping Hands Health Education	Nepal
Indus Foundation	India
Kai Hang Cultural Exchange	China
Krishna Consultants	India
Oh! Study Education Center	International
Paulo Jordao de O.C. Fortes (Alum)	Brazil
Shaheda Higher Education Consultancy	Bangladesh
Tang Institute	China
The Chopras Global Holdings	India

UhakBean Overseas Education Center	Korea
University Partnership Foundation	Japan
Yathapu Consulting (i20fever)	India

TO: The Board of Regents Addendum X-B-2

Business Affairs

MEETING DATE: February 7, 2020

SUBJECT: Intermediate Design for Outdoor Track Replacement at the University of Nebraska-Lincoln (UNL).

RECOMMENDED ACTION: Approve the Intermediate Design with Scope Change and Budget Increase for Outdoor Track Replacement at UNL.

PREVIOUS ACTION: October 25, 2019 - Approved the Program Statement for Outdoor Track Replacement at UNL.

EXPLANATION: The existing location of the track at Ed Weir Stadium, the area between Memorial Stadium, the Hawks Championship Center and the Coliseum, has been identified as the site for the new 'Go Big' athletic facility. Therefore, the current track needs to be relocated.

The new outdoor track facility will be constructed north of the Devaney Sports Center and will support 155 Women's and Men's Track and Field student-athletes, representing approximately 25% of all student-athletes in Nebraska Athletics. During 130 years of competition in intercollegiate track and field, the Nebraska Track and Field program has won 109 conference titles and 3 national championships.

The intermediate design report summary is:

UNL – Outdoor Track Replacement

Program Statement Approved:	October 25, 2019
Intermediate Design Review:	February 7, 2020

	Program Statement	*Intermediate Design*
Total Project Budget:	$11,475,000	$16,500,000
Non Construction Budget:	$1,634,000	$2,635,000
Construction Budget:	$9,841,000	$13,865,000
NSF:	8,330	15,181
GSF:	8,330	18,097
Substantial Completion:	March 2021	March 2021

The budget increase, which may be funded from a variety of private, trust, cash or University internal lending program funds, is due to three factors:

- $1,725,000 for site-related items including additional land acquisition costs, additional site prep costs due to poor soil conditions, and rebuilding the south parking area due to moving the track facility south to avoid the Salt Creek levy system.

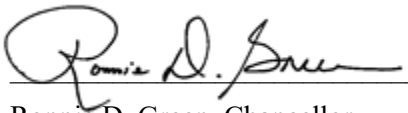
- $1,650,000 for amenities to enable Athletics to host track and field championships to build upon our rich championship tradition, including visiting team dressing rooms, meet management spaces and an extra practice area on the south end of the track.

- $1,650,000 for improvements to the outdoor throws area which was already planned for within Athletics FY20 budget prior to the approval of the new outdoor track facility. This project now provides design and construction efficiencies to construct the new state-of-the-art throws practice facility in conjunction with the new track project.

The intermediate design report and budget increase has been reviewed by the Business Affairs Committee.

SOURCE OF FUNDS: Private Donations, Trust Funds, Cash, University Internal Lending Program

SPONSOR: William J. Nunez
Vice Chancellor for Business & Finance

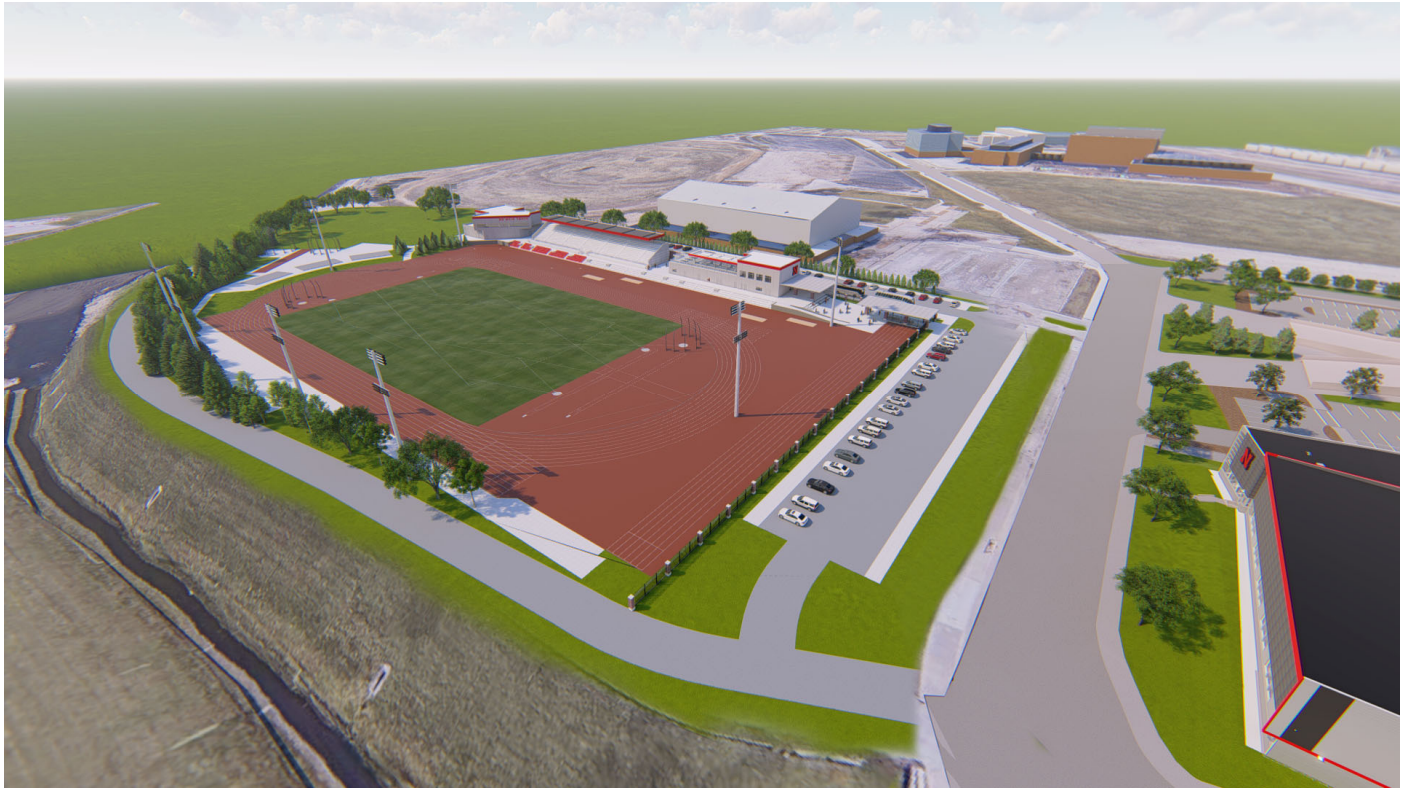
RECOMMENDED: 

Ronnie D. Green, Chancellor
University of Nebraska-Lincoln

DATE: January 31, 2020

OUTDOOR TRACK REPLACEMENT

Intermediate Design Review
Board of Regents Business Affairs Committee
January 29, 2020



The Clark Enersen Partners

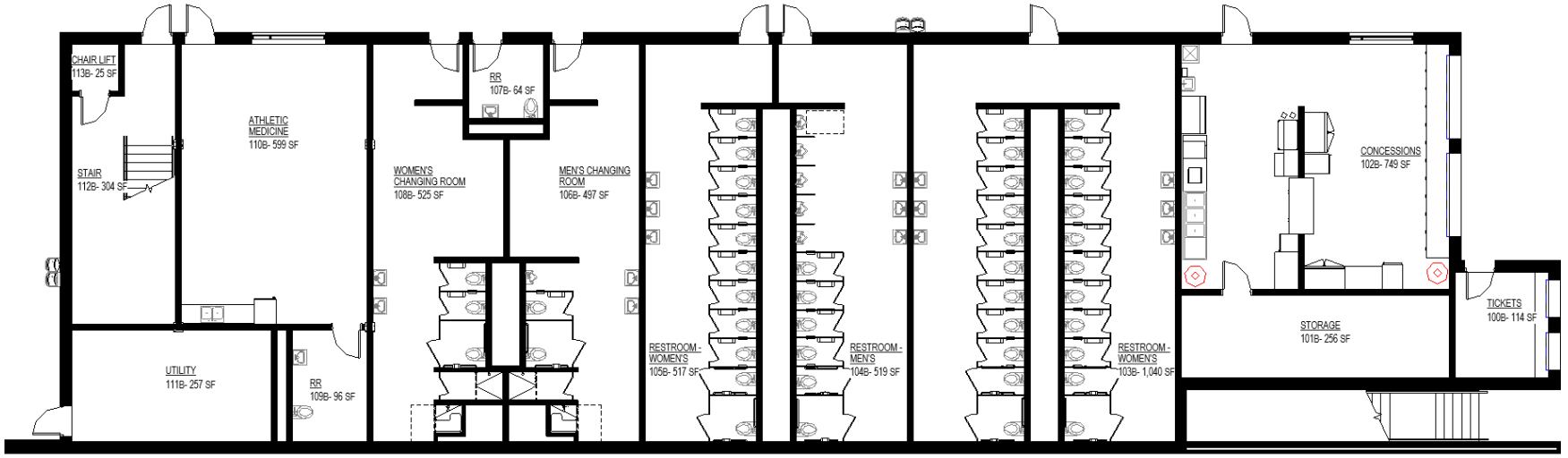
OUTDOOR TRACK REPLACEMENT

Intermediate Design Review
Board of Regents Business Affairs Committee
January 29, 2020

SITE PLAN

OUTDOOR TRACK REPLACEMENT

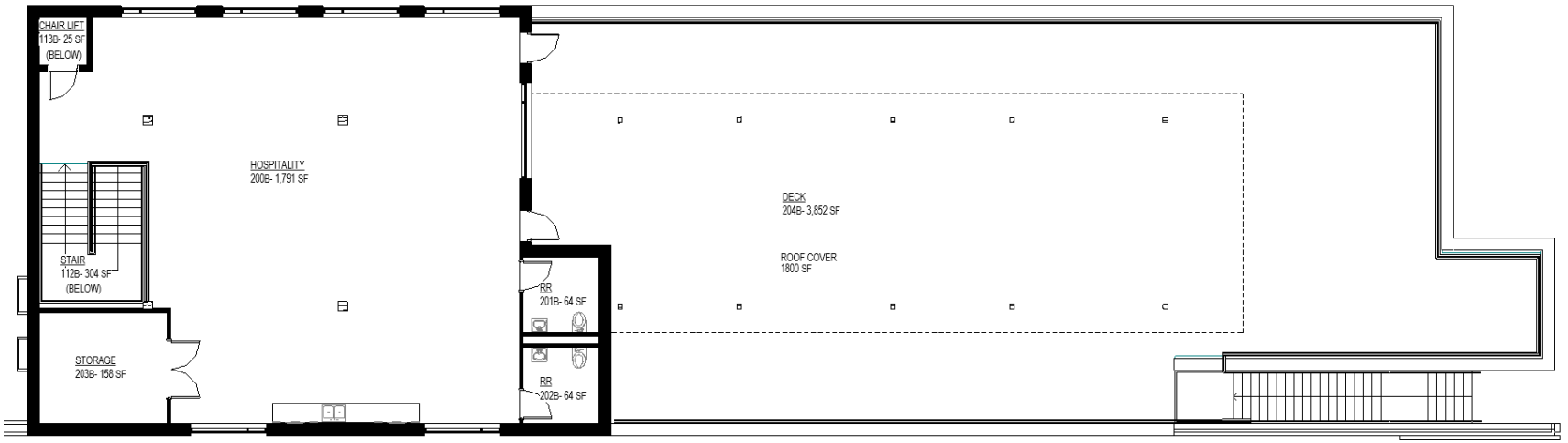
Intermediate Design Review
Board of Regents Business Affairs Committee
January 29, 2020



FIRST FLOOR PLAN – AREA - B

OUTDOOR TRACK REPLACEMENT

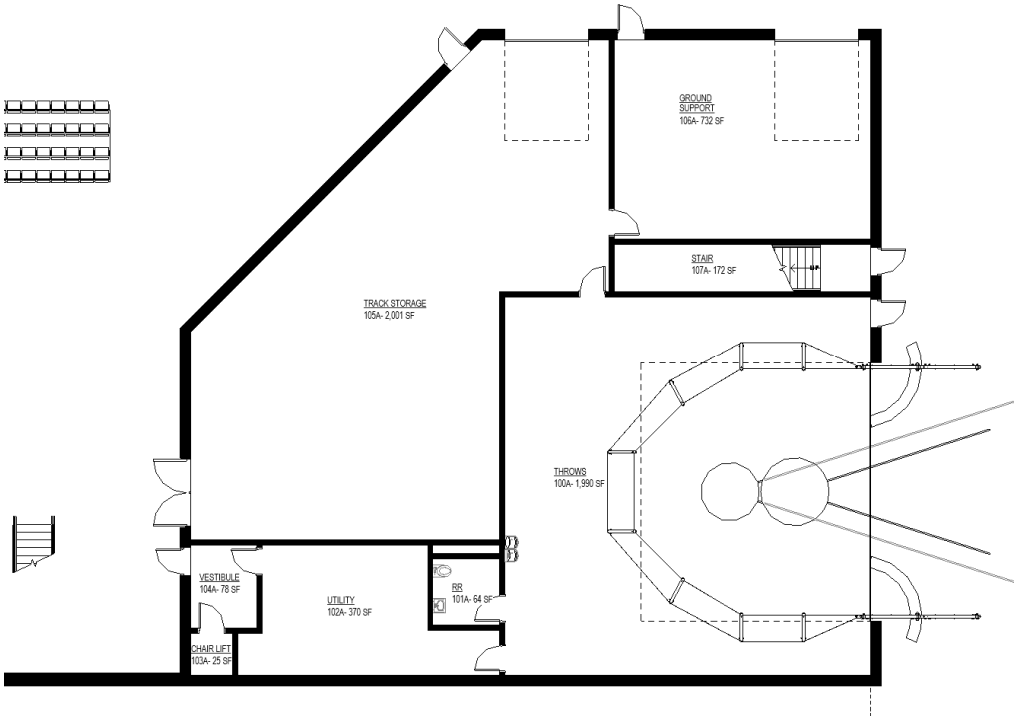
Intermediate Design Review
Board of Regents Business Affairs Committee
January 29, 2020



SECOND FLOOR PLAN – AREA - B

OUTDOOR TRACK REPLACEMENT

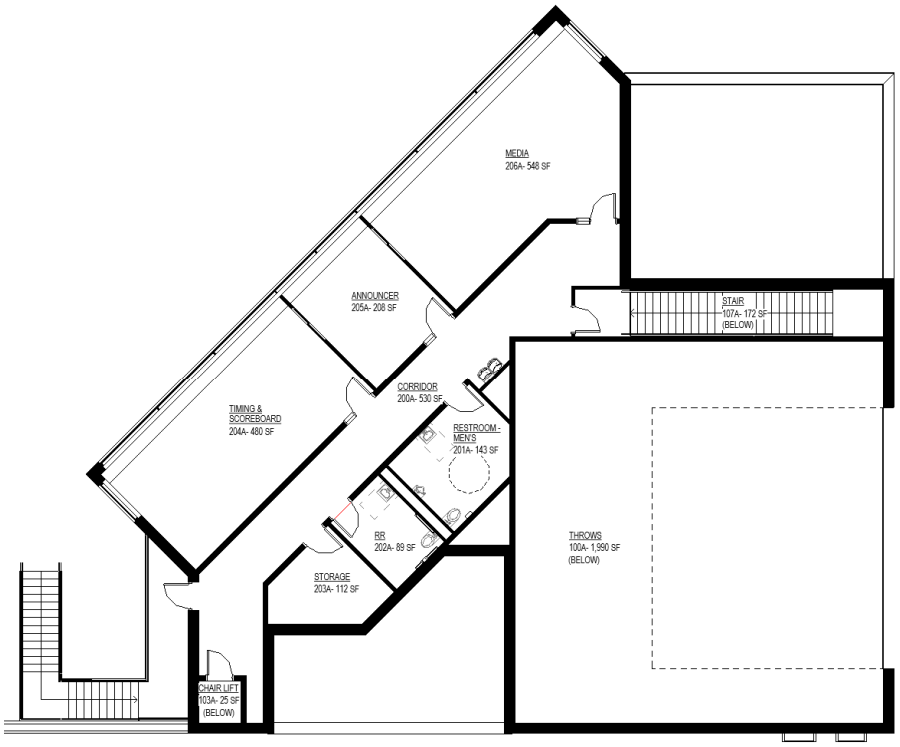
Intermediate Design Review
Board of Regents Business Affairs Committee
January 29, 2020



FIRST FLOOR PLAN – AREA - A

OUTDOOR TRACK REPLACEMENT

Intermediate Design Review
Board of Regents Business Affairs Committee
January 29, 2020



SECOND FLOOR PLAN – AREA - A

OUTDOOR TRACK REPLACEMENT

Intermediate Design Review
Board of Regents Business Affairs Committee
January 29, 2020

SPACE PROGRAM COMPARISON SUMMARY

	Program Statement		Intermediate Design	
Space Description	**Room**	**Total NSF**	**Total NSF**	**Difference**
Special-Use Facilities				
Athletic / Indoor Rec / Physical Education	510		1,990	1,990
Audio-Visual, Radio, Television	525	150	208	58
Clinic (Non-Health Professions)	535	600	599	-1
Category 500 Subtotal		750	2,797	2,047
General Use Facilities				
Assembly	610	0	1,791	1,791
Food Facilities	630	1,000	1,005	5
Locker Rooms	690	0	1,022	1,022
Category 600 Subtotal		1,000	3,818	2,818
Physical Plant Support Space				
Storage	730	3,100	2,891	-209
Support Space	790	640	1,254	614
Category 700 Subtotal		3,740	4,145	405
Other Area				
Circulation	WWW	0	1,134	1,134
Restroom Facilities / Custodial	XXX	2,240	2,660	420
Mechanical Area	YYY	600	627	27
Category Other Subtotal		2,840	4,421	1,581
TOTAL Net Square Feet		**8,330**	**15,181**	**6,851**
TOTAL Gross Square Feet		**8,330**	**18,097**	**9,767**

OUTDOOR TRACK REPLACEMENT

Intermediate Design Review
Board of Regents Business Affairs Committee
January 29, 2020

PROJECT BUDGET

Project Cost	Program Statement	Intermediate Design
Construction Costs	9,841,000	$13,865,000
Non-Construction Costs	1,634,000	2,635,000
Total Project Costs	**$11,475,000**	**16,500,000**

OUTDOOR TRACK REPLACEMENT

Intermediate Design Review
Board of Regents Business Affairs Committee
January 29, 2020

PROJECT BUDGET DETAILS

Construction Costs	Program Statement	Intermediate Design
General Construction	$9,293,000	$13,090,000
Fixed Equipment	0	0
UNL In-House Construction	80,000	110,000
Construction Contingency	468,000	$665,000
Subtotal	**$9,841,000**	**13,865,000**

Non-Construction Costs	Program Statement	Intermediate Design
Project Planning	$25,000	$25,000
Professional Consultant Fees	742,000	934,000
Professional In-House	294,000	440,000
Equipment- Capital	0	0
Equipment- Non-Capital	0	200,000
Land Acquisition	500,000	875,000
Other Non-Construction	33,000	61,000
Non-Construction Contingency	40,000	100,000
Subtotal	**$ 1,634,000**	**$ 2,635,000**

OUTDOOR TRACK REPLACEMENT

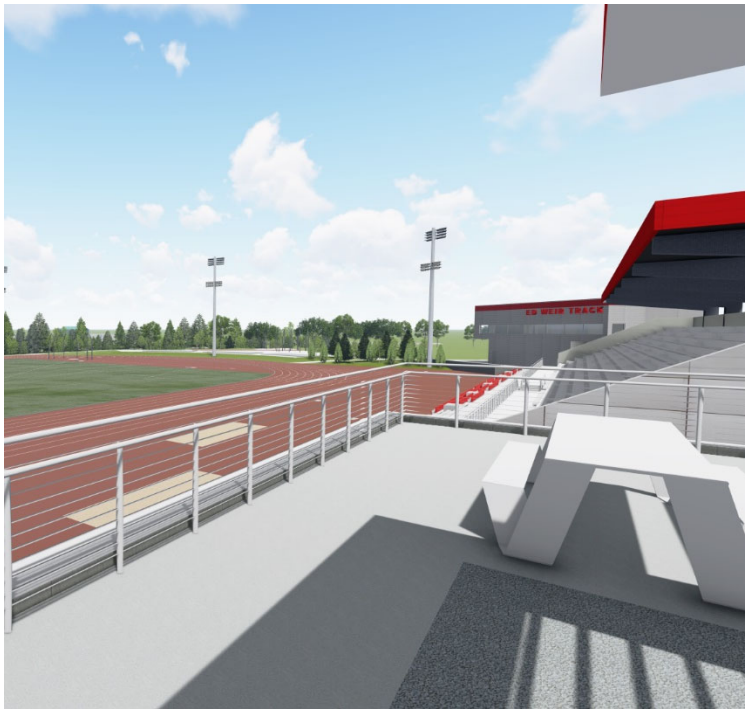
Intermediate Design Review
Board of Regents Business Affairs Committee
January 29, 2020

PROJECT SCHEDULE

Milestone	Program Statement	Intermediate Design
Program Approval by Board of Regents	October 2019	October 2019
Start Design	November 2019	November 2019
Intermediate Design Review	January 2020	February 2020
Design Complete	February 2020	February 2020
Start Construction	March 2020	March 2020
Complete Construction	March 2021	March 2021
Occupancy	March 2021	March 2021

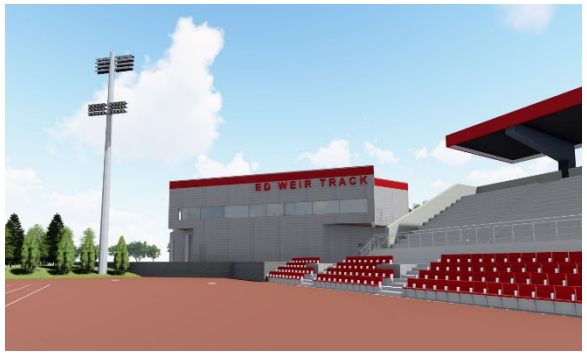
OUTDOOR TRACK REPLACEMENT

Intermediate Design Review
Board of Regents Business Affairs Committee
January 29, 2020



OUTDOOR TRACK REPLACEMENT

Intermediate Design Review
Board of Regents Business Affairs Committee
January 29, 2020



TO:	The Board of Regents	Addendum X-B-3
	Business Affairs	
MEETING DATE:	February 7, 2020	
SUBJECT:	Program Statement for the renovation of Nebraska Hall on the UNL campus to house the Enterprise Technology Services and Data Solutions team	
RECOMMENDED ACTION:	Approve the Program Statement for the renovation of Nebraska Hall on the UNL campus to house the Enterprise Technology Services and Data Solutions team	
PREVIOUS ACTION:	None	

EXPLANATION:

This project will renovate space in Nebraska hall to bring together teams from the University's Student Information Systems (NESIS), Business Information System (NEBIS) and Institutional Research. These teams and systems support critical functions across the University such as student enrollment, financial aid, academic advising, payroll, and accounting.

Currently, these teams are in multiple places spread across various buildings, including off-campus leased space. To become more efficient and cost effective, Interim President Dr. Susan Fritz charged representatives from these service areas to develop a facilities plan that would enable the teams to co-locate to improve the operations and reporting capacity of the University of Nebraska system.

Research indicates a shared-spaced, open concept approach can help the success of these areas. Organizations as diverse as UNL Husker Hub, the University of Nebraska Medical Center and Hudl have realized gains in using a similar open space concept. This project will allow these teams to be united under one umbrella which should provide greater efficiencies and collaboration.

The program statement and budget have been reviewed by the Business Affairs Committee.

Proposed start of construction (demolition)	June 2020
Proposed completion of construction	December 2020

PROJECT COST:	Project Budget	$5,100,000
ON-GOING FISCAL IMPACT:	Estimated Operating and Maintenance	$12,000
SOURCE OF FUNDS:	LB 957 Deferred Maintenance bond proceeds	

SPONSORS:

Susan M. Fritz
Executive Vice President and Provost

William J. Nunez
Vice Chancellor for Business & Finance

RECOMMENDED:

Walter E. Carter, President
University of Nebraska

DATE: January 10, 2020

Program Statement

Project Name: Enterprise Technology Services & Data Solutions Renovation
Campus: UNL City Campus
Date: February 7, 2019
Prepared by: NU Facilities Planning & Construction, Provost Office, NU IT and Barry Shull
Campus Project No: 13068
Phone: (402) 472-3131

1. Introduction

A. Background and history

The University of Nebraska currently relies directly on a variety of technology and data services to support organizational operations, strategic initiatives and compliance reporting. These services provide the framework for the critical functions including; financial aid, admissions, student records and enrollment, academic advising, event scheduling, payroll, finance, HCM, procurement, budget, benefits systems, security, database support, client services, infrastructure and project management. Data from these services provides reporting including the University of Nebraska Fact book, Board of Regents Strategic Framework metrics, Legislative data requests, external survey completion and in connection with the University's participation in the Nebraska statewide longitudinal P20-W data warehouse (NSWERS).

Under Interim President Dr. Susan Fritz's leadership, representatives from these service areas were charged with developing a facilities plan that enables the teams to improve the interoperability, data quality and reporting capacity of the University of Nebraska system. Research indicates the space devoted to such endeavors plays a critical role in ensuring the success of these areas. Organizations as diverse as UNL Husker Hub, the University of Nebraska Medical Center and Hudl have realized gains in information technology services and data functionality using a similar shared-space, open concept approach. This project will provide integrated space for technology and data services for both logistical and strategic reasons in Nebraska Hall on the UNL campus: eliminating barriers to team interaction and communication; allowing for cross-training of staff for greater efficiency and reduction of risk; collaborating on common goals, strategies and procedures; better utilizing employed talent and office space.

This $5.1 million project is proposed at a particularly opportune time given the space constraints currently being faced by some of the teams providing these critical services. The three groups involved in this office space initiative are Information Technology Services (ITS), Enterprise Services (ES) and Enterprise Data Services (EDS). The University of Nebraska currently relies on rented retail space to house some personnel areas and this space is scheduled to be demolished within the next 18 months. Additional teams face space shortages in their current buildings. The current proposal will allow for higher occupancy density in the same amount of assignable campus square footage, thus enabling a more cost-effective use of University resources.

The OneIT initiative helped form a unified Information Technology Services (ITS) division aligning the strategic needs of the University of Nebraska and each campus. Bringing together a system-wide technology team creates an environment of success across all campuses. This initiative allows for a broader sharing of knowledge within a large, dedicated team that has the same goal, while also cutting down obstacles, reallocating and optimizing resources for emerging needs and innovation. People are one of the strongest components of the new OneIT initiative and we are committed to investing in people so we build an exceptional work environment with avenues for advancement and growth and maintain a culture that embraces diversity in all forms.

ITS offers a broad range of services designed to meet the computing, communications, and networking needs of the University of Nebraska's faculty, staff and students. ITS supports:

- Teaching and learning components of every academic unit including communication and collaboration for students plus the technology in almost every University classroom. Over 400,000 students, faculty and staff throughout Nebraska are served by ITS.
- Provides support for every piece of computer hardware and software within the University.

- Supports the needs of Teaching, Research, Outreach, and Administration.
- Endpoint computing which include backing up of computers and systems as well as connections to and within all of the University campuses.
- Support for the campus' computer infrastructure including the network backbone, cellular services, cloud hosting and VPM-Virtual Private Network.
- Provides computing support for the administrative and business needs of the University.
- The Enterprise Services (ES) Department of University of Nebraska ITS is comprised of three teams; Nebraska Student Information Systems (NeSIS), Nebraska Business Information Systems (NeBIS) and the Web Application & Development Management (WADM). These three teams report to the Assistant Vice President of Enterprise Services.

The NeSIS team has leased space at 56th & 'O' Street since the PeopleSoft Student Information System ERP implementation in 2008. The NeSIS team manages the services and provides support for the Student Information System and additional applications for students, faculty, staff, advisors, applicants, parents and guests for the Nebraska Universities and State Colleges. These services include financial aid, admissions, student records, student financials, event scheduling and academic advising. There are 20 employees on the NeSIS team plus two interns. Per the building owner/manager, the office building at 56th & 'O' Street is scheduled for demolition and a new commercial facility will be built on the site approximately May of 2021.

The NeBIS team has been located on the UNL campus in East Nebraska Hall since the implementation of the SAP Finance ERP in 1999. All Nebraska Universities and State Colleges utilize the SAP system. The NeBIS team manages the services and provides the support for the finance, HCM, procurement, budget, payroll and benefits systems. The team is comprised of 26 employees.

The WADM team is also located in East Nebraska Hall and has 10 team members. The WADM team is responsible for designing, developing and supporting web applications and web sites for the University of Nebraska Central Administration and for developing and supporting the distance education and business operations systems of the University of Nebraska Online and the University of Nebraska High School.

The Enterprise Data Solutions (EDS) Team was recently restructured under the Provost, merging members from different teams together into a common team. The merged team provides support to the Enterprise Data Warehouse, allowing common reporting to University of Nebraska System and the State Colleges as well as reporting support for the President and Provost offices. Currently, members of the team are housed in two different locations, both in East Nebraska Hall and Varner Hall, and members are sharing single office spaces in Varner Hall. In total, ten employees utilize office and conference space between East Nebraska Hall and Varner Hall. The team needs different space to meet with campus data stewards to build out additional reporting structures as well as house training sessions to many users.

The University of Nebraska has recently become a founding partner in the Nebraska Statewide Workforce & Educational Reporting System (or "NSWERS"). NSWERS staff and infrastructure will be housed at the University of Nebraska and this renovation will provide space for this team in addition to the teams mentioned above.

B. Project description

ITS currently occupies space on the second and third floors of East Nebraska Hall. Of this of area, about 8,000 square feet are assigned to a computer machine room, server farm, battery backup, and equipment storage areas which are the lifeblood of the University's information technology system and network. The other approximately 18,000 square feet is office, workrooms, and cubicle areas for some of the ITS teams.

This project will eliminate all interior walls of the existing ITS offices on the second and third floors of East Nebraska Hall. Several smaller 'project rooms' will be created for working on small group

projects as well as conference rooms for meeting with clients or private meetings. The majority of the space will be large open areas or an 'Open Plan' concept with workstations which can be assigned to a single employee or allow the employees to use whatever workstation they wish, allowing environmental diversity for the staff.

'Open Plan' is the generic term used in architectural and interior design for any floor plan which makes use of large, open spaces and minimizes the use of small, enclosed rooms such as private offices. An open floor plan can allow more employees to work in a single space, enabling efficient use of space by creating office space with less construction costs and minimizing maintenance issues.

Since many of the existing office spaces have not been renovated for decades and presently have smaller inefficient corridors connecting groups of private offices, this renovation will allow for a more holistic program that brings together the data and analytics, student information, business & finance, security, project management and ITS Support teams into a single space. It will improve efficiencies by 46% by incorporating additional staff from off-campus building as well as staff from the Provost's office. It will also bring existing staff offices into the 21st century when competing with industry IT environments for talented staff members. This renovation will be modeled after high-tech corporate offices that have contemporary, inviting, and versatile open spaces but at the same time private and collaborative spaces.

The renovated offices on the second and third floor of East Nebraska Hall will offer a variety of spaces including:

- Open concept work areas configured in clusters of 4-8 workstations.
- Three separate project rooms of various sizes designed to have from eight to 18 workstations. This will allow staff members working on a single project to work together in a single space with whiteboards on walls for organic brainstorming sessions.
- Five large conference rooms with seating for 12-14, suitable for meetings with clients, off campus visitors or group staff meetings.
- Nine smaller, 4-6 person, conference rooms suitable for small collaborations or private conversations. Since the "Open Plan" office concept does not allow for private or personal conversations, these smaller conference rooms are designed to allow spaces for staff members to visit about projects or private issues without disturbing their peers in the open workspace.
- One training room with a seating capacity of 40.
- Four copy and work areas suitable for making copies, collating or putting together presentation materials.
- Four break areas to allow staff members to make coffee and microwave lunches, store refreshments or just sit down and relax. With 147 staff members, the space needs multiple coffee and break areas.
- Tables in various configurations for working or conversing in groups, to allow collaborations in proximity to workstations.
- Flexible and mobile furniture that promotes using the space to meet the needs of changing projects, conversations and workgroups.

In conjunction with architectural improvements, building system improvements will be made to mechanical, electrical and low voltage infrastructure. The renovations will address ADA and life-safety code compliance as well.

C. Purpose and objectives

The primary purpose of redefining the East Nebraska Hall space is to bring multiple groups together while at the same time creating an inviting space that allows increased collaboration and creativity among the various teams. Currently, team members impacted by this change office on multiple

campuses and amongst various buildings, including off-campus leased spaces, one of which will be demolished in 2021. Teams housed in some location are over capacity and sharing small office spaces.

Currently, 18,668 square feet of office and support space on the second and third floors of East Nebraska Hall are included in this proposal and occupied by current ITS staff. The noted space has organically grown over time and received limited updates. Construction includes many small corridors and offices, including many hidden spaces behind the very dated and dimly lit institutional corridor walls and doors. Navigating the space is difficult and hard to find for off-campus guests and is neither a collaborative nor a user-friendly space for students, staff or visitors. The configuration of the space is nearly impossible for groups to work together or support team building and communication.

As noted, a bigger vision of this project is to bring as many of the teams that focus on key institutional technical processes together to create a contiguous office space that supports collaboration and improves data quality by creating a common 'hub' for staff to work. The charge was to enable service teams to improve data quality and reporting capability of the University of Nebraska system. Moving teams together that are devoted to data-related activities and providing better adjacency to other teams that support and enhance ERP functions and data reporting (e.g., Infrastructure, Security, etc.) will help meet the charge. This project will create an open concept space capable of supporting a variety of configurations while at the same time increase the capacity without adding any additional square footage.

Objectives include:

- Encourage active and interactive work among and between ITS groups.
- Promote collaboration and cooperation.
- Move the student data teams (NeSIS), business and finance teams (NeBIS) and data reporting teams (EDS) staff together in a common space to elevate data collection and reporting.
- Build an ITS community.
- Create flexibility for future growth and changes.
- Provide a central location for ITS training.

While this space has noted goals, some additional benefits will address very practical issues such as taking out hazardous materials and better organizing space. No classroom space is impacted but the reconfiguration will help students understand boundaries of staff and student space. The updates will encourage functional work to occur in East Nebraska Hall while modernizing and making welcoming spaces for very technical and highly marketable employees.

2. Justification of the Project

A. Data that supports the funding request

An organization's workplace is one of its biggest assets, primarily because of the impact it has on employees and their engagement. Supportive space promotes staff retention, recruiting top talent, conveying brand and values, engaging with clients and visitors, and supporting employee productivity. While space on the University of Nebraska campus is limited, a good return on investment of taxpayer's dollars is to build open concept spaces, transforming the work environment from private offices into large, open collaborative and transparent workspaces that increase occupancy while not increasing the square footage.

This project develops a workplace strategy that aligns to the strategic goals of the department; providing spaces where people can do their best work. Workplaces with a variety of spaces, both enclosed and open, shared and individual, give employees and departments the ability to choose the space that suits them best. It will include the following:

- Increase the occupancy of staff members from 101 to 147. Move employees who currently lease space off campus to on campus space.

- Upgrade the very tired and aged offices facilities into fresh, open and contemporary facilities.
- Create obvious and easily identifiable entrances into the office suite.
- Create a welcoming impression for visitors upon arrival.
- Create a clear navigation throughout the building.
- Make better use of 'in between' spaces by eliminating small corridors in between the maze of existing offices.
- Update mechanical, electrical, and plumbing systems.

Advantages of the open floor plan concept include:

- Reduce overhead and maintenance costs by increasing the number of workstations and staff members in the same square footage. Easier for employees to interact with each other on a regular basis.
- Allow the various ITS groups to work together without traveling from building to building or campus to campus.
- Equality among all employees since each will have the same open workstation configuration.
- Enhances the flow of information and teamwork.
- Break down silos.
- Overhear useful information, learn from others, and contribute to solving problems in real-time.
- Cultivate a sense of community.
- Increased collaboration, which is extremely important for working on group projects and technical breakdown.
- More relationship and teamwork building interactions, which are extremely helpful when other Nebraska IT groups participate in training.
- Future oriented space planning. Greater flexibility to accommodate evolving personnel needs.

B. Alternatives considered

1. **Do not renovate East Nebraska Hall and continue leasing ITS space off campus.**

   The opportunity to bring the groups together on campus was the priority so this alternative was considered only as a last option.

2. **Renovate 1901 'Y' street area.**

   The cost would have been more to remove old buildings, create parking, add an elevator, and complete other renovations to make the space suitable. The goal was to provide space for 85 personnel and an addition would have been required which would also increase costs.

3. **Purchase the former Josephs College of Beauty building at Cotner & 'O' St:**

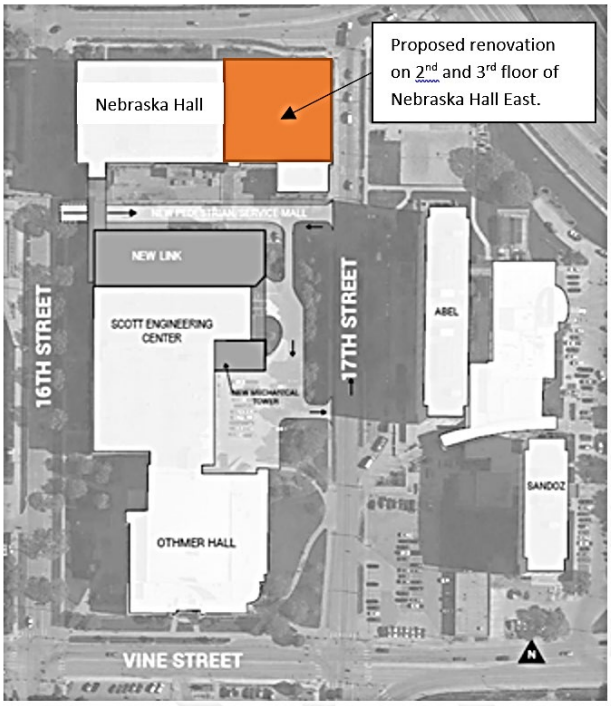
   This space lacked the required parking and renovations would require an extensive investment.

3. Location and site considerations

A. County: Lancaster

B. Town or campus: University of Nebraska-Lincoln City Campus

C. Proposed site



D. Statewide building inventory:

Building	Tag Number
Nebraska Hall	51ZZ0051900B

E. Influence of project on existing site conditions

1) Relationship to neighbors and environment

The site is located in the northeast corner of City Campus between 16th and 17th Streets. Abel Hall and Sandoz Hall are across 17th Street. Parking lots are located to the North and West of Nebraska Hall. The College of Engineering renovations and new construction are adjacent to this site.

2) Utilities

There is no impact to existing utilities by this renovation.

3) Parking & circulation

There is no impact to circulation by this renovation. Additional visitor parking stalls shall be coordinated through Parking Services to accommodate volume of visitors for training and meetings.

4. Comprehensive Plan Compliance

A. Compliance with the University of Nebraska Strategic Framework, Campus Roles and Mission and Campus Strategic Plan.

The Enterprise Technology Services & Data Solutions project aligns with the goals outlined in the University of Nebraska Strategic Planning Framework 2014-2016. The following goal is most

pertinent:

6. The University of Nebraska will be cost effective and accountable to the citizens of the state.
   c. Allocate resources in an efficient and effective manner.
      ii. Leverage roles and missions of campuses to find savings and cost reductions through academic, administrative and business process efficiencies and effectiveness.
   f. Maximize potential of information technology to support the university's activities.

B. Consistency with the agency comprehensive capital facilities plan (year of plan and updates or revisions)

The Enterprise Technology Services & Data Solutions project is consistent with the Plan Big adopted by the Board of Regents in 2013.

The Plan Big UNL: UNL Campus architectural guideline principles this project will embrace include:

- *Material and color selections should contribute to a contextual and integrated aesthetic environment.*
- *Places should embody design qualities that express UNL's place as a premier, forward-looking institution where high levels of achievement are the standard.*
- *Places should create spaces that inspire social and intellectual collaboration.*

C. Consistency with the current version of the CCPE Project Review Criteria/Statewide Plan

This project is consistent with Nebraska's Coordinating Commission for Postsecondary Education Comprehensive Statewide Plan for Postsecondary Education, Chapter 6: Statewide Facilities Plan; specifically, as follows:

Nebraskans will advocate a physical environment for each of the state's postsecondary institutions that: supports its role and mission; is well utilized and effectively accommodates space needs; is safe, accessible, cost effective, and well maintained; and is sufficiently flexible to adapt to future changes in programs and technologies.

Individual capital construction projects will support institutional strategic and comprehensive facilities plans; comply with the Comprehensive Statewide Plan for Postsecondary Education, which includes the Statewide Facilities Plan; and not unnecessarily duplicate other facilities.

5. Analysis of existing facilities

A. Function and purpose of existing programs as they relate to the proposed project

The space on the 2nd and 3rd floors of East Nebraska Hall is already assigned to ITS as office space. Renovations will only change space already assigned to ITS and this space will remain ITS office space after the renovation. Current employees remain in the renovated space and the plan both modernizes and creates efficiency to add members from additional teams. The University is losing its lease for ITS offices at 56th and "O" Street, so the plan is to absorb the staff there into existing space in East Nebraska Hall. In addition, with the goal of trying to co-locate teams with similar focus, several staff from the Provost's office from Varner Hall will also move into East Nebraska Hall.

B. Square footage of existing areas:

The existing area to be impacted by the renovation is 27,742 net square feet of office and circulation space.

C. Utilization of existing space by facility, room and/or function

All affected existing spaces are presently used as office related. After the renovation, all spaces will continue to be used as office related.

D. Physical deficiencies

Nebraska Hall was an existing building purchased by the University in 1958. Second and third floors have been renovated on an ad hoc basis over the years. The existing space occupied on the second and third floors of East Nebraska Hall has not been significantly upgraded. The majority of spaces have not been re-painted for more than a decade and the carpeting in most spaces is 30 plus years old.

Other building deficiencies include:

- Asbestos remains in flooring and ceiling and will be removed as part of this project scope.
- Entrance accessibility is limited and uninviting.
- The lighting is fluorescent T-12 and does not meet current energy codes.
- The corridor floor tile is deteriorating and delaminating from the surface, requiring constant maintenance.
- All door hardware is non-compliant with ADA standards.
- Existing HVAC Controls are pneumatic. This project will install electronic controls for increased efficiency and ability to incorporate night and weekend temperature setbacks when areas are unoccupied.

E. Programmatic deficiencies

The current space on the second and third floors of East Nebraska Hall is unsuitable as a modern high technology office environment representing the state-of-the-art technology that is provided and supported by the teams impacted by this proposal. The offices, as a whole, lack many of the features that are necessary to create an atmosphere of a hi-tech, collaborative, and team building support group.

Current programmatic deficiencies include:

- Lack of openness to allow for gathering and collaboration.
- Lack of rooms equipped with special technology.
- Does not allow support for vision to expand and improve collaboration between data entities.

F. Replacement cost of existing building

The replacement cost of Nebraska Hall is listed in the FMIR 2017 as $95,815,463

6. Facility Requirements and the Impact of the Proposed Project

A. Functions and purpose of the proposed program

1) Activity identification and analysis

The function and purpose of the programs assigned to this space will remain the same - to provide office space for Information Technology Services. The only changes in function and purpose will be to increase the number of ITS groups and staff members occupying this space and add team members from the Provost's Office.

2) Projected occupancy/use levels

- **Personnel projections**

  The project will increase the occupancy by almost 46% from 101 staff to 147 staff to accommodate staffing needs.

- **Describe/justify projected enrollments/occupancy**

The goal of this renovation is to bring multiple groups together to create a more cohesive and collaborative department. There will be no new staff added. However, the number of staff that will reside in East Nebraska Hall will increase after team members move from leased space and other locations into East Nebraska Hall. The open floor plan will allow room to add new staff for future needs.

B. Space requirements

1) Square footage by individual areas and/or functions

Space Description	Space Use Code	Existing NSF	Renovated NSF	New NSF	Total NSF For Project
Office	310	14,078	17,119		17,119
Office Service	315	1,141	880		880
Conference Room (Office Related)	350	1,856	3,491		3,491
Circulation Area (Department)	WWW	1,593	0		0
Circulation Area (Common Corridor)	WWW	6,252	6,252		6,252
Net Square Feet		24,920	27,742		27,742
Gross Square Feet					30,516
Efficiency					0.91

2) Basis for square footage/planning parameters

ITS offices are presently assigned about 18,000 square feet of space on the second and third floors of East Nebraska Hall. All of these existing office spaces will be renovated. In addition, because the existing configuration of small individual offices requiring secondary corridors to access these offices, the existing corridor space will be incorporated into assignable space with the design of creating an 'Open Plan' office configuration. This will allow us to increase the occupancy and efficiency of the existing spaces.

3) Square footage difference between existing and proposed areas (net and gross)

	Existing	Proposed for Renovation	Difference
Net Square Feet	24,920	27,742	2,822
Gross Square Feet	30,516	30,516	0

The net square footage after renovation will be 2,822 square feet more than before the renovation. The increase is because of the removal of walls. Many walls will be removed, and the thickness of walls is absorbed into the calculated footage of the open office areas. The most significant increase is due to the optimization from small corridors between individual offices that will change into usable square footage in the open office areas.

C. Impact of the project on existing space

1) Reutilization and function(s)

This project will maintain the same function in East Nebraska Hall. The space will still be used as staff workspaces, only at a higher occupancy density.

2) Demolition

All of the existing ITS offices on the 2nd and 3rd floors of East Nebraska Hall will be completely demolished. Some corridor walls will be pushed out into the oversized corridors to gain additional meeting space. All egress paths will be maintained during construction.

3) Renovation

The project is primarily one of renovation. Only existing space is included; the renovation will reconfigure, upgrade and make more efficient use of the space.

7. EQUIPMENT REQUIREMENTS

A. List of available equipment for reuse

The team currently leasing space off-campus (NeSIS) has relatively new furniture and conference room technology. This equipment will be moved and reused for the East Nebraska Hall renovation. The existing training room tables and chairs in East Nebraska Hall will also be reused in the remodeled training room.

B. Additional Equipment

1) Fixed equipment

There will be no fixed equipment needed for this project. The goal of this renovation is to create an open and flexible working environment. Therefore, no built-in or fixed equipment is included.

2) Movable equipment

In order to accommodate the desired capacity of IT staff in the existing space in East Nebraska Hall, the area will be reconfigured so each staff member will have an open workstation. Therefore, workstations will be purchased. Each new workstation will be height adjustable for ergonomic comfort of the staff and flexibility in use of the space. New desk chairs will be offered to staff members.

3) Special or technical equipment

There will be large monitors in each meeting and collaboration room where rooms will have the technology for virtual meetings. Since this will be a completely 'open office environment,' each workstation will be outfitted with fixed monitors and computer docking stations. With staff being mobile, working at other campuses and remotely, some staff may need to retire their desktop computers in lieu of more mobile laptop computers.

8. SPECIAL DESIGN CONSIDERATIONS

A. Construction Type

The construction type will be II-A per the IBC and II (111) per NFPA 101.

B. Heating and Cooling Systems

The existing HVAC system is a dual duct ventilation system. Existing air handlers serving the area will remain and the distribution system will be modified. Inefficient Variable Air Volume (VAV) boxes will be removed and replaced with new, smaller, and more efficient VAV boxes. Terminal diffusers will also be replaced and reconfigured to better distribute tempered air to the larger open spaces. Finally, the less precise pneumatic controls for the HVAC system will be outfitted with new digital controls to allow Facilities Maintenance & Operations to monitor the temperatures in the renovated spaces. These energy management controls will realize energy savings by setting back temperatures during off hours.

C. Sustainability

The project will not formally file for LEED Certification but will meet the requirements for sustainable design as set forth by the University of Nebraska President's Administrative Policy. The design will include good, long-term choices for components of the building finishes, building systems, and construction materials.

D. Life Safety/ADA

All areas being renovated and constructed will be renovated as required under the terms of the ADA and Nebraska Accessibility Guidelines. Life safety systems will be designed in accordance with current code requirements.

E. Security

The existing complex security system will be evaluated during design and additional controls and monitoring points will be added as warranted. Card Access rough-ins shall be provided at any new door locations to allow ease of future installation.

F. Historic or architectural significance

Neither exist in relation to this interior renovation project.

G. Artwork

The State's 1% for Art program applies to this project. The specified budget has been allocated and artwork will be selected and procured in conjunction with the Nebraska Arts Council.

H. Phasing

The project is planned to be constructed and occupied in a single phase to support better construction costs. Existing occupants of the space will be relocated to other facilities temporarily.

I. Future expansion

There are no plans for to expand the ITS area. The open concept allows for desks for new hires and allows for hotel space for employees who regularly work from home and/or student workers.

J. Other

Since the existing ITS office space will be under construction and demolished, there will be a need for swing space. At 56th and 'O' Street, there is presently over 3,000 square feet of space unleased on the first floor. In addition, there are multiple suites ranging from 1,000 square feet to 1,500 square feet available on the second floor. This vacant space is a good short-term option for swing space offices while this project is being completed. Since the University is already leasing space in the building, fiber connectivity is already in place and will only need extended to additional leased space.

9. PROJECT BUDGET & FISCAL IMPACT

A. Cost Estimate Criteria

1) Identify recognized standards, comparisons and sources

The estimated probable costs of construction were developed by University of Nebraska staff utilizing historical data with reference to costs of similar projects. UNL provided services and non-construction costs were estimated by FPC staff.

2) Identify year and month on which estimates are made and inflation factor used

The estimate was prepared in November 2019. No inflation factor was used.

3) Net and gross square feet

Net Square Feet	27,742
Gross Square Feet	30,516

4) Project cost per net and gross square foot

$184 per NSF

$167 per GSF

5) Construction cost per gross square foot

$107 per GSF

B. Total project cost

Construction	
General Construction	2,680,000
Site Work/Utilities	0
Fixed Equipment	26,000
In-House Construction	414,000
Construction Contingency	156,000
TOTAL CONSTRUCTION COSTS	**3,276,000**
Non-Construction	
Project Planning	0
Professional Consultant Fees	234,000
Professional In-house	160,000
Equipment - Capital	183,000
Equipment - Non-Capital	1,000,000
Land Acquisition	0
Artwork	47,000
Other	121,000
Non-Construction Contingency	79,000
TOTAL NON-CONSTRUCTION COSTS	**1,824,000**
TOTAL PROJECT COST	**$ 5,100,000**

C. Fiscal impact based on first full year of operations

1) Estimated additional operational and maintenance costs per year

Additional operating and maintenance costs are estimated to be $12,000.

2) Estimated additional programmatic costs per year

No additional programmatic costs. There will be a cost decrease because NeSIS will not pay rent every year for off-campus space.

10. FUNDING

A. Total funds required: $5,100,00

B. Project Funding Sources:

Funding Sources	Amount	% Total
State Funds - LB957	$5,100,000	100%
Total	**$5,100,000**	**100%**

C. Fiscal year expenditures

FY 2019-2020	367,000
FY 2020-2021	4,733,000
Total	$5,100,000

11. TIMELINE

BOR Approves Program Statement	February 7, 2020
Design Begins	February 2020
Intermediate Design Review to BAC	May 2020
Complete Demolition Package	April 2020
Receive Bids for Demolition	May 2020
Demolition Begins	June 2020
Complete Construction Package	June 2020
Receive Bids for Construction	July 2020
Complete Demolition / Construction Begins	August 2020
Complete Construction	November 2020
Occupancy	December 2020

12. HIGHER EDUCATION SUPPLEMENT

A. Coordinating Commission for Postsecondary Education (CCPE) Review

1) ☒CCPE review is required.
A copy of the project program statement will be forwarded to the Coordinating Commission for Post-secondary Education for review following approval by the Board of Regents.

2) ☐CCPE review is not required.

B. Method of Contracting

1) Identify method

Design-Bid-Build

2) Provide rationale for method selection

The type and complexity of the project make design-bid-build method the most effective contracting option for this project and funding.

TO:	The Board of Regents	Addendum X-B-4
	Business Affairs	
MEETING DATE:	February 7, 2020	
SUBJECT:	Approval of master pricing agreements to provide equipment and related services for campus, backbone, and data centers network solutions	
RECOMMENDED ACTION:	Approve master pricing agreements with DataVizion LLC and GovConnection Inc. to provide equipment and related services for campus backbone and data center network solutions	
PREVIOUS ACTION:	None	
EXPLANATION:	The University of Nebraska network, supported by Information Technology Services, NU-ITS, is vital to the academic, research, and business functions of the University. It serves as a foundation upon which all other information technology related services are delivered. A majority of the network equipment is at or nearing the end of its useful life and is due for replacement. The replacement of this equipment mitigates multiple risks and ensures the University remains competitive with peers. This effort is a part of the OneIT transition, aligning well to the high-level NU-ITS strategic plan goals of security and scale by improving the security of the environment, reliability of services, and future supportability of the technology. UNMC is a close partner that actively participated in this process and is eligible to use these agreements. These awards to the respective low responsible bidders establish master pricing agreements for the purchase and installation of replacement equipment and related services for wireless and wired network connectivity, campus communication backbones, and data center network connectivity. This action standardizes architectures and deployments across the campuses and achieves the economies of scale desired from the OneIT transition. This will be the largest system-wide equipment standardization effort undertaken by NU-ITS as previous network purchases in these categories were campus-specific. By consolidating multiple campus equipment needs under this RFP, these agreements will realize an estimated savings of more than $15M over the initial term of the contract when compared to discount pricing historically offered to the University. This item has been reviewed by the Business Affairs Committee.	
PROJECT COST:	Based upon current usage, estimated $21 million over 5 years	
ON-GOING FISCAL IMPACT:	N/A	

SOURCE OF FUNDS:	State Funds, Student Fees and Revolving Funds
SPONSOR:	Chris J. Kabourek Vice President for Business & Finance | CFO
RECOMMENDED:	 Walter E. Carter, President University of Nebraska
DATE:	January 10, 2020

DataVizion Response
3131-19-4321
NETWORK HARDWARE SOLUTIONS
TABLE OF CONTENTS

Redacted items contained within this contract reflect inapplicable terms that the parties do not agree to as part of the award to DataVizion, LLC for Unified Edge Solution.

SCOPE OF WORK
University of Nebraska eBid # 3131-19-4321

The University of Nebraska has developed the following Scope of Work document in order to provide each bidder with specific and relevant background information related to this bid document.

PURPOSE
The University of Nebraska is requesting proposals from firms offering 1) Unified Edge Solutions, 2) Data Center Network Solutions, and 3) Campus Backbone Solutions for campuses in Lincoln, Omaha, Kearney, and Curtis. The intent of this Request for Proposal (RFP) and the ensuing process is to provide companies with the information, requirements, and specifications necessary for the preparation of a professional and comprehensive proposal. Three awards will be made from this RFP, one per category. Specific terms and conditions are outlined.

As used within this RFP, "Bidder" shall refer to those companies receiving and responding to this RFP. "University" shall refer to the University of Nebraska.

If the Bidder will not be selling directly to the University, it is the Bidder's responsibility to choose one reseller with whom they will partner on this project.

BACKGROUND
The unified University of Nebraska Information Technology Services team supports four University campuses; the University of Nebraska-Lincoln (UNL), the University of Nebraska at Omaha (UNO), the University of Nebraska at Kearney (UNK), and the Nebraska College of Technical Agriculture (NCTA). The unified team's goal is to align the strategic needs of the University of Nebraska and each campus.

The following values are estimates, compiled from various network management tools that we believe to be reasonably accurate in terms of existing quantities. The values may change some over time due to decommissioning of locations, remodels, renovation, or new construction.

	Lincoln	Omaha	Kearney	Curtis	Out-State	Total
Buildings	259	54	35	27	90	465
Closets (Total)	318	163	65	17	91	654
Switches (Total)	501	658	238	18	97	1,485
Ports (Total)	59,113	19,508	10,496	752	3,344	93,213
PoE Ports	48,422	19,220	5,448	536	3,344	76,950
Wireless Controllers	12	2	2	0		16
Wireless APs	4,802	972	1,203	66		7,043

The majority of the campuses are wired with CAT5E & CAT6 cabling, with limited installation of CAT-6A. Equipment currently varies by campus, as described below.

Lincoln: Edge switches are Cisco 4500 chassis with a handful of other fixed configuration models lightly interspersed. Uplinks to redundant distribution routers are a mix of 1Gbps and 10Gbps using single-mode fiber. MDF-IDF links are a mix of 1Gbps and using a mix of multi-mode and single-mode fiber. End-user connections are 1Gbps copper. Wireless is primarily Cisco 702w, 2600, 2700 and 2800 series.

Omaha: Edge switches are primarily Cisco stackable, 3800s, 3750s, and 2960s with a handful of other models lightly interspersed. Uplinks to redundant core routers are primarily 10Gbps using a mix of multi-mode and single-mode fiber. MDF-IDF links are primarily 10Gbps using a mix of multi-mode and single-mode fiber. End-user connections are 1Gbps copper, with some at 100Mbps copper. Wireless is primarily Cisco 2600, 2700 and 2800 series. Wireless in Baxter Arena is on Xirrus.

Kearney: Edge switches are primarily Extreme Networks stackable switches, Models X450, B5, C5 both POE and non-POE with a handful of other models lightly interspersed. Uplinks to redundant core routers are a mix of 1Gbps and 10Gbps using a mix of multi-mode and single-mode fiber. MDF-IDF links are a mix of 1Gbps and 10Gbps using a mix of multi-mode and single-mode fiber. End-user connections are 1Gbps copper. Wireless is primarily Aruba 104, 105, 303H and 315 series.

Out-State: These locations represent UNL County Extension and Research Centers throughout Nebraska. Edge switches are primarily Cisco 2900 series switches of both POE and non-POE models. Wireless is primarily Cisco 2700 & 2800 series.

A portion of the wired and wireless environment consists of current hardware and software, with the overall environment being significant in size. In section 6, the University is requesting that respondents evaluate existing hardware and software in Attachment A for trade-in value and/or identify opportunities to leverage or integrate existing components.

Datacenter & Campus Backbone: For background information see the Objectives, Section 1.a.

SCOPE OF WORK

1. **Description of the Goods or Services Sought**:

First, the University seeks to replace, as a unified "system", the wired and wireless network components of the University network. This refresh will include related software management platforms supporting network authentication, monitoring, and analytics. The hardware and software components must work together to provide and secure access to the network by users of the University. This refresh will seek software platforms that contribute to the security of edge, situational awareness of the environment, and analytics to identify growth and areas for improvement. The University seeks the best solution to ensure optimum operation, user satisfaction, and support of the access-layer or edge network. Preference will be given to single-vendor solutions, where all components are sourced from a single vendor, to ensure the best integration, long-term support, and development.

Secondly, the University seeks to replace the networking components of its Data Centers. This refresh will include network hardware and related software required for configuration and management. This refresh will seek components that are scalable, high performing, highly reliable, and interoperable with existing University networks. The University seeks to ensure the services hosted on these Data Center networks are capable of meeting current and future business needs of the University in terms of performance and reliability. Preference will be given to single-vendor solutions, where all components are sourced from a single vendor, to ensure the best integration, long-term support, and development.

Thirdly, the University seeks to replace campus network backbone, including core and distribution equipment across the Lincoln, Omaha, Kearney, and Curtis campuses. This refresh will include network hardware and related software required for configuration and management. This refresh will seek components that are scalable, high performing, highly reliable, and interoperable with existing University networks. The University seeks the best solution to ensure optimum operation, user satisfaction, and support to meet the academic, research, and administrative needs of the University. Preference will be given to single-vendor solutions, where all components are sourced from a single vendor, to ensure the best integration, long-term support, and development.

a. Objectives

i. Establish negotiated pricing

The University continues to grow through new construction, renovation, and expansion as well as augmentation of existing networks. It is common throughout a given year to purchase additional wireless and wired network hardware and software to meet those needs. A pricing agreement is required for the life of the hardware and software and of the contracts established through this RFP.

ii. Refresh unified edge infrastructure

Replace edge infrastructure, including wired switching, wireless access points, and associated authentication and management software to provide a "unified edge" platform across University locations.

1. Replace existing edge switches

Approximately 1388 edge switches are in scope for replacement across the Lincoln, Omaha, Kearney, and Curtis campuses. The University will seek to replace edge switches in a phased purchase and installation approach, over a period of five years.

Both modular and fixed configuration switches may be proposed at the Bidder's discretion and both will be considered.

a. Ensure adequate PoE capability

Wireless is becoming the ubiquitous method of connectivity at the University. While wired still has a place, wireless is now the preferred method of access to network services. The University has a large enterprise wireless environment, totaling nearly 7,043 access points, and growing, across the four campuses. To support continued wireless growth and increasing power needs of newer access points, the need for PoE continues to rise.

PoE is also important for many IoT devices, such as security cameras, IP phones, thin-clients, and other building control devices. These types of devices are proliferating on the wired network and require power from the edge switches.

b. Access to multi-gig capability

As users continue to prefer wireless, wireless infrastructure may consume higher bandwidth than a single 1Gbps connection can provide. Selective access to multi-gig 802.3bz/NBase-T technology will benefit forthcoming wireless infrastructure. With newer wireless standards around the corner and a potential increase in services such as Wi-Fi calling, higher bandwidth to the AP will likely be necessary.

Multi-gig also has the promise of providing greater than 1Gbps to a directly connected workstation. As multi-gigabit NICs become available, increased bandwidth options may benefit users, such as researchers who need to move large data files.

c. Ensure adequate security at the edge

Securing network access is an important initiative for the University, and identifying devices, assigning roles, and building methods for mitigation are critical going forward. Switching must have the ability to provide per-port authentication with access to advanced features, such as downloadable ACLs and SNMP or RADIUS triggered VLAN moves.

With the large BYOD environment managed by the University, multiple forms of authentication need to be supported, such as 802.1x (EAP-PEAP and EAP-TLS), MAC authentication, and captive portal authentication. Options to enforce security such as dynamic user profiles and policies are critical to micro-segmentation of individual user traffic. Also needed in an authentication platform are tools to initiate a change-of-authority to remediate compromised clients, moving them to quarantine networks or denying the client access altogether.

d. Prepare for bandwidth growth

Edge switches connect every user at the University in one way or another. There are times when a user, such as a researcher, may require a higher bandwidth option than is offered within the 1-10Gbps range. With a large managed device environment, it is also

crucial to have adequate bandwidth available for updating large volumes of wired and wireless devices. Switches performing at line rate on all ports and with options above 10Gbps for select cases, such as MDF-to-core uplinks, would also be beneficial.

2. Refresh the existing wireless infrastructure

The University is requesting proposals to accommodate a refresh of its wireless LAN infrastructure, including wireless controllers and access points.

a. In-place swap of existing wireless infrastructure

The University intends to make a one-for-one swap of its existing wireless access points as the first step in migrating from its current platform to the Bidder's platform. In most cases, access points will be replaced in conjunction with switch replacement. The University is primarily standardized on a ceiling mount deployment; however, the Bidder must consider the suitability of their access point when both wall and ceiling mounts are used.

b. Improve performance in areas of high wireless client density

The University intends to utilize the wireless network during classroom instruction, including in large lecture hall areas and in areas that contain many large classrooms in close proximity. It is highly desirable that the Bidder's solution support up to 600 concurrent wireless users in a large, single room. Other dense environments include arena, event, and conference spaces. This will require effective RF and wireless host management strategies.

c. Continue to provide stable service

Wireless is the predominant method of end-user connectivity at the edge. The existing environment is stable and user satisfaction is good, but a majority of access-point hardware is end of life and needs refreshed. Expansion will continue to fill coverage gaps on campus, increase the density of deployment, and expand into outdoor spaces.

The University is looking for a mature, stable platform with peer installations in the higher education community. There will be limited time for testing, so references provided by the Bidder will be used to help evaluate stability and suitability. The University looks to avoid controller reboots, access point reboots, and hardware or software bugs that result in service disruptions to wireless hosts.

A requirement is that the loss of any campus should not affect the wireless service on other campuses, i.e., the loss of network connectivity in Lincoln should not affect the wireless network in Omaha. The University network is architected in a redundant fashion such that a general loss of network today on any campus should not adversely affect the remaining campuses.

Controller capacity between the campuses should not be shared. Lincoln controllers should only adopt Lincoln access points, Omaha controllers should only adopt Omaha access points, and Kearney controllers should only adopt Kearney access points. Smaller locations, including Curtis and County Extension Officers, may be adopted by the controllers in Lincoln, Omaha, or Kearney. The controllers at each location must support the full number of access points indicated per campus.

The growth capacity of the controller arrangement must be specified. The controllers proposed should be proposed in a configuration that can support 35,000 concurrent wireless clients in Lincoln, 15,000 concurrent wireless clients in Omaha, and 7,000 concurrent wireless clients in Kearney.

The controllers must be proposed to support N+1 redundancy. It is desirable to have 1+1 redundancy with physical diversity. On each campus, the controllers will be deployed between two geographically diverse MDF facilities and the loss of one facility

should not degrade the operation of the wireless network. The remaining MDF should be able to support the full complement of access points and clients.

If any of the wireless components are virtualized, the University has two data centers approximately 50 miles apart. One data center in Lincoln and the other in Omaha. The data centers have the ability to stretch layer2 if required.

The vendor is welcome to present modifications to the current wireless design or propose a new design.

d. Optimize wireless configuration and coverage
It is highly desirable that the Bidder's solution provide robust and dynamic RF adjustments to optimize service and identify service coverage gaps.

e. Scalability
University wireless services currently support more than 40,000 simultaneous wireless clients near peak. Wireless usage continues to increase as more and more computing devices begin to use wireless over Ethernet, saving on wiring costs. Newer mobile and entertainment devices, and the increased use of Wi-Fi calling, also ensure that client counts will continue to grow. We anticipate annual growth of wireless devices to be between 10 – 15%.

f. Improve wireless system management
Multiple administrators must be able to manage the wireless controllers and access points efficiently. A single point of configuration for the entire installation or per campus is highly desirable. The ability to monitor the system and successfully query the wireless controllers for operational information is critical.

3. Leverage unifying software for authentication, monitoring, and analytics
Situational awareness of the status of the edge network and connected clients are important factors to managing a large network. Authentication and instrumentation for the entire edge environment will help streamline access and support; providing the ability to predict and respond to problems before they affect the network, its security, or the satisfaction of the users.

a. Authenticate and authorize all clients connecting to the University network
Authentication is a crucial component of edge access, providing real-time information for each connection. A policy-based network access platform with flexibility to provide end-user facing interfaces for device management is needed. Authentication must support multiple methods, such as 802.x EAP-TLS and EAP-PEAP, the application of role-based policies, and extensive logging of the process. Many devices that connect to the University network are not capable of 802.1x authentication. Additional methods such as a MAC registration and authentication or captive portal authentication are necessary.

b. Provide role-based access
The software platforms and associated hardware must support the assignment and enforcement of role-based access. Flexibility is key, allowing for movement of a client to a specific VLAN or assignment of a restrictive ACL are all methods to provide segmentation based on roles. The capability to modify an existing role and apply those changes to a large client population or simply change the role of a single client are necessary capabilities to manipulate the client environment to prevent and respond to security issues.

c. Standardize on a centralized policy framework
The authentication platform will be the central point for distributing role-based policies to wired and wireless networking devices; allowing for a single point of configuration and distribution of role-based policies and dynamic ACLs.

d. Situational awareness of the edge environment
The software platform should monitor all components of the edge environment, including wireless controllers, wireless access points, and edge switching. The provided data should be detailed and specific to each monitored device and provide the engineering team with data to troubleshoot connectivity issues, identify and locate clients, and track trends and statistics necessary to manage and improve the environment. The data will also be made available on a limited basis to security and support groups to query specific data based on their organizational roles. Also critical is some method to present the placement of edge devices, especially wireless access points, on top of architectural maps for location tracking and some estimation of their function and reach.

e. Authorize and limit access to consumer media or IoT devices without requiring shared broadcast domains
With the advent of IoT and the multitude of media devices, the NAC needs to provide the end-users with an ability to register and manage personal devices. The NAC, or other platforms, need to support interfaces for managing the visibility and access to a registered device. Many types of devices are found within our campuses, including Apple TV, Google Chromecast, Amazon Fire devices, and other comparable devices. Access to these devices do have limits and is not ubiquitous, however, tools are needed in the edge solution to manage these devices to the greatest extent possible.

iii. Refresh data center network infrastructure
The University is seeking proposals to replace networking infrastructure for its on-premise Data centers.

BACKGROUND: Today the University has a mixture of network equipment for Data center routing and switching at different sites. Cisco: 6506E (VSS), Nexus 5548 (vPC) w/FEX 2248, Nexus 93180 (vPC). Arista: 7504E (MC-LAG), 7150, 7050, 7010. This is mostly serving 1Gb connected hosts while 10Gb is limited to infrastructure links along with VMware servers, load balancers and storage. Traffic is segmented using vlans and 802.1q trunking across single or LAG/MC-LAG links. Inter-site DC connectivity is multiple 10G links using dark fiber or DWDM. Today network redundancy is achieved using dual chassis and VSS/vPC/MC-LAG at aggregation points and in some cases dual routed paths out of a DC. The University has recently purchased two pairs of Palo Alto firewalls to serve these two sites. **Note**: Compute, storage, firewalls, load balancers, and DWDM optical transport are outside the scope of the Data Center section of this RFP

1. Build new networking infrastructure for Data Centers at multiple sites
The University has two main Data Centers (DC), one in Omaha, NE (TierPoint) and one in Lincoln, NE (Nebraska Hall). Both sites will house active compute and storage along with redundant pairs of load balancers and firewalls at each site. These main sites will be connected directly into the NU-WAN network and separate from any campus network.

These two DC sites are 50+ miles apart. The University owns and operates a 100G capable WAN and DWDM transport between these sites. For applications that can support it, both DC's will be active and providing redundant services at the same time. For other services, one site will be primary for connectivity and the other will be secondary.

There are also auxiliary DC sites on each campus. In the future the roles of these sites could potentially change. Therefore, any proposed networking architecture should be able to

accommodate two or more inter-connected DC sites. There is a desire to use common network hardware models when possible in the main and auxiliary sites.

For this RFP the proposed network solution should focus on the two main DC's. The University can then replicate this model to other auxiliary sites if needed.

2. **Be scalable, high performance, supporting current trends and industry standards**
There is an expectation to have a DC network solution that is standards based and has a current high adoption rate, preferably within HigherEd. While open to other solutions, there is a desire for a Spine-Leaf network using a layer 3 routed underlay. Ideally the Spine to Leaf links would all be 100G. The use of VxLAN for layer 2 and layer 3 services along with EVPN is expected to be supported along with standard routing protocols such as OSPFv2/3, BGP for IPv4 and IPv6.

   The University is targeting to have 95% of servers virtualized in the future. There is an expectation that 10G will be the new connection standard, though 1G support will be needed for the foreseeable future. On the leaf switch there should be support for 1G/10G/25G/100G. The desire would be for all physical hosts to be dual connected to different leaf switches when possible using link redundancy protocols such as LACP.

   For external connectivity at each DC site, the desire would be to have a pair of switches that will be dedicated for border routing functions. These switches would connect to the NU-WAN routers for connectivity to the University and Internet. The DC firewalls at each site should also connect to these border leaf switches.

   The University is also investigating VMware NSX for possible use. While NSX is outside the scope of this RFP, any proposals should include statements of what NSX support is available in the solution.

   The University is also utilizing hybrid cloud deployments. Most activity today in this space is with AWS. In the future, DC's could be involved in terminating cloud connectivity. While providing cloud services is outside the RFP scope, proposals should highlight any features or key advantages as it relates to integrating on-prem DC resources with the cloud.

3. **Infrastructure is highly available, redundant, independent at each site**
Any proposed network solution must be highly available and redundant. The expectation is the network fabric will remain operational with the failure of any single Spine or Leaf switch. Leaf switches will be installed in pairs. There is a desire for all hardware to have redundant power supplies and fans that are field replaceable.

   Any proposed solution should have the ability to perform device software upgrades in a controlled fashion. This should allow software upgrades to happen incrementally as to not impact the entire fabric at any one site. If In-Service-Software-Upgrade (ISSU) or 'hitless upgrades' is available on any devices it should be highlighted.

   While the DC sites are interconnected, the expectation is that each site will be survivable and operate independently in the case of a total failure at one of the other sites. The overlay configuration must have the ability to control potential Broadcast, Unknown Unicast, Multicast (BUM) traffic storms from propagating between DC sites.

4. **Achieve higher operational efficiency through automation and orchestration**
There should be the option to use a vendor supplied graphical software tool for configuring, deploying, and modifying the Spine-Leaf networks.

   In addition, the proposal should state which programmability features of the solution are available using open automation tools.

5. **Provide enhanced features for network management, performance monitoring and troubleshooting**
   The ability to ensure the DC network fabrics are working optimally will be critical. This will include the ability to monitor and troubleshoot the hardware, underlay and overlay networks.

   Any features built-in into the solution, or optional products, which aid in this effort should be highlighted. This would include the ability to monitor interface buffers in real-time and the option for streaming analytics. There is also an expectation to have integration with Splunk for logging and analysis. In addition, the support for exporting network flows and port-mirroring are expected. If there are any built-in capabilities to perform packet captures within the solution those should be highlighted.

   There is the expectation that the solution has strong monitoring support for SNMP polling from network management systems. If any added capabilities or integrations with Solarwinds are available those should be highlighted

iv. Refresh campus backbone core/distribution network infrastructure

The University is requesting proposals to refresh its campus backbone core/distribution network infrastructure. The University network supports a wide variety of activities including but not limited to educational, research, and community engagement.

The University's current backbones are built on a variety of hardware platforms including Extreme X670 (5 systems), Cisco Catalyst 6807-XL systems (12 systems), Alcatel-Lucent Enterprise OS6900-X72 (22 systems), and a variety of aggregation switches. A variety of different technologies and protocols have been used to deploy networking services such as OSPF, BGP, 802.1Q VLAN trunking, and 802.1AQ Shortest Path Bridging, and VRF-Lite. The University is seeking a backbone solution that can deploy current and future services on a common platform for all campuses.

1. **Build capacity and simplify delivery of new services**
   The University is seeking to build networking capacity and simplify delivery of virtualized Layer 3 (IPv4 and IPv6 routing) and virtualized Layer 2 (Ethernet bridging) services over a routed transport. It is highly desirable that the Bidder's solution is built on modern industry standards.

2. **Utilize existing fiber optic cabling plant**
   Campus fiber optic plants were built using different topology designs. 1) A dual-hub and spoke topology 2) A hub-spoke topology for a smaller site 3) A ring of spokes topology 4) a partial mesh topology. The University is seeking a solution that can utilize the existing topologies in the short term with no or minimal changes while a future fiber optic refresh is planned. A more detailed diagram of fiber connectivity in Attachment C – Campus Fiber Optic Maps is provided.

3. **Continue to provide stable service**
   Campus network backbone provides business critical connectivity for campus services including telephone services, fire life-safety systems. Providing equipment and geographic redundancy where possible is highly desirable. Compatibility with existing and future downstream networking equipment as well as Wide-Area-Network (WAN) equipment is paramount to support a phased deployment.

4. **Scalability**
   Port-density requirements on routers vary by location and can range from as few as 6 downstream devices to 90+ downstream devices. The University will consider chassis,

modular, and fixed form routers and switches. Aggregation switching may be used in locations where applicable.

5. **Operational Effectiveness**
   The University is seeking greater operation effectiveness through the use of 1) same or similar equipment models where possible to allow for cold-spare equipment sharing and sharing of skills 2) consistent and quick deployment of infrastructure through zero-touch-provisioning 3) consistent and quick deployment of services through orchestration and automation.

2. **Proposal**
The selected Bidder must propose a Master Pricing Agreement for hardware and related pricing, which meets the objective and criteria of this RFP. Due to the quantity of hardware and replacement schedule, a subset of the equipment will be the focus of a pricing proposal for comparison.

Please reference Attachment A for a list of current Unified Edge assets and create a pricing proposal for equivalent hardware that satisfies the requirements of this RFP. Pricing for network access control licensing, and any necessary hardware, sized to support authentication for the entirety of the wireless access points and total number of switches should be included. Adequate monitoring licensing and any necessary hardware to monitor and provide analytics for the entire wired and wireless environment should be included. If possible, the solution should be designed for geographically redundant deployment.

Please reference Attachment B to create a comparative pricing proposal for Campus Backbone networking. Pricing for the Campus Backbone proposals should include any licenses necessary to support features listed as required in this RFP.

Please reference Attachment D to create a comparative pricing proposal for Data Center networking. Pricing for Data Center (DC) proposals should include any necessary licenses needed to support required features. This includes any graphical software tools available for configuration and support of the DC network.

Pricing should be reflected separately from any trade-in offers of equipment listed in Attachment A. Please list Trade-In and any additional incentives as separate line per details in Section 5.d.

Support and licensing pricing for five (5) years for all components, including software and hardware should be included.

Upon award of the RFP, the University will proceed to place an initial order of equipment, software, and licensing to begin refreshing the University network. This will begin the refresh, one building at a time, on each campus, refresh of data center networks, and of campus backbones. The University intends to begin cycling out the older equipment beginning in early 2020 and continuing as schedules and budgets permit until completion.

i. **Training**
The selected Bidder must provide pricing for training of twenty (20) University personnel on the proposed products in a facility within 30 miles of the Lincoln or Omaha campuses. The training may be held onsite at the University. This training shall include instruction on the operating system, configuration, and troubleshooting of equipment which is pertinent to the University's intended use. In order to preserve business continuity, two training sessions must be provided. Due to the scope of the project, training is a critical component to ensure the engineering staff are able to effectively expand and support the environment.

ii. **Optional Certification**
Certifications pertaining to the equipment being purchased and their supporting systems should be listed as an optional cost.

iii. **Technical Support**

It is strongly desired that, at a minimum, edge switching be accompanied by a lifetime warranty, with support and software upgrades, by the manufacturer. If this is not the case, the selected Bidder must provide technical support from the equipment manufacturer on the proposed switching hardware for a period of five (5) years. Any hardware or software not covered under a lifetime warranty should include five (5) years (60 months) of support, including software updates and next-business day parts replacement.

Any support must include online access to software upgrades, online access to the manufacturer's knowledge base, online initiation of technical support cases, phone-based initiation of technical support cases, and initial response from a technical support engineer within two hours of initiating a technical support case, and next-business-day replacement of failed hardware.

iv. **Equipment Delivery**
Equipment must be delivered within four weeks of order placement unless an estimated delivery schedule is provided within the first week after order placement. Software, virtual appliances, and/or licenses should arrive as soon as possible after order placement.

v. **Value Add**
Please describe any additional services that you would like to include at no cost to the University, such as but not limited to the items listed below:

- Tier 3 engineer availability onsite for initial implementation.
- Direct access to Tier 3 engineering for on-going support throughout the hardware and software lifecycle.
- Installation crews to accelerate conversion process to new hardware.
- Supporting software that would otherwise be purchased separately.
- Engineering assessment of wireless access placement, including high traffic areas and outside environments.

3. **Services Area/Delivery Locations/Maintenance Timeframe**:
   a. Delivery locations for equipment will be as follows:
      i. Lincoln: University of Nebraska - Lincoln
      Attn: Information Technology Services
      1321 Military Road
      Lincoln, NE 68583

      ii. Omaha: University of Nebraska at Omaha
      Attn: Information Technology Services
      601 South Saddle Creek Road
      Omaha, NE 68106

      iii. Kearney: University of Nebraska – Kearney
      Attn: Information Technology Services
      905 W 25th Street
      Kearney, NE 68849

      iv. Curtis: Will be delivered to one of the three locations listed above.

4. **Price:**

   a. Provide a comparative proposal using Attachment A, B, and D:

      i. All hardware described in section 1, including associated support and licensing for five (5) years.

      ii. All necessary related components describe in section 1, such as power-supplies, fan trays, transceivers, line cards, brackets, and etc.

iii. Any equipment relating to providing outside wireless, including associated support and licensing for five (5) years.

iv. All components for available management platforms, including associated support and licensing for five (5) years.

v. Any additional software for authenticating, monitoring, measuring, and troubleshooting the edge network environment, including associated support and licensing for five (5) years.

vi. All pricing should be provided in line item detail format.

b. In addition to the comparative proposal in 4.a, a pricing list of all hardware and components offered as a part of this RFP is required. This pricing list should be provided in Microsoft Excel format and include a list price column, a discount column with the discount percentage offered, and a net price column.

It is strongly preferred that there is not a charge for support and maintenance on spare equipment. Please indicate if the support covers hardware, software, or both. It is strongly desired that the edge switching be covered under lifetime warranty.

i. Specify any ongoing protected, flat percentage (%) discount from manufacturer's list price for future purchases, including equipment, services, licensing, and support not specified in the Bidder's response. The discount must also be applicable to all organizations where the Board of Regents of the University of Nebraska holds an ownership stake, and organizations of the Nebraska State College System. The discount structure should be firm for a minimum of five (5) years, with an option to renew for an additional five (5) one-year terms. Bidder must agree that the discount will be increased to the University if the Bidder increases discounts generally to its customers above the offered discount to the University, for relevant goods and services.

ii. The list pricing shall not increase except as part of a non-targeted, across-the-board pricing increase by the Bidder, applicable to its customers generally, for the relevant goods or services. The selected Bidder will give the University at least 90 days advance notice of any increase in the list pricing it charges to the University under the pricing agreement. Such increase shall not exceed CPI or 2% each year of the term, whichever is lower.

iii. Bidder agrees to provide at minimum a current master pricing list for applicable product categories annually no later than January 31st of each year of the contract. If product releases occur on a different schedule, catalog should be provided to the University within 30 days after major product updates.

c. Provide the cost, if any, for training described in Section 1.b.2.

d. Provide the trade-in value the Bidder is willing to provide for the equipment listed in Attachment A. The equipment cannot be guaranteed to be provided in full to the selected Bidder, instead provided as each building is refreshed. The University can provide incremental portions of the equipment during the installation process. It is the Bidder's obligation to arrange packing, pick-up and transportation, of the equipment. Trade-in shall be listed separately from the purchase cost.

e. Please indicate if proposed Value Add items in Section 1.b.6 will be at no cost. Otherwise, please indicate line item pricing for optional services.

5. **Term of Contract**:

a. **Initial Term** shall be defined as five years.

b. The University may extend the life of the contract by an additional five one-year terms beyond the Initial Term, defined as the **Extended Term**.

6. **Evaluation**:

Selection of the successful company will be based upon:

- Ability to meet technical specifications and statement of needs
- Total cost of ownership
- References
- Value-add
- Acceptance of terms and conditions

These criteria have been listed in order of importance.

7. **Proposal Response**

The Bidder's response to this proposal should include answers to the following series of questions. So that the RFP team can easily follow the questions and responses, please assure that the question is stated immediately prior to the response. In addition to point-by-point responses, you may include descriptive literature if you refer to specific contents. In reviewing the proposals, University personnel will not search through general literature. Where a question is asked, answer the question and supply any supportive detail. Any deviation from this format and sequence may result in the proposal being immediately rejected.

While responses should address all solicitation items, it is important to note that we also encourage and will consider any creative ideas for improvements or cost savings related to this transaction that may not be suggested in this document. Functional, technical, and economic solutions beyond the confines of this solicitation may also be considered.

The responses should address all solicitation items. However, the University reserves the right to consider other ideas and solutions, or only a restricted subset of the configuration discussed in this document.

All optional arrangements should be described and priced separately.

a. All proposal responses must include:

i. The name, address, phone and fax number, and email address for the duly authorized agent submitting the proposal.

ii. Full description of company, including experience, qualifications, and organizational chart.

iii. Documentation of any intent to partner with a reseller for any part or the whole of the services offered in response to this RFP.

iv. Copies of all documents that could become a part of a final Agreement arising from this process. A legal review of the Bidder's proposed Agreement terms will be part of the criteria in evaluating the Bidder's offer.

v. The Bidder must provide five reference customers. A minimum of two references must be from higher educational institutions of 20,000 students or greater within the United States using the proposed equipment in a similar manner to the University of Nebraska. However, three of these references are strongly desired.

Attachments

Attachment A – Equipment Inventory
Attachment B – Campus Backbone Pricing Proposal
Attachment C – Logical Campus Fiber Optic Maps
Attachment D – Data Center Pricing Proposal

Attachment A

Unified Edge Inventory List

The inventory list below indicates the inventory that is currently installed across the NU system. We are requesting bids for models that are suitable replacements for these models meeting the specifications listed in the RFP. Utilizing as few AP models and controllers as possible. In addition, a network access and control policy management solution must be included.

Wireless Inventory

Cisco Controller Inventory	
AIR-CT5520-K9	7
WS-SVC-WISM2-K9	4
Cisco Access point Inventory	
AIR-AP1562D-B-K9	50
AIR-AP1562E-B-K9	2
AIR-AP1562I-B-K9	18
AIR-AP1810W-B-K9	273
AIR-AP1815W-B-K9	66
AIR-AP2702I-UXK9	289
AIR-AP2802E-B-K9	19
AIR-AP2802I-B-K9	1715
AIR-CAP1532I-A-K9	27
AIR-CAP2602E-A-K9	1
AIR-CAP2602I-A-K9	914
AIR-CAP2702I-A-K9	782
AIR-CAP2702I-B-K9	240
AIR-CAP3502I-A-K9	60
AIR-CAP3602I-A-K9	25

AIR-CAP702I-A-K9	1
AIR-CAP702W-A-K9	698
AIR-LAP1142N-A-K9	352
AIR-LAP1242AG-A-K9	19
AIR-LAP1252AG-A-K9	53
IW3702-4E-B-K9	4
AIR-AP1572EAC-B-K9	2
AIR-AP3802P-B-K9	4
AIR-CAP1552EU-A-K9	1
AIR-CAP3602E-A-K9	2
AIR-CAP3702I-A-K9	40
AIR-CAP3702P-A-K9	8
Total	**5665**
Aruba Controller Inventory	
Aruba 7240	2
Aruba Access Point Inventory	
Aruba AP 365	3
Aruba AP 315	230
Aruba AP 303H	343
Aruba AP 275	13
Aruba AP 225	13
Aruba AP 205H	52
Aruba AP 205	2
Aruba AP 105	153
Aruba AP 104	394
Total	**1203**
Xirrus Controller Inventory	
XMS server Model 9000	1

Xirrus Access Point Inventory	
XR620	163
XR2426	6
XR2425H	3
XR4826	1

Wired Inventory

The inventory list below indicates the switch inventory that is currently installed across the NU system. We are requesting bids for models that are suitable replacements for these models meeting the specifications listed in the RFP. Standardizing on as few different switch models as possible.

Cisco Access switch Inventory	
WS-C4506-E	208
WS-C3750-24PS-S	117
WS-C3750V2-24PS-S	84
WS-C2960X-24PS-L	73
WS-C3750X-24P-S	72
WS-C2960X-48FPS-L	68
WS-C2960S-24PS-L	40
WS-C2960X-24PD-L	37
WS-C3750G-24PS-S	36
WS-C2960S-48FPS-L	35
WS-C2960X-48FPD-L	33
WS-C3850-48P-S	32
WS-C3750X-48P-S	31
WS-C2960S-48LPS-L	29
WS-C3750E-24PD-S	24
WS-C3850-48U-L	21
WS-C3750G-12S-S	17
WS-C2960G-48TC-L	14

WS-C2960G-24TC-L	11
WS-C3560CG-8PC-S	11
WS-C3560E-24PD-S	11
WS-C3750-24TS-S	9
WS-C2960-24TC-L	8
WS-C3560X-24T-L	8
WS-C3850-48P-L	8
IE-3000-8TC	7
WS-C3560C-12PC-S	7
WS-C3560E-12D-S	7
WS-C3750X-12S-S	7
WS-C2960G-8TC-L	6
WS-C3560CX-8PC-S	6
WS-C3750E-24TD-S	6
WS-C2960S-48TS-L	5
IE-2000-16TC-G-E	4
IE-2000-8TC-G-B	4
WS-C3560CX-12PC-S	4
WS-C3750G-24TS-S	4
IE-2000-4TS-G-B	3
WS-C3560X-48T-L	3
WS-C4510R+E	3
WS-C2960S-24TS-L	2
WS-C3560G-48PS-S	2
WS-C3850-12S-S	2
WS-C6513-E	2
IE-3010-16S-8PC	1
WS-C2940-8TT-S	1
WS-C2960-8TC-L	1
WS-C3560-24PS-S	1
WS-C3560X-24T-S	1
WS-C3750X-24T-L	1

WS-C3850-12S	1
WS-C3850-24S-S	1
WS-C6506-E	1
WS-C6509-E	1
Total	**1131**

Enterasys Switch Inventory	
71K91L4-24	9
B3G124-24P	2
B3G124-48P	3
B5G124-24P2	12
B5G124-48P2	15
C3G124-24	1
C3G124-48	3
C5G124-24	2
C5G124x24P2	10
C5G124x48	94
C5G124x48P2	52
S4	1
Total	**204**
Extreme Switch Inventory	
summitX450G2-24p-10G4	1
summitX450G2-48p-10G4	28
summitX670G2-48x-4q	5
Total	**34**

Attachment B- Campus Backbone Equipment

Campus Backbone Background

The University of Nebraska has four campus networks located in Curtis, Kearney, Lincoln, and Omaha. Each campus network will be interconnected with the University operated Wide Area Network in 2 distinct physical locations, with the exception of the Curtis campus. The operation of the campus network should not be dependent on the equipment in any single interconnections.

Campus networks will have reachability between campuses and possibly have virtualized IPv4/IPv6 or select Ethernet services spanning across campuses. Each campus network is expected to operate independently of other campus networks. Each campus network is expected to survive the failure of any single Data Center network.

For more information, please see:

- Attachment C - Logical Campus Fiber Optic Maps.
- Campus Backbone Objectives section of the RFP for required and preferred criteria for hardware.
- Data Center Networking section of the RFP.

As described in the RFP, pricing proposals seek to compare Total Cost of Ownership. Campus Backbone network hardware may be purchased and installed in phases.

Base Specifications, Support, Maintenance, and Spare Hardware

- Pricing proposals must provide an itemized cost by SKU.
- Include all hardware, software, licenses, and 5 years of maintenance.
- Include 24x7 support for routing and switching equipment.
- Include 8x5 hardware replacement for all equipment.
- Where a pair of routers or switches are specified for use, include any cabling required for connectivity between the pair of routers or switches.
- For each model of hardware, include 6 spare units. Spare units will be kept at a customer location and will be used in the event of equipment failure. University IT staff must be able to install spare equipment into a production network without contacting vendor support. (i.e. University IT staff must not be required to contact vendor support to transfer software licenses prior to putting spare hardware into production).
- Spare equipment may be used for training or testing purposes.

Service Specifications by Campus

Curtis

Routing

- Include equipment for two routers located in the same room. Each router will serve 16downstream devices. The downstream devices will connect to each router forming an MC-LAG.
- Include a total of 32x 10GBase-LR optics to connect to downstream devices.

Kearney

Routing

- Include equipment for two routers at each of 4 physical locations. Each router will serve 16downstream devices. The downstream devices will connect to each router forming an MC-LAG.
- Each router pair must support 2-4 connections to neighboring routers.
- Include a total of 128x 10GBase-LR optics to connect to downstream devices.
- Include a total of 8x 100GBase-LR optics for router-to-router connectivity to form the campus backbone.
- Include a total of 2x 100GBase-LR optics for campus-to-WAN connectivity.

Aggregation Switches

- Include equipment for a pair of aggregation switches at each of 6 locations. Each aggregation switch pair will serve 12 downstream devices. The downstream devices will connect to each aggregation switch forming an MC-LAG.
- Include a total of 144x 10GBase-LR optics to connect to downstream devices.
- Include a total of 12x 10GBase-LR optics for aggregation switch uplinks.

Lincoln

Routing – Site A

- Include equipment for a minimum of one router at each of 2 physically separate locations. Each router will serve 90 downstream devices. The downstream devices will connect to each router forming an MC-LAG.
- Each router pair must support 2-4 connections to neighboring routers at different sites.
- Include a total of 180x 10GBase-LR optics to connect to downstream devices.
- Include a total of 4x 100GBase-LR optics for router-to-router connectivity to form the campus backbone.
- Include a total of 2x 100GBase-LR optics for campus-to-WAN connectivity.

Routing – Site B

- Include equipment for a minimum of one router at each of 2 physically separate locations. Each router will serve 16 downstream devices. The downstream devices will connect to each router forming an MC-LAG.
- Each router pair must support 2-4 connections to neighboring routers at different sites.
- Include a total of 32x 10GBase-LR optics to connect to downstream devices.
- Include a total of 4x 100GBase-LR optics for router-to-router connectivity to form the campus backbone.

Routing – Site C

- Include equipment for a minimum of one router at each of 2 physically separate locations. Each router will serve 204 downstream devices. The downstream devices will connect to each router forming an MC-LAG.
- Each router pair must support 2-4 connections to neighboring routers at different sites.
- Include a total of 408x 10GBase-LR optics to connect to downstream devices.
- Include a total of 4x 100GBase-LR optics for router-to-router connectivity to form the campus backbone.
- Include a total of 2x 100GBase-LR optics for campus-to-WAN connectivity.

Aggregation Switching

- Include equipment for a pair of aggregation switches at each of 31 locations.
- A 10GBase-LR uplink from each aggregation switch to a router, forming an MC-LAG.
- Each aggregation switch pair will serve 4-10 downstream devices. The downstream devices will connect to each aggregation switch, forming an MC-LAG.
- Include a total of 204x 10GBase-LR optics to connect to downstream devices.
- Include a total of 62x 10GBase-LR optics for aggregation switch uplinks.

Omaha

Routing

- Include equipment for a pair of routers at each of 21 locations.
- Each router pair will serve 3-18 downstream devices. The downstream devices will connect to each router using 10GBase-LR optics forming an MC-LAG.
- Include a total of 368x 10GBase-LR optics to connect to downstream devices.
- Each router pair must support 2-4 connections to neighboring routers.
- Include a total of 50x 100GBase-LR optics for router-to-router connectivity to form the campus backbone.
- Include a total of 4x 100GBase-LR optics for campus-to-WAN connectivity.

Aggregation Switching

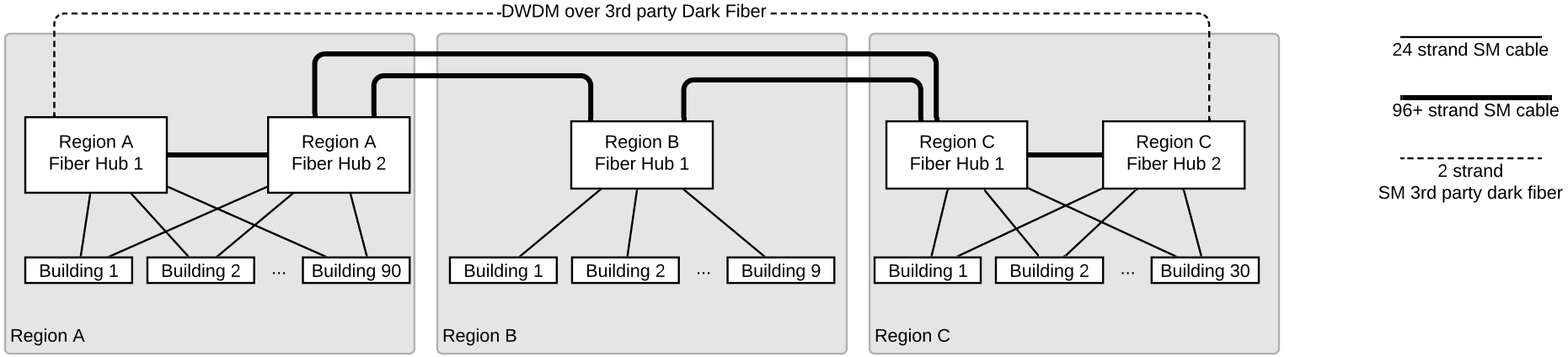
- Aggregation switching is not required for the Omaha campus backbone.

Design Variations

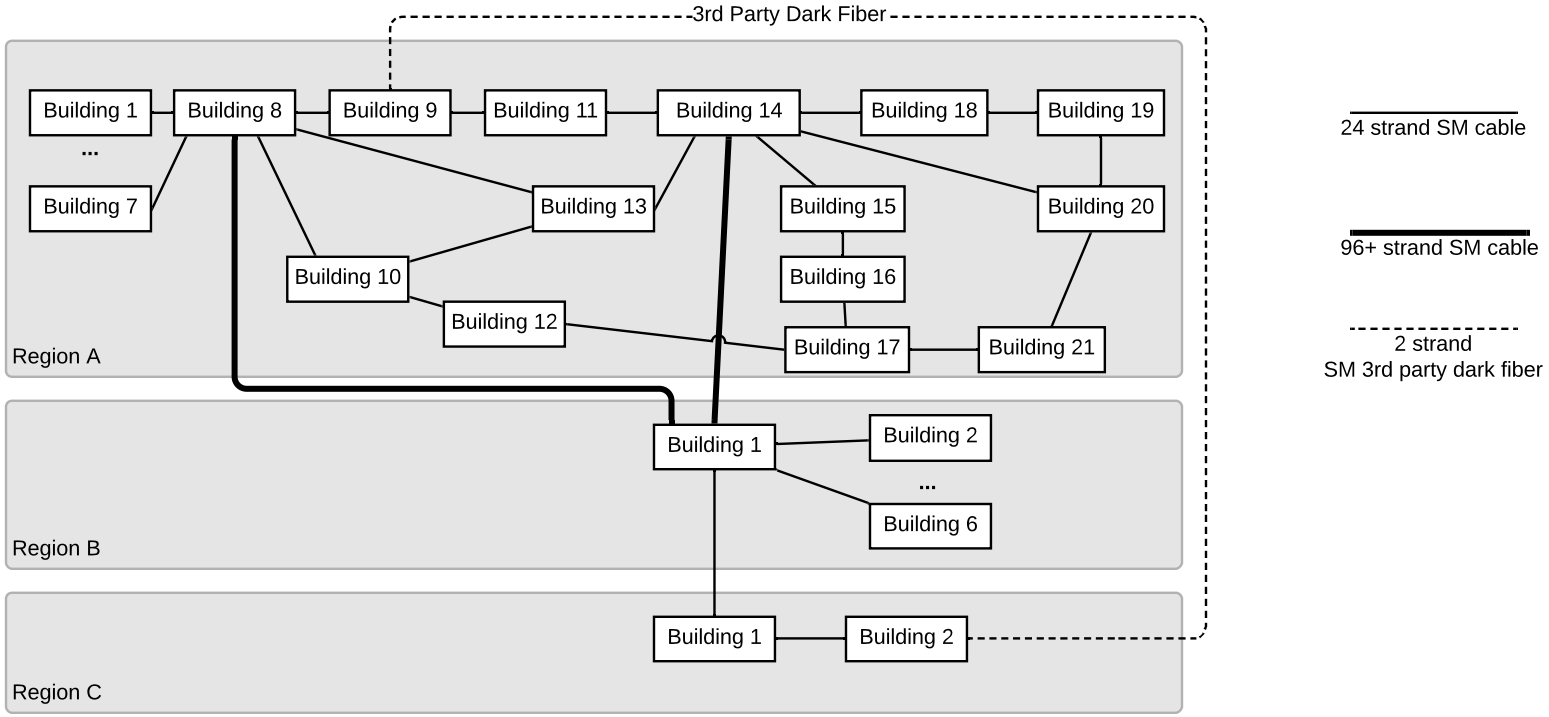
- Bidders are welcome to propose alternative configurations where appropriate.
- Bidders are welcome to propose additional equipment where role separation is desired (i.e. Separate Provider/Provider-Edge functionality), or where the addition of equipment may simplify day-to-day operations.
- Bidders are welcome to note pricing of 25Gbps capable equipment and optics where available.
- Bidders are welcome to note pricing of alternatives to specified optics where applicable. (i.e. 100GBase-CWDM4 or 100GBase-DR instead of 100GBase-LR4)

Attachment C - Campus Fiber Maps

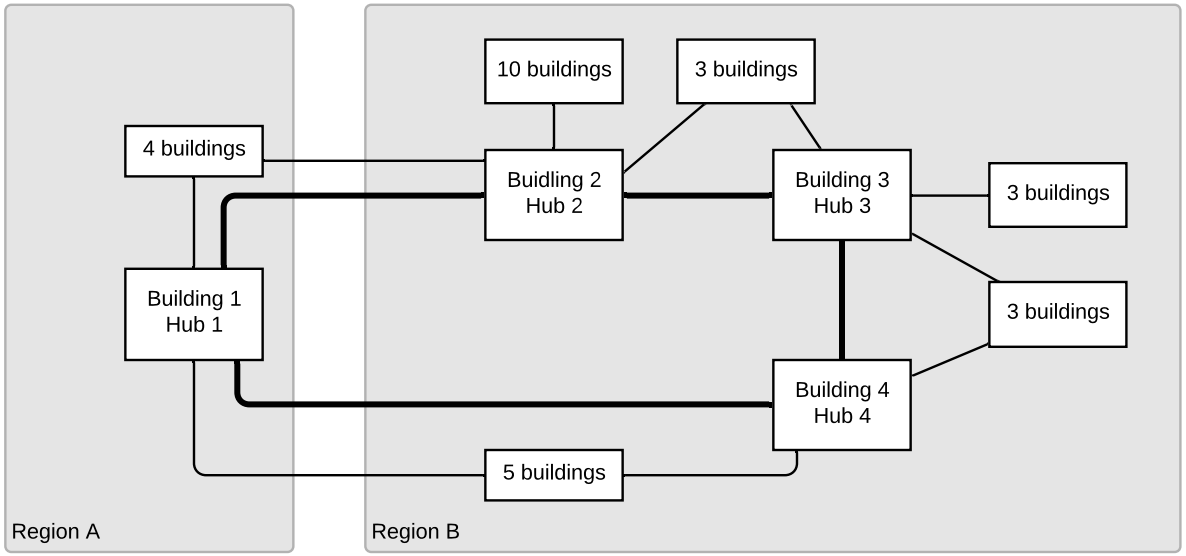
UNL Campus Fiber Model



UNO Campus Fiber Model



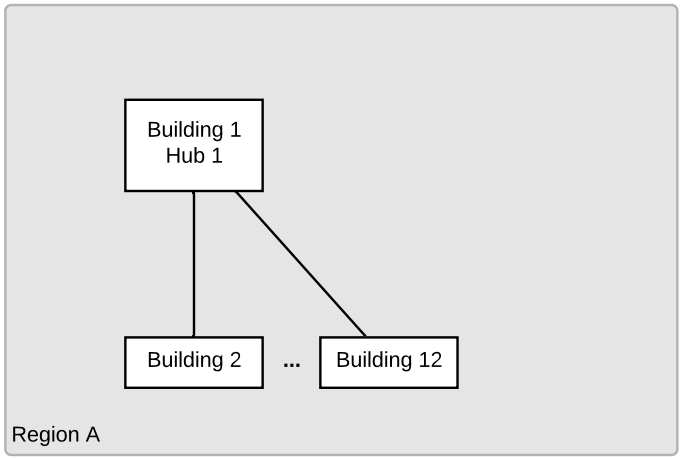
UNK Campus Fiber Model



6-24 strand

60-96 strand SM between hubs

Curtis Campus Fiber Model



6-24 strand

Attachment D – Data Center Proposal

Data Center Background

The University of Nebraska has two main Data Centers (DC), one in Lincoln (Nebraska Hall – NH) and one in Omaha (Tierpoint). The University owns and operates a 100G capable WAN/MPLS network and DWDM transport between these sites. The DC's connect into the WAN routers for inter-DC, campus and external connectivity.

Both DC's will house active compute and storage along with redundant pairs of load balancers and firewalls at each site. For applications that can support it, both DC's will be active and providing redundant services at the same time. For other services, one site will be primary for connectivity and the other will be secondary. While the DC sites are interconnected, the expectation is that each site will be survivable and operate independently in the case of a total failure at one of the other sites.

For more Data Center background please see the Objectives section of the RFP.

Data Center Proposal Summary

The University is seeking to refresh the network infrastructure inside both of its main DC's. **Please consult the RFP for sections related to the Data Center Objectives, required and strongly desired features**. The term 'leaf' is used to describe the Top of Rack switch. The 'spine' is used to describe the devices where the leaf uplinks connect to.

Some components will be highlighted in the following sections. The details for the pricing proposal will be at the end. The University desires solutions using open standards such as VxLAN and EVPN, however proposals may include vendor-specific solutions. In either case the solution must integrate with existing University networks.

DCI (Data Center Interconnect)

The University is seeking a DCI solution to provide inter-DC connectivity. The DCI needs to support the extension of Layer 2 and Layer 3 between DC sites. The DCI can utilize the University WAN (100G) for provide IP connectivity between sites. Proposals may also include DCI options that utilize direct connections between sites using the University optical transport.

Note: There are other auxiliary DC's located on each campus. In the future these auxiliary sites may serve in different roles. The proposed DCI solution should be capable of inter-connecting two to four sites. For the proposal it is only required to interconnect the two main DC's. (See Border leaf section for related information).

WAN Connectivity

The DC network at each site will need to connect to the existing WAN/MPLS routers at 100G. This will be two 100G connections per DC site, a single connection into two separate routers. The University will provide any needed fiber paths between the DC and WAN routers. The connections to the WAN will utilize **single mode** fiber. There is an expectation to be able to extend MPLS L3VPN's into the new DC VRF structure. (See Border leaf section for related information).

Firewall Connections

Each DC site will have a pair of Palo Alto firewalls in routed mode. The DC network will need to provide two 100G connections in a LAG/LACP configuration to each firewall. Assume the use of **multimode fiber** when providing interfaces. (See Border leaf section for related information).

- DC site 1 : 2 x 100G for each firewall = (4) 100G for firewalls
- DC site 2 : 2 x 100G for each firewall = (4) 100G for firewalls

Top of Rack (leaf)

There is a desire for two leaf switches in each cabinet for **general use**. The two leafs in each cabinet will be paired together to allow end hosts to connect redundantly into each switch using LACP. The leaf switch will have support for 1G/10G/25G/100G. All leaf to spine links will be 100G. Each leaf should support at least four 100G interfaces. In most cases the host interfaces will use 10G or 1G. **Assume the use of multimode fiber for Leaf to Spine links**.

- 2 leaf switches per cabinet for general use
- 48 host ports per leaf, mostly 10G or 1G
- 4 100G uplink ports per leaf minimum

Border leaf

There will be two border leafs at each DC site providing connectivity to the **WAN and DCI**. Proposals may also use the border leafs for firewall and load balancer connections. Optionally proposals may include a pair of Services leafs at each site to handle connections for firewalls and load balancers. In either case, the border or services leafs will be dedicated to their purpose and will not be providing host connections. Other features needed in the border leaf are listed in the WAN and DCI sections above.

Spine

As all spine to leaf connections will be 100G, all spine connections will be 100G. With two spines this should yield a 2.4:1 oversubscription ratio for general use leafs. This should provide acceptable performance and basic redundancy requirements. Adding more than two spines will provide more bandwidth and resiliency during times of spine maintenance or failure. Proposals may include more than two spines based on vendor recommendations.

The University has a desire to consolidate DC equipment into fewer cabinets. The pricing proposal based on 8 cabinets for general use reflects this goal. Over the next 5-7 years the University needs may change. For this reason, the University is requesting a second proposal that reflects a possible 20 cabinets (40 leafs).

(Continue to next page for Pricing Proposal)

Pricing Proposal 1 - 16 general leafs

Please provide pricing based on the following. Refer to this document and the RFP for information on desired features, interface speeds and count, fiber type, etc.

Data Center SITE 1 - (16 general leafs)

Qty	Description	Notes
16	General use leaf	Provide redundant leafs for 8 cabinets
2	Border leafs	For WAN, DCI
2*	Spines	*May propose more than 2
• For interface types, assume multimode fiber for all intra-DC links unless otherwise noted. <u>All interfaces for needed for spine and leafs should be included. This includes interfaces from leafs to WAN and firewalls</u>. • Fiber cables should not be included. • Include all licensing required for solution • Optional - Include any additional recommended equipment (ex. Leafs, etc)		

Data Center SITE 2 - (16 general leafs)

Qty	Description	Notes
16	General use leaf	Provide redundant leafs for 8 cabinets
2	Border leaf	For WAN, DCI
2*	Spines	*May propose more than 2
• For interface types, assume multimode fiber for all intra-DC links unless otherwise noted. <u>All interfaces for needed for spine and leafs should be included. This includes interfaces from leafs to WAN and firewalls</u>. • Fiber cables should not be included. • Include all licensing required for solution • Optional - Include any additional recommended equipment (ex. Leafs, etc)		

Software

Include any products that would be recommended for configuration, troubleshooting and maintenance of this solution.

Pricing Proposal 2 - 40 general leafs

Please provide pricing based on the following. Refer to this document and the RFP for information on desired features, interface speeds and count, fiber type, etc.

Data Center SITE 1 - (16 general leafs)

Qty	Description	Notes
40	General use leaf	Provide redundant leafs for 20 cabinets
2	Border leafs	For WAN, DCI
2*	Spines	*May propose more than 2
• For interface types, assume multimode fiber for all intra-DC links unless otherwise noted. <u>All interfaces for needed for spine and leafs should be included. This includes interfaces from leafs to WAN and firewalls</u>. • Fiber cables should not be included. • Include all licensing required for solution • Optional - Include any additional recommended equipment (ex. Leafs, etc)		

Data Center SITE 2 - (16 general leafs)

Qty	Description	Notes
40	General use leaf	Provide redundant leafs for 20 cabinets
2	Border leaf	For WAN, DCI
2*	Spines	*May propose more than 2
• For interface types, assume multimode fiber for all intra-DC links unless otherwise noted. <u>All interfaces for needed for spine and leafs should be included. This includes interfaces from leafs to WAN and firewalls</u>. • Fiber cables should not be included. • Include all licensing required for solution • Optional - Include any additional recommended equipment (ex. Leafs, etc)		

Software

Include any products that would be recommended for configuration, troubleshooting and maintenance of this solution.

Addendum for UNL eBid # 3131-19-431
Network Hardware Solutions RFP

Addendum # 2
Issue Date: 09/19/2019

Addendum to Attachment B – Campus Backbone

We request that proposals for Campus Backbone equipment be broken down for each campus for the purposes of cost analysis. Please reference items notes in the lines tab of the RFP.

RESPONSE TO QUESTIONS:

1. Question: The RFP doesn't call out implementation services. Will this be a part of the required response?
   UNL's RESPONSE: Include options and pricing for any available professional services or implementation services that could be provided under the resulting contract.

2. Question: Is the RFP response intended to be submitted by the partner, the Manufacturer, or in conjunction with each other?
   UNL's RESPONSE: The response is open to bids from both partners and manufacturers. If a manufacturer only sells through partners and not direct, it is preferable that the response is submitted in conjunction with a named partner.

3. Question: For the line items section, is this considered pricing for the initial purchase, or pricing for future purchases as well?
   UNL's RESPONSE: Initial and future purchases, the scope of the initial purchase and desired purchase timeline will be determined after award based on price, implementation effort, and financing options.

4. Question: Will the University look to standardize on AX technology as part of this RFP?
   UNL's RESPONSE: The University would prefer the ability to deploy and support 802.11ax technology where campus use-cases fit the standard. The University also expects the refreshes of the product catalog to include new technologies and standards as they are brought to market over the life of the contract.

5. Question: Campus backbone- UNL Campus fiber model. Does the DWDM connection at UNL require colored optics?
   UNL's RESPONSE: The DWDM connection will not require colored optics.

6. Question: if no colored optics are required, do we need single or multi-mode optics into the DWDM MUX?
   UNL's RESPONSE: If connecting to a DWDM network, single mode fiber is preferred.

7. Question: Campus backbone- UNO Campus fiber model. Are colored optic required on the 3rd party dark fiber for the connection between Region A Building 9 and Region C Building 2
   UNL's RESPONSE: Colored optics are not required on this connection.

8. Question: If no colored optics are required, do we need single or multi-mode optics into the DWDM MUX?
   UNL's RESPONSE: The service from Region A Building 9 and Region C building 2 is a dark fiber, single-mode service and as such, there is no DWDM MUX involved. Optics capable of 10km over a pair of single-mode fiber will be required.

9. Question: Can you please indicate router/hub locations?
   UNL's RESPONSE: ITS expects the most effective location for Campus Backbone routers to be in the hub locations specified in Attachment C.

10. Question: Campus backbone- Curtis Campus fiber model. How many and what type of connectivity is required at the WAN?
    UNL's RESPONSE: Two ports of 10Gbase-LR from diverse equipment are preferred.

Addendum for UNL eBid # 3131-19-431
Network Hardware Solutions RFP

11. Question: Campus backbone- UNL/UNO/UNK. All call for 100G LR connections. Can you please indicate which building these are in?
    UNL's RESPONSE: All router-to-router connections.

12. Question: Based on fiber plant models, routers and SFP counts, can you please briefly describe how you arrived at these numbers?
    UNL's RESPONSE: Regarding SFP/Optic counts in Attachment C – Campus Backbone, SFP/Optic counts were counted for Campus Backbone and Aggregation switches needed to connect to access switches. SFP/Optic counts for access switches were not included. Port density on access switching may change in the future, so the intent of these counts is to provide a comparable bid.

13. Question: Data Center/Campus Backbone -WAN/MPLS Connectivity - Do we need to have a CER and understand labels or will these be Ethernet hand-offs?
    UNL's RESPONSE: WAN hand-offs from the Data Center and Campus Backbone will be Ethernet hand-offs.

14. Question: NAC/Monitoring- Our solutions can be deployed with dedicated hardware appliances and or virtual appliances. Within this RFP, do you have a preference of hardware vs virtual?
    UNL's RESPONSE: No preference either is acceptable.

15. Question: If we were to plan our solution around virtualization, please confirm our requirements can be met. Virtualization for UNL 2 Virtual instance of: CPU: 2.6 GHz Intel Xeon E5-2640v3, Memory: 96GB, Storage: 8 300 GB 12G SAS 15K 2.5 in SC ENT HDD, Physical Cores: 16; Passmark score: 19,892, Recommended IOPS: 2,842
    UNL's RESPONSE: Requirements can be met prior to the time of deployment. It's worth noting that the University IT department offers 2 Virtual Instance hosting options 1) Virtual Instance hosting in two centralized Data Center environments 2) Virtual Instance hosting within the campus network at one or two of the fiber hub locations (internally termed Local Campus Resources). Due to the economics of scale, it tends be more cost effective to host Virtual Instances in the centralized Data Center environments and is preferred unless there is a specific site-survivability or performance benefit to having a service hosted from an LCR.

16. Question: Virtualization for UNK 1 Virtual instance of: CPU: 2.6 GHz Intel Xeon E5-2640v3, Memory: 96GB, Storage: 8 300 GB 12G SAS 15K 2.5 in SC ENT HDD, Physical Cores: 16; Passmark score: 19,892, Recommended IOPS: 2,84
    UNL's RESPONSE: See Question 15.

17. Question: UNK 1 Virtual instance of: CPU: 8 Virtual CPU's and recommended to have a Passmark score of at least 9600 or higher, Memory: 16GB, Storage: 1TB, Recommended IOPS: 40-60 read/write profile for 4K random read/write = 105
    UNL's RESPONSE: See Question 15.

18. Question: If virtual requirements cannot be met at this time, do we assume that these requirements can be met before time of deployment or will we be required to propose hardware appliances to fulfill the RFP? UNO 1 Virtual instance of: CPU: .6 GHz Intel Xeon E5-2640v3, Memory: 96GB, Storage: 8 300 GB 12G SAS 15K 2.5 in SC ENT HDD, Physical Cores: 16, Passmark Score: 19,892, Recommended IOPS: 2,842
    UNL's RESPONSE: See Question 15.

19. Question: UNO 1 Virtual instance of: CPU: 24 Virtual CPU's and recommended to have a Passmark score of at least 9900 or higher, Memory: 64GB, Storage: 1800Gb, Recommended IOPS: 40-60 read/write profile for 4K random read/write = 350
    UNL's RESPONSE: See Question 15.

20. Question: Wireless For any indoor access points, can you tell us what the mounting requirements and quantities of each are? Ex: Ceiling Grid 15/16'' Ceiling Grid 9/16'' Silhouette 9/16'' Hard Ceiling Side wall mounted.
    UNL's RESPONSE: 15/16" 30% 9/16" 40% Silhouette 5% Hard Ceiling/Side Wall 25% (Hard Ceiling/Side Wall gets a boost from Housing APs). Need flexibility to order any of the listed mounting solutions

21. Question: For any outdoor access points, can you tell us what the mounting requirements are? Ex: Mounted on side of building, Mounted to a Pole
    UNL's RESPONSE: Both options will be required to support Outdoor AP deployment.

22. Question: For any outdoor access points with external antennas, can you tell us what antenna model is being used?
    UNL's RESPONSE: Cisco. AIR-ANT2547VG-N, AIR-ANT2513P4MN.

23. Question: For any outdoor access points, can you tell us what the coverage pattern requirements are?
    UNL's RESPONSE: Both omni and directional. Varying patch & yagi style depending on requirements.

24. Question: For any outdoor access points, do you have any point to point/bridge/mesh configured? If so, can you tell us what model of AP's these are and the distance between?
    UNL's RESPONSE: No mesh presently deployed but would like to keep that possibility open.

25. Question: For any indoor AP with external antennas, can you tell us what antenna model is being used?
    UNL's RESPONSE: We have utilized 60-degree antennas. AIR-ANT2566P4W-R= we expect to increase that number and require additional antenna choices.

26. Question: Is it a requirement for us to match or beat the AIR-AP2802I-B-K9 series AP that offers Dual 5Ghz radios? Specifically, do you require to have dual 5ghz for the one to one replacement?
    UNL's RESPONSE: That would be preferable. Desire is to conduct a one for one replacement initially.

27. Question: Out of all of the AP's listed in the RFP, how many are located in very high-density locations? EX: Auditoriums, Gymnasiums, Etc.
    UNL's RESPONSE: We estimate less than 15% of covered spaces are VHD.

28. Question: Wired: What are the population requirements for 4506's?
    UNL's RESPONSE: The RFP does not request a bid for Catalyst 4506 chassis; it only notes what is currently installed. Closet port counts and can vary from 24 available access ports up to 720 available access ports. As such, chassis populations can vary widely as well. Please see Question and Answer #115.

29. Question: What are the PoE requirements for each switch?
    UNL's RESPONSE: See question #115

30. Question: What are the SFP Requirements? Please list the current SFP's being used for each switch.
    UNL's RESPONSE: Each access switch chassis or switch stack must support SFP+ or better uplinks into Campus Backbone (core or aggregation). SFP models being used vary but tend to be 1GBase-LR or 10GBase-LR. The current access network does not deliver access to clients via SFP/SFP+.

31. Question: What are the Stacking requirements? Out of 24/48 port switches, how many need to be stacked?
    UNL's RESPONSE: Vendors are not required to use 24/48 port switches but any closet that has over 1x 24/48 port switch should be in a stack configuration.

32. Question: Do you have a closet list with PoE/Port requirements as opposed to the provided list of switches?
    UNL's RESPONSE: The University does not have a per-closet breakdown of POE requirements

33. Question: Do we accommodate for a growth factor or stick to a one to one replacement?
    UNL's RESPONSE: For comparative pricing proposals, stick to a one-to-one replacement.

34. Question: Around legal docs: Would UNL agree to put a non-solicitation of employees in the master agreement?
    UNL's RESPONSE: Yes, the University would consider negotiating a mutual non-solicitation of employee's clause into the master agreement.

35. Question: If a bid bond is required, is that going to be on services and product?
    UNL's RESPONSE: No bid bond will be required

36. Question: Is a performance bond going to be required if a bid bond is required?
    UNL's RESPONSE: No performance bond will be required

37. Question: Is the Data Center WAN DWDM equipment to be replaced?
    UNL's RESPONSE: WAN and DWDM equipment is not in scope for this bid.

38. Question: How many vmware hosts or how any other hypervisor are there?
    UNL's RESPONSE: Approximately 50 VMware hypervisor hosts per data center site are expected.

39. Question: Do you also need boarder leaf to be managed by the management solution for L2 & L3 DCI?
    UNL's RESPONSE: It is preferable that DCI border leaf switches are managed through the management solution, however it is not required. If border leaf switches are not managed through the management solution, please provide a description of why.

40. Question: In the IP backbone section, it states: "Each router pair must support 2-4 connections to neighboring routers". Is it a logical connection or physical connection? Do we need to count more interfaces for this if it's not included in any actual port count?
    UNL's RESPONSE: These are physical connections to other Campus Backbone routers. These interfaces will need to be included in the port count.

41. Question: Is the campus to WAN connectivity required only in a selective location as described in the IP backbone description?
    UNL's RESPONSE: Campus Backbone to WAN connectivity is only required in selective locations in each city. We are seeking appropriate resiliency to hardware failure, site failure (fire or power), and fiber backbone damage (fiber cuts). In most cases, this would mean peering the Campus Backbone with two unique WAN routers as mentioned in Question 55.

42. Question: Do you need all switches & routers to operate at line rate or is oversubscription acceptable on certain devices?
    UNL's RESPONSE: Unified Edge switching may operate at a reasonable oversubscription rate. Typical traffic flows are North/South in these use cases. Campus Backbone may be reasonably oversubscribed. The Data Center fabric as a whole may be reasonably oversubscribed; however, it is atypical for a single leaf or spine switch in a datacenter fabric to be oversubscribed internally. If oversubscription is included in the design, please describe.

43. Question: Will solarwinds monitor all new routers and switches?
    UNL's RESPONSE: At this time, Solarwinds is the primary monitoring service in use at the University and it would be used to monitor network devices. Any additional proprietary tools would be considered if they added value beyond Solarwinds' capabilities.

44. Question: Non-Disclosure Agreement (NDA). Will the University complete a Non-Disclosure Agreement? Sub question: Will the University provide the contact information for the individual who will be signing an Electronic version?

UNL's RESPONSE: Yes, the University would be willing to sign a non-disclosure agreement within the bounds of any Statutes relevant to being a public institution. The University will provide contact information for signing after award.

45. Question: Question #1228 Company's capability in the Attributes Tab, can you please clarify what is meant by "point-by-point responses in Section 1?"
UNL's RESPONSE: In Section 1 of the SOW document, please elaborate on your company's ability to meet or exceed the stated objectives listed.

46. Question: Unified Edge: Does the University require field serviceable power supplies and fans?
UNL's RESPONSE: If the power supplies and fans are modular, the University would prefer they be field serviceable. If they are fixed, then they would not need to be field serviceable.

47. Question: What are the port counts in the referenced existing chassis? Backbone and Unified Edge.
UNL's RESPONSE: Please see Attachment A for Unified Edge port counts. Please see Attachment B for Campus Backbone port counts.

48. Question: What is University expecting for % of Multi-rate ports needed per closet?
UNL's RESPONSE: No NBase-T is deployed today, however for purposes of a comparable bid please assume 10% of all access ports will need NBase-T.

49. Question: Is the University standardizing on WIFI 6 Access Points?
UNL's RESPONSE: See Question 4

50. Question: How many Devices will be managed by Network Access and Control?
UNL's RESPONSE: Currently no devices are managed by Network Access Control and as such we are unable to estimate the number of devices that would be managed in the future. See question #138-140 for an estimated total scale for access devices.

51. Question: Will UN IT Group sign an NDA? So we can provide detailed confidential information and Roadmap information.
UNL's RESPONSE: See Question 44.

52. Question: Reseller/Manufacturer will NOT be providing any Implementation Services? Our understanding is that the requested Training of UN ITS Staff will provide the necessary knowledge transfer to accommodate this.
UNL's RESPONSE: Reseller/Manufacturer may offer implementation services as an option, however it is not required for the bid.

53. Question: Security Assessment Questionnaire Specific to this Network RFP, do we ONLY need to provide a response to Network Security NS1 – NS4? See attachment.
UNL's RESPONSE: The Network Security attachment is a standard security questionnaire used for all RFPs. Please respond to all questions.

54. Question: Scope of Work 4.a Pricing. Do you have an example of a "comparative proposal format" that you'd prefer to see for Attachment A, B & D? SOW 4.b seems pretty straightforward on what you're wanting to see.
UNL's RESPONSE: For a comparative proposal, please use a Microsoft Excel format and include list price, discount, discount percentage offered, and net price per each item as well a quantity of item specified. If it is desirable to provide supplementary materials such as diagrams, descriptions, or other write-ups, please attach those with the proposal.

55. Question: Explain or outline the current Fiber or MPLS circuit's that interconnects the three main campuses?
UNL's RESPONSE: The University operates MPLS based backbone between the three main campuses. The MPLS backbone has a current capacity of 100Gbps between Lincoln and Omaha and 20Gbps to Kearney. The MPLS PE routers hand-off services using 10Gbase-LR/SR, 100GBase-SR4/LR4, or

possibly other optics as supported by the Juniper MX10003 platform. On the diagram provided in attachment C, MPLS nodes are located at UNL Region A – Fiber Hub 2, UNL Region C Fiber Hub 1, UNO Region A Building 14, UNO Region B Building 1, UNK Region B building 4, and UNK Region B Building 2. The MPLS network is built using diverse backbone paths. These WAN routers are typically used for campus-to-campus, but are typically not used for transport within a single campus.

56. Question: What are the WAN connectivity options for the remote site (Ethernet handoff? or Fiber/Copper?) and can you please clarify. What speed is the connection? (DS1 or DS3).
    UNL's RESPONSE: Remote sites use an Ethernet handoff, typically at 1Gbase-T copper.

57. Question: Can you please clarify or outline the expectations from design, deploy, and or implementation services aspect of the project?
    UNL's RESPONSE: There is no expectation for services to be included, but Bidder may include and describe any optional implementation services offered. The University may opt to utilize services to propose designs, review designs or design modifications made by the University, configuration templates, operational practices, other services, or none of the above. In addition, the University may opt to use implementation services to speed the deployment of new or updated infrastructure depending on project need.

58. Question: What topics or Categories would you require professional services for (Datacenter, Wireless, Networking, and or Security)?
    UNL's RESPONSE: See question 57.

59. Question: Can you elaborate on what the university is anticipating for bandwidth growth, with regards to the network?
    UNL's RESPONSE: The University expects a vast majority of buildings to be connected to a campus backbone at 2x10Gbps, with select (1-5) being connected at a higher speed either through the use of link aggregation or higher speed links (25/40/100Gbps). In the future, a Science DMZ VRF may be deployed with higher speed backbone handoffs to these specialized network areas.

60. Question: Do you require a wireless site survey to address the wireless networking needs of the "areas of high wireless client density"
    UNL's RESPONSE: No, that is not part of the proposal requirements. Any services to conduct wireless site surveys could be included as an optional item and would be allowed.

61. Question: Can you please share any existing Visio or network diagrams/ topology maps for all aspect of the RFP. Datacenter, Backbone, Wireless, Campus?
    UNL's RESPONSE: Please see attachment C for a diagram of the fiber optic backbone that can be used in the Campus Backbone.

62. Question: Are you looking for POE+ or UPOE on the access layer switching?
    UNL's RESPONSE: Option for both would be preferable.

63. Question: Do you want to consider an EA for the licensing that would accompany any hardware?
    UNL's RESPONSE: The University would consider an EA if it provided additional value over renewing licensing through the master contract established from this bid.

64. Question: What is the current Routing Protocols that are being used and where are they being used?
    UNL's RESPONSE: OSPF and BGP are currently being used in Campus Backbones. Data Centers currently do not utilize routing protocols. Access/Unified Edge devices do not utilize routing protocols.

65. Question: Is MGig preferred over 1g port speed with regards to Wireless AP uplink connectivity?
    UNL's RESPONSE: No, but the University believes that WiFi 6/ax could benefit from MGig in high density locations.

66. Question: What is estimated latency between DC's?

UNL's RESPONSE: The estimated RTT latency between Data Centers is less than 1-2ms under normal operating conditions. If there is a requirement for anything under 5ms, please make note of it in the bid.

67. Question: What is the estimated Latency between the campus sites?
    UNL's RESPONSE: The estimated latency between UNK and UNO is 5ms under normal operating conditions. The estimated latency between Curtis and UNO under normal conditions is 7ms under normal conditions.

68. Question: On RFP document University of Nebraska eBid # 3131-19 -432 Page 4 litem c- stats a total 57k wireless clients, but on page 5 – item E states support more than 40k at or near peak? – Which of client counts is correct?
    UNL's RESPONSE: 57,500 is the correct number.

69. Question: What is current wired client / device count per for access switching per each campus?
    UNL's RESPONSE: See Question 28.

70. Question: Are there considerations regarding firewall and IPS deploying with regards to network?
    UNL's RESPONSE: Firewall and IPS appliances are not in scope for this project. The University is currently using Palo Alto firewalls to secure the network and any changes would be the result of a future bid.

71. Question: What are the current routing protocols that are being used currently, and where are used (internal, campus, between campuses)?
    UNL's RESPONSE: See Question 64.

72. Question: Are there any Point to Point outdoor Wireless bridge devices imbedded into the network?
    UNL's RESPONSE: Yes, the university has several outdoor Point-to-Point wireless bridges in use today where fiber optic connections that were cost or time-prohibitive. Approximately 20 are in use today. Additional PtP bridges are anticipated over the life of the contract.

73. Question: Has a Wireless site survey been conducted with regards to any outdoor Wireless network needs?
    UNL's RESPONSE: No.

74. Question: Does the Wireless network need to have the ability of providing redundancy for the (LAN) Network?
    UNL's RESPONSE: No.

75. Question: What type of clients or endpoints does the BYOD environment support? Are they any Compliance or Policy requirements that the Authentication platform need to match up against?
    UNL's RESPONSE: The University expects that any and all types of BYOD devices may be brought onto the campus from students, faculty, and staff. NAC is not in use at this time and policies are not currently set. A preference towards integration with RADIUS and/or Shibboleth to allow clients to use their common University username and password are preferable.

76. Question: Does the university already have a pre-configured or automated action for remediation when a client device is inspected and determined to be out of compliance of any role-based authentication platform?
    UNL's RESPONSE: No, NAC is not in use at the University today.

77. Question: Does the university need to have an appliance or software application that will predetermine bandwidth allocations for any consumer media or IoT devices?
    UNL's RESPONSE: The University does not have any such appliance or software application at this time but would be open to it being included as part of the response if it added value to the network.

78. Question: Can you explain or elaborate on how the University leverages the AWS cloud in terms integration with existing Datacenter environment?

UNL's RESPONSE: The University runs select services within the AWS cloud and has site-to-site VPNs setup between the AWS cloud and University data centers.

79. Question: Can you elaborate on the any or all Cloud solutions that university is currently leveraging?
UNL's RESPONSE: At this time, the University's Infrastructure as a Service footprint in the cloud is with AWS and Azure. Many Software as a Service products are also in use.

80. Question: With the regards to the Datacenter aspect of the RFP, are there any specific Applications that the solution needs to support?
UNL's RESPONSE: VMware vSphere, SAP, and PeopleSoft Campus Solutions.

81. Question: Unified Edge: As per the Scope of Work document - objectives - Replace existing edge switches, supplier understands that it is expected to replace 1388 edge switches. However as per the Attachment A, Unified Edge Inventory List the total number of edge switches are 1369. Kindly validate and share the inventory for the missing edge switches as well.
UNL's RESPONSE: Please see Question and Answer #115.

82. Question: Unified Edge: In continuation to the above information, supplier also performed the end of support analysis of the existing Unified Edge inventory and figured out that the following number of edge switches have reached EOS and should be replaced year on year. 469 in 2019 (275 Cisco & 194 Enterasys); 111 in 2020 (111 Cisco); 225 in 2021 (Cisco); 9 in 2024 (Enterasys); 7 in 2025 (Cisco). And a total of 548 switches (Cisco, Enterasys & Extreme) have not been declared EOS by the OEM yet. However, As per the objectives in the Scope of Work document we are expected to replace 1388 edge switches. So does the University of Nebraska wants the supplier to replace the entire wired inventory even if they are not yet declared EOS by the OEM? OR it expects to perform the replacement of switches in a phased manner - year on year and leverages the ones which are not yet declared EOS by the OEM.
UNL's RESPONSE: Yes, the University intends to migrate to a standardized network deployment across all campuses in a phased approach, year on year, until complete regardless of EOS date by the OEM.

83. Question: Unified Edge: Similarly for Wireless Edge devices, As per the supplier's analysis for the End of Support devices. 425 in 2019 (Cisco); 547 in 2020 (Aruba); 1004 in 2021 (Cisco); 178 in 2022 (2 Aruba, 4 Cisco, 172 Xirrus); 766 in 2023 (67 Aruba & 699 Cisco); 1399 in 2024 (13 Aruba & 1386 Cisco); and 2736 have not been declared EOS by the OEM yet. However, As per the objectives in the Scope of Work document supplier is expected to replace the entire wireless edge infrastructure. So does the University of Nebraska wants the supplier to replace the entire wireless inventory even if they are not yet declared EOS by the OEM? OR it expects to perform the replacement of Wireless devices (WAP and WLC) in a phased manner - year on year and leverages the ones which are not yet declared EOS bythe OEM.
UNL's RESPONSE: We anticipate this to be a phased deployment across locations over several years.

84. Question: General Network: Share what all Network Tools are deployed in the existing state for the various tasks listed: Network Management and Reporting tool for Wired and Wireless Edge devices; Network Performance Monitoring; Network Reporting of wired and wireless devices; Network Capacity management; Network Automation tool; Network Configuration management; ITSM Tool; MoM layer tool if any.
UNL's RESPONSE: Prime (Cisco), Airwave (Aruba), Netsight (Extreme), Voyance (Nyansa), Solarwinds (Monitoring), AKIPS (Monitoring), BMC Footprints (ITSM Tool), Splunk (Logging)

85. Question: General Network: How are the DNS and DHCP services deployed in the current state, please share the details. How is the IP managemnet done in the existing deployment of DC and remote LAN. Also, please share the number of DNS queries in your current environment along with DHCP lease, number of IP address, VLANs in your current state.
UNL's RESPONSE: DNS/DHCP services are hosted in each campus at an LCR (see question #). Management appliances for the DNS/DHCP service are hosted in a centralized datacenter and push DNS/DHCP data to individual campuses. IP management varies at the current moment. DHCP queries typically peak at 50/s for the UNL campus and less for other campuses. DNS queries peak at around

1700/s for the UNL campus and less for other campuses. IP addresses in-use at the UNL campus are estimated to be around 74k, and the number of VLANs at around 800. For UNO we estimate those metrics are around 50% and UNK around 25%.

86. Question: General Network: The Supplier understand that a Unified University of Nebraska Information Technology Services team supports all four University campuses. How is this team located, is it placed in a single location or divided amongst the 4 different university campuses?
    UNL's RESPONSE: Divided amongst locations in Lincoln, Omaha, and Kearney with all staff supporting all locations jointly.

87. Question: General Network: Share the Site wise incident, change and Problem data for network data equipment for the past 6 months - 1 year along with categorization.
    UNL's RESPONSE: This information is not available to be shared at this time.

88. Question: General Network: How is the current hardware maintenance provided - is it through OEM support or spares or both? Is there a local hardware break-fix provider contracted for each region or is the support handled by Customer resources located onsite?
    UNL's RESPONSE: Both OEM support and spares.

89. Question: General Network: Supplier wants to know if there is any asset refresh policy for network equipment. If yes Please share the asset lifecycle and details for the same. How are these End of Support devices currently supported. Please specify?
    UNL's RESPONSE: Core network services are kept under support and maintenance and are refreshed/retired at or before the end of support date. This includes Campus Backbone, Data Center, and Wireless controllers. It is the University's desire to replace/retire Access Switch and Wireless APs prior to their end-of-support date, however financial restrictions can mean these devices are used past their end-of-support dates in some cases. For longer-lived devices, longer support periods are desirable.

90. Question: General Network: Supplier wants to know if there any in-flight projects that would affect the design of our proposed solution for this RFP? If yes, please share the details.
    UNL's RESPONSE: For the purposes of RFP responses, there are no in-flight projects that would affect the design of the proposed solution.

91. Question: Data Centre LAN: Supplier understands that the existing Data Centres have a mixture of network equipment for Data center routing and switching at different sites. Cisco: 6506E (VSS), Nexus 5548 (vPC) w/FEX 2248, Nexus 93180 (vPC). Arista: 7504E (MC-LAG), 7150, 7050, 7010 devices. The supplier is expected to provide the future state based on Leaf and Spine Architecture. Kindly validate. Also, please share the existing inventory details for the supplier to analyze and check if some of the equipment can be leveraged / reused. For ex - Nexus 93180 - the count of these switches, if spare, can the supplier leverage them be used as TOR Leaf switch for the new architecture?
    UNL's RESPONSE:
    For the purposes of evaluating Data Center proposals we are assuming that no hardware will be re-used in the evaluation of bids. Due to the complexity of the existing networks, we intend to build a new environment and migrate existing services into the new environment.

    For the purposes of evaluating Campus Backbone proposals, re-using of existing equipment will be handled on a case-by-case basis after the RFP process. To simplify evaluation of bids we are ignoring existing core equipment.

    The University is seeking to build a new Datacenter environment and migrate existing workloads into the new environment. The complexity and timeline of this migration has not been evaluated yet and as such the bidder should not assume that existing equipment can be used in the new build.

92. Question: Data Centre LAN: Supplier understands that every TOR leaf switch is expected to have 48 hosts per leaf mostly 10G/1G. Is the supplier expected to provide some spare ports for each Top of Rack switch?

UNL's RESPONSE: Each TOR leaf switch is expected to deliver 48x 10G/1G ports to hosts in total. The 48 count has spare/empty ports built-in.

93. Question: Data Centre LAN: Kindly share the high-level architecture diagram of the Data Centre locations for supplier to better understand the design of the existing state.
UNL's RESPONSE: The design of the current Data Center is not in scope of this proposal. The University is requesting proposals for building new DC networks. The University will explore potential integration or migration of old and new DC environments at a future time.

94. Question: Data Centre LAN: Supplier wants to know that how is University of Nebraska planning to migrate from the existing to the new architecture for their respective DC locations as in the future state both the DC are expected to run active - active. Is it going to be a Big bang approach or a phased approach of migration?
UNL's RESPONSE: The decision will depend on the service impact and cost. Implementation will include a greenfield data center facility and the University is open to considering big bang and phased approaches at this time.

95. Question: Campus Backbone: Supplier understands that The University's existing campus backbones are built on a variety of hardware platforms including Extreme X670 (5 systems), Cisco Catalyst 6807-XL systems (12 systems), Alcatel-Lucent Enterprise OS6900-X72 (22 systems), and a variety of aggregation switches. Share the details of the inventory and existing architecture diagrams for all the campus backbone locations for the supplier to analyze the existing inventory and redesign the future state architecture.
UNL's RESPONSE: The university is seeking a clean slate proposal. Please see attachments B and C for details on available infrastructure.

96. Question: Campus Backbone: As per Attachment B _Service Specification by Campus - For Curtis Supplier should include a pair of routers such that each router will be serving to 16 downstream devices. Will these downstream devices connect directly to the router or will there be an intermediate switch as well? Please share the existing architecture diagram which will help us build a future state architecture.
UNL's RESPONSE: The 16 downstream devices will be access switch switches either in stack or chassis configuration. The access switches will connect directly to the routers.

97. Question: Campus Backbone: For Kearney, the supplier is expected to provide a pair of routers at 4 physical locations with 16 downstream devices each and pair of aggregation switches at each of 6 physical location with 12 downstream devices each. The number of physical locations vary for the router and the aggregation switches and is not very clear with respect to the fibre connectivity diagram for Kearney. Supplier requests for the existing high-level LAN/WAN connectivity diagram to better design the future state.
UNL's RESPONSE: Aggregation switches were specified to solve the problem of limited inter-building fiber optic plant and as such will be located in a downstream building. The fiber diagrams summarize the overall architecture.

98. Question: Campus Backbone: Supplier wants to know if aggregate switching is required for all the three sites - A, B & C for Lincoln location? If yes, then as per the requirement the aggregate switches are required for each of the 31 physical location. However as per the Attachment C, UNL fibre map there are more than 31 physical locations covering all the three sites of Lincoln. Please clarify and share the high-level LAN/WAN diagram for all this location as well.
UNL's RESPONSE: Many of the locations at UNL did not require aggregation switching. See question #130 for clarifications on when aggregation switches were requested.

99. Question: Campus Backbone: Share a high-level LAN/ WAN diagram for Omaha campus backbone network as well.
UNL's RESPONSE: WAN nodes are located in Region A building 14 and region B building 1. UNO buildings tend to have more and smaller access closets than other campuses. A detailed LAN diagram is unavailable at the moment.

100. Question: General Network: Share the service window which supplier needs to support for the Managed Network Services
UNL's RESPONSE: Managed services would typically be scheduled within the hours of 8:00am to 5:00pm, Monday through Friday. Rates for after-hours and weekend work are also desired.

101. Question: Steady State Support: Confirm if the operations support for the underlying Network architecture is also in scope for the service provider. If yes, Please share the required support window (24x7 or 16x5).
UNL's RESPONSE: No, the general operation of the network will be handled by University staff.

102. Question: Can you breakdown the port count and switch count per building?
UNL's RESPONSE: See Question 28.

103. Question: In a building does the fiber terminate to a central MDF? Then do the IDFs all have fiber to that single MDF? Could we get a count of MDF/IDF per building?
UNL's RESPONSE: IDF Fiber terminates to a central building MDF with typically 12 or more strands of single mode fiber. In some cases 62.5µ or 50µ fiber is used. For purposes of a comparable bid, assume that single-mode fiber is used. We are unable to provide an IDF count per building at this time.

104. Question: Is campus housing included in the RFP?
UNL's RESPONSE: Campus Housing for UNL, UNK, and Curtis is included in this RFP. Campus Housing for UNO is out-of-scope.

105. Question: What connectivity is the campus backbone providing? To clarify is it used to interconnect/route the campus sites from a user data perspective? Is it used for the Data Center interconnect between Omaha and Lincoln? Is it used for WAN connectivity/routing for the remote sites? Has consideration been provided to directly connect the campuses without a need for a IPN? Can the datacenter interconnect be directly connected fiber or ethernet handoff? Do the remote sites all terminate in Lincoln or is it going to other sites too? There is a potential to bypass the need of an elaborate backbone network if there is directly connected fiber and/or ethernet handoff between sites. This goes back to questions 1 and 2 above.
UNL's RESPONSE: The purpose of the campus backbone is to serve as aggregation for campus buildings (users) and regions within a campus (UNK, UNL,UNO). The backbone on each campus is also used for connecting to the University MPLS WAN (NU-WAN). The NU-WAN provides connectivity between NU campuses, to Internet, and to Data Centers including potentially DCI functions. The remote sites use leased circuits to connect to a statewide educational MPLS WAN (NN-WAN) which the University helps administrate. Traffic from the remote sites is aggregated and routed through the Lincoln campus today. In summary, the campus backbone is used for high speed connectivity and resiliency for users at each of the campuses.

106. Question: Which wired NAC use cases are deployed today and which ones are desired to be deployed for the University in the future?
UNL's RESPONSE: The University does not currently have a NAC solution in place and is open to considering any use cases that add value to the network or better mitigate our security and compliance risks.

107. Question: What network automation use cases does the University have in mind for the new campus deployment?
UNL's RESPONSE: Zero touch provisioning, VLAN assignment, port reconfiguration, firmware updates, and others that allow us to better utilize our staff's time.

108. Question: Does the University have a NetDevOps group or does it plan to build one or is consulting or professional services desired to automate network operations workflows?
UNL's RESPONSE: The University does not have a NetDevOps group today and intends to leverage existing staff, collaborations with peer institutions, and professional services to automate network operations workflows.

109. Question: Does the University use any type of Software Defined Controller or controllerless overlay technologies today?
UNL's RESPONSE: No.

110. Question: What VXLAN use cases does the University desire to implement?
UNL's RESPONSE: Regarding Data Center use cases – the university seeks Layer 2 and Layer 3 virtualization with scalability, reliability, and convergence characteristics of a routed underlay. In a majority of cases, Layer 2 and Layer 3 segments will be within a single datacenter. In a subset of cases, layer 2 and layer 3 segments may be connected through a DCI technology to provide IP mobility between datacenters.

111. Question: What are the Universities use cases and requirements for your industrial switches?
UNL's RESPONSE: Parking garages and outdoor deployment of connectivity where environmental control for the switch locations is not always possible.

112. Question: For the chassis switches shown in inventory can a configuration or utilization of the chassis be provided?
UNL's RESPONSE: See Question 115

113. Question: How many multi-rate ports on average do you believe will be needed per closet?
UNL's RESPONSE: See Question 48.

114. Question: Would it be acceptable to add a dedicated multi-rate switch or a pair of multi-rate switches (for HA) to a stack if there is a significant cost benefit vs using modules in each individual switch?
UNL's RESPONSE: Yes.

115. Question: In the SOW under background info UNL provided quantities of switches, closets, ports, POE ports etc… and the total number of switches comes to 1,485 and later states 1388 edge switches are to be replaced. When looking at attachment A the total number of switches come to 1,389 including the C65XXs and C45XXs without carding info. For bid proposal purposes when considering edge switching can we get a breakout with something like the number of 48port, 24port, 12 port switches you would like to see bid? Or can we get more details on the carding where modular chassis' exist and a confirmation of what should be included in for replacement in the edge portion of the proposal vs the backbone if both functions exist in the same chassis?
UNL's RESPONSE: All Unified Edge proposals should be based on information in Attachment A. The total number of switches and port counts for each switch should be based on existing switch footprint. The Catalyst 6500 & Catalyst 4500 switches should be considered edge only and not part of the backbone. For the Catalyst 4500, each switch has 192 ports (4x48 10/100/1000 PoE) and each Catalyst 6500 switch has 288 ports (6x48 10/100/1000 PoE).

116. Question: 2. Existing inventory includes industrial switching. Can an explanation be given to how and where they are used (environmental concerns, DC power needed, etc…)?
UNL's RESPONSE: See Question 111. AC power is available at all locations. Industrial switching is typically located in an environmentally sealed location (such as a NEMA enclousure), but are not environmentally controlled and in some cases may not be ventillated.

117. Question: How many N-Base-T, 802.3bz capable ports need to be on each switch.
UNL's RESPONSE: See Question 48.

118. Question: What are the POE requirements? Is it only 802.3at or do you have 802.3bt requirements?
UNL's RESPONSE: See Question 62.

119. Question: Will you accept 802.11ac wave 2 access points or only WiFi 6 capable Aps?
UNL's RESPONSE: See Question 4.

120. Question: Do you have a network equipment inventory per building and per closet?

UNL's RESPONSE: No.

121. Question: Do you have an AP inventory per building?
UNL's RESPONSE: Information can be provided for implementation planning after award but is not currently compiled on a per building basis.

122. Question: (Attribute) Questions 27, 1228, 1229, 1230 Talk about capabilities and risk mitigation of installing but there doesn't seem to be install asked for. Can you clarify what information exactly you are looking to gather?
UNL's RESPONSE: The University is seeking technical risk mitigations to hardware/software/utility failure. Faults in networking equipment can have a cascading effect on otherwise healthy networking components. We're seeking information on how a technology used in a proposal can help identify or isolate networking faults such as gray

123. Question: What network automation use cases does the University have in mind for the new campus deployment?
UNL's RESPONSE: See Question 107.

124. Question: Does the University have a NetDevOps group or does it plan to build one or is consulting or professional services desired to automate network operations workflows?
UNL's RESPONSE: See Question 108.

125. Question: What are the Universities use cases and requirements for your industrial switches?
UNL's RESPONSE: See Question 111.

126. Question: For the chassis switches (Cat4500, Cat6500) shown in inventory can a configuration or utilization of the chassis be provided?
UNL's RESPONSE: See Question 115.

127. Question: There are a few VXLAN questions in the Campus Attributes questions, is VxLAN design a requirement for Campus LAN, what is the driver for VxLAN in the campus LAN if so?
UNL's RESPONSE: VxLAN is not a requirement for edge proposal.

128. Question: Are optics for building out the Campus LAN proposal in scope for the RFP response?
UNL's RESPONSE: No

129. Question: There are total downstream optics counts on the Campus backbone routers specified. For example, for Kerney 128 x 10GBase-LR are specified. Is this required per router?
UNL's RESPONSE: This is the total number of LR optics required for a campus/region as a whole. Please refer to the number of "downstream devices" per router when reviewing Attachment B. For example, UNK specifies 16 downstream devices per-router, this means that each router would need to support 16x connections to access/aggregation switches. Each aggregation/access switch or switch pair would need an uplink into two unique routers to form an MC-LAG.

130. Question: Why are 10G used between aggregation switches and the Campus core routing layer? Can this be moved to 40 or 100G to save real estate on the Campus routers? If so please update the 10G counts to reflect the higher speed. 100G is preferred between aggregation switching and Campus routing.
UNL's RESPONSE: 40G or 100G may be used between the Campus Core Routing and aggregation switches. Regarding the UNL Campus Backbone, aggregation switch pairs were specified when the closet switch count in a single building exceeded 4 switches. Regarding the UNK Campus Backbone, aggregation switch pairs were specified when fiber pair counts in the existing fiber plant were limited to access switches. The bidder may provide a design that uses aggregation switches hosted in fiber hubs serving multiple buildings or in a building. It's the University's desire that the failure of any single building, fiber cable, or other piece of equipment does not disproportionately jeopardize services to other University buildings where possible.

131. Question: Do the Palo Alto DC firewalls provide segmentation for east to west traffic in the DC? Are there any micro-segmentation technologies being used or considered in the DC?
UNL's RESPONSE: Yes, the Palo Alto firewalls provide east-west segmentation today. No micro-segmentation technologies are currently being used but VMware NSX is being considered.

132. Question: Are proposals for DAC cables to the server in scope for the RFP? If so, please provide the quantity, lengths and speeds needed for the DC leafs.
UNL's RESPONSE: No. Cables are not in scope for any section of the RFP

133. Question: Are optics for building the DC fabric in scope for the RFP response?
UNL's RESPONSE: Yes. The optics should be included, but not any cabling.

134. Question: Can the University share information on what the current compute and orchestration stack looks like today and for the proposed DC enhancement?
UNL's RESPONSE: The current computer/orchestration stack is fragmented and limited at the moment, but is composed of several VMware vSphere instances. The ultimate goal is to consolidate those vSphere instances to a smaller number once a unified DC environment is established.

135. Question: The RFP states that the University is looking to deploy NSX in the DC. Would a competing solution be of interest for the University?
UNL's RESPONSE: Yes.

136. Question: How does the University provide connectivity to their AWS VPC's today? Is automating connectivity and security for Multicloud connectivity considered as part of this RFP? If so can the scale of the AWS deployment be shared? (How many VPCs and compute instances)
UNL's RESPONSE: AWS connectivity today is via site-to-site VPN's. No, the automation of connectivity and security for multi-cloud is outside the scope of this RFP.

137. Question: In Attachment A, it states "In addition, a network access and control policy management solution must be included." Are you requesting a NAC deployment for the wireless, wired or both?
UNL's RESPONSE: Options for both.

138. Question: If wireless, please tell us the peak number of devices connected at a given time. Please break this out between UNL/UNK/UNO campuses.
UNL's RESPONSE: Most recent data: UNL – 28,300, UNO – 8,200, UNK – 5,400.

139. Question: If wired, please tell us the peak number of wired devices connected at a given time. Please break this out between UNL/UNK/UNO campuses.
UNL's RESPONSE: UNL – 27,500 , UNO – 12,500 , UNK – 5,500

140. Question: Do you require posture health assessments for any devices connected to your wireless network? If so, please tell us how many devices need to be postured.
UNL's RESPONSE: There is no requirement for posturing devices currently. But anticipate the need to utilize posturing/end point profiling for wired and wireless devices.

141. Question: Do you require posture health assessments for any devices connected to your wired network? If so, please tell us how many devices need to be postured.
UNL's RESPONSE: See Question 140

142. Question: Do you require posture health assessments for any devices connected to your wired network? If so, please tell us how many devices need to be postured.
UNL's RESPONSE: See Question 140.

143. Question: Section a.ii.1.d: Should we assume speeds above 10Gbps do not mean bundling of multiple 10Gbps links?
UNL's RESPONSE: Yes.

144. Question: Sections a.ii.2.a and a.ii.2.c are at odds with each other. Are we to expect one-to-one replacement, or fill coverage gaps on campus and/or increase density of deployment? Does it make sense to do this after or during initial deployment? Will wireless surveys be allowed prior to initial deployment? WiFi calling (Section a.ii.1.b requirement) will require the ability to deliver S/N of -67dBM.
UNL's RESPONSE: This is understood by the University, objective is –67dBM. Since WiFi surveys have not been completed 1:1 replacement is the best estimate for cost comparison between proposals. Wireless surveys will be allowed prior to initial deployment with the objective of designing spaces to meet that requirement.

145. Question: Section a.ii.2.c: are there controller-less technologies we can consider?
UNL's RESPONSE: Yes.

146. Question: Section a.iii.3: Does this imply OTV for overlay configuration ability to control BUM traffic storms?
UNL's RESPONSE: No.

147. Question: Section a.iii.4: Programmability features using open automation tools? Can those tools be specified?
UNL's RESPONSE: Ansible is primarily used today but knowledge of all supported open tools would be preferred.

148. Question: Section a.iii.5: Is Splunk for log aggregation or is there more integration being requested?
UNL's RESPONSE: Log aggregation.

149. Question: Section a.iii.5: Is Netflow the implied standard for exporting network flows, or is SFlow preferred?
UNL's RESPONSE: The University is accepting proposals that include either or both flow technologies. SFlow is not preferred.

150. Question: Section a.iii.5: What modules of Solarwinds are currently in place?
UNL's RESPONSE: NCM, NPM, SAM

151. Question: Section a.iii.5: What monitoring tools are owned and used today, can you provide a full list of tools and their associated modules e.g. SolarWinds' Network Performance Monitor (NPM)
UNL's RESPONSE: University-wide: SolarWinds NPM (see question 150), AKIPs, Splunk.

Campus-specific tools may include: Net-Insight, NetMRI, Nagios Core, and ELK Stack.

152. Question: Section a.iii.5: Are you looking for services to set up the tools to monitor the proposed hardware solution. Should these services include the setup of the correct alerts, reports and dashboards within the SolarWinds and Splunk toolset?
UNL's RESPONSE: No.

153. Question: Section a.iii.5: Is an Application Performance Monitoring (APM) solution required as part of the proposed solution?
UNL's RESPONSE: No.

154. Question: Section a.iii.5: Would you like Splunk dashboards or visualizations built?
UNL's RESPONSE: Open to seeing pricing to do so as an optional line item.

155. Question: Section a.iii.5: There is a comment in the RFP – "There is also an expectation to have integration with Splunk for logging and analysis". Is the network solution looking for the capability for integration of network events into Splunk or looking for actual integration of networking events into Splunk?
UNL's RESPONSE: See Question 148.

156. Question: Could an on-site session to have a HL architectural discussion of current state be arranged prior submission of proposal?
UNL's RESPONSE: Due to timeline constraints, we will not be able to have on-site discussions prior to submission proposal.

157. Question: Building /MDF-IDF questions: Lincoln: Estimate an average on how many closets per building?
UNL's RESPONSE: 2

158. Question: Estimate a lowest closet count per building?
UNL's RESPONSE: 1

159. Question: Estimate a highest closet count per building?
UNL's RESPONSE: 6

160. Question: Estimate how many are SM fiber and how many are MM fiber?
UNL's RESPONSE: We have standardized on SM fiber within buildings in Lincoln

161. Question: Is it MM fiber OM3 or OM4?
UNL's RESPONSE: No MM MDF-IDF fiber in use

162. Question: Estimate in the longest length MM fiber from a closet to MDF-IDF?
UNL's RESPONSE: No MM MDF-IDF fiber in use

163. Question: Estimate in the longest length SM fiber from a closet to MDF-IDF?
UNL's RESPONSE: 200 meters

164. Question: Building /MDF-IDF questions: Omaha: Estimate an average on how many closets per building?
UNL's RESPONSE: UNO Typically has 4-5 closets per building.

165. Question: Estimate a lowest closet count per building?
UNL's RESPONSE: 1

166. Question: Estimate a highest closet count per building?
UNL's RESPONSE: 9 closets in a single building is the highest count.

167. Question: Estimate how many are SM fiber and how many are MM fiber?
UNL's RESPONSE: UNO typically has SM fiber from a building MDF to each IDF. Assume 12 strands for the purposes of a comparable proposal

168. Question: Is it MM fiber OM3 or OM4?
UNL's RESPONSE: The small install base of MM fiber varies in standard. For purposes of a comparable proposal, assume SMF.

169. Question: Estimate in the longest length MM fiber from a closet to MDF-IDF?
UNL's RESPONSE: N/A

170. Question: Estimate in the longest length SM fiber from a closet to MDF-IDF?
UNL's RESPONSE: 300 meters

Question:
171. Question: Building /MDF-IDF questions: Kearney: Estimate an average on how many closets per building?
UNL's RESPONSE: 2

172. Question: Estimate a lowest closet count per building?
UNL's RESPONSE: 1

173. Question: Estimate a highest closet count per building?
UNL's RESPONSE: 3

174. Question: Estimate how many are SM fiber and how many are MM fiber?
UNL's RESPONSE: All MDF-IDF are SM fiber

175. Question: Is it MM fiber OM3 or OM4?
UNL's RESPONSE: No MM fiber in use

176. Question: Estimate in the longest length MM fiber from a closet to MDF-IDF?
UNL's RESPONSE: No MM fiber in use

177. Question: Estimate in the longest length SM fiber from a closet to MDF-IDF?
UNL's RESPONSE: 200 meters

178. Question: Out-State locations: Estimate how many connections How these connections are brought in (MPLS, L2 Services, VPLS, EVPL, Internet/VPN, etc)
UNL's RESPONSE: Approximately 32 sites are currently connected via leased L2 circuits into University managed MPLS network.

179. Question: Campus Access: Is it an underlay (as asked for the DC; VXLAN underlay) is required and/or preferred?
UNL's RESPONSE: An underlay or something with similar characteristics is preferred for Campus Backbone and Data Center

180. Question: If underlay is required/desired, an estimate in how many overlays would need to be supported.
UNL's RESPONSE: At this time we do not have an estimate for the total number of overlays.

181. Question: Same as is desired not to share controller between campuses in the Wireless solution, is it OK to assumed that each campus will be its own underlay with unique overlays or is it expected to all campus be part of the same underlay.
UNL's RESPONSE: Connectivity and authentication for users are the primary concerns related to local campus resources, ensuring a campus can function with loss of connectivity to University data centers. Management, monitoring, and other services can, and likely will overlay the entire network across locations.

182. Question: Is it multicast a requirement?
UNL's RESPONSE: Depending on what section of the RFP this is referring to

183. Question: Is it IPv6 a requirement and/or preferred?
UNL's RESPONSE: Support for IPv6 is required.

184. Question: Existing secured wired access to the network? All ports or provide a percentage estimate of the total ports listed.
UNL's RESPONSE: See Questions 138-140

185. Question: If secured wired access is in place, what solution is been used?
UNL's RESPONSE: See Questions 138-140

186. Question: Percentage estimate of expected supported mGig technology out of the total ports listed.
UNL's RESPONSE: See Question 48.

187. Question: Wireless Is it Wi-Fi 6 required for outdoor Aps?

UNL's RESPONSE: Yes, once those are available in the marketplace.

188. Question: Out of the initial 8 SSIDs Are all of them expected in all campus or different SSIDs per campus? How many WPA2-Enterprise? Is it centralizing traffic back to controller a mandatory business/technical requirement?
UNL's RESPONSE: The majority of the SSIDs will be broadcast at all locations. A few will be location specific, only deployed within specific areas or buildings. With a few exceptions, the University tunnels all wireless traffic back to a controller. Solutions that do not tunnel traffic would be considered if they add significant value to the network. At least one WPA2-Enterprise SSID will be provided at all locations.

189. Question: Datacenter Is it AC power? Type of power outlet in cabinets/PDUs ?
UNL's RESPONSE: All Data Centers and MDF/IDF closets have AC power, typically 110/220V available within the cabinets with a preference towards 220V. No preference to outlet types at this time.

190. Question: Is it the Lincoln datacenter (Nebraska Hall) located in one of the fiber hub regions as described in Attachment C – Campus fiber map. Case not, is it the datacenter out of one of the buildings? Which fiber hub region servers this building?
UNL's RESPONSE: Nebraska Hall is located near one of the fiber hubs as described in Attachment C. The Data Center environment will be treated as a site off the WAN independent of the campus network and will have its own connectivity into the University WAN. Any traffic between the UNL campus and the Data Center environment will transit the WAN hardware. This maintains design parity between sites and allows for Data Center high availability to be designed independent of any campus backbone.

191. Question: General use leaves Most of the interfaces are listed to be 1Gig and/or 10Gig. Out of the 768 listed ports.
UNL's RESPONSE: This does not appear to be a question.

192. Question: Estimate percentage in 1Gig copper connections?
UNL's RESPONSE: We estimate 50% of active connections may operate at 1Gbps. All server-facing connections in the Data Center environment should support 10Gbps or better.

193. Question: Estimate percentage in 10Gig copper connections?
UNL's RESPONSE: We do not anticipate any 10GBase-T connections in the Data Center environments. If any are present, it is preferable to use 10GBase-T SFP+ transceivers or equivalent.

194. Question: Estimate percentage in 10Gig fiber connections? Is it OK to assume MM fiber for these connections?
UNL's RESPONSE: We estimate 50% of the active connections will operate at 10Gbps.

195. Question: Is it IPv6 multicast required or only IPv4 multicast?
UNL's RESPONSE: IPv6 Multicast routing is not in use today, however it preferable to have multicast routing parity between IPv4 and IPv6. If IPv6 multicast routing is not a current capability, but is on the road-map, please list it as "Variance" to any RFP attributes specifying it as such and describe the estimated implementation timeline.

196. Question: Duplicate VLAN tags on the overlay or underlay?
UNL's RESPONSE: Duplicate VLAN may be required in the overlay. For example: two unique ethernet services may exist that get delivered to two different tenants using the same 802.1Q VLAN tag. Although this does not exist today, it may be possible that those two tenants are connected to the same backbone routers but on different ports. Primarily it is important for the RFP committee to understand whether VLAN tags must be unique globally, unique to a router, or unique to a service delivery point / service access point.

197. Question: Campus Backbone Existing VRFs in place are all VRF-lite
UNL's RESPONSE: All existing VRFs within the campus backbone are implemented as VRF-Lite.

198. Question: Is it MPLS LDP/MPLS SR to expand VRF-life deployment a requirement
UNL's RESPONSE: MPLS LDP/RSVP/SR transport on the Campus Backbone would meet the requirement, however MPLS is not a specific requirement. Other technologies such as VXLAN-EVPN may be considered if they fulfil the requirements (IE: deliver virtualized layer 3 services and virtualized layer 2 services).

199. Question: Is it 1Gig and 10Gig services required at the campus backbone layer
UNL's RESPONSE: The backbone is expected to deliver 10Gig services to aggregation and access layer devices and we are targeting a 100Gbps capacity between backbone routers.

200. Question: What's the campus → Aggregation/Access layer speed requirement
UNL's RESPONSE: Aggregation devices are expected to deliver 10Gig or better service to access layer devices. Access layer devices are expected to deliver 1Gbps to client devices and wireless APs. See Question and Answer #48

201. Question: UNL – Campus Is it expected a backbone core per region (as described in Attachment C – Campus fiber map)
UNL's RESPONSE: At UNL it expected that there will be at least 2 backbone nodes per region able to provide connectivity to each building. For regions A and C, Campus Backbone routers would be located in physically separate buildings (fiber hub 1 and 2) to maintain service in the event of a complete power blackout in one of the fiber hubs. Region B has a single fiber hub at present, so two Campus Backbone routers would be deployed in the same fiber hub. More than one router may be used to provide service from a single hub if needed for port capacity reasons, however the solution must be able to deliver the same Layer 3 subnet to access devices connected to different Backbone Routers.

202. Question: Attachment B – Campus Backbone It mentions 6 spare units is required for each model of hardware listed on this section. Is it accurate to have 6 spare units for campus backbone equipment? Or is it spare units required only for equipment on the access campus.
UNL's RESPONSE: For a comparable proposal, please include 6 spare units for each model, including campus backbone equipment.

203. Question: Equipment list section: Wired Inventory, Chassis based equipment, They dual supervisor engine? Are all line cards/ports copper?
UNL's RESPONSE: Access switches do not have dual supervisors. All line cards are copper with the exception of a line card (typically the supervisors) for SFP/SFP+ uplinks.

204. Question: Standalone switches, Could an estimate be provided of an average on how stackable switches are stack?
UNL's RESPONSE: Existing switch stacks typically fall in the 3-5 count per-stack.

205. Question: Could an estimate be provided of the lowest members per stack?
UNL's RESPONSE: The lowest number of switches per stack is 1.

206. Question: Could an estimate be provided of the highest members per stack?
UNL's RESPONSE: The highest number per-stack is 9. It's worth noting that in some closets have a maximum available port count of 720 ports, so multiple stacks may be required if stackable switches are used.

207. Question: Can University of Nebraska approve an extension on this RFP?
UNL's RESPONSE: That will be evaluated by Procurement and will be communicated to all bidders through the system.

208. Question: Can our company utilize the existing agreed on MSA attached above instead of signing the Master Agreement included in the RFP?
UNL's RESPONSE: No, the size of this agreement will require a new MSA.

209. Question: The RFP suggested providing free training options. Is the University of Nebraska interested in pricing for training options?
UNL's RESPONSE: Yes.

210. Question: Section ii : 1 – The University makes reference to a 5 year deployment plan – Over the course of the 5 years, would the University accept a co-terminus support agreement, allowing all equipment support ending at the same time, or would the university prefer a 5 year support agreement on each phase?
UNL's RESPONSE: The University would prefer that all subscriptions and support be co-termed to a common end date across multiple purchases that will occur on the contract, either from a phased installation or general expansion over time.

211. Question: The University makes several references to network – Is the University looking for network connectivity in this RFP? If so, what are the requirements?
UNL's RESPONSE: The University is not seeking any additional external network connectivity or bandwidth as part of this RFP.

212. Question: The University makes several references to scalability of the Network – Can the University provide current bandwidth (1G, 10G etc.) to date and expectations for growth?
UNL's RESPONSE: Approximate Peak WAN utilization Curtis is 200Mbps, UNK 2Gbps, UNL is 10Gbps, UNO is 2Gbps. We expect 20% growth per year for most usage. Re-architecting the Data Center environments will likely increase that utilization, however it is difficult to estimate due to the current architecture of Data Center environments. Delivery of a Science DMZ over the campus backbone over a VRF instead of through dedicated dark fiber could affect utilization.

213. Question: Power Requirements were not referenced: Describe power requirement for edge devices (AC or DC). Describe power requirements de the Data Centers (AC or DC).
UNL's RESPONSE: See Question 189.

214. Question: Section D, Page 11 – Refers to trade in of the current infrastructure. This can only be provided with a complete inventory of the University's hardware. Can the University provide said inventory of the devices the University would like to trade in?
UNL's RESPONSE: This is provided in attachment A for Unified Edge. A complete inventory of Campus Backbone and Datacenter will not be provided.

215. Question: Does the RFP allow for third party vendors to meet some of the stated requirements?
UNL's RESPONSE: Yes, as long as requirements are met.

216. Question: Does the RFP allow for a third-party network access control and/or role-based access control integrated solutions? If so, is there an existing or preferred third party network access control and/or role-based access control vendor today?
UNL's RESPONSE: Yes. No existing NAC solution applying enforcement is in place today.

217. Question: Are you doing only or more? If so, what capacity?
UNL's RESPONSE: Question is not clear.

218. Question: May a bidder submit more than one proposal?
UNL's RESPONSE: Yes, a bidder may submit more than one proposal. Each proposal must be easily identifiable for evaluation purposes. Alternate line-items can be submitted by clicking on "add alternate"

219. Question: Since the responses were extended a day, will the submission deadline be extended
UNL's RESPONSE: Yes, the deadline will be extended to Oct 7th at 1pm US/Central time.

3131-19-4321 Addendum 3
DataVizion, LLC
Supplier Response

Event Information

Number: 3131-19-4321 Addendum 3
Title: Network Hardware Solutions
Type: RFP - Request for Proposal
Issue Date: 8/30/2019
Deadline: 10/7/2019 01:00 PM (CT)
Notes: In order to participate in this bid you must submit your responses electr onically through this eBid system. Bidders must be registered in eBid t o review more details regarding this opportunity. Please review all tab s in the bid to obtain the specific information before submitting a bid re sponse. No paper bids will be accepted.

This is a very complex project, allow plenty of time to complete you response.

The University of Nebraska is requesting proposals from firms offering 1) Unified Edge Solutions, 2) Data Center Network Solutions, and 3) Campus Backbone Solutions for campuses in Lincoln, Omaha, Kearn ey, and Curtis. The intent of this Request for Proposal (RFP) and the e nsuing process is to provide companies with the information, requirem ents, and specifications necessary for the preparation of a profession al and comprehensive proposal.

Addendum 2 - University response to questions received is in the atta

chments tab.
Addendum 3 - Bid Close Date moved to Monday October 7, 2019 at 1 :00 p.m. (CST)

Contact Information

Contact: Claudette Biskup
Address: 1700 Y Street
Lincoln, NE 68588-0645
Phone: 1 (402) 472-2126
Fax: 1 (402) 472-2246
Email: ebid@unl.edu

DataVizion, LLC Information

Contact: Robert deMalignon
Address: PO Box 21876
Lincoln, NE 68542
Phone: (402) 327-1880 x203
Fax: (888) 522-8090
Toll Free: (888) 265-2431

By submitting your response, you certify that you are authorized to represent and bind your company.

Mike Patrick
Signature

mpatrick@datavizion.com
Email

Submitted at 10/4/2019 1:33:40 PM

Requested Attachments

Key Personnel/Engagement Team — Key Engagement Teams.pdf

Provide an outline of your proposed engagement team, which shall include the following: Organizational chart of the e ntire engagement team, including titles, number of people in each position, etc.

Master Price Agreement — Master Pricing Agreementv5.xlsx

Include: Part Number, Description, Manufacturer List Price, Percentage % Discount, Discount Price

Service Level Agreement — 985_Foundation_Care (1).pdf

See attribute 985. Provide your Service Level Agreement (SLA). Upload a copy of your SLA to the Attachments sectio n of this RFP.

Attachment A Unified Edge — DVZQ13688-01 - UE CX.pdf

Proposal for Attachment A

Attachment B Campus Backbone — DVZQ13687-01 - Backbone.pdf

Attachment B – Campus Backbone Pricing Proposal

Attachment D Data Center — DVZQ13702 - DC 16.pdf

Attachment D – Data Center Pricing Proposal

Response Attachments

628 Controller NAC Topology.pdf

Response to 628

636 AP-510 DS.pdf

Response to 636

649 Mounting Bracket.png

Response to 649 (1/2)

649 Mounting Bracket 1.png

Response to 649 (2/2)

985 Foundation Care.pdf

Response to 985

CONFIDENTIAL 1213 8325 Architecture.png

CONFIDENTIAL response of block diagram of 8325.

CONFIDENTIAL 1213 8400 Architecture.png

CONFIDENTIAL response of block diagram of 8400

Security_Assessment_Questionnaire_v3.xlsx

Security Assessment Questionnaire

NU 2019 RFP Exhibit A Design v1.pdf

Attached is the design for the Unified Edge

UN System Backbone & DC.pdf

These are recommended/optional designs to further connect existing sites/campus regions as depicted in the Campus Fiber Maps, as we understand them. These designs are also providing further redundancy and expanded Spine conn ectivity to increase overall DC performance within the 40 leaf response.

4. Master_Agreement (signed).pdf

Master Agreement

5. Appendix_A_Technology_Agreement (signed).pdf

Appendix A - Tech Agreement

Nebraska Executive Summary.pdf

Executive Summary for Network Hardware Solutions RFP's.

Aruba Academy .pdf

Here is a brief description for the new Aruba Academy

Aruba CX Overview.pdf

Attached, you will find a nice briefing on the Aruba OS-CX Switch Series. This solution will give Nebraska a single OS f rom the Data Center to the Edge.

DVZQ13705 - Spares.pdf

Spares proposal as requested.

DVZQ13703 - DC 40.pdf

Datacenter proposal with 40 leaf configuration.

University of Nebraska Value-Add Items.pdf

This document highlights all of the value-add items that we are proposing with our response.

DVZQ13693-01 - UE AOS-S.pdf

Alternate bid for Unified Edge - Aruba AOS-S+WLAN

Bid Attributes

1	**Bidder Requirements** I acknowledge reading and understanding the UNL Bidder Requirements attachment. **All bids must be received by the system *before* the bid deadline. It is the responsibility of the bidder to a llow adequate time for reviewing and submitting their proposal *before* the deadline to ensure all requir ed responses have been completed. The "Submission Button" in the University's eBid system will be in operable when the deadline for submission for eBids has ended. Incomplete bids will be rejected by th e system.** Bidder Requirements Attachment
2	**Bid Terms and Conditions** I acknowledge reading and understanding the Bid Terms and Conditions attachment. Bid Terms and Conditions Attachment

3	**Site Terms & Conditions** Bidder acknowledges to having read and understand eBid Terms and Conditions of Access and Use. Site Terms & Conditions

4	**Public Information** Bids submitted to the University are presumed to be public records. If bids contain trade secrets, academic or scient ific research work in progress and unpublished, or other proprietary or commercial information which if released wo uld give advantage to business competitors and serve no public purpose, it is the responsibility of the bidder to desi gnate such content as confidential. When bids are opened to determine a successful bidder, all bids will be availabl e for public inspection. Portions of bids designated by the bidder as confidential will be withheld from public inspecti on. Any reasonably segregable portion of the bid that is not designated as confidential shall be provided for public i nspection after deletion of the portion or portions of the bid which may be withheld. Price terms appearing in bids or proposals, invoices, purchase orders or other documents calling for the expenditure of public funds may not be desi gnated as confidential or withheld from public inspection. A bidder shall be solely responsible for providing the defense to any challenge to a decision to withhold information contained in a proposal, based upon bidder's identification of the information as confidential. **A bidder must submit any confidential material, as defined above, as a "separate" and "redacted" attach ment with their response in the UNL eBid system. This attachment must be clearly marked/identified as " Confidential".** Public Information

5	**Scope of Work** I have carefully examined the Scope of Work attachment and I fully understand the type and quality of the product(s) and/or service(s) sought by UNL and hereby propose to supply such at the prices stated and in accordance with th is bid. Scope of Work Attachment

6	**Bid Responses** Unless a response specifically requests an attachment I shall make every effort to provide answers in the spaces av ailable within each bid tab. Furthermore I understand that by not doing so this may disqualify my proposal as submit ted. Bid Responses

7 **Company Profile**

Describe your company (a brief history may be appropriate), its size and locations, and number of employees.

Aruba was founded in February, 2002 and was acquired by Hewlett Packard (Now Hewlett Packard Enterprise) in 2015. Our customer base ranges from large campus deployments such as the Ohio State University and California State University systems to some of the largest global enterprise customers including Microsoft and Google. Aruba is also the solution of choice for government agencies at every level from small municipalities and school districts to the U.S. Department of Defense.
Hewlett Packard Enterprise and Aruba have had a history of success within all vertical markets with a global install base of over 145,000 customers ranging from commercial accounts to government and to our most prolific market; higher education. Both companies have excelled at meeting the requirements for large campus deployments for being able to consistently deliver scalability, manageability, feature set, and cost effectiveness. Together, Aruba and HPE are capable of delivering a best in class network solution for any customer regardless of size, business needs, or geographical location.
Aruba has enjoyed continued revenue and market share growth over the years and now that it has joined forces with HPE, the combined networking entity has revenue of $3 Billion with over 4,000 full time employees worldwide.

DataVizion:

Founded by Kelly Schrad in 2001, DataVizion is a local IT Solutions provider based in Lincoln, NE. We currently have 46 employees. The majority are in Lincoln, but we also have teams in Omaha and Des Moines. As the years pass, DataVizion has grown into an organized project services machine. Our partnership started with Aruba Networks in 2012. We were looking for a partnership that could help drive our vision of providing the best solutions to our customer base. We took hold and it has been an incredible journey. As a PLATINUM partner of Aruba, DataVizion has continued to invest in our engineering team to make sure we are educated and experienced in deploying Aruba Networks. DataVizion is part of the Aruba Advisory Council and we hold many high level certifications. When it comes to networking, we are 100% dedicated to Aruba Networks and our customer's success.
Currently we have 7 Certified Aruba Engineers including one of the first partner engineers to receive the ACMX (Aruba Certified Mobility Expert) Certification.

In addition, we hold the following:

ACMA (Aruba Certified Mobility Associate)
ACSA (Aruba Certified Switching Associate)
ACCP (Aruba ClearPass Professional)
ACMP (Aruba Mobility Professional)
ACCX (Aruba Certified ClearPass Expert)
DataVizion has done a major network project replacing Cisco with Aruba at a regional Division 1 University that cannot be officially named as a reference. We are in their internal process to get that approval at this time and will have that available at time of submitting official RFP response.
DataVizion has many large distributed enterprise deployments not related to Education that cannot be officially referenced. Some are in the Fortune 500 with complex Networks and ClearPass deployments. They can be discussed, but not listed.

8 **Audited Financial Statements**

The bidder shall, upon request, provide UNL with audited financial statements and that of any parent or holding company for the three most recent fiscal years. Demonstrated financial ability and stability to ensure performance under any contract awarded is of extreme importance to the evaluation process. Without stating specific reasons, the University may reject or refuse to further evaluate any proposal based on the exercise of its judgment in its sole discretion that the financial position presented in a proposal lacks the qualities that UNL deems necessary to the success of the project. Entities unable to meet the requirements set forth in this paragraph may provide other information or guaranties, which in the discretion of UNL, meet its concerns regarding financial stability. Can you provide, if requested, three years of audited financial statements as described above?

Yes

9 **Litigation or Claims**

Identify any litigation or claim brought against your company within the last seven years, which might reflect adverse ly on your company's professional image or ability in relation to providing the goods or services sought under this bi d.

Aruba: Hewlett Packard Enterprise is involved in lawsuits, claims, investigations, and proceedings—including paten t, commercial, and environmental matters—which arise in the ordinary course of business. There are no such matt ers pending that Hewlett Packard Enterprise expects to be material to the fulfillment of the opportunity under consi deration. Matters which are material to Hewlett Packard Enterprise's business or financial results are reported in o ur 10K and other appropriate public filings. DataVizion does not have any litigation or claims brought against the c ompany.

10 **Company Sale or Acquisition**

Is your company currently for sale or involved in any transaction to expand or to become acquired by or merged wit h another organization? If so, please explain. Has your company been involved in any reorganization, acquisition or merger within the last two years? If so, please explain.

Acquisitions are a key element of Hewlett Packard Enterprise's growth strategy. We look for opportunities that are synergistic to our current business, that are consistent with our long-term business strategy, and that can enhance our skill set, geographic coverage, or both in order to expand or complement our broad portfolio of technology and services. DataVizion is not currently for sale nor has not been a part of a sale or acquisition.

11 **Reference #1**

Provide a client reference (including length and nature of service relationship, name of the contact person, title, pho ne number, email, and address) with whom you have or have had a comparable business relationship. Other educat ional institutions would be most valuable. Do NOT reference University of Nebraska or it's employees.

Ohio State University
Bob Corbin, Sr Director of Network Infrastructure - Office of the CIO
Corbin.2@osu.edu
(614) 292-9997

Ohio State University has been an important Aruba customer since 2007.
They have roughly 24,000 Aruba Access Points, Multiple Controllers, Network Management Software (Airwave), Ac cess Management Software (ClearPass), NetInsight, and Aruba Access Switches.

12 **Reference #2**

Provide a client reference (including length and nature of service relationship, name of the contact person, title, pho ne number, email, and address) with whom you have or have had a comparable business relationship. Other educat ional institutions would be most valuable. Do NOT reference University of Nebraska or it's employees.

The University of Iowa
Neil Johnson, Network Team Lead
neil-johnson@uiowa.edu
319 384-0938
2800 University Capitol Centre
Iowa City IA 52242-5500

The University of Iowa has been a large Aruba Customer since 2013.
Iowa has roughly 11,000 Access Points, Multiple Controllers, Network Management Software (Airwave), Access Ma nagement Software (ClearPass), and are evaluating Aruba Switching.

13

Reference #3

Provide a client reference (including length and nature of service relationship, name of the contact person, title, phone number, email, and address) with whom you have or have had a comparable business relationship. Other educational institutions would be most valuable. Do NOT reference University of Nebraska or it's employees.

The University of Minnesota
Louis Hammond, Service Owner - Voice and Data Network Services
louis@umn.edu
(612) 626-2040
3 Morrill Hall
100 Church St. S.E.
Minneapolis MN 55455

The University of Minnesota has been a large Aruba Customer since 2016 and has over 13,000 AP's, Network Management Software (Airwave) and a Major Access Management Solution (ClearPass) through Aruba Networks.

14

Reference #4

Provide a client reference (including length and nature of service relationship, name of the contact person, title, phone number, email, and address) with whom you have or have had a comparable business relationship. Other educational institutions of 20,000 students or greater within the United States using the proposed equipment in a similar manner to the University of Nebraska would be most valuable. Do NOT reference University of Nebraska or it's employees.

The University of Illinois
Brent Tuggle
Acting Director, IT Infrastructure
University of Illinois – Technology Services
Phone – (217) 265-0522
btuggle@illinois.edu

Aaron Brown
Manager, Network Design & Support
University of Illinois – Technology Services
Phone – (217) 244-0722
aaronb@illinois.edu

The University of Illinois has been a large customer for a number of years. Their environment includes all Aruba/HP switches, 12,000 Access Points, Network Management Software (Airwave) Access Management Software (ClearPass), and NetInsight.

15

Reference #5

Provide a client reference (including length and nature of service relationship, name of the contact person, title, phone number, email, and address) with whom you have or have had a comparable business relationship. Other educational institutions of 20,000 students or greater within the United States using the proposed equipment in a similar manner to the University of Nebraska would be most valuable. Do NOT reference University of Nebraska or it's employees.

Indiana University
Kirt Guinn
Director, Telecommunications
mguinn@iu.edu
(812) 855-1784

Indiana owns and operates approximately 1,500 Aruba Switches and over 10,000 Access Points across 7 regional campuses. They support roughly 150,000 students and faculty, and on busy days see over 250,000 connections on the Aruba Network.

16 **Warranty**

I warrant that all equipment and supplies offered will conform to the design, specifications, samples, or other descrip tions contained in this bid, will be free from defects in workmanship and material and to the extent that I know, or hav e reason to know of the purpose for which the supplies are intended, will be fit and sufficient for such purpose as de emed applicable. The warranty required here under must provide all parts, equipment, transportation, technical assi stance, labor and supervision necessary to correct any deficiency resulting from manufacturing defects without char ge for a period of one (1) year after the date of final acceptance of all materials, equipment, and services furnished by successful bidder. Thereafter the manufacturer's standard warranty will apply.

Warranty

17 **University System Participation**

I acknowledge that in some instances, other University campuses or state agencies may wish to explore the possibili ty of sharing in the benefits of this bid and its resultant contract.

Univ System Participation

18 **Non-Collusive Bid**

I acknowledge that any bid responses submitted are not the result of collusion with other eligible bidders, with any e mployee of the State or University, and no effort has been made to preclude UNL from obtaining the most advantag eous response possible to this bid.

Noncollusive Bid

19 **University Employee**

I affirm that if I am an employee of the University of Nebraska, I have notified the buyer of my status as such and tha t this contract must be completed in accordance with Board of Regents Policy 6.2.1.12, Purchases Involving Univers ity Personnel.

N/A

20 **Deviations/Exceptions/Bid Compliance**

If you do not comply or partially comply with any terms, conditions, specifications, processes, etc. of this bid, we ask that you indicate those sections and your counter term, condition, explanation here. Failure to provide such informa tion here indicates that you are in complete compliance with those terms, conditions, specifications as stated in this bid. Attachments can be included in your bid response, but you must indicate here that an attachment is provided. Please include any deviations/exceptions/bid compliance counter terms.

DataVizion Complies
Aruba Complies

21 **Contractor's Certificate of Insurance**

I acknowledge and understand that prior to the commencement of any work, successful bidder is required to furnish a certificate of insurance with coverage’s to bodily injury/personal injury/liability coverage, property damage liability coverage, and workman's compensation coverage. This certificate must be on file in the Procurement Services offic e prior to any commencement of work. It is absolutely necessary that "The Board of Regents of the University of Ne braska as an additional insured” be added to the face of the certificate for all coverage except worker's compensati on. The above statement must be worded in this manner. It is also absolutely necessary that a “Completed Operatio ns Coverage” must be included as part of the vendor’s General Liability. In addition to standard insurance coverage ’s the vendor will be required to carry minimum: $1 million per claim & $3 million per occurrence for liability and prop erty damage.

Contractors Cert of Ins will be provided

22 **Line Item Award**

I acknowledge and understand that this is a line by line bid, with the possibility of each line being awarded to a differ ent Bidder and it is possible not all items will be awarded.

Line Item Award

23 **Technical Support**

It is strongly desired that, at a minimum, edge switching be accompanied by a lifetime warranty, with support and sof tware upgrades, by the manufacturer. If this is not the case, the selected Bidder must provide technical support fro m the equipment manufacturer on the proposed switching hardware for a period of **five (5)** years. Any hardware or software not covered under a lifetime warranty should include **five (5) years (60 months)** of support, including soft ware updates and next-business day parts replacement.

Any support must include online access to software upgrades, online access to the manufacturer's knowledge base , online initiation of technical support cases, phone-based initiation of technical support cases, and initial response f rom a technical support engineer within two hours of initiating a technical support case, and next-business-day repl acement of failed hardware.

Yes, I can

24 **Equipment Delivery**

Equipment must be delivered within four weeks of order placement unless an estimated delivery schedule is provide d within the first week after order placement. Software, virtual appliances, and/or licenses should arrive as soon as possible after order placement

Yes, I can

25 **Key Personnel/Engagement Team**

Key Personnel/Engagement Team - Describe in detail as specified on the "Response Attachments" tab.

Read and acknowledged

26 **Company Contact Information**

Identify the person within your organization to whom questions regarding this proposal should be addressed, includi ng name, title, address, and phone number. It is preferable that the contact be the lead engineer.

Aruba Sales: Nick Patrick - Aruba Territory Manager - 3333 Scott Blvd, Santa Clara, CA 95054 - (402) 980-2934 - nick.patrick@hpe.com: Lead Engineer: Dustin Hopkins - Aruba Solutions Engineer - dustin.hopkins@hpe.com (98 5) 264-8194 DataVizion: Mike Patrick - Account Manager - 5760 Cornhusker Highway, Lincoln, NE 68507 - (402)7 09-6204 - mpatrick@datavizion.com

27 **Mitigation of Risk**

With a vast and complex networking environment, the participant should describe how risk and downtime would be a voided in changing the entire switching and wireless environment across the enterprise

Non-disruptive phased cutover plan is enabled through Aruba support for standards based protocols and multi-ve ndor support.

28 **Value Add**

Describe any additional services that you would like to include at no cost to the University

Attachment Added in Response Attachments Section

29 **Travel Policy**

The University of Nebraska has strict guidelines related to the reimbursement of travel. Our travel policy can be fou nd at: http://travel.unl.edu/.
I acknowledge that I have read and understand the University's travel policy and any reimbursable travel expenses will adhere to these policies. Furthermore I acknowledge that in accordance with Bidder's Requirements Section 8.2, prior to an award, contract, or purchase order by the University any travel incurred is considered non-reimbursable.

Travel Policy

30 **Attachments**

Any response attachments must be 100MB or smaller in size per file. Please indicate whether or not you will be sup plying attachments with your bid response.

YES

31 **Unified Edge Solutions Required Features – Switching**

Proposed solutions must offer components which support the following list of features. Please simply affirm or deny that your proposed solution meets the following requirements by notating each item with "**accept**", "**deny**", or "**vari ance**." Please explain any variances in your product. The Bidder cannot answer "accept" if the feature is not curre ntly available in the proposed hardware running current general availability (production) release software. If a featu re is not in production software at the time of the RFP submission, the Bidder must choose "deny" or "variance." If a feature not in production software is described under a "variance," it must be noted the feature is not currently avail able

32 **Layer 2 protocols and functions**

33 **Support IEEE 802.1D bridging**

Proposed switches must fully support IEEE 802.1D bridging, including features originally defined as 802.1w (Rapid Spanning Tree Protocol). RSTP is currently used on some campus's current switches.

Accept

34 **Variance to support IEEE 802.1D bridging**

Support IEEE 802.1D bridging

No response

35 **Configure a port as an edge-port**

Layer 2 protocols and functions: Proposed switches must support a feature to configure a port as an edge-port, su ch that spanning-tree will transition more quickly/immediately to a forwarding mode and not generate topology-chan ge-notifications (TCNs

Accept

36 **Variance Configure a port as an edge-port**

Variance Configure a port as an edge-port

No response

37 **Support a loop protection feature**

Layer 2 protocols and functions: Proposed switches must support a loop protection feature, independent of STP, to disable a port where a loop has been detected on a down-stream switch.

Accept

38 **Variance to support a loop protection feature**

Support a loop protection feature

No response

39 **Support a per-port feature to ignore STP BPDUs**

Layer 2 protocols and functions: Proposed switches must support a per-port feature to ignore STP BPDUs (i.e. bpd u-filter), allowing the port to remain in a forwarding state.

Accept

40 **Variance to support a per-port feature to ignore STP BPDUs**

Support a per-port feature to ignore STP BPDUs

No response

41 **Switches must support a per-port feature to block**

Layer 2 protocols and functions: Proposed switches must support a per-port feature to block a port that receives a BPDU (i.e. bpdu-protect), applicable to ports configured as edge-ports

Accept

42 **Variance to switches must support a per-port feature to block**

Switches must support a per-port feature to block a port that receives a BPDU

No response

43 **Support switches must fully support IEEE 802.1Q VLAN tagging on layer 2 interfaces.**

Proposed switches must fully support IEEE 802.1Q VLAN tagging on layer 2 interfaces.

Accept

44 **Variance to switches must support IEEE 802.1Q VLAN**

Switches must support IEEE 802.1Q VLAN tagging on layer 2 interfaces.

No response

45 **Support switches must support jumbo frame sizes of 9,192+ bytes**

Proposed switches must support jumbo frame sizes of 9,192+ bytes on all routed physical and virtual interfaces and ports operating as L2-only bridging ports.

Accept

46 **Variance to support jumbo frame sizes of 9,192+ bytes**

Support jumbo frame sizes of 9,192+ bytes on all routed physical and virtual interfaces and ports operating as L2-only bridging ports.

No response

47 **Support switches must be non-blocking**

All switch ports on a switch must be non-blocking, capable of simultaneous forwarding of traffic at line rate, between ports on the same switch or card and, for chassis-based switches, between ports on different cards.

Accept

48 **Variance to switch must be non-blocking**

Variance to switch being non-blocking

No response

49 **Support a form of multi-chassis link aggregation**

Proposed switches must support form of multi-chassis link aggregation (i.e. MLAG or MC-LAG), between at least two switches. Allowing for members of a downstream link-aggregate to terminate at least one member on each aggregated switch.

Accept

50 **Variance to a form of multi-chassis link aggregation**

Variance to a form of multi-chassis link aggregation.

Virtual Switching Framework (VSF) creates one resilient switch from two chassis

51 **Support the option for virtual chassis**

Proposed switches must support the option for virtual chassis or, if non-chassis, stacking such that connected switc hes are manageable as a single switch.

Accept

52 **Variance to switches must support the option for virtual chassis**

Variance to support the option for virtual chassis.

6400 VSX Pairing, or OVA Virtual Chassis; 5400R VSF Front-Plane Virtual Stacking

53 **Support 802.3ad compliant LACP link aggregates**

Proposed switches must support 802.3ad compliant LACP link aggregates.

Accept

54 **Variance to 802.3ad compliant LACP link aggregates**

Variance to 802.3ad compliant LACP link aggregates.

No response

55 **Support virtual chassis or stacking**

Is virtual chassis or stacking is supported, members of an LACP aggregate must be able to terminate individually on the same switch or across different switches.

Accept

56 **Variance to virtual chassis or stacking**

Variance to virtual chassis or stacking.

No response

57 **Support chassis-based switches IEEE 802.3ad link**

Chassis-based switches, proposed line cards must support IEEE 802.3ad link aggregation with aggregate member ports on the same, or different, line cards.

Accept

58 **Variance to chassis-based switches support IEEE 802.3ad l**

Variance to chassis-based switches, proposed line cards must support IEEE 802.3ad link aggregation with aggregat e member ports on the same, or different, line cards.

No response

59 **Switches in the stack must support IEEE 802.3ad link**

Fixed configuration switches supporting stacking or virtual-chassis are proposed, all switches in the stack must supp ort IEEE 802.3ad link aggregation with ports on the same or different, switches in the stack.

Accept

60 **Variance to switches in the stack must support IEEE 802.3ad link**

Variance to switches in the stack must support IEEE 802.3ad link

No response

61 **Switches must be full-featured switches**

Proposed switches must be full-featured switches and not port extenders.

Accept

62 **Variance to switches must be full-featured switches**

Variance to switches being full-featured switches.

No response

63 **Switches must support static MAC assignment**

Proposed switches must support static MAC assignment, allowing for the mapping of a MAC address to a port or ser ies of ports.

Accept

64 **Variance to support static MAC assignment**

Variance to support static MAC assignment, allowing for the mapping of a MAC address to a port or series of ports.

No response

65 **Following Attributes pertain to IPv4/IPv6 Layer3 protocols and functions**

66 **Switches must support basic L3 functionality and protocols**

Proposed switches must support basic L3 functionality and protocols, with a minimum of L3 forwarding via default-g ateway or IPv4/IPv6 static routes.

Accept

67 **Variance to support**

Variance to support basic L3 functionality and protocols, with a minimum of L3 forwarding via default-gateway or IPv 4/IPv6 static routes.

No response

68 **Switches must support IPv4 and IPv6 addressing**

Proposed switches must support IPv4 and IPv6 addressing, of VLAN interfaces via static or DHCP assignment, frequ ently used to verify DHCP and/or gateway reach-ability.

Accept

69 **Variance to support IPv4 and IPv6 addressing**

Variance to support IPv4 and IPv6 addressing

No response

70 **Switches must support Internet Group Management Protocol version 3 (IGMPv3)**

Proposed switches must support Internet Group Management Protocol version 3 (IGMPv3) as described by RFC 33 76 on routed and non-routed physical and virtual interfaces.

Accept

71 **Variance to support Internet Group Management Protocol version 3 (IGMPv3)**

Variance to support Internet Group Management Protocol version 3 (IGMPv3) as described by RFC 3376 on routed and non-routed physical and virtual interfaces.

No response

72 **Switches must support a ping utility to source ICMP**

Proposed switches must support a ping utility to source ICMP echo requests for both IPv4 and IPv6.

Accept

73 **Variance to support a ping utility to source ICMP**

Variance to support a ping utility to source ICMP echo requests for both IPv4 and IPv6.

No response

74 **Switches must support a ping utility allowing specification**

Proposed switches must support a ping utility that allows specification of the source address as any locally defined IPv4 or IPv6 interface on the device.

Accept

75 **Variance to support a ping allowing specification**

Variance to support a ping utility that allows specification of the source address as any locally defined IPv4 or IPv6 interface on the device.

No response

76 **Switches must support a trace-route utility for both IPv4 and IPv6**

Proposed switches must support a trace-route utility for both IPv4 and IPv6.

Accept

77 **Variance to support a trace-route**

Variance to support a trace-route utility for both IPv4 and IPv6.

No response

78 **Switches must support a trace-route utility allowing specification**

Proposed switches must support a trace-route utility that allows specification of the source address as any locally defined IPv4 or IPv6 interface on the device.

Accept

79 **Variance to support a trace-route utility allowing specification**

Variance to support a trace-route utility that allows specification of the source address as any locally defined IPv4 or IPv6 interface on the device.

No response

80 **Following attributes pertain to Security and AAA**

81 **Switches must support the ability to mirror traffic**

Proposed switches must support the ability to mirror traffic from a set of source ports to single destination port in hardware.

Accept

82	**Variance to support the ability to mirror traffic from a set of source ports to single destination port in hardware.** Variance to support the ability to mirror traffic from a set of source ports to single destination port in hardware. *No response*
83	**Switches must support the ability to mirror traffic from a higher bandwidth port to a 1 Gb port** Proposed switches must support the ability to mirror traffic from a higher bandwidth port to a 1 Gb port with the und erstanding that the destination port would be oversubscribed by some ratio. Accept
84	**Variance to support the ability to mirror traffic from a higher bandwidth port to a 1 Gb port** Variance to support the ability to mirror traffic from a higher bandwidth port to a 1 Gb port. *No response*
85	**Switches must be able to apply an IPv4 or IPv6 ACL** Proposed switches must be able to apply an IPv4 or IPv6 ACL in hardware to both inbound and outbound traffic for all routed and non-routed physical interfaces and VLANs (including loopbacks). Accept
86	**Variance to support the ability to apply an IPv4 or IPv6 ACL** Variance to support the ability to apply an IPv4 or IPv6 ACL in hardware to both inbound and outbound traffic for all routed and non-routed physical interfaces and VLANs (including loopbacks). *No response*
87	**Switches must be able to apply layer2 MAC based ACLs** Proposed switches must be able to apply layer2 MAC based ACLs in hardware to both inbound and outbound traffi c for all routed and non-routed physical interfaces and VLANs. Accept
88	**Variance to support the ability to apply layer2 MAC based ACLs** Variance to support the ability to apply layer2 MAC based ACLs in hardware to both inbound and outbound traffic fo r all routed and non-routed physical interfaces and VLANs. *No response*
89	**Switches must support an RFC 3176 compliant version of** Proposed switches must support an RFC 3176 compliant version of sFlow, RFC 3954 compliant version of Netflow, or RFC 5101 compliant version of IPFIX with support for IPv4 and IPv6. Accept
90	**Variance to support an RFC 3176 compliant version of** Variance to support an RFC 3176 compliant version of sFlow, RFC 3954 compliant version of Netflow, or RFC 5101 compliant version of IPFIX with support for IPv4 and IPv6. RFC 3176 sFlow compliant
91	**Switches must support some type of ARP protection mechanism** Proposed switches must support some type of ARP protection mechanism, to avoid spoofing, and it is strongly prefe rred that the feature also operates when the switch is in Layer2 mode only. Accept

92 **Variance to support some type of ARP protection mechanism**

Variance to support some type of ARP protection mechanism, to avoid spoofing, and it is strongly preferred that the feature also operates when the switch is in Layer2 mode only.

No response

93 **Switches must support enabling 802.1x user-authentication via RADIUS**

Proposed switches must support enabling 802.1x user-authentication via RADIUS, or other methods, on a per-port basis, allowing for the exclusion of some ports from authentication.

Accept

94 **Variance to support enabling 802.1x user-authentication via RADIUS**

Variance to support enabling 802.1x user-authentication via RADIUS

No response

95 **Switches must support 802.1x using EAP-PEAP and EAP-TLS**

Proposed switches must support 802.1x using EAP-PEAP and EAP-TLS.

Accept

96 **Variance to support 802.1x using EAP-PEAP and EAP-TLS**

Variance to support 802.1x using EAP-PEAP and EAP-TLS.

No response

97 **Switches must support MAC-authentication-bypass**

Proposed switches must support MAC-authentication-bypass, allowing for fail-thru MAC based authentication, for th ose clients that do not support 802.1x supplicants.

Accept

98 **Variance to support MAC-authentication-bypass**

Variance to support MAC-authentication-bypass, allowing for fail-thru MAC based authentication, for those clients th at do not support 802.1x supplicants.

No response

99 **Switches must support fall-through placement**

For those clients that are unable to perform 802.1x authentication and fail MAC authentication, all switches must su pport fall-through placement on a preconfigured guest or unauthorized client VLAN to provide limited network acces s.

Accept

100 **Variance to support fall through placement**

Variance to support all switches must support fall-through placement on a preconfigured guest or unauthorized clien t VLAN to provide limited network access.

No response

101 **Switches must support caching of successful client authentications**

Proposed switches must support caching of successful client authentications for the purpose of re-authentication in the event of AAA server failure/unreachable.

Accept

102

Variance to switches must support caching of successful client authentications

Variance to switches must support caching of successful client authentications

No response

103

Switches must be able to authenticate multiple users

Proposed switches must be able to authenticate multiple users on a single switch port using both 802.1x and MAC a uthentication, to support the attachment of non-managed, end-user switches to authenticated ports.

Accept

104

Variance to must be able to authenticate multiple users

Variance to must be able to authenticate multiple users

No response

105

Switches must support change-of-authority (CoA)

Proposed switches must support change-of-authority (CoA) such that a user, who has been moved into a new role (i .e. Quarantine) on the AAA server, can be more swiftly transitioned to their new role status.

Accept

106

Variance to must support change-of-authority (CoA)

Variance to must support change-of-authority (CoA)

No response

107

Switches must support a monitor only mode

Proposed switches must support a monitor only mode, where authentication features can be enabled, but regardles s of the result, users will be placed in a definable VLAN or network state. This is needed to validate whether port/us er-authentication will work or not on a particular switch or switch-port.

Accept

108

Variance to support a monitor only mode

Variance to support a monitor only mode

No response

109

Switches must support the dynamic VLAN assignments per-client from the AAA/NAC server

Proposed switches must support the dynamic VLAN assignments per-client from the AAA/NAC server.

Accept

110

Variance to support the dynamic VLAN assignments per-client from the AAA/NAC server

Variance to support the dynamic VLAN assignments per-client from the AAA/NAC server.

No response

111

Switches must support a method, such as, MAC-based VLAN assignment

Proposed switches must support a method, such as MAC-based VLAN assignment, to support individual VLAN acce ss by multiple users connected to end-user switches connected to authenticated edge ports.

Accept

112	**Variance to support a method, such as, MAC-based VLAN assignment** Variance to support a method, such as, MAC-based VLAN assignment, to support individual VLAN access by multiple users connected to end-user switches connected to authenticated edge ports. *No response*
113	**Switches must support the application of per-client dynamic ACLs delivered from the AAA/NAC server** Proposed switches must support the application of per-client dynamic ACLs delivered from the AAA/NAC server. Accept
114	**Variance to support the application of per-client dynamic ACLs delivered from the AAA/NAC server** Variance to support the application of per-client dynamic ACLs delivered from the AAA/NAC server. *No response*
115	**Switches must support locally configured named ACLs that can be applied via RADIUS** Proposed switches must support locally configured named ACLs that can be applied via RADIUS. Accept
116	**Variance to support locally configured named ACLs that can be applied via RADIUS** Variance to support locally configured named ACLs that can be applied via RADIUS. *No response*
117	**Switches must support locally configured named roles** Proposed switches must support locally configured named roles, callable via RADIUS, that include options for assignment of security policy or ACL and VLAN. Accept
118	**Variance to support locally configured named roles** Variance to support locally configured named roles *No response*
119	**Switches must support locally downloadable roles and ACLs** Proposed switches must support locally downloadable roles and ACLs, so they can be centrally managed and distributed from a centralized RADIUS/NAC server. Accept
120	**Variance to support locally downloadable roles and ACLs** Variance to support locally downloadable roles and ACLs *No response*
121	**Switches must support SNMP traps for link status change** Proposed switches must support SNMP traps for link status change. Accept
122	**Variance to support SNMP traps for link status change** Variance to support SNMP traps for link status change. *No response*

123 **Switches must support be able to apply an IPv4 access control list (ACL)**

Proposed switches must be able to apply an IPv4 access control list (ACL) in hardware to both inbound and outbound traffic for all routed and non-routed interfaces and VLANs (including loopbacks).

Accept

124 **Variance to be able to apply an IPv4 access control list (ACL)**

Variance to be able to apply an IPv4 access control list (ACL)

No response

125 **Switches must support be able to apply an IPv6 access control list (ACL)**

Proposed switches must be able to apply an IPv6 access control list (ACL) in hardware to both inbound and outbound traffic for all routed and non-routed interfaces and VLANs (including loopbacks).

Accept

126 **Variance to be able to apply an IPv6 access control list (ACL)**

Variance to be able to apply an IPv6 access control list (ACL)

No response

127 **Switches must support a method of DHCP snooping for IPv4 and IPv6**

Proposed switches must support a method of DHCP snooping for IPv4 and IPv6, where ports not identified as trusted will not accept DHCP-OFFERs from clients.

Accept

128 **Variance to support a method of DHCP snooping for IPv4 and IPv6**

Variance to support a method of DHCP snooping for IPv4 and IPv6, where ports not identified as trusted will not accept DHCP-OFFERs from clients.

No response

129 **Switches must support an IPv6 RA guard feature**

Proposed switches must support an IPv6 RA guard feature to prevent clients connected to untrusted ports from originating IPv6 router-advertisements.

Accept

130 **Variance to support an IPv6 RA guard feature**

Variance to support an IPv6 RA guard feature to prevent clients connected to untrusted ports from originating IPv6 router-advertisements.

No response

131 **Switches must support the concept of a private VLAN**

Proposed switches must support the concept of a private VLAN, where all clients in the broadcast domain can learn the MAC address of the gateway but are not able to discover other hosts on the same VLAN/broadcast domain.

Accept

132 **Variance to support the concept of a private VLAN**

Variance to support the concept of a private VLAN, where all clients in the broadcast domain can learn the MAC address of the gateway but are not able to discover other hosts on the same VLAN/broadcast domain.

No response

133	**Following attributes pertain to Mangement**
134	**Switches must support SNMPv2c and SNMPv3** Proposed switches must support SNMPv2c and SNMPv3. Accept
135	**Variance to support SNMPv2c and SNMPv3** Variance to support SNMPv2c and SNMPv3. *No response*
136	**Switches must support remote access** Proposed switches must support remote access to the command line interface (CLI) via SSHv2. Accept
137	**Variance to support remote access** Variance to support remote access to the command line interface (CLI) via SSHv2. *No response*
138	**Switches must support restricting access to SSH** Proposed switches must support restricting access to SSH by an ACL or equivalent protection. Accept
139	**Variance to support restricting access to SSH** Variance to support restricting access to SSH by an ACL or equivalent protection. *No response*
140	**Switches must support access to the CLI** Proposed switches must support access to the CLI via a serial console port, or some other method to communicate via direct physical connection. Accept
141	**Variance to support access to the CLI** Variance to support access to the CLI via a serial console port, or some other method to communicate via direct phy sical connection. *No response*
142	**Switches must support RADIUS authentication for SSH** Proposed switches must support RADIUS authentication for SSH and serial console users. Accept
143	**Variance to support RADIUS authentication for SSH** Variance to support RADIUS authentication for SSH and serial console users. *No response*

144 **Switches must support failover**

Proposed switches must support failover to a user account locally defined on the device, if the RADIUS server is unreachable.

Accept

145 **Variance to support failover**

Variance to support failover to a user account locally defined on the device, if the RADIUS server is unreachable.

No response

146 **Switches must support encryption of the RADIUS**

Proposed switches must support encryption of the RADIUS shared secret stored in the configuration file.

Accept

147 **Variance to support encryption of the RADIUS**

Variance to support encryption of the RADIUS shared secret stored in the configuration file.

No response

148 **Switches must support encryption of local user passwords**

Proposed switches must support encryption of local user passwords stored in the configuration file.

Accept

149 **Variance to support encryption of local user passwords**

Variance to support encryption of local user passwords stored in the configuration file.

No response

150 **Switches must be able to represent its configuration**

Proposed switches must be able to represent its configuration (such as a text file) that can be uploaded to restore a configuration.

Accept

151 **Variance to be able to represent its configuration**

Variance to be able to represent its configuration (such as a text file) that can be uploaded to restore a configuration

No response

152 **Switches must support logging to a syslog server**

Proposed switches must support logging to a syslog server on a configurable port other than default syslog (udp/514).

Accept

153 **Variance to support logging to a syslog server**

Variance to support logging to a syslog server on a configurable port other than default syslog (udp/514).

No response

154 **Switches must preferably support NTP**

Proposed switches must preferably support NTP as described in RFC 5905, or at minimum, SNTP as described by RFC 4330.

Accept

155 **Variance to preferably support NTP**

Variance to preferably support NTP as described in RFC 5905, or at minimum, SNTP as described by RFC 4330.

RFC 5905 Compliant

156 **Switches must support IEEE 802.1ab Link-Layer Discovery Protocol (LLDP).**

Proposed switches must support IEEE 802.1ab Link-Layer Discovery Protocol (LLDP).

Accept

157 **Variance to support IEEE 802.1ab Link-Layer Discovery Protocol (LLDP).**

Variance to support IEEE 802.1ab Link-Layer Discovery Protocol (LLDP).

No response

158 **Switches must support some form of traffic limiting/policing**

Proposed switches must support some form of traffic limiting/policing or storm-control per port.

Accept

159 **Variance to support some form of traffic limiting/policing**

Variance to support some form of traffic limiting/policing or storm-control per port.

No response

160 **Switches must support secure encrypted file transfer**

Proposed switches must support secure encrypted file transfer for uploading/downloading code or configuration file s.

Accept

161 **Variance to support secure encrypted file transfer**

Variance to support secure encrypted file transfer for uploading/downloading code or configuration files.

No response

162 **Switches must support naming of individual interfaces**

Proposed switches must support naming of individual interfaces within the configuration and this information must b e retrievable via CLI "show" commands and SNMP.

Accept

163 **Variance to support naming of individual interfaces**

Variance to support naming of individual interfaces within the configuration and this information must be retrievable via CLI "show" commands and SNMP.

No response

164 **Following attributes pertain to Physical & Power Characteristics**

165 **Switches must support an option for multi-rate ports supporting speeds greater than 1Gbps**

Proposed switches must support an option for multi-rate ports (802.3bz/NBase-T and 10GBASE-T) supporting spee ds greater than 1Gbps.

Accept

166

Variance to support an option for multi-rate ports supporting speeds greater than 1Gbps

Variance to support an option for multi-rate ports (802.3bz/NBase-T and 10GBASE-T) supporting speeds greater th an 1Gbps.

No response

167

Switches must be mountable

Proposed switches must be mountable in both a standard two-rail 19" communication rack (preferred) and a standa rd 19" four-post server rack.

Accept

168

Variance to be mountable

Variance to be mountable in both a standard two-rail 19" communication rack (preferred) and a standard 19" four-p ost server rack.

No response

169

Switches must support 120 and 208 VAC

Proposed switches must support 120 and 208 VAC capable power supplies.

Accept

170

Variance to support 120 and 208 VAC

Variance to support 120 and 208 VAC capable power supplies.

No response

171

Switches must contain N+1 power redundancy

Proposed switches must contain N+1 power redundancy, such that if any individual power supply were to fail or lose power, the switch would continue to function without any impairment. For example, if a switch requires three power s upplies to function, the switch must support four power supplies such that any individual power supply could fail and the switch would continue to function without impairment, to include the delivery of PoE/PoE+ power.

Accept

172

Variance for switch to contain N+1 power redundancy

Variance for switches must contain N+1 power redundancy, such that if any individual power supply were to fail or lo se power, the switch would continue to function without any impairment.

No response

173

Switches must have hot swappable power

Proposed switches must have hot swappable power supplies.

Accept

174

Variance to have hot swappable power supplies

Variance to have hot swappable power supplies.

No response

175

Fans are individually replaceable, all switches must have N+1 redundant fan trays

If fans are individually replaceable, all switches must have N+1 redundant fan trays, or fans, such that any individua l fan tray can fail without impairing the switch's function or requiring the switch to shut down.

Accept

176

Variance to fans are individually replaceable

Variance to fans are individually replaceable, all switches must have N+1 redundant fan trays, or fans, such that any individual fan tray can fail without impairing the switch's function or requiring the switch to shut d

No response

177

Switches must support both 802.3af (PoE) and 802.3at (PoE+)

Proposed switches must support both 802.3af (PoE) and 802.3at (PoE+) power.

Accept

178

Variance to support both 802.3af (PoE) and 802.3at (PoE+)

Variance to switches must support both 802.3af (PoE) and 802.3at (PoE+) power.

No response

179

Switches must support hot swapping of line cards

Proposed switches must support hot swapping of line cards, without adversely affecting other cards in operation.

Accept

180

Variance to support hot swapping of line cards

Variance to switches support hot swapping of line cards, without adversely affecting other cards in operation.

No response

181

Stackable switches, a switch stack must allow for the failure of any one switch

For stackable switches, a switch stack must allow for the failure of any one switch, without disabling the stack or deg rading the operation of the remaining stack members.

Accept

182

Variance to stackable switches failure

Variance to stackable switches, a switch stack must allow for the failure of any one switch, without disabling the stac k or degrading the operation of the remaining stack members.

No response

183

Stackable switches, any switch in a stack must be replaceable

For stackable switches, any switch in a stack must be replaceable without disabling the stack nor degrading the ope ration of the remaining stack members.

Accept

184

Variance to stackable switches replacement

Variance to stackable switches, any switch in a stack must be replaceable without disabling the stack nor degrading the operation of the remaining stack member

No response

185

Strongly Desired Features – Switching

The following list of features are highly desirable in a proposed solution. Please simply affirm or deny that your pro posed solution meets the following requirements by notating each item with "**accept**", "**deny**", or "**variance**." Pleas e explain any variances in your product. The Bidder cannot answer "accept" if the feature is not currently available in the proposed hardware running current general availability (production) release software. If a feature is not in pr oduction software at the time of the RFP submission, the Bidder must choose "deny" or "variance." If a feature not i n production software is described under a "variance," it must be noted the feature is not currently available.

186	**The following attributes pertain to Layer 2/3 protocols and functions**
187	**Switches should support concurrent use of VLANs 1-4096** Proposed switches should support concurrent use of VLANs 1-4096. Accept
188	**Variance to switches support concurrent use of VLANs 1-4096** Variance to switches should support concurrent use of VLANs 1-4096. *No response*
189	**Switches should support hardware forwarding** Proposed switches should support hardware forwarding for a minimum of 60,000 hosts (MAC table entries) via layer 2 bridging functions, please indicate the maximum. Variance
190	**Variance to switches should support hardware forwarding** Variance to switches should support hardware forwarding. The Aruba 6400 supports up to 32K ARP and 32K MAC. The Aruba 5400R supports up to 25k ARP and 64k MAC
191	**Switches should support minimum of 4,096 hosts** Proposed switches should support a minimum of 4,096 hosts, or MAC entries, in a single layer 2 VLAN**.** Accept
192	**Variance to switches should support a minimum of 4,096 hosts** Variance to switches should support a minimum of 4,096 hosts, or MAC entries, in a single layer 2 VLAN. *No response*
193	**Switches should support support broadcast storm control** Proposed switches should support broadcast storm control and multicast storm control for all ports operating as L2-only bridging ports. Accept
194	**Variance to switches should support broadcast storm control** Variance to switches should support broadcast storm control and multicast storm control for all ports operating as L 2-only bridging ports. *No response*
195	**Switches should support IPv4 static ARP entries** Proposed switches should support IPv4 static ARP entries. Accept
196	**Variance to switches should support IPv4 static ARP entries** Variance to switches should support IPv4 static ARP entries. *No response*

197	**Switches should support IPv6 static neighbor-table entries** Proposed switches should support IPv6 static neighbor-table entries. Accept
198	**Variance to switches should support IPv6 static neighbor-table entries** Variance to switches should support IPv6 static neighbor-table entries. *No response*
199	**The following attributes pertain to Security**
200	**Switches should support a client redirect to a third-party captive portal** Proposed switches should support a client redirect to a third-party captive portal for authentication; i.e. a captive-portal hosted on a NAC platform for web-based authentication or acceptable-use acceptance by guests. Accept
201	**Variance to switches should support a client redirect to a third-party captive portal** Variance to switches should support a client redirect to a third-party captive portal for authentication; i.e. a captive-portal hosted on a NAC platform for web-based authentication or acceptable-use acceptance by guests. *No response*
202	**Switches should support a minimum of two traffic-mirroring sessions** Proposed switches should support a minimum of two traffic-mirroring sessions. Accept
203	**Variance to switches should support a minimum of two traffic-mirroring sessions** Variance to switches should support a minimum of two traffic-mirroring sessions. *No response*
204	**The following attributes pertain to Management**
205	**Switches should support an out-of-band management port** Proposed switches should support an out-of-band management port. Accept
206	**Variance to switches should an out-of-band management port** Variance to switches support an out-of-band management port. *No response*
207	**Switches should should run the same operating system** Proposed switches should run the same operating system. Accept
208	**Variance to switches should run the same operating system** Variance to switches should run the same operating system. All edge switches run the same operating system, and all spine/leaf switches run the same operating systems.

209

Switches should support restricting SNMP access

Proposed switches should support restricting SNMP access by an access control list or equivalent protection.

Accept

210

Variance to switches support restricting SNMP access

Variance to switches support restricting SNMP access by an access control list or equivalent protection.

No response

211

Switches should support restricting SNMP access

Proposed switches should represent the following information as objects that can be queried via SNMP:
Status of physical devices (chassis, fan trays, power supplies, line cards, and etc.).
Status of resources (CPU, memory, and etc.).
Status and statistics of internal processes.
Status of physical interfaces, sub-interfaces, and physical and virtual interfaces.
Traffic and error counters for physical interfaces, sub-interfaces, and physical and virtual interfaces

Accept

212

Variance to switches represent the information as objects that can be queried via SNMP

Variance to switches support represent the information as objects that can be queried via SNMP

No response

213

Switches should represent the following information as objects that can be queried via SNMP

Proposed switches should represent the following information as objects that can be queried via SNMP.
Transmit and receive light levels on optical transceivers.
Serial number and slot position of every field replaceable part.

Accept

214

Variance to switches represent the information as objects that can be queried via SNMP

Variance to switches support represent the following information as objects that can be queried via SNMP

No response

215

Switches should support SNMP traps identifying MAC address changes on a switch port

Proposed switches should support SNMP traps identifying MAC address changes on a switch port.

Accept

216

Variance to switches support SNMP traps identifying MAC address changes on a switch port

Variance to switches support SNMP traps identifying MAC address changes on a switch port.

No response

217

Switches should report via the CLI per-interface

Proposed switches should report via the CLI per-interface and/or per-VLAN traffic counters for L2-only interfaces.

Accept

218

Variance to switches should report via the CLI per-interface

Variance to switches should report via the CLI per-interface and/or per-VLAN traffic counters for L2-only interfaces.

No response

219 **Switches should support manual assignment of syslog facilities local0 - local7.**

Proposed switches should support manual assignment of syslog facilities local0 - local7.

Accept

220 **Variance to switches should support manual assignment of syslog facilities local0 - local7.**

Variance to switches should support manual assignment of syslog facilities local0 - local7.

No response

221 **Switches should support syslog over TCP.**

Proposed switches should support syslog over TCP.

Accept

222 **Variance to switches should support syslog over TCP.**

Variance to switches should support syslog over TCP.

No response

223 **Switches optical transceivers should report transmit and receive light levels**

Proposed all optical transceivers should report transmit and receive light levels.

Accept

224 **Variance to optical transceivers**

Variance to optical transceivers should report transmit and receive light levels.

No response

225 **Switches switches should support high frequency updates**

Proposed switches should support high frequency updates for interface counters (1-5 seconds preferred).

Accept

226 **Variance to switches should support high frequency updates**

Variance to switches should support high frequency updates for interface counters (1-5 seconds preferred).

No response

227 **Switches switches should support programmatic management**

Proposed switches should support programmatic management using one or more API protocols such as NETCONF or REST for example. Please specify, support of these, or other, protocols and/or provide user documentation.

Accept

228 **Variance to switches should programmatic management**

Variance to switches should support programmatic management using one or more API protocols such as NETCONF or REST for example.

NETCONF or REST for example. REST API for Aruba 5400R https://support.hpe.com/hpsc/doc/public/display?docId=a00057978en_us ; REST API for Aruba 6400 https://support.hpe.com/hpsc/doc/public/display?docId=emr_na-a00075250en_us&docLocale=en_US

229 **Switches switches should support CLI reporting**

Proposed switches should support CLI reporting of the serial number and slot position of every field replaceable part.

Accept

230	**Variance to switches should support CLI reporting** Variance to switches should support CLI reporting of the serial number and slot position of every field replaceable part. *No response*
231	**Switches switches should log usernames of authorized users** Proposed switches should log usernames of authorized users to the syslog server at the time of login. Accept
232	**Variance to switches should log usernames of authorized users** Variance to switches should log usernames of authorized users to the syslog server at the time of login. *No response*
233	**Switches switches log the username** Proposed switches should log the username associated with configuration changes to the syslog server at the time changes are committed. Accept
234	**Variance to switches should log the username** Variance tp switches should log the username associated with configuration changes to the syslog server at the time changes are committed. *No response*
235	**Switches switches support in-service software upgrade (ISSU)** Proposed switches should support in-service software upgrade (ISSU). Accept
236	**Variance to switches should support in-service software upgrade (ISSU)** Variance to switches should support in-service software upgrade (ISSU). Aruba 6400 deployed in VSX pairs are capable of ISSU by dynamically shifting traffic to allow for modular upgrades between the pair, allowing for no disruption in service
237	**Switches switches support third-party optics and transceivers** Proposed switches should support third-party optics and transceivers. Accept
238	**Variance to switches should support third-party optics and transceivers** Variance to switches should support third-party optics and transceivers. The Aruba 6400 will no support third party optics and transceivers, but is a potential use case for some optics in the future. The Aruba 5400R is able to support third-party standards-based optics, but there is no guarantee they will work.
239	**Switches switches should support configuration management** Proposed switches should support configuration management that includes the ability to archive, rollback and delta with running configurations on the switches themselves. Accept

240

Variance to switches should support configuration management

Variance to switches should support configuration management.

No response

241

Switches switches support control plane protection

Proposed switches should support control plane protection. Traffic forwarding, switch adjacencies, and CLI manage ment of the device over the serial console and out-of-band management ports should continue to function with high volumes of traffic. This includes, but is not limited to ARP storms, broadcast storms, DHCP relay forwarding, and ha ndling traffic with IP options set.

Accept

242

Variance to switches should support control plane protection

Variance to switches should support control plane protection.

No response

243

Switches switches support assigning role based administrative access

Proposed switches should support assigning role based administrative access by using a returned RADIUS attribute such that the switches restrict the execution of CLI commands based on the returned role code.

Accept

244

Variance to switches should support assigning role based administrative access

Variance to switches should support assigning role based administrative access.

No response

245

Switches switches support zero-touch-provisioning

Proposed switches should support some form of zero-touch-provisioning.

Accept

246

Variance to switches should support zero-touch-provisioning

Variance to switches should support some form of zero-touch-provisioning.

No response

247

The following attributes pertain to Hardware – Fixed and Modular chassis

248

Switches switches support N+1 redundant supervisors or management modules

Proposed switches should support N+1 redundant supervisors or management modules.

Accept

249

Variance to switches support N+1 redundant supervisors or management modules

Variance to switches should support N+1 redundant supervisors or management modules.

No response

250

Switches that contain N+1 supervisor modules

Proposed switches that contain N+1 supervisor modules should support hot swapping the non-active supervisor (i.e ., supervisor removal without powering down the chassis) without degrading the function of the device.

Accept

251

Variance to switches that contain N+1 supervisor modules

Variance to switches that contain N+1 supervisor modules

No response

252

Hardware supporting N+1 supervisor/management modules

Hardware supporting N+1 supervisor/management modules, switches should support "non-stop" forwarding followin g the failure of the primary supervisor when a redundant supervisor is installed. Failure of the primary supervisor sh ould not result in interruption of service, which includes traffic forwarding and maintaining routing information such t hat no re-convergence is required by running routing protocols.

Accept

253

Variance to hardware supporting N+1 supervisor/management modules

Variance to hardware supporting N+1 supervisor/management modules.

No response

254

Modular switches should support individual upgrades of supervisor cards

All modular switches should support individual upgrades of supervisor cards so that data forwarding is not affected by the upgrade process. In-service-software-upgrade is also acceptable.

Accept

255

Variance to modular switches should support individual upgrades of supervisor cards

Variance to modular switches should support individual upgrades of supervisor cards.

No response

256

The following attributes pertain to Physical & Power Characteristics

257

Switches should should support 802.3bt PoE type 3 or 802.3bt PoE type 4 power

Proposed switches should support 802.3bt PoE type 3 or 802.3bt PoE type 4 power.

Accept

258

Variance to switches should support 802.3bt PoE type 3 or 802.3bt PoE type 4 power

Variance to switches should support 802.3bt PoE type 3 or 802.3bt PoE type 4 power.

No response

259

The following attributes pertain to Questions and Clarifications – Switching

Bidder must answer the following set of questions designed to help identify basic metrics, scaling issues, and suitabi lity. If more than one type of switch is proposed, the values for each type must be specified.

260

Layer 2/3 VXLAN features

If supported, are VXLAN features and forwarding supported in hardware or software?

The Aruba 6400 supports VXLAN forwarding in the hardware (centralized L3 gateway).
The Aruba 5400R supports L2 static VXLAN tunnels.

261

Layer 2/3 VXLAN forwarding

If supported, does the VXLAN forwarding implementation use unicast, multicast or both/other?

VXLAN supports Unicast, Broadcast and Multicast.

262	**Layer 2/3 support VRF functionality** Does the proposed switching hardware support VRF functionality?
	Our primary proposal of the Aruba 6400 supports VRF. The legacy proposal with the 5400, 2930, and 3810 do not support VRF.
263	**Layer 2/3 indicate maximum supported IPv4 multicast IGMP groups** Indicate the maximum supported IPv4 multicast IGMP groups.
	Our primary proposal supports up to 4,000 IGMP multicast groups. The legacy proposal ArubaOS-Switch proposal supports up to 2038 IGMP multicast groups.
264	**Layer 2/3 indicate maximum supported IPv6 multicast MLD groups** Indicate the maximum supported IPv6 multicast MLD groups.
	The Aruba 6400 supports up to 4,000 MRD groups The Aruba 5400 supports 2037 MLD groups
265	**Layer 2/3 indicate the Ethernet forwarding modes** Indicate the Ethernet forwarding modes available and which is default.
	The interfaces on the Aruba switches will be in speed-auto, duplex-auto, and bridged mode by default.
266	**Layer 2/3 indicate if the support is for the entire VLAN** If private VLANs are supported, please indicate if the support is for the entire VLAN or can be configured per-port?
	The "private" in private VLAN refers to the restriction of the switch ports in the VLAN, called "private ports." Ports in a PVLAN can communicate only with a specified uplink port and with specified ports within the same VLAN. A PVLAN consists of a regular VLAN that is partitioned into primary and secondary VLANs. The partitione regular VLAN becomes the primary VLAN. Secondary VLANs are associated with the primary VLAN, have unique VLAN IDs, and have different types—isolated and community—that determine how and to where packets can be forwarded
267	**Layer 2/3 briefly describe layer 3 functions** Briefly describe any layer 3 functions and protocols supported by the proposed solution.
	The legacy proposal L3 functionality includes BFD, UDP helper, Route maps and a DHCP server. Routing features include Static IP routing, RIPv1, RIPv2. The primary proposal supports all the above features and MP-BGP, BGP-EVPN and VRF.
268	**Layer 2/3 if routing is supported maximum number of unicast routes supported** If routing is supported, specify the maximum number of unicast routes supported.
	The Aruba 6400 supports up to 64K IPv4 routes. The Aruba 5400R supports up to 10k IPv4 routes.
269	**Layer 2/3 if routing is supported maximum number of multicast routes supported** If routing is supported, specify the maximum number of multicast routes supported.
	The Aruba 6400 supports up to 4K Multicast routes. The Aruba 5400R supports 2k.
270	**Layer 2/3 explain the ARP protection mechanism** Explain the ARP protection mechanism, and whether it operates in L2 and/or L3. If ARP protection is available in L2 mode, briefly indicate the operation and requirements (i.e. DHCP snooping, manual IP to MAC assignments, and etc.).
	Both proposals feature Dynamic ARP protection with authenticates IP to MAC bindings stored from a lease maintained by DHCP snooping, or by using static bindings configured for non-DHCP clients. It is configured per VLAN and categorizes ports in two ways, trusted and untrusted (default).

271

Layer 2/3 proposed switches support a non-spanning-tree loop protection mechanism

If the proposed switches support a non-spanning-tree loop protection mechanism, does that mechanism function in tandem with MAC-based VLAN assignment and multiple authenticated users on a single switch port?

In cases where spanning tree protocols cannot be used to prevent loops at the edge of the network, loop protection may provide a suitable alternative. Loop protection can find loops in untagged layer 2 links, as well as on tagged VLANs.
The cases where loop protection might be chosen ahead of spanning tree to detect and prevent loops are:
• On ports with client authentication: When spanning tree is enabled on a switch that uses 802.1X, web authentication, or MAC authentication, loops may go undetected. For example, spanning tree packets that are looped back to an edge port will not be processed because they have a different broadcast/multicast MAC address from the client-authenticated MAC address. To ensure that client-authenticated edge ports get blocked when loops occur, you should enable loop protection on those ports.
• On ports connected to unmanaged devices: Spanning tree cannot detect the formation of loops where there is an unmanaged device on the network that does not process spanning tree packets and simply drops them. Loop protection has no such limitation, and can be used to prevent loops on unmanaged switches.

272

Layer 2/3 behavior of spanning-tree

What is the behavior of spanning-tree when an 802.1x authenticated port has multiple authenticated users on a downstream unmanaged switch and each of those users are in a different VLAN (MAC-based VLAN assignment)?

STP packets will be blocked until the client in the VLAN or port that STP is enabled on, is authenticated.

273

Layer 2/3 proposed solution allows for tunneling of wired user traffic

If the proposed solution allows for tunneling of wired user traffic, please briefly detail this feature and any requirements.

Aruba can use dynamic segmentation to tunnel all traffic back to the controller to extend Aruba's secure policy management and WLAN policy enforcement capabilities to make wired network access simple and secure. Wired client devices can be dynamically assigned polcies based on port or user role--ideal for IoT devices.

274

The following attributes pertain to Hardware and Architecture

275

Hardware and architecture control plane protection

Briefly describe the hardware architecture of each proposed switching solution, including a description of control plane mechanisms, port/ASIC grouping, and client traffic forwarding. Please also include any relevant documents explaining the architecture that can be shared for review.

The Primary proposal featuring the Aruba 6400 and Aruba 6300 utilize the new 7th generation fabric and switch ASIC. The 5 slot 6405 has a single fabric and two switch ASICs. The 6300 is a fixed-form factor switch that utilizes a single fabric ASIC, Packet processor ASICs and switching ASIC.

The Aruba 5400R uses a 6th Generation ProVision ASIC with dual speed Hi-Speed Links (HSLs) capable of connecting at up to 32Gbps each at 64b to 512b frame sizes and up to 40Gbps at 512b and larger frame sizes, and when used in conjunction with the ProVision Fabric Chip, can meet the needs of Gigabit Ethernet switching applications. It has a robust Classification and Security functionality including ACLs, Hardware Virus Throttling, and tunneled-node.

276

Hardware and architecture TCAM size

Describe in detail the control plane protection mechanisms available in each proposed device, especially those related to multicast or broadcast traffic.

Both the 6400 and 5400R feature CoPP Control Plane Policing which limits traffic, such as MSTP, unicast and multicast control packets from going to the CPU. CoPP has a user configurable rate limit and protects against DoS attacks, misconfiguration and problems in the network.

277

Hardware and architecture size of the port buffers

Specify the TCAM size.

The Aruba 6400 and 6400 have two TCAMs (internal and external) the internal TCAM supports 8192 entries, The external high capacity TCAM/LPM supports 262,144 entries TCAM = 8192 entries per chassis.

The legacy proposal switches feature a TCAM table of 8192 entries.

278

Port buffers

Specify the size of the port buffers and whether they are shared or per-port.

The 6400 has a total of 320Mb buffer. The Aruba 6400 features port buffers on the line cards with >25Gbps front ends with a 32Mb internal packet buffer. The <10Gbps front end port line cards feature an 8Mb Internal packet buf fer. The 6300 features 8Mb shared internal packet buffer dynamically shared among ports and queues.

The Aruba 5400R and 3810M feature 16.875Mb of packet buffers, 3.375 of egress packet buffer and 13.5Mb of in gress packet buffer.

279

Traffic queues

Specify the traffic queues per port and their size.

Each port on the Aruba 6400 has 8 hardware queues which can be used to provide class-based service to networ k traffic. 32MB is supported per line card.

The 5400 features 8 hardware queues. 13.5MB buffer for each line card.

280

Memory Layout

Specify the overall memory layout of the switch.

Aruba 6400 features 16GB DDR4 ECC and 32GB eMMC Flash memory in each management module. The 6300 h as 8Gb DDR4.

The legacy proposal features the 5400R has 4Gb DDR3, the 2930M has 2Gb DDR3, and the 3810M has 1Gb DD R3.

281

Maximum MAC addresses supported

Specify the maximum number of MAC addresses supported.

The Aruba 6400 and 6300 have a MAC table size of 32,000
The Aruba 5400, 2930 and 3810 have a MAC table size of 64,000

282

Per-port MAC address limitations

Specify any per-port MAC address limitations.

256 MAC addresses per port for MAC auth

283

Non-hardware traffic forwarding

Specify all known conditions that result in non-hardware traffic forwarding.

The Aruba switches are designed to forward traffic in hardware via the onboard ASIC.
The CPU handles control plane calculations which get sent to the ASIC where traffic gets forwarded.

284

Maximum ethernet frame size

Specify the maximum Ethernet frame size supported. If it is not consistent across all interface types, specify the maxi mum frame size per interface type.

Largest jumbo frame supported is 9216bytes.

285

Per-slot maximum bandwidth

For any proposed modular switches, specify the per-slot maximum and available bandwidth.

The Aruba 6400 features 1.2Tb/s per slot of bandwidth
The Aruba 5400R features 80Gb/s per slot of bandwidth.

286

Backplane bandwidth capacity

For any proposed switches, describe the switch maximum and available backplane or switch fabric bandwidth capacity.

The Aruba 6400 has a backplane capcity of 24Tbps (6410), 14Tbps (6405) and a throughput of 13.9Bpps. The 6300 has a maximum switch capacity of 880Gb/s and a forwarding capacity of 655Mpps.

The Aruba 5400R has a Routing/Switching Capacity of 960Gbps, Switch Fabric speed is 1015Gbps. The 2930F has a throughput of 112.0Mpps, and a switching capacity of 176Gbps. The 3810M has a throughput of 320Gbps and a switching capacity of 338Gbps.

287

Limitations to utilizing full bandwidth

Describe any limitations to utilizing the full bandwidth per-slot or along the backplane, are there limitations introduced by management or switching cards, or other components?

The 5400R is limited from full bandwidth if utilizing V2 line cards in comparability mode.

288

Forwarding architecture

In a chassis-based switch, is bandwidth distributed across the backplane or centralized through a switching or management card?

ARUBA 6400:
A powerful Aruba Gen7 ASIC, used in the Aruba 6400, delivers performance and robust feature support with flexible programmability for tomorrow’s applications.
The Aruba 8400 switch series supports up to 1.4 Tb/s (2.8Tb/s bi-directional) of switch Fabric bandwidth per slot. Each slot is built with twenty-eight 50 Gb/s high-speed interfaces facing the fabric ASICs, which are active and fixed components of the switch.
As shown below those twenty-eight 50 Gb/s high-speed interfaces connect to the single Fabric ASIC in the 6405, or they are spread between the 2 ASICs using the 6410 switch.
In both cases the 28 x 50G high speed interfaces are able to provide the bandwidth need to reach 2.8Tb bi-di per slot

Aruba 5400R
The Aruba 5400R has a similar architecture that utilizes the Gen 6 Fabric and switching ASICs.

289

Oversubscription rate

For any proposed modular switches, specify the oversubscription rate, if any, for all line cards and/or port groups in the proposed switching platform(s).

All line cards are full-line rate non-blocking.

290

ASIC Arrangement

Describe the ASIC arrangement for each proposed line card or switch chassis type.

The 6405 uses a single fabric ASIC and the 6410 uses two fabric ASICs. The 6400 has two connections between each slot and the fabric. The line cards contain a single Gen 7 switch ASIC, with fabric ASIC(s) located in the backplane.

The 5406R uses a single fabric ASIC and the 5412R uses two fabric ASICs. The Aruba 5400R has two connections between each slot and the fabric. The ProVision switching ASIC is a single chip capable of forwarding packets at L2 through L4. Each Line card has it's own switching ASIC and the fabrics are located on the backplane.

291

ASIC Description

Describe the ASIC/processor used for traffic forwarding.

Generation 7 ASIC (legacy proposal features 6th generation) is a single chip capable of forwarding packets at L2 t hrough L4. Using the Provision technology, the chip can have a number of front-plane configurations.

292

Software feature licensing

Indicate whether all software features are enabled by default on the proposed switches or if additional licenses woul d be needed for activation. Please indicate available licenses and reference costs.

No licenses are required.

293

Port licensing

Indicate whether all ports are enabled by default on the proposed switches or if additional licenses would be needed for activation. Please indicate available licenses and reference costs.

No licenses are required

294

NBase-T bandwidth options in stackable switches

For those switches or cards that support NBase-T/802.3bz service, please indicate the supported bandwidth option s (i.e. 10M, 100M, 1G, 2.5G, 5G, and 10G).

Line cards or fixed-configurations are avaiable featuring 10/100/1000, 1G/2.5G/5G/10G/ 10G, 25G, 40G, and 100 G. We have the flexibility to deliver whatever configuration is needed.

295

NBase-T bandwidth options in chassis or modular switches

For those switches supporting NBase-T/802.3bz, how many ports per fixed chassis, or for modular chassis, per line-card, support 1, 2.5, 5, and 10G?

The 6400 multigig line card is able to support 48 ports at 1/2.5/5/10BASE-T.

The 5400R multi-gig line card is able to support 8 1/2.5/5/10BASE-T PoE+ ports or 20 10/100/1000BASE-T and 4 1/2.5/5/10GBASE-T

296

NBase-T and POE support

For those switches or cards that support NBase-T/802.3bz service, are the ports able to support PoE/PoE+/PoE Ty pe 3/PoE Type 4?

The 6400 and 6300 HPE Smart rate ports support up to 60W 802.3bz Class 6 PoE

The 2930M HPE smart rate is able to support 60W 802.3bz Class 6, other switches in the legacy proposal feature only 30W PoE+

297

NBase-T standards

For any ports that > 1Gbs and < 10Gbs, please list the supported standard (i.e. NBase-T or 802.3bz).

1G/10GbE SFP+, 10/100/1000BASE-T, 1GbE SFP, and 40GbE QSFP+, 10/25GbE SFP28 (6400), 40/100GbE QS FP28 (6400)

298

Supervisor or management card redundancy

If proposed modular switches support modular supervisor cards, are N+1 supervisor-cards supported for redundanc y?

Yes. Redundant management modules are available.

299 **Control plane forwarding**

Explain all layer2/layer3 protocols that are forwarded to the switch control plane for consideration.

The Aruba switches are designed to forward traffic in hardware via the onboard ASIC.
The CPU handles control plane calculations in which the results will get sent to the ASIC where traffic gets forwarded.
The below table shows the default COPP policy built into the Aruba 8325 switch. It shows which protocols get sent to the CPU and hw it should be treated.

class drop priority rate pps burst pkts hardware rate pps
---
acl-logging 0 50 50 50
arp-broadcast 3 7000 7000 7000
arp-unicast 4 2500 2500 2500
bfd 7 1000 1000 1000
bgp-ipv4 6 1500 1500 1500
bgp-ipv6 6 1500 1500 1500
dhcp-ipv4 1 1000 1000 1000
dhcp-ipv6 1 1000 1000 1000
erps 7 1000 1000 1000
hypertext 5 1000 500 1000
icmp-broadcast-ipv4 3 2000 2000 2000
icmp-multicast-ipv6 3 2000 2000 2000
icmp-unicast-ipv4 4 1000 1000 1000
icmp-unicast-ipv6 4 1000 1000 1000
igmp 6 2500 2500 2500
ip-exceptions 0 150 150 150
ipsec 6 2500 2500 2500
ipv4-options 2 150 150 150
ipv6-options 2 150 150 150
lacp 6 1000 1000 1000
lldp 6 500 500 500
loop-protect 7 1000 1000 1000
mirror-to-cpu 1 1000 1000 1000
mld 7 1000 1000 1000
mvrp 6 1000 1000 1000
ntp 5 150 150 150
ospf-multicast-ipv4 6 2500 2500 2500
ospf-multicast-ipv6 6 2500 2500 2500
ospf-unicast-ipv4 6 2500 2500 2500
ospf-unicast-ipv6 6 2500 2500 2500
pim 6 1500 1500 1500
sflow 1 2000 2000 2000
ssh 5 1000 500 1000
stp 7 2500 2500 2500
telnet 5 500 500 500
udld 7 500 500 500
unknown-multicast 2 1500 1500 1500
unresolved-ip-unicast 2 1000 1000 1000
vrrp-ipv4 6 1000 1000 1000
vrrp-ipv6 6 1000 1000 1000
default 1 1000 500 1000

300 **Control plane policing**

Explain in detail any built-in policers and any other related protection mechanisms for the control plane.

CoPP is built in to protect traffic from the control plane.

301 **Per-port multicast rate limiting**

Can the switch rate limit multicast traffic per port?

Yes.

302 **Per-port broadcast rate limiting**

Can the switch rate limit broadcast traffic per port?

Yes.

303 **Per-port unknown-unicast rate limiting**

Can the switch rate limit unknown-unicast traffic per port?

Yes.

304 **Storm-control units**

Can the storm-control settings be applied as a percentage of bandwidth value per port?

5400R – Yes
6400 – No (kbps and pps)

305 **Stack cabling**

For any proposed fixed configuration switches, please indicate the type and method of cabling supported to create the stack.

VSX and VSF utilize front-plane stacking via a front-plane port of choice. The 2930M and 3810M both utilize stacking modules with proprietary stack cables.

306 **Maximum switches in a stack**

For any proposed fixed configuration switches that are stackable, please indicate the maximum number of switches in a stack.

The VSX and VSF pairs (5400, 6400) all support 2 switches. The 6300 supports up to 32 members in a stack (ASIC limit) and the 3810M, and 2930M support up to 10 switches. the 2930F supports up to 8.

307 **Stacking bandwidth**

For any proposed fixed configuration switches that are stackable, please indicate the cabling method and the bandwidth for the stacking connection.

The 6400 can stack VSX pairs via 100GbE QSFP28. The 5400R can stack VSF pairs via 40Gb SFP28. The 2930M, and 3810M have an 80Gbps capacity in ring topology. The 2930M features up to 100Gbps stacking performance.

308 **Stacking master unit and failover**

For any proposed configuration requiring stacking (i.e. fixed configuration switches), please indicate if there is a "master" switch and what happens if that switch fails.

This is done dynamically

309

MAC learning with MLAG

Please describe the MAC learning between two switches using MLAG, when an LACP with two members, has one m ember terminating on each MLAG member switch.

With Aruba 8325/8400/6400 we utilize active gateway configurations which is the same on each switch pair. Each V SX switch will have an Anycast IP and common MAC address which will be used.
When a VC boots up it will learn automatically all the LACP/MAC/ARP/DB entries from the other VSX switch and it will implement a delay timer at the same time to ensure that once the interface comes up, the active switch will alre ady have learned all the MACs learned by the pair VSX switch.

In the Aruba 5400R, if using distributed trunking, VRRP would be used to utilize a virtual MAC.

310

MAC learning with Virtual Chassis

Please describe the MAC learning between two switches using stacking/virtual-chassis, when an LACP with two me mbers, has one member terminating on each MLAG member switch.

Not supported with 6400, it uses VSX, similar to MC-LAG.

The Aruba 5400R uses Virtual Switching Framework (VSF), which uses a single MAC address across the stack, wh ich would be learned upstream or downstream.

311

ARP learning with MLAG

Please describe the ARP learning between two switches using MLAG when an LACP with two members, has one me mber terminating on individual member switches.

5400R – utilizes VRRP in a Distributed trunking configuration.
With Aruba 8325/8400/6400 we utilize active gateway configurations which is the same on each switch pair. Each V SX switch will have an Anycast IP and common MAC address which will be used.
When a VC boots up it will learn automatically all the LACP/MAC/ARP/DB entries from the other VSX switch and it will implement a delay timer at the same time to ensure that once the interface comes up, the active switch will alre ady have learned all the MACs learned by the pair VSX switch.

312

ARP learning with Virtual Chassis

Please describe the ARP learning between two switches using stacking/virtual when an LACP with two members, ha s one member terminating on individual member switches.

5400R – single IP address
6400 – stacking is not supported, uses VSX

313

MLAG Active-Active support

For LACP link members originating on switches using MLAG or stacking/virtual-chassis, are LACP members active-passive or active-active?

The Aruba 6400 supports both static or active LACP connections. Which to use will vary depending on the attache d host and how that is set up, however LACP active is recommended.
Aruba 5400R supports passive or active LACP links.

314

LAG packet hashing

Describe the packet hashing method(s) for traffic traversing LACP link-aggregate members, assuming all members are active-active.

5400R – L3 and L4 LACP hashing
6400
- Source MAC and destination MAC
- Source IP and destination IP
- Source port and destination port

315 **MLAG packet hashing**

Describe the packet hashing method(s) for traffic traversing link-aggregate members, each terminating on an individual member of an MLAG or stacked/virtual-chassis pair.

The 5400R supports L3 and L4 LACP hashing
The 6400 supports:
• Source MAC and destination MAC
• Source IP and destination IP
• Source port and destination port

316 **MLAG and Virtual-Chassis traffic forwarding limitations**

For switches configured for MLAG or stacking/virtual-chassis, please describe any limitations to the switch operation or traffic forwarding.

The Aruba 6400 supports a dual control plane when used in Virtual-Chassis configuration. This allows both switches to act independently with regards to routing tables and decisions.
When operating in Virtual Chassis both switches are able to share and synchronize the tables so that each switch can take over in case of a failure.
Each switch forwards locally first.
The 5400R supports a unified control plane when in VSF (stacking). All traffic is handled locally as much as possible and only traverses the stack links if needed. Multicast will choose a designated forwarder.

317 **Available line-cards for chassis based switches**

For any proposed modular switches, please provide a list of available line cards for the purposes of seeing available port and bandwidth options.

The Aruba 6400: 48p 1G PoE .at | 48p 1G PoE .at + 4xSFP56 | 48p 1G PoE .bt + 4xSFP56 | 48p Smart Rate PoE .bt + 4xSFP56 | 24p Smart Rate + 4xSFP56 | 24p SFP+ and 4x SFP56 | 48p 10/25G | 12p 40/100G

The Aruba 5600: 20-port 10/100/1000BASE-T PoE+ / 4-port 1G/10GbE SFP+ MACsec | 20-port 10/100/1000BASE-T PoE+ / 4p 1/2.5/5/10GBASE-T PoE+ MACsec 20-port 10/100/1000BASE-T PoE+ MACsec / 1-port 40GbE QSFP+8-port 1G/10GbE SFP+ MACsec | 8-port 1/2.5/5/10GBASE-T PoE+ MACsec | 2-port 40GbE QSFP+ v3 zl2 Module | 24-port 10/100/1000BASE-T PoE+ MACsec | 24-port 10/100/1000BASE-T MACsec 24-port 1GbE SFP MACsec |12-port 10/100/1000BASE-T PoE+ / 12-port 1GbE SFP MACsec

318 **Available models of fixed configuration switches**

For any proposed fixed configuration switches, please provide a list of all models in the line for the purposes of seeing available port and bandwidth options.

6300: Aruba 6300M 24-port SFP+ and 4-port 50G SFP Switch | Aruba 6300M 48-port HPE Smart Rate ½.5/5GbE PoE Class 6 and 4-port 50G SFP Switch | Aruba 6300M 48-port 1GbE and 4-port 50G SFP Switch | Aruba 6300M 24-port 1GbE and 4-port 50G SFP Switch | Aruba 6300M 24-port HPE Smart Rate ½.5/5GbE PoE Class 6 and 4-port 50G SFP Switch | Aruba 6300M 24-port 1GbE PoE Class 4 and 4-port 50G SFP Switch | Aruba 6300F 24-port 1GbE and 4-port 50G SFP Switch | Aruba 6300F 48-port 1GbE and 4-port 50G SFP Switch | Aruba 6300F 24-port 1GbE PoE Class 4 and 4-port 50G SFP Switch | Aruba 6300F 48G PoE+ with 4x10/25/50G SFP |

2930M: Aruba 2930M 48G PoE+ 1-slot Switch | Aruba 2930M 24G PoE+ 1-slot Switch | Aruba 2930M 48G 1-slot Switch | Aruba 2930M 24G 1-slot Switch | Aruba 2930M 40G 8SR PoE+ 1-slot Switch | Aruba 2930M 24SR PoE+ 1-slot Switch

3810M Aruba 3810M 24G 1-slot Switch | Aruba 3810M 48G 1-slot Switch | Aruba 3810M 24G PoE+ 1-slot Switch | Aruba 3810M 48G PoE+ 1-slot Switch | Aruba 3810M 16SFP+ 2-slot Switch | Aruba 3810M 40G 8SR PoE+ 1-slot Switch

319 **The following attributes pertain to physical, power and cooling characteristics**

320

Physical dimensions

Specify the number of rack units for each type of modular chassis in the proposal.

The 6405 is a 7RU height and the 6410 is a 12RU height
The 5406R zl2 is a 4U height and the 5412R zl2 is a 7U height

321

802.3bt type 3 and type 4 support

Please specify current or planned support for 802.3bt PoE supporting device Type 3 (60W) and Type 4 (90W).

The 6400, 6300 and 2930M currently have 802.3bt 60W PoE.

322

Power requirements

Specify the power requirements of each proposed fixed or modular configuration switch when using AC power.

The Aruba 6400 has 4 PSU bays. Available PSUs are 1800W PS with a C16 inlet, or a 3000W PS w/ a C20 inlet

Available power supplies are 700W, 1100W or 2750W PSUs. The 5406 supports 2 PSUs, whereas the 5412 can s upport up to 4 PSUs and requires a minimum of 2 PSUs. The PSUs require 100-127/200-240 VAC (depending on PSU chosen)

323

BTU output

Specify the BTU output for each standalone switch or modular chassis model in the proposed configuration for 120 V AC, 208V AC (and -48V DC operation if applicable).

The Aruba 5400R outputs 4900 BTU/hr max with no POE and 7400 BTU/hr with max POE
The Aruba 6400 outputs approx. 10,500 BTU/hr with max POE and 7,345 BTU/hr

324

Boot time

Specify the boot time in seconds for each proposed device configuration. This should be the time it takes for the de vice to reach a full forwarding state from a powered off state without taking into consideration convergence of routin g protocols.

The Aruba 5400R reboots in 2 minutes.

Data for the 6400 is not currently available as the device is still in testing

325

Airflow direction

Specify the airflow direction through each type of proposed switch and whether it can be modified.

6400: Front to back
6300: Front and side to back
5400: left to right (front view)
2930M: front to back

326

POE totals

Specify the maximum amount of PoE/PoE+/PoE Type 3/PoE Type 4 power that can be delivered at once per chassis slot or fixed configuration switch.

6400: max 7714.46W, all ports at 30W, 122 ports at 60W.
6300: max 1600W of PoE power, all ports at 60W.
5400: max 9250W of PoE power, 288 ports at 30W.
3810: max 1440W of PoE power, 48 ports at 30W.
2930M: max 1440W of PoE power, 24 ports at 60W. 48p at 30W.

327 **Maximum POE type 3/4 power delivery**

Specify the maximum number of ports that can supply full PoE/PoE+/PoE Type 3/PoE Type 4 power at once, for any proposed chassis or fixed configuration switches, in the proposed configuration.

6400: max 7714.46W, all ports at 30W, 122 ports at 60W.
6300: max 1600W of PoE power, all ports at 60W.
5400: max 9250W of PoE power, 288 ports at 30W.
3810: max 1440W of PoE power, 48 ports at 30W.
2930M: max 1440W of PoE power, 24 ports at 60W. 48p at 30W.

328 **The following attributes pertain to management**

329 **Software upgrade process**

Describe the switch software upgrade process and estimated time to complete.

When deployed in VSX pairs the 6400 and 6300 have live upgrades, dynamically shifting load and traffic from the switches to allow for modular upgrades of the OS, never requiring any network down time.

The legacy proposal switches host dual flash images that require only downloading the new firmware, switching pri mary and secondary image and rebooting the switch.

330 **MLAG / Virtual Chassis upgrade process**

Describe the software upgrade process for the switches when configured as an MLAG or VC pair and indicate any d owntime for one or both switches.

The 6400 allows for live upgrades where the chassis dynamically shift traffic load to allow for an uninterrupted upg rade process.

331 **APIs supported**

Describe supported APIs and their capabilities, providing any documentation as relevant.

REST API is supported. Guide is available here.
Primary Proposal: ArubaOS-CX https://support.hpe.com/hpsc/doc/public/display?docId=emr_na-a00075250en_us &docLocale=en_US
Legacy Proposal: ArubaOS-Switch https://support.hpe.com/hpsc/doc/public/display?docId=a00057978en_us

332 **XML/JSON configuration file support**

Is there support for importing and/or exporting the switch configuration in XML or JSON format?

JSON

333 **Libraries or related tools**

Describe any vendor provided tools or programming libraries or Ansible roles, that benefit automation/orchestration.

https://github.com/aruba
API Guide listed in Question 331
https://github.com/aruba/arubaos-switch-api-python
https://ase.arubanetworks.com/solutions?page=1&page_size=20&products=12&order=-modified
https://ase.arubanetworks.com/

334 **Rollback**

Indicate whether the software has a provision for a "rollback" feature allowing the return of the configuration to one or more historic revisions.

The Primary proposal 6400/6300 use NetEdit to simplify orchestration, automation of configurations and makes roll back a simple GUI interface.

The legacy proposal: Rollback is achieved by simply switching the configuration back from secondary to primary, t his would roll back to the last image prior to upgrade.

335 **Pre-loading of software/configuration**

Indicate whether the switches support the saving of or pre-positioning of software or configuration files in their onbo ard flash memory.

Zero touch provisioning is supported, allowing the switch to pull down a configuration from Aruba AirWave

336 **Multiple versions of software**

Is it possible to store more than one version of the system software on the switch and choose which to boot?

Yes, primary and secondary image

337 **Out of band management protocols**

If the switches contain an out-of-band management port, please indicate what types of management traffic are sour ced from this port and can that traffic be directed to standard ports? (i.e. RADIUS, NTP, SNMP requests or sFlow/Ne tflow/IPFIX export?)

5400R – SSH, Telnet, RADIUS, sFlow,
6400 – SSH, RADIUS, sFlow

338 **Exclusive configuration**

Is there an "edit exclusive" option when editing the configuration and prohibiting other users from doing the same si multaneously.

Yes, the number of admin logins can be restricted down to a single session, as to disallow other admins from openi ng another configuration session.

339 **Zero-Touch-Provisioning**

If zero-touch-provisioning is supported, please detail what is required and if there are supplemental management pl atforms provided for this.

Aruba AirWave, a supplemental NMS has been included in our proposal, however ZTP will function with the free-to-use Cloud based Aruba Activate. The switch will boot up with the factory default config, and send out a DHCP disc overy from a data port or OOBM. The preferred config method uses DHCP option 43 value as a string to parse Air Wave configuration. Switch expects a DHCP option 60 with value "ArubaInstant" alwith DHCP option 43 to parse Air Wave details. IPv6 is also available using DHCP option 17 with suboption 100 and vendor class Enterprise ID as 4 7196

340 **sFlow support**

If the proposed switches support sFlow, what is the maximum sampling rate for a switch under heavy load? A sampli ng rate of 1:1 being ideal.

Sampling rate can be configured to 1:1 but performance would likely suffer.

341 **NetFlow support**

If the proposed switches support Netflow, what is the maximum sampling rate for a switch under heavy load? A sampl ing rate of 1:1 being ideal.

Sampling rate can be configured to 1:1 but performance would likely suffer.

342 **IPFIX support**

If the proposed switches support IPFIX, what is the maximum sampling rate for a switch under a heavy load? A sampling rate of 1:1 being ideal.

Not supported

343 **OpenFlow support**

If supported, what version of OpenFlow is used?

The legacy proposal (Aruba 5400) supports OpenFlow 1.0 and 1.3

The Aruba 6400 does not support OpenFlow

344 **OpenFlow hardware support**

Describe the forwarding for OpenFlow, are flows managed in hardware or software?

Primarily the flows are managed in hardware, and what cannot be managed in hardware is managed in software.

345 **Security**

346 **802.1x functionality when authentication is unavailable**

Please explain the expected operation of a switch configured for 802.1x or MAC authentication when the AAA/NAC server is unreachable and a new client connects, or an existing client's authentication times out.

5400R – Critical/Open Authentication – allows fallback to an authenticated VLAN or user role
6400 – Allows a critical or authenticated user role for fallback access in case of RADIUS unreachability.

347 **802.1x functionality with an unmanaged downstream switch**

In the case where switch port is configured for 802.1x and an unmanaged switch is connected to the port, what are the expected limitations to serving various types of authenticating (or non-authenticating) clients on the downstream unmanaged switch; i.e. can they be placed on different VLANs, have different ACLs, etc.?

5400R – Each client is assigned to a vlan or appropriate role/policy at the authenticating switch
6400 – Each client is assigned to a VLAN or appropriate role/policy at the authenticating switch.

348 **Documentation related to port-based authentication**

Please provide documentation related to the expected operation and configuration of port-based authentication options.

http://h22208.www2.hpe.com/eginfolib/Aruba/16.09/5200-5908/index.html#book.html

349 **Documentation related to port-based authentication with multiple users per port**

Please provide documentation related to the expected operation and configuration of port-based authentication options when multiple users connect to the same port.

http://h22208.www2.hpe.com/eginfolib/Aruba/16.09/5200-5908/index.html#book.html

350 **Maximum number of authenticated clients per switch port**

Please indicate the maximum number of clients that can be authenticated on a single switch port when multiple users connect to the same port.

The Aruba 6400 switch supports 256 clients per port.
Aruba 5400R supports 32 clients per port.

351 **Simultaneous authentication methods on a single port**

Please describe the combinations of authentication methods that can be simultaneously enabled on a switch port. (i .e. 802.1x, MAC authorization, web authorization, others?)

All listed methods can be used simultaneously.

352 **Dynamic Roles / ACLs**

Please describe the necessary security relationship between the NAC/RADIUS server and the switch that would allo w the NAC/RADIUS server to modify the switch configuration to provide downloadable roles and/or dynamic ACLs.

In conjunction with Aruba ClearPass, the switch is able to download user roles without having to define them locally on the switch, This relationship is natively configured between ClearPass and the switch once it is configured to lo ok for the ClearPass server.

353 **User-traffic tunneling**

Please describe any features that would allow tunneling of user traffic for specific VLANs to a centralized switch or c ontroller with access to a common layer3 interface, much like centralized forwarding for wireless APs. This feature w ould be of limited but broad use, allowing for guests, IoT and gaming systems (as examples) to share a common su bnet or pool of subnets.

Aruba's dynamic segmentation allows organizations to connect users and devices to wired ports and tunnel them t o a controller or connect them to the appropriate VLAN and subnet and to download a dynamic policy (with securit y and QoS settings) to the port to which they are connected. This extends the functionality of traditional wired 802. 1x to workflows that were typically deployed only in wireless networks, such as easy onboarding by users BYOD, wi red guest access with the same captive portal on the wireless network, and automated support and remediation for devices failing policy or posture check with captive portal.

354 **Encryption of local secrets**

Please describe the encryption used for the storage of radius secrets and local user passwords in the configuration file.

5400R – Suite B Cryptography
6400- ecdsa | ed25519 | rsa

355 **Required Features – Wireless**

Proposed solutions must offer components which support the following list of features. Please simply affirm or deny t hat your proposed solution meets the following requirements by notating each item with "accept", "deny", or "varianc e." Please explain any variances in your product. The Bidder cannot answer "accept" if the feature is not currently a vailable in the proposed hardware running current general availability (production) release software. If a feature is n ot in production software at the time of the RFP submission, the Bidder must choose "deny" or "variance." If a featur e not in production software is described under a "variance," it must be noted the feature is not currently available.

356 **Required Features – Wireless - General Features**

357 **Maintenance**

The proposed wireless controllers and access points must be eligible and covered for maintenance for 60-months fr om date of purchase.

Accept

358 **Variance to maintenance**

Variance to The proposed wireless controllers and access points must be eligible and covered for maintenance for 60-months from date of purchase.

No response

359 **Wireless Access Point Auto-Provisioning**

Wireless access points must support auto-provisioning via DHCP attributes or DNS queries, such that access points are adopted by wireless controllers and fully functional without manual configuration.

Accept

360 **Variance to wireless Access Point Auto-Provisioning**

Variance to auto-provisioning via DHCP attributes or DNS queries, such that access points are adopted by wireless controllers and fully functional without manual configuration.

No response

361 **Controller Uplinks**

The proposed stand-alone controllers or chassis must support at minimum, two 10 Gbps interfaces for network redu ndancy. If a chassis using a data backplane is proposed, each controller must have 10 Gbps of bandwidth available via the backplane/switch fabric.

Accept

362 **Variance to controller Uplinks**

Variance to at minimum, two 10 Gbps interfaces for network redundancy. If a chassis using a data backplane is prop osed, each controller must have 10 Gbps of bandwidth available via the backplane/switch fabric.

No response

363 **Captive Portal**

The proposed solution must include a captive portal that can be used to provide instructions on how to configure cli ents and the ability to download configuration software. The captive portal must allow the University to upload custo m web pages, and it must allow unauthenticated clients to access IP-based resources by specifying a set of allowed IP addresses (via an access control list or equivalent strategy).

Accept

364 **Variance to captive Portal**

Variance to The proposed solution must include a captive portal that can be used to provide instructions on how to configure clients and the ability to download configuration software. The captive portal must allow the University to u pload custom web pages, and it must allow unauthenticated clients to access IP-based resources by specifying a se t of allowed IP addresses (via an access control list or equivalent strategy).

No response

365 **Wireless Access Point Uplink**

Wireless access points must connect to the wired network via at a minimum of 1 Gbps/full-duplex Ethernet and also support multi-gig.

Accept

366 **Variance to wireless Access Point Uplink**

Variance to Wireless access points must connect to the wired network via at a minimum of 1 Gbps/full-duplex Ethern et and also support multi-gig.

No response

367 **IGMP Snooping Support**

The proposed system must support IGMP snooping.

Accept

368 **Variance to iGMP Snooping Support**

Variance to IGMP snooping.

No response

369 **Layer 3 Roaming**

The proposed solution must support IP (L3) roaming.

Accept

370 **Variance to layer 3 Roaming**

Variance to IP (L3) roaming.

No response

371 **Dual-Stack feature parity**

The University wireless service is currently a dual-stacked IPv4/IPv6 network. The features available for IPv4 must al so be available for IPv6 (i.e., feature parity) in the proposed system, including reporting the IPv6 address of the clie nt on the controller and wireless management application. Any functional differences between IPv4 and IPv6 suppor t must be individually noted in the variance explanation.

Accept

372 **Variance to dual-Stack feature parity**

Variance to The University wireless service is currently a dual-stacked IPv4/IPv6 network. The features available for IPv4 must also be available for IPv6 (i.e., feature parity) in the proposed system, including reporting the IPv6 addres s of the client on the controller and wireless management application. Any functional differences between IPv4 and I Pv6 support must be individually noted in the variance explanation.

No response

373 **IPv6 RA Guard**

The proposed system must support IPv6 RA guard, such that a wireless client cannot send IPv6 router advertiseme nts that are received by other wireless clients.

Accept

374 **Variance to iPv6 RA Guard**

Variance to IPv6 RA guard, such that a wireless client cannot send IPv6 router advertisements that are received by other wireless clients.

No response

375 **IPv6 SLAAC support**

The proposed system must support IPv6 wireless clients using SLAAC addressing in a dual-stacked environment.

Accept

376 **Variance to iPv6 SLAAC support**

Variance to IPv6 wireless clients using SLAAC addressing in a dual-stacked environment.

No response

377 **IPv6 DHCPv6 support**

The proposed system must support IPv6 wireless clients using DHCPv6 addressing in a dual-stacked environment.

Accept

378	**Variance to iPv6 DHCPv6 support** Variance to IPv6 wireless clients using DHCPv6 addressing in a dual-stacked environment. *No response*
379	**IPv6 multicast optimizations** The proposed system must support the same IPv6 multicast optimizations as are provided for IPv4. Accept
380	**Variance to iPv6 multicast optimizations** Variance to the same IPv6 multicast optimizations as are provided for IPv4. *No response*
381	**Disable LEDs** Access points must have the option of turning off all LED indicator lights. Accept
382	**Variance to disable LEDs** Variance to Access points must have the option of turning off all LED indicator lights. *No response*
383	**Zero-Configuration bridging** The proposed system must support bridging Bonjour, and other zero-configuration protocol advertisements betwee n SSIDs/VLANs, such that services on one SSID/VLAN can be discovered across SSIDs/VLANs by wireless clients (e .g., if an AppleTV is associated to SSID1 on VLAN1, a client associated with SSID2 on VLAN2 must be able to disco ver and use the AppleTV). Accept
384	**Variance to zero-Configuration bridging** Variance to bridging Bonjour, and other zero-configuration protocol advertisements between SSIDs/VLANs, such tha t services on one SSID/VLAN can be discovered across SSIDs/VLANs by wireless clients (e.g., if an AppleTV is asso ciated to SSID1 on VLAN1, a client associated with SSID2 on VLAN2 must be able to discover and use the AppleTV) . *No response*
385	**Selective Zero-configuration advertisements** The proposed system must have full-featured management of Bonjour and other zero-configuration protocols, such that service advertisements can be selectively sent between VLANs and clients based on location, logical group, or user attributes. Accept
386	**Variance to selective Zero-configuration advertisements** Variance to The proposed system must have full-featured management of Bonjour and other zero-configuration prot ocols, such that service advertisements can be selectively sent between VLANs and clients based on location, logic al group, or user attributes. *No response*

387 **VLAN ID in RADIUS Attributes**

Wireless controllers must support placing users into appropriate VLANs when returning a text-based VLAN ID in the RADIUS Tunnel-Private-Group-ID value (e.g., returning the value "faculty" rather than "801").

Accept

388 **Variance to vLAN ID in RADIUS Attributes**

Variance to placing users into appropriate VLANs when returning a text-based VLAN ID in the RADIUS Tunnel-Private-Group-ID value (e.g., returning the value "faculty" rather than "801").

No response

389 **VLAN Name RADIUS Attribute**

Wireless controllers must support naming/correlating a specific VLAN or VLAN pool to a descriptive text value that can be used in conjunction with RADIUS returned values (e.g., naming VLAN 801 "faculty", so that a RADIUS returned VLAN ID of "faculty" places the user in VLAN 801).

Accept

390 **Variance to vLAN Name RADIUS Attribute**

Variance to naming/correlating a specific VLAN or VLAN pool to a descriptive text value that can be used in conjunction with RADIUS returned values (e.g., naming VLAN 801 "faculty", so that a RADIUS returned VLAN ID of "faculty" places the user in VLAN 801).

No response

391 **SSID VLAN Assignment**

Wireless controllers must support the association of specific VLANs or VLAN pools to SSIDs (e.g., assign VLAN 101 to SSID1, VLAN 102 to SSID2, etc.).

Accept

392 **Variance to sSID VLAN Assignment**

Variance to the association of specific VLANs or VLAN pools to SSIDs (e.g., assign VLAN 101 to SSID1, VLAN 102 to SSID2, etc.).

No response

393 **Hospitality Access Points**

The proposed controllers must support a currently available small form-factor hospitality access point that can be installed in a typical wall outlet box.

Accept

394 **Variance to hospitality Access Points**

Variance to currently available small form-factor hospitality access point that can be installed in a typical wall outlet box.

No response

395 **Hospitality Access Point frequency support**

Hospitality access-points must support both 2.4 GHz and 5 GHz radios, able to operate simultaneously, and wired Ethernet access with an option to centrally forward, or tunnel, Ethernet traffic.

Accept

396 **Variance to hospitality Access Point frequency support**

Variance to both 2.4 GHz and 5 GHz radios, able to operate simultaneously, and wired Ethernet access with an optio n to centrally forward, or tunnel, Ethernet traffic.

No response

397 **Ceiling mounting options**

Wireless APs must support wall and ceiling mounting options (excluding hospitality APs).

Accept

398 **Variance to ceiling mounting options**

Variance to wall and ceiling mounting options (excluding hospitality APs).

No response

399 **Remote worker support**

The proposed controllers and access-points must support a remote access option, where APs can be deployed indi vidually for remote workers.

Accept

400 **Variance to remote worker support**

Variance to remote access option, where APs can be deployed individually for remote workers.

No response

401 **AP Tunneling behind NAT**

APs must create a secure tunnel back to the controllers and provide enterprise wireless over the Internet, even whe n placed behind a NAT device such as a home broadband router.

Accept

402 **Variance to aP Tunneling behind NAT**

Variance to APs must create a secure tunnel back to the controllers and provide enterprise wireless over the Intern et, even when placed behind a NAT device such as a home broadband router.

No response

403 **AP Tunneling Ethernet**

Remote access-points must have at least one Ethernet port capable of tunneling traffic back to controllers on camp us.

Accept

404 **Variance to aP Tunneling Ethernet**

Variance to Remote access-points must have at least one Ethernet port capable of tunneling traffic back to controlle rs on campus.

No response

405 **AP Tunneling VLAN support**

Remote access-points having Ethernet ports, must also support VLAN tagging and be able to tunnel traffic back to t he controllers on campus, per-VLAN.

Accept

406

Variance to aP Tunneling VLAN support

Variance to Remote access-points having Ethernet ports, must also support VLAN tagging and be able to tunnel traf fic back to the controllers on campus, per-VLAN.

No response

407

Controller Capacity specifications by Campus

Controller capacity between the campuses must not be shared. Lincoln controllers should only adopt Lincoln acces s points, Omaha controllers should only adopt Omaha access points, and Kearney controllers should only adopt Ke arney access points. Controllers need to support at least 35,000 concurrent users in Lincoln, 15,000 concurrent us ers in Omaha, and 7,000 concurrent users in Kearney.

Accept

408

Variance to controller Capacity specifications by Campus

Variance to Controller capacity between the campuses must not be shared. Lincoln controllers should only adopt Li ncoln access points, Omaha controllers should only adopt Omaha access points, and Kearney controllers should o nly adopt Kearney access points. Controllers need to support at least 35,000 concurrent users in Lincoln, 15,000 c oncurrent users in Omaha, and 7,000 concurrent users in Kearney.

No response

409

Controller Redundancy

The controllers must be proposed to support N+1 redundancy and must have 1+1 redundancy with physical diversit y.

Accept

410

Variance to controller Redundancy

Variance to The controllers must be proposed to support N+1 redundancy and must have 1+1 redundancy with phy sical diversity.

No response

411

Required Features – Wireless - Wireless Related

412

Wi-Fi Alliance 5 and 6 certification

All access points must be Wi-Fi Alliance certified for WiFi 5 & 6 for 2.4 GHz radios and 5 GHz radios.

Accept

413

Variance to wi-Fi Alliance 5 and 6 certification

Variance to All access points must be Wi-Fi Alliance certified for WiFi 5 & 6 for 2.4 GHz radios and 5 GHz radios.

No response

414

Wi-Fi Alliance WPA2 Enterprise certification

Access points and wireless controllers must be Wi-Fi Alliance certified for WPA2 Enterprise.

Accept

415

Variance to wi-Fi Alliance WPA2 Enterprise certification

Variance to Access points and wireless controllers must be Wi-Fi Alliance certified for WPA2 Enterprise.

No response

416 **Spatial Stream support**

All access points, with the exception of hospitality units, must fully support four 802.11ac spatial streams (4x4:4 MU-MIMO).

Accept

417 **Variance to spatial Stream support**

Variance to four 802.11ac spatial streams (4x4:4 MU-MIMO).

No response

418 **MU-MIMO wave 2 support**

All access points must support 802.11ac wave 2 Multi-user MIMO (MU-MIMO).

Accept

419 **Variance to mU-MIMO wave 2 support**

Variance to 802.11ac wave 2 Multi-user MIMO (MU-MIMO).

No response

420 **WMM certification**

All access points must be Wi-Fi Alliance WMM certified.

Accept

421 **Variance to wMM certification**

Variance to All access points must be Wi-Fi Alliance WMM certified.

No response

422 **Dual-band support**

All access points must support dual-band, two-radio operation such that 2.4 GHz and 5 GHz operations are support ed concurrently.

Accept

423 **Variance to dual-band support**

Variance to dual-band, two-radio operation such that 2.4 GHz and 5 GHz operations are supported concurrently.

No response

424 **802.11n channel bonding**

All 5 GHz radios must support 802.11n channel bonding (40 MHz operation).

Accept

425 **Variance to 802.11n channel bonding**

Variance to 802.11n channel bonding (40 MHz operation).

No response

426 **802.11ac channel bonding**

All 5Ghz radios must support 802.11ac channel bonding (40, 80, 160MHz operation).

Accept

427 **Variance to 802.11ac channel bonding**

Variance to 802.11ac channel bonding (40, 80, 160MHz operation).

No response

428 **DFS support**

All access points must support 5 GHz DFS channels.

Accept

429 **Variance to dFS support**

Variance to 5 GHz DFS channels.

No response

430 **BSSID uniqueness**

All access points must advertise a unique BSSID per SSID.

Accept

431 **Variance to bSSID uniqueness**

Variance to All access points must advertise a unique BSSID per SSID.

No response

432 **SSID count support**

The proposed wireless access points must support advertising a minimum of eight SSIDs simultaneously.

Accept

433 **Variance to sSID count support**

Variance to advertising a minimum of eight SSIDs simultaneously.

No response

434 **Auto-channel selection**

The proposed solution must support auto-channel selection for all access point radios.

Accept

435 **Variance to auto-channel selection**

Variance to auto-channel selection for all access point radios.

No response

436 **Channel-set selection for auto-assignment**

The proposed solution must allow administratively defining the set of channels used for auto-assignment for both 2. 4 GHz and 5 GHz operation.

Accept

437 **Variance to channel-set selection for auto-assignment**

Variance to The proposed solution must allow administratively defining the set of channels used for auto-assignmen t for both 2.4 GHz and 5 GHz operation.

No response

438 **Channel restriction for auto-channel assignment**

The proposed system must allow restricting the channels used for auto-channel assignment at both global and user -defined group levels.

Accept

439 **Variance to channel restriction for auto-channel assignment**

Variance to The proposed system must allow restricting the channels used for auto-channel assignment at both glo bal and user-defined group levels.

No response

440 **Auto-power selection**

The proposed solution must support auto-power selection for all access point radios.

Accept

441 **Variance to auto-power selection**

Variance to auto-power selection for all access point radios.

No response

442 **Basic and transmit rates**

The proposed system must support the selection of basic and transmit rates for 2.4 and 5Ghz radios.

Accept

443 **Variance to basic and transmit rates**

Variance to the selection of basic and transmit rates for 2.4 and 5Ghz radios.

No response

444 **Load balancing**

The proposed solution must support load balancing wireless clients across multiple radios.

Accept

445 **Variance to load balancing**

Variance to load balancing wireless clients across multiple radios.

No response

446 **Band steering**

The proposed solution must support band steering, such that 5 GHz capable wireless clients have a much higher pr obability of associating to an available 5 GHz radio over an available 2.4 GHz radio.

Accept

447 **Variance to band steering**

Variance to band steering, such that 5 GHz capable wireless clients have a much higher probability of associating to an available 5 GHz radio over an available 2.4 GHz radio.

No response

448 **Guard interval**

Access points must support 802.11n/ac short guard interval.

Accept

449 **Variance to guard interval**

Variance to 802.11n/ac short guard interval.

No response

450 **IP Multicast transmit rate**

The system must be able to specify the IP multicast transmit rate.

Accept

451 **Variance to iP Multicast transmit rate**

Variance to The system must be able to specify the IP multicast transmit rate.

No response

452 **Device fingerprinting**

The proposed solution must support device fingerprinting to identify the type of wireless client on the network by ge neral device type and operating system.

Accept

453 **Variance to device fingerprinting**

Variance to device fingerprinting to identify the type of wireless client on the network by general device type and op erating system.

No response

454 **Client isolation**

The proposed solution must have a feature to prohibit inter-user traffic when users are associated to the same SSI D, i.e. a guest network.

Accept

455 **Variance to client isolation**

Variance to The proposed solution must have a feature to prohibit inter-user traffic when users are associated to th e same SSID, i.e. a guest network.

No response

456 **Required Features – Wireless - Management**

457 **Single point for configuration**

The proposed system must provide a management interface or application that allows a single point of configuration for the entire solution or a single point of configuration per campus.

Accept

458 **Variance to single point for configuration**

Variance to The proposed system must provide a management interface or application that allows a single point of c onfiguration for the entire solution or a single point of configuration per campus.

No response

459 **Centralized data plane**

The proposed solution must support a centralized data plane, such that user traffic is tunneled to wireless controller s.

Accept

460

Variance to centralized data plane

Variance to centralized data plane, such that user traffic is tunneled to wireless controllers.

No response

461

Bridging wireless clients to LAN

The proposed solution must support bridging wireless client traffic at the access point to the local LAN. This must be configurable per SSID, per logical group, and per access point.

Accept

462

Variance to bridging wireless clients to LAN

Variance to bridging wireless client traffic at the access point to the local LAN. This must be configurable per SSID, per logical group, and per access point.

No response

463

Multi-role support

The proposed wireless management application and all controllers must support multiple role-based permission lev els that can be set via returned RADIUS Attribute-Value Pairs.

Accept

464

Variance to multi-role support

Variance to multiple role-based permission levels that can be set via returned RADIUS Attribute-Value Pairs.

No response

465

Console port

All standalone controllers and chassis must support a console management interface.

Accept

466

Variance to console port

Variance to console management interface.

No response

467

Management and IP reachability

All controllers and chassis must support IP reachability to a management IP interface.

Accept

468

Variance to management and IP reachability

Variance to IP reachability to a management IP interface.

No response

469

SNMP Support

All controllers and chassis must support SNMPv2c and SNMPv3.

Accept

470

Variance to sNMP Support

Variance to SNMPv2c and SNMPv3.

No response

471

Management access control

All controllers and chassis must support restricting management access via a locally defined access control list (or equivalent protection). This must apply to all management protocols supported on the proposed wireless controllers and management application (HTTPS, SNMP, SSH, REST, SOAP, etc.). All controllers and the management application must support the ability to restrict access by a combination of source IP and destination port.

Accept

472

Variance to management access control

Variance to restricting management access via a locally defined access control list (or equivalent protection). This must apply to all management protocols supported on the proposed wireless controllers and management application (HTTPS, SNMP, SSH, REST, SOAP, etc.). All controllers and the management application must support the ability to restrict access by a combination of source IP and destination port.

No response

473

RADIUS authentication

All controllers and chassis must support RADIUS-based authentication for HTTPS (GUI), SSH, and serial console users.

Accept

474

Variance to rADIUS authentication

Variance to RADIUS-based authentication for HTTPS (GUI), SSH, and serial console users.

No response

475

Local account failover

All wireless controllers must support failover to a locally defined user account, if the RADIUS server is unreachable for management.

Accept

476

Variance to local account failover

Variance to failover to a locally defined user account, if the RADIUS server is unreachable for management.

No response

477

Controller SSID and User SNMP information

All wireless controllers must represent the following information as objects that can be queried via SNMP: 1) Wireless client associations 2) The following information regarding 802.11 wireless clients: MAC address, IPv4 address, IPv6 address, Channel, Transmit data rate, Receive data rate, 802.1X authentication status, Transmit and receive bandwidth consumption, RSSI, and SSID.

Accept

478

Variance to controller SSID and User SNMP information

Variance to All wireless controllers must represent the following information as objects that can be queried via SNMP: 1) Wireless client associations 2) The following information regarding 802.11 wireless clients: MAC address, IPv4 address, IPv6 address, Channel, Transmit data rate, Receive data rate, 802.1X authentication status, Transmit and receive bandwidth consumption, RSSI, and SSID.

No response

479	**Access Point SNMP information** All wireless controllers must represent the following information as objects that can be queried via SNMP regarding access points (via the controller): Transmit and receive bandwidth consumption on the access point's wired uplink, Error counters per radio, Number of retransmits per radio, Number of users per radio, Channel the radio is currently operating on, IP address, Wireless radio base MAC address, BSSIDs, Wired Ethernet MAC address, Status of resou rces (CPU, memory, etc.), Status and statistics of internal processes, Status of all physical interfaces, and Traffic co unters for controller physical interfaces. Accept
480	**Variance to access Point SNMP information** Variance to All wireless controllers must represent the following information as objects that can be queried via SNMP regarding access points (via the controller): Transmit and receive bandwidth consumption on the access point's wire d uplink, Error counters per radio, Number of retransmits per radio, Number of users per radio, Channel the radio is currently operating on, IP address, Wireless radio base MAC address, BSSIDs, Wired Ethernet MAC address, Statu s of resources (CPU, memory, etc.), Status and statistics of internal processes, Status of all physical interfaces, and Traffic counters for controller physical interfaces. *No response*
481	**Encryption of RADIUS secrets** All wireless controllers must support encryption of RADIUS shared secrets stored in the configuration file. Accept
482	**Variance to encryption of RADIUS secrets** Variance to encryption of RADIUS shared secrets stored in the configuration file. *No response*
483	**Encryption of local user passwords** All wireless controllers must support encryption of local user passwords stored in the configuration file. Accept
484	**Variance to encryption of local user passwords** Variance to encryption of local user passwords stored in the configuration file. *No response*
485	**Configuration backup and restore** All wireless controllers must be able to represent its configuration in a text file that can be uploaded to restore the c onfiguration. Accept
486	**Variance to configuration backup and restore** Variance to All wireless controllers must be able to represent its configuration in a text file that can be uploaded to r estore the configuration. *No response*
487	**Syslog support** All wireless controllers and the management application must support logging to a syslog server on a configurable p ort. Accept

488

Variance to syslog support

Variance to logging to a syslog server on a configurable port.

No response

489

Logging of administrator logins

All wireless controllers and the management application must log usernames of authorized users to the syslog serve r at the time of login.

Accept

490

Variance to logging of administrator logins

Variance to All wireless controllers and the management application must log usernames of authorized users to the syslog server at the time of login.

No response

491

Logging of configuration changes

All wireless controllers and the management application must log the username associated with configuration chang es to the syslog server at the time changes are committed.

Accept

492

Variance to logging of configuration changes

Variance to All wireless controllers and the management application must log the username associated with configur ation changes to the syslog server at the time changes are committed.

No response

493

Reporting of client IPv4 and IPv6 addresses

The IPv4 and IPv6 addresses of wireless clients must be reported on the controller GUI and the wireless manageme nt application.

Accept

494

Variance to reporting of client IPv4 and IPv6 addresses

Variance to The IPv4 and IPv6 addresses of wireless clients must be reported on the controller GUI and the wireless management application.

No response

495

Controller fail-over

The proposed system must support controller failover to an online spare.

Accept

496

Variance to controller fail-over

Variance to controller failover to an online spare.

No response

497

MTU size for control channel

The control channel between the wireless controller and the access point must operate given an IP MTU smaller tha n 1500 bytes.

Accept

498

Variance to mTU size for control channel

Variance to The control channel between the wireless controller and the access point must operate given an IP MTU smaller than 1500 bytes.

No response

499

Per-SSID RADIUS server support

The controller must have the capability of specifying the RADIUS server used for wireless client authentication per SSID. For example, the following correlation must be possible: SSID1 <-> RADIUS-server1, SSID2 <-> RADIUS-server 2, SSID3 <-> RADIUS-server1.

Accept

500

Variance to per-SSID RADIUS server support

Variance to The controller must have the capability of specifying the RADIUS server used for wireless client authentication per SSID. For example, the following correlation must be possible: SSID1 <-> RADIUS-server1, SSID2 <-> RADIUS-server2, SSID3 <-> RADIUS-server1.

No response

501

RADIUS fail-over

The controller must support multiple RADIUS servers (primary and backup) per SSID.

Accept

502

Variance to rADIUS fail-over

Variance to multiple RADIUS servers (primary and backup) per SSID.

No response

503

SSID in RADIUS Called-Station-ID

The controller must add the SSID value in the "Called-Station-ID" sent to a RADIUS server when authenticating wireless clients. For example, if a wireless client attempting to authenticate to the SSID "eduroam", then the Called-Station-ID might be represented as "10.1.2.3:eduroam".

Accept

504

Variance to sSID in RADIUS Called-Station-ID

Variance to The controller must add the SSID value in the "Called-Station-ID" sent to a RADIUS server when authenticating wireless clients. For example, if a wireless client attempting to authenticate to the SSID "eduroam", then the Called-Station-ID might be represented as "10.1.2.3:eduroam".

No response

505

Client MAC in RADIUS Calling-Station-ID

The controller must report wireless client MAC addresses in the "Calling-Station-ID" sent to a RADIUS server when authenticating wireless clients.

Accept

506

Variance to client MAC in RADIUS Calling-Station-ID

Variance to The controller must report wireless client MAC addresses in the "Calling-Station-ID" sent to a RADIUS server when authenticating wireless clients.

No response

507 **Controller administration by multiple admins**

The controller GUI must support administrative access by multiple users simultaneously.

Accept

508 **Variance to controller administration by multiple admins**

Variance to administrative access by multiple users simultaneously.

No response

509 **Management administration by multiple admins**

The wireless management application must support administrative access by multiple users simultaneously.

Accept

510 **Variance to management administration by multiple admins**

Variance to administrative access by multiple users simultaneously.

No response

511 **Definition of configuration groups**

The proposed system must allow the definition of logical configuration groups. The University of Nebraska currently defines a logical group per building to allow for configuration differences, such as which SSIDs are bound to the acc ess points in a building.

Accept

512 **Variance to definition of configuration groups**

Variance to The proposed system must allow the definition of logical configuration groups. The University of Nebras ka currently defines a logical group per building to allow for configuration differences, such as which SSIDs are bou nd to the access points in a building.

No response

513 **Licensing in a fail-over scenario**

The failure of any one controller in a group of redundant controllers must not change the number of access points li censed for the group.

Accept

514 **Variance to licensing in a fail-over scenario**

Variance to The failure of any one controller in a group of redundant controllers must not change the number of acc ess points licensed for the group.

No response

515 **Client tracking and searching**

The wireless controller and management application must support finding wireless host information by MAC address , IP address, and username.

Accept

516 **Variance to client tracking and searching**

Variance to finding wireless host information by MAC address, IP address, and username.

No response

517	**SNTP support** All wireless controllers and the wireless management application must support SNTP as the described by RFC 2030 . Accept
518	**Variance to sNTP support** Variance to SNTP as the described by RFC 2030. *No response*
519	**Required Features – Wireless - Physical and power characteristics**
520	**POE minimums** All access points must be function using 802.3af power-over-Ethernet (i.e., there must be minimal feature impairme nt or degradation). Accept
521	**Variance to pOE minimums** Variance to All access points must be function using 802.3af power-over-Ethernet (i.e., there must be minimal featur e impairment or degradation). *No response*
522	**Controller service and power supply redundancy** All standalone controllers and chassis must support redundant power supplies, such that if any individual power sup ply were to fail, the controller or chassis would continue to function without impairment or degradation of service. Accept
523	**Variance to controller service and power supply redundancy** Variance to redundant power supplies, such that if any individual power supply were to fail, the controller or chassis would continue to function without impairment or degradation of service. *No response*
524	**Controller function and power supply redundancy** Given two power sources, all standalone controllers and chassis must support a power supply configuration such th at losing one power source does not impair or degrade function. Accept
525	**Variance to controller function and power supply redundancy** Variance to power supply configuration such that losing one power source does not impair or degrade function. *No response*
526	**Hot swappable power supplies** All standalone controllers and chassis must have hot swappable power supplies, such that they are individually rem ovable without impairing or degrading function. Accept

527 **Variance to hot swappable power supplies**

Variance to All standalone controllers and chassis must have hot swappable power supplies, such that they are indi vidually removable without impairing or degrading function.

No response

528 **Strongly Desired Features – Wireless**

The following list of features are highly desirable in a proposed solution. Please simply affirm or deny that your prop osed solution meets the following requirements by notating each item with “accept”, “deny”, or “variance.” Please ex plain any variances in your product. The Bidder cannot answer “accept” if the feature is not currently available in th e proposed hardware running current general availability (production) release software. If a feature is not in product ion software at the time of the RFP submission, the Bidder must choose “deny” or “variance.” If a feature not in prod uction software is described under a “variance,” it must be noted the feature is not currently available.

529 **Strongly Desired Features – Wireless - General Functions**

530 **VLAN pooling**

All controllers should support VLAN pooling to allow for optimized utilization of IP addresses.

Accept

531 **Variance to vLAN pooling**

Variance to VLAN pooling to allow for optimized utilization of IP addresses.

No response

532 **Fast AP migration during a controller failure**

Wireless access points should not have to reboot to move to a redundant wireless controller, following a controller f ailure.

Accept

533 **Variance to fast AP migration during a controller failure**

Variance to Wireless access points should not have to reboot to move to a redundant wireless controller, following a controller failure.

No response

534 **Control wireless access based on MAC address**

The proposed solution should support denying wireless clients based on MAC address using centralized strategy (i. e., RADIUS or an equivalent strategy).

Accept

535 **Variance to control wireless access based on MAC address**

Variance to denying wireless clients based on MAC address using centralized strategy (i.e., RADIUS or an equivalen t strategy).

No response

536 **L3 Roaming**

The IP (L3) roaming strategy should allow reverse path forwarding enforcement on router interfaces (i.e., a roamed client will not have traffic discarded, because the wireless system forwards the client's traffic to a routed interface th at is not configured for the wireless client's subnet).

Accept

537	**Variance to l3 Roaming** Variance to The IP (L3) roaming strategy should allow reverse path forwarding enforcement on router interfaces (i.e ., a roamed client will not have traffic discarded, because the wireless system forwards the client's traffic to a routed interface that is not configured for the wireless client's subnet). *No response*
538	**DHCP enforcement** The proposed solution should allow a configurable option to enforce that all IPv4 addresses and IPv6 are assigned via DHCP. This option should be configurable per SSID. Accept
539	**Variance to dHCP enforcement** Variance to The proposed solution should allow a configurable option to enforce that all IPv4 addresses and IPv6 ar e assigned via DHCP. This option should be configurable per SSID. *No response*
540	**Remote packet capture** The proposed solution should support remote packet captures on access points and controllers and allow capture fi lters to filter which packets are captured. Accept
541	**Variance to remote packet capture** Variance to remote packet captures on access points and controllers and allow capture filters to filter which packets are captured. *No response*
542	**Distributed data plane support** The proposed system should support access points in a distributed data plane configuration, such that wireless clie nt traffic is bridged from the access point to the local switch. Setting access points into distributed mode should be a llowed based on user-defined groups. There are potential applications for this in some remote locations and for ma naging access points at smaller regional campuses. Accept
543	**Variance to distributed data plane support** Variance to access points in a distributed data plane configuration, such that wireless client traffic is bridged from th e access point to the local switch. Setting access points into distributed mode should be allowed based on user-defi ned groups. There are potential applications for this in some remote locations and for managing access points at s maller regional campuses. *No response*
544	**Strongly Desired Features – Wireless - Wireless Related**
545	**Over-the-air packet capture** Access points should support over-the-air packet captures while simultaneously serving wireless clients without imp airment or degradation. Accept

546

Variance to over-the-air packet capture

Variance to over-the-air packet captures while simultaneously serving wireless clients without impairment or degradation.

No response

547

Rogue access point detection

Access points should support rogue access point detection while simultaneously serving wireless clients without impairment or degradation.

Accept

548

Variance to rogue access point detection

Variance to rogue access point detection while simultaneously serving wireless clients without impairment or degradation.

No response

549

RF monitoring

The proposed solution should perform RF monitoring while simultaneously serving clients without impairment or degradation.

Accept

550

Variance to rF monitoring

Variance to The proposed solution should perform RF monitoring while simultaneously serving clients without impairment or degradation.

No response

551

Logging of channel modifications

The controller should have the capability to log access point channel modifications, including the new channel assignment, the previous channel assignment, and the reason for the change.

Accept

552

Variance to logging of channel modifications

Variance to The controller should have the capability to log access point channel modifications, including the new channel assignment, the previous channel assignment, and the reason for the change.

No response

553

Logging of power modifications

The controller should have the capability to log access point power modifications, which include the new power level, the previous power level, and the reason for the change.

Accept

554

Variance to logging of power modifications

Variance to The controller should have the capability to log access point power modifications, which include the new power level, the previous power level, and the reason for the change.

No response

555

Interference classification

The proposed solution should have the ability to classify types of interference observed during RF monitoring and generate alerts based on user specified criteria.

Accept

556

Variance to interference classification

Variance to The proposed solution should have the ability to classify types of interference observed during RF monitoring and generate alerts based on user specified criteria.

No response

557

Ruggedized AP support

The proposed controllers should support a ruggedized AP for outdoor coverage.

Accept

558

Variance to ruggedized AP support

Variance to ruggedized AP for outdoor coverage.

No response

559

802.11u HotSpot support

The proposed solution should provide support for 802.11u HotSpot features.

Accept

560

Variance to 802.11u HotSpot support

Variance to The proposed solution should provide support for 802.11u HotSpot features.

No response

561

Strongly Desired Features – Wireless - Management

562

Access Point to Controller encryption

All control communication between the access points and the controllers should be encrypted using industry-standard protocols.

Accept

563

Variance to access Point to Controller encryption

Variance to All control communication between the access points and the controllers should be encrypted using industry-standard protocols.

No response

564

Hitless controller failover

The proposed controllers should provide a hitless failover in case of controller failure.

Accept

565

Variance to hitless controller failover

Variance to The proposed controllers should provide a hitless failover in case of controller failure.

No response

566

Logging of successful and unsuccessful client band-steering

The proposed system should log or otherwise provide a mechanism to determine when a wireless client is successfully or unsuccessfully band steered.

Accept

567	**Variance to logging of successful and unsuccessful client band-steering** Variance to The proposed system should log or otherwise provide a mechanism to determine when a wireless client is successfully or unsuccessfully band steered. *No response*
568	**Logging of successful and unsuccessful client load-balancing** The proposed system should log or otherwise provide a mechanism to determine when a wireless client is successf ully or unsuccessfully load balanced. Accept
569	**Variance to logging of successful and unsuccessful client load-balancing** Variance to The proposed system should log or otherwise provide a mechanism to determine when a wireless client is successfully or unsuccessfully load balanced. *No response*
570	**Controller redundancy across IP subnet boundaries** The proposed controllers should support redundancy across IP subnet boundaries (i.e., no requirement for L2 adja cency between the controllers). Accept
571	**Variance to controller redundancy across IP subnet boundaries** Variance to redundancy across IP subnet boundaries (i.e., no requirement for L2 adjacency between the controllers). *No response*
572	**Distinct RADIUS servers for MFA support** Wireless controllers and the wireless management application should support multi-factor authentication for GUI logi n using two successive RADIUS authentication queries to two different RADIUS servers. For example, a user should be authenticated with a username/password against one RADIUS server, and then the controller or management ap plication should require and process a one-time password token against a second distinct RADIUS server. Accept
573	**Variance to distinct RADIUS servers for MFA support** Variance to multi-factor authentication for GUI login using two successive RADIUS authentication queries to two diffe rent RADIUS servers. For example, a user should be authenticated with a username/password against one RADIUS server, and then the controller or management application should require and process a one-time password token a gainst a second distinct RADIUS server. *No response*
574	**Administrative GUI MFA support** In addition to 2-factor authentication using two RADIUS servers, it is strongly desired that any GUI access to the con trollers be able to integrate with multi-factor authentication. Accept
575	**Variance to administrative GUI MFA support** Variance to In addition to 2-factor authentication using two RADIUS servers, it is strongly desired that any GUI acces s to the controllers be able to integrate with multi-factor authentication. *No response*

576

Multiple software image support on controllers

The wireless controller should support storing multiple software images.

Accept

577

Variance to multiple software image support on controllers

Variance to storing multiple software images.

No response

578

Software version rollback support

The wireless controller should support rolling back to a previous version of software following an upgrade.

Accept

579

Variance to software version rollback support

Variance to rolling back to a previous version of software following an upgrade.

No response

580

Configuration rollback support

The wireless controller should support rolling back to the previous configuration.

Accept

581

Variance to configuration rollback support

Variance to rolling back to the previous configuration.

No response

582

Categorized debug log support

The wireless controller should support categorized debug logging on a per technology basis (e.g., enable debuggin g for RADIUS or enable debugging for load), such that debugging does not need to be enabled globally for troubles hooting a specific problem.

Accept

583

Variance to categorized debug log support

Variance to categorized debug logging on a per technology basis (e.g., enable debugging for RADIUS or enable de bugging for load), such that debugging does not need to be enabled globally for troubleshooting a specific problem.

No response

584

Multiple syslog destination support

All controllers and the wireless management application should log to multiple syslog destinations.

Accept

585

Variance to multiple syslog destination support

Variance to All controllers and the wireless management application should log to multiple syslog destinations.

No response

586

Assignment of preferences to individual APs or AP groups

The proposed solution should allow assigning preferences to individual access points and user-defined groups of a ccess points.

Accept

587 **Variance to assignment of preferences to individual APs or AP groups**

Variance to The proposed solution should allow assigning preferences to individual access points and user-defined groups of access points.

No response

588 **Resource consumption monitoring**

The proposed solution should allow visibility into resource consumption on the controllers and access points (bandwidth, CPU, memory, process information, and etc.).

Accept

589 **Variance to resource consumption monitoring**

Variance to The proposed solution should allow visibility into resource consumption on the controllers and access points (bandwidth, CPU, memory, process information, and etc.).

No response

590 **Role-based access for delegation**

The wireless management application should allow role-based access to user-defined groups of access points (e.g., we would like the ability to delegate view access to access points in the computer science group to the computer science department, but without delegating access to data for any other groups access points).

Accept

591 **Variance to role-based access for delegation**

Variance to The wireless management application should allow role-based access to user-defined groups of access points (e.g., we would like the ability to delegate view access to access points in the computer science group to the computer science department, but without delegating access to data for any other groups access points).

No response

592 **Customization of default dashboard**

The wireless management application should support customization of the default "dashboard."

Accept

593 **Variance to customization of default dashboard**

Variance to customization of the default "dashboard."

No response

594 **Rate limiting based on SSID and RADIUS attributes**

The wireless controller should have the ability to set rate limits on wireless hosts based on SSID and based on returned RADIUS attributes (or lack of attributes).

Accept

595 **Variance to rate limiting based on SSID and RADIUS attributes**

Variance to The wireless controller should have the ability to set rate limits on wireless hosts based on SSID and based on returned RADIUS attributes (or lack of attributes).

No response

596 **Flow monitoring support**

Proposed controllers should support an RFC 3176 compliant version of sFlow, RFC 3954 compliant version of Netflow, or RFC 5101 compliant version of IPFIX records for both IPv4 and IPv6 traffic.

Accept

597	**Variance to flow monitoring support** Variance to an RFC 3176 compliant version of sFlow, RFC 3954 compliant version of Netflow, or RFC 5101 compliant version of IPFIX records for both IPv4 and IPv6 traffic. *No response*
598	**Out of band management protocols** The proposed controllers and chassis should support an out-of-band Ethernet management port. Accept
599	**Variance to out of band management protocols** Variance to an out-of-band Ethernet management port. *No response*
600	**Firewalling service** The proposed controllers should support firewall services with traffic information available in the controller's dashboard. Accept
601	**Variance to firewalling service** Variance to firewall services with traffic information available in the controller's dashboard. *No response*
602	**Application level visibility** The proposed controllers should support a dashboard with application level visibility into user traffic. Accept
603	**Variance to application level visibility** Variance to dashboard with application level visibility into user traffic. *No response*
604	**Configuration backup transfer protocols** The proposed wireless controllers should be able to back up configurations via TFTP or SCP. Accept
605	**Variance to configuration backup transfer protocols** Variance to The proposed wireless controllers should be able to back up configurations via TFTP or SCP. *No response*
606	**Dual-stack feature parity** The proposed wireless management application should support the same feature set for IPv4 and IPv6 (i.e., feature parity). Any functional differences between IPv4 and IPv6 support must be individually noted in the variance explanation. Accept
607	**Variance to dual-stack feature parity** Variance to the same feature set for IPv4 and IPv6 (i.e., feature parity). Any functional differences between IPv4 and IPv6 support must be individually noted in the variance explanation. *No response*

608

Simulate client authentication

The wireless controller should be able to simulate a PEAP/MS-CHAPv2 wireless client authentication to verify RADIUS configuration and verify returned RADIUS attributes.

Accept

609

Variance to simulate client authentication

Variance to The wireless controller should be able to simulate a PEAP/MS-CHAPv2 wireless client authentication to verify RADIUS configuration and verify returned RADIUS attributes.

No response

610

Questions and Clarifications – Wireless

Participant must answer the following set of questions designed to help identify basic metrics, scaling issues, and suitability. If more than one type of switch is proposed, the values for each type must be specified.

611

Questions and Clarifications - Wireless - General

612

Architecture overview

Briefly describe the architecture of your wireless solution, including a description of control plane mechanisms and client traffic forwarding. Please include any hardware acceleration (encryption/decryption, packet forwarding, etc.) and the point of AES encryption/decryption (access point or controller).

ArubaOS 8. is Aruba’s centralized, multi-tier architecture that provides a clear separation between management, control, and forwarding functions. Mobility Master takes the place of a master controller in the network hierarchy. A single Mobility Master or a cluster of Mobility Masters oversee controllers that are co-located Each Mobility Master cluster is referred to as a Mobility Master domain. All the controllers that connect to Mobility Master act as managed devices. In a large campus, there may be multiple Mobility Master Domains. Aruba’s support for various AP/controller data forwarding options and multi Gigabit encryption in controllers is unique within the industry. Aruba's 11n/ac APs consistently perform faster than competition and are the only controllers in the market that integrate fully programmable ASICs and hardware based crypto supporting for multi Gigabit encryption.

613

Broadcast and multicast traffic management

Describe the proposed solution's broadcast traffic and multicast management capabilities.

The controller supports bc/mc optimization to suppress unnecessary broadcast and multicast from propagating to the rest of the network. The optimization may be turned off but many of the larger networks would leave this enabled. If a multicast stream is sourced from a wireless station, the managed device forwards the stream to the multicast router through the VLAN, where the client is located. The downstream is still from the multicast router to each managed device in the cluster through the configured VLAN for multicast proxy operation. If the two VLANs are the same, the proxy on the UAC of the sourcing client will not receive the stream from the multicast router.

614

Rogue access point detection methods

Describe rogue access point detection methods and include any impact on wireless clients.

The Aruba system does not require separate devices for rogue AP classification. APs that are deployed for user servicing may be utilized for rogue classification where teh interfering neighbor APs are automatically separated from real rogue threats. These APs can listen to other channels during a "quiet time." UNL does have the option to implement APs dedicated to full-time monitoring referred to as Air Monitors.

615

L3 roaming strategy

Describe the IP (L3) roaming strategy in the proposed solution.

Aruba's layer-3 mobility solution is based on the Mobile IP protocol standard, as described in RFC 3344, IP Mobility Support for IPv4. Unlike other layer-3 mobility solutions, an Aruba mobility solution does not require that you install mobility software or perform additional configuration on wireless clients. The Aruba managed devices perform all functions that enable clients to roam within the mobility domain. In a mobility domain, a mobile client is a wireless client that can change its point of attachment from one network to another within the domain. A mobile client receives an IP address (a home address) on a home network. A mobile client can detach at any time from its home network and reconnect to a foreign network (any network other than the mobile client's home network) within the mobility domain.

616

Voice over Wi-Fi features

Describe any voice over Wi-Fi features in your product.

Aruba provides protocol-aware QoS to ensure voice traffic is prioritized properly. Other WLAN solutions provide simple Weighted Fair Queuing (WFQ) that can end up dropping critical voice traffic in the presence of large amounts of data traffic. Aruba provides voice-optimized strict queuing supplemented by flow-based Call Admission Control (CAC) that guarantees voice priority while preventing queue starvation for data traffic. Voice and video applications need higher traffic priority relative to other traffic types to support strict latency and throughput requirements.

617

E911 options

Describe any E911 options available in the proposed solution.

With Aruba the University can send location information directly to public-safety personnel on campus. AirWave pinpoints a user's location For emergency response, AirWave integrates with RedSky E911 Services. With WiFi location-based services, organizations are free to move to IP voice while meeting their E911 obligations, this includes indoors and outdoors.

618

Client location services

Describe any wireless client location services available in the proposed solution.

Aruba AirWave uses RTLS using WiFi only to provide location tracking of 3-5 meters accuracy. Aruba APs feature built-in BLE beacons and Aruba offers other products, stand-alone beacons and Aruba Meridian for more accurate and customizable location services. We offer indoor-wayfinding, asset tracking as well as other location services, not scoped in this RFP.

619

Voice over Wi-Fi best practices

Describe best practices with your product regarding voice over Wi-Fi (including the minimum RSSI value for service coverage area).

Aruba has published a Validated Reference Design Guide (VRD) specifically detailing our best practices for a Skype for Business optimized network, it is available here: https://community.arubanetworks.com/t5/Validated-Reference-Design/Skype-for-Business-VRD/ta-p/508692

620

Access point scale

Specify the maximum number of access points supported on the proposed controller model.

The Aruba 7240XM controller supports up to 2048 access points.

621

Wireless client scale

Specify the maximum number of wireless hosts supported on the proposed controller model.

The Aruba 7240XM controller supports up to 32,768 concurrent users/devices.

622 **Wireless client scale per AP**

Specify the maximum and recommended number of simultaneous wireless clients supported for each type of radio included in the proposal, listed by access point model.

The Aruba 510 series access points support up to 256 associated client devices per radio. The typical recommended limit for active clients is 150.

623 **AP to controller communication - control channel**

Describe the control channel between wireless access points and the wireless controller.

Both GRE and IPSEC are supported as tunneling protocols between controllers and other devices. Both accomplish the same goal, but IPSEC provides extra security by encrypting the control channel. Aruba supports a control and provisioning protocol that supports all modern wireless standards. Aruba's control and provisioning protocol is based on open standards IPsec and GRE which ensure security and interoperability with existing networks. ArubaOS supports secure IPsec communications between a controller and campus or remote APs using public-key self-signed certificates created by each Mobility Master.

624 **Device fingerprinting**

Describe the method used for device fingerprinting and the types of devices and operating systems that the proposed system can identify.

ClearPass maintains device fingerprinting dictionaries that can easily be upgraded on an as needed basis. ClearPass includes an intelligent profiling engine that aggregates data from various sources to provide a validated device profile. Data regarding devices can include MAC OUI, the DHCP fingerprint, HTTP User-Agent strings, and forensic data. Our tiered profiling model automatically classifies this data into 3 distinct sections - a Device Category, a Device Family and a Device Name. The classification is done by using a built-in intelligent rules engine and does not require any administrator intervention.

625 **Throughput capacity**

Describe the tested throughput capacity of your controller with respect to wireless client traffic and the method for determining the specified capacity.

The Aruba 7240XM has a firewall throughput of 40 Gbps and a wired bridged throughput of 40 Gbps. The Encrypted throughput is as follows: 3DES--29Gbps, AES-CBC-256--31Gbps, AES-CCM--29Gbps, AES-GCM-256--35Gbps.

626 **Product lifecycle**

Describe where the proposed wireless controllers and access points are in their product life cycle.

The proposed products are all mature products in the market, without announced end-of-sale (EOS) dates. Six months prior to the EOS date, Aruba will publish the end of sale notice. After EOS is reached, Aruba will continue to support the device for an additional five years.

627 **AP plenum rating**

List the controller supported access points that are plenum rated.

The proposed APs are UL-2043 plenum rated for safe deployment in air-handling spaces.

628 **Controller topology**

Provide a diagram of the proposed controller topology. A network diagram of the current environment can be provided upon request for reference.

Please see attachment 628.

629 **Questions and Clarifications - Wireless - Wireless Related**

630

Maximum SSID count

Specify the number of SSIDs that can be simultaneously advertised on each proposed access point model.

Up to 16 BSSIDs per radio are supported, although this many is usually not necessary within the Aruba Role-based architecture

631

Band-steering method

Describe the method used to band-steer clients.

The ClientMatch feature of Aruba's Adaptive Radio Management (ARM) technology continually monitors a client's RF neighborhood to provide ongoing client band steering and load balancing, and enhanced AP reassignment for roaming mobile clients. The managed device aggregates information it receives from all APs using ClientMatch, and maintains information for all associated clients in a database. The managed device shares this database with the APs (for their associated clients), and the APs use the information to compute the client-based RF neighborhood and determine which APs should be considered candidate APs for each client.

632

Load-balancing method

Describe the method used to load-balance clients across access points, including the method to determine which access points are included in the set of access points available for load balancing a client.

Load balancing clients across Mobility Controllers is another valuable feature that plays a role in maintaining cluster performance. While the hashing algorithm applied to clients that associate to an AP for UAC assignment works well for its intended purpose occasionally it can result in a disproportionate distribution of clients across members of the cluster. The result of this imbalance is inefficient usage of system resources. Load balancing enables the cluster leader to optimally distribute users across the cluster and in the process return the previously overburdened system to peak performance levels. The cluster leader load balances clients across the cluster by following a multi-step calculation process where it identifies the model of each controller of the cluster, counts the number of associated clients, and compares the client count against the maximum capacity for each device to derive its load ratio

633

Auto-channel strategy

Describe the auto-channel assignment strategy.

Aruba's AirMatch technology maximizes WLAN performance even in the highest traffic networks by computing the best channel, channel width and transmit power for each Aruba AP by a global system optimization approach looking at the entire network. This results in an even distribution of channels and power for all APs constituting the entire WLAN network. This holistic look at the entire network fundamentally addresses co-channel and adjacent channel interference in its assignment algorithm. Additionally Aruba's APs respond to dynamic RF events such as high noise or radar detection by moving from their current channel to another where the interference effect from all neighboring APs (co-channel and adjacent) is minimized.

634

Auto-power strategy

Describe the auto-power assignment strategy.

AirMatch automatically samples RF performance from manged devices and forwards it to the Mobility Master, which computes the optimum RF settings and deploys a global RF plan at a preset time for the entire network. This adjusts power, channel and interference-mitigation.

635

Channels supported

Specify all the channels (including DFS channels) certified by the FCC for use with each proposed radios listed by access point model.

Supported frequency bands (country-specific restrictions apply): 2.400 to 2.4835Ghz, 5.150 to 5.250 Ghz, 5.250 to 5.350 Ghz, 5.470 to 5.725 Ghz, 5.725 to 5.850 Ghz.

636

Azimuth and Elevation charts

Provide Azimuth and Elevation charts for each radio in the proposed access point models using the proposed omni-directional antennas (integrated or external).

Please see the attached data sheet "636 AP-510 DS" Also available Online at https://www.arubanetworks.com/assets/ds/DS_AP510Series.pdf

637

Point-to-point bridging support

Describe how bridging between access points (point-to-point) can be supported in the proposed solution.

RFC 2516 PPPoE is supported. ArubaOS supports a flexible, wire-free design for AP uplinks in the absence of fiber or cable runs. Most commonly deployed for point-to-point wireless backhaul, security camera use cases and for network access in on-premises locations, wireless mesh provides the same enterprise network services as standard wire-based design. Aruba uses an intelligent link management algorithm between each AP to automatically adjust and optimize traffic paths and links Network managers can re-purpose any Aruba indoor or outdoor AP, or utilize new 802.11ad technology for high-performance and extended range requirements.

638

Spectrum analysis features

Describe the spectrum analysis capabilities of your solution, including the types of interference that can be identified, and any impact on serving wireless clients (i.e., does the access point use time slices between serving clients and monitoring RF).

Aruba Spectrum Analyzer module does not require the addition of dedicated AP hardware besides the existing set of APs. As opposed to solutions that require new hardware with built-in SA chipsets, Aruba APs perform wireless security scanning and SA simultaneously--without having to time-slice between these two functions. If desired, you can configured every radio on an AP that supports the SA feature as a spectrum device. APs can be set as dedicated spectrum monitors or Hybrid APs.

639

802.11ax support

Describe your roadmap plans for 802.11ax support including anticipated controller and/or architecture changes needed to support.

Aruba is proposing our new 802.11ax access points. WFA WiFi 6 certification is not available yet, however our APs feature a chipset that will be WFA WiFi 6 compliant, and certified once the process is available.

640

Wireless mesh capabilities

The University does not have immediate plans on implementing wireless mesh but would like to understand options for future implementation. Describe the wireless mesh capabilities of your products.

The University can deploy mesh portals to create a hybrid mesh/remote AP environment to extend network coverage to remote locations; this feature is called remote mesh portal, or RMP. The RMP feature integrates the functions of a remote AP (RAP) and the mesh portal. As a RAP, it sets up a VPN tunnel back to the corporate switch that secures control traffic between the RAP and the switch.

641

High density strategy

Describe your architectural strategy for supporting areas with a high density of users.

Aruba supports some of the densest RF environments in the world with the most challenging resource demands of an production network through a variety of features including intelligent network design, adaptive radio management technology, ClientMatch, appropriate antenna selection/placement etc. A detailed description of Aruba's deployment strategy for high-density WLAN environments can be found in our High-Density Validated Reference Design Guide: http://community.arubanetworks.com/aruba/attachments/aruba/Aruba-VRDs/21/1/High-Density%20Wireless%20Networks%20for%20Auditoriums.pdf

642

Questions and Clarifications - Wireless - Management

643

Controller fail-over

Describe the controller failover model.

Stateful failover is a critical aspect of cluster operations that safeguards users from any impacts associated with a controller failure event. Two key conditions that must be met: Redundancy mode must be enabled, L2-connected s tate must exist between all cluster members. Client state will then be fully synced between the UAC and the S-UAC meaning information will be shared between the two. No client deauthentication occurs in a stateful failover event w hen client state is fully synced.

644

AP behavior during a controller fail-over event

Describe how an access point moves from a primary to a backup controller after a controller fails including the time required for the process to complete.

When a campus AP loses contact with the active controller they do not need to re-bootstrap when they failover to t he standby controller. This significantly reduces AP downtime. APs using the HA feature regularly communicate wit h the standby controller so the controller has a light workload to process in the event of an AP failover. The result i s a very rapid failover time and shorter client reconnect period. This is sub-second AP failover.

645

Controller upgrade process

Describe the controller upgrade process.

Controllers running ArubaOS 8.x can perform live upgrade, and the mobility master can dynamically update individ ual service modules. This results in in-service upgrades, where the system does not need to be disrupted to updat e.

646

Largest recommended subnet size

Please indicate the largest recommended subnet size for client traffic when utilizing centralized forwarding.

This will depend on the configuration, size, mobility and actual deployment. Our best practices will be applied durin g initial configuration and implementation.

647

Questions and Clarifications - Wireless - Physical, power, and cooling characteristics

648

Recommended AP mounting position

Specify the recommended/optimal mounting position (wall, ceiling, in-wall outlet) for each proposed access point mo del.

The APs have built-in antennas that are optimized for horizontal ceiling mounted orientation of the AP. The maximu m gain is roughly 30°

649

Mounting bracket

Provide a diagram for the mounting brackets for each proposed access points.

Please see attachments "649 Mounting Bracket" Mounting brackets include: suspended ceiling rail, flat 9/16, ceilin g rail flat 15/16, ceiling rail, profile 9/16, solid surface, and wall-box variations.

650

Supported AP mounting position

Specify all supported mounting positions (wall, ceiling, in-wall outlet) for each proposed access point model and the considerations for mounting an access point not in the recommended position.

Internal antennas are optimized for ceiling mount, but there are available wall mounts, and flat surface mounts. Aru ba offers AP variants available with external antennas for remote placement.

651

Controller size

Specify the height in number of rack units for each proposed standalone-controller or chassis system.

The 7240XM is a 1RU controller

652

Controllers supported in a chassis

If proposing a chassis-based system, specify the number of controllers supported in a single chassis.

N/A

653

120v power requirements

Specify the power requirements of each proposed controller or chassis configuration when using 120V AC power.

The 7240XM has an input range of 100 to 240VAC, and an output voltage of +12VDC 29.16A, Frequency of 50-60 Hz. AC line input current is 7.1 -3.4A

654

208v power requirements

Specify the power requirements of each proposed controller or chassis configuration when using 208V AC power.

The 7240XM has an input range of 100 to 240VAC, and an output voltage of +12VDC 29.16A, Frequency of 50-60 Hz. AC line input current is 7.1 -3.4A

655

48v power requirements

Specify the power requirements of each proposed controller or chassis configuration when using -48V DC power.

With the 350Watt DC PSU, the 7240XM has a range input voltage range DC -48 to DC -60V, output voltage of 12+ DC 29.16A, Input frequency of 50-60 Hz, and AC line unput current 5 - 2.5A.

656

Thermal output

Specify the BTU output for each standalone controller or chassis model in the proposed configuration for 120V AC and 208V AC operation.

The 7240XM has a maximum heat dissipation of 563BTU.

657

Maximum power consumption

Specify the maximum power consumption of each proposed standalone controller or chassis model.

The 7240XM has a maximum power consumption of 165W.

658

Maximum thermal output

Specify the maximum BTU output for each proposed standalone controller or chassis model.

The 7240XM has a maximum heat dissipation of 563BTU.

659

AP power needs for future access points

Please provide your assessment of future power needs for access points.

The AP-510 series when powered by 802.3at or 802.3bt (class 5) will operate without restrictions. When powered by 802.3af (class 3) the AP-510 will start up unrestricted, but may apply restrictions depending on PoE budget and actual power. Our higher performance 802.11ax APs require 802.3bt, or dual 802.3at connections to ensure unres tricted performance.

660

Required Features – Software Platforms

Proposed solutions must offer components which support the following list of features. Please simply affirm or deny t hat your proposed solution meets the following requirements by notating each item with “accept”, “deny”, or “varianc e.” Please explain any variances in your product. The Bidder cannot answer “accept” if the feature is not currently a vailable in the proposed hardware running current general availability (production) release software. If a feature is n ot in production software at the time of the RFP submission, the Bidder must choose “deny” or “variance.” If a featur e not in production software is described under a “variance,” it must be noted the feature is not currently available.

661

Required Features – Software Platforms - General

662

Automated backups

Proposed software systems must support a mechanism for automated backups to a secondary storage server using a secure protocol.

Accept

663

Variance to automated backups

Variance to mechanism for automated backups to a secondary storage server using a secure protocol.

No response

664

Restore from backup

The backup for any proposed software systems must be loadable such that the system is fully functional after a rest ore of an archived configuration.

Accept

665

Variance to restore from backup

Variance to The backup for any proposed software systems must be loadable such that the system is fully functional after a restore of an archived configuration.

No response

666

Two factor support

The proposed software platforms must allow for 2-factor authentication.

Accept

667

Variance to two factor support

Variance to The proposed software platforms must allow for 2-factor authentication.

No response

668

Required Features – Software Platforms - Network Access Control

669

NAC deployable as a discreet system

The network access control platform, or NAC, providing RADIUS and policy enforcement must be a discreet softwar e system, separate from other software systems or components.

Accept

670

Variance to NAC deployable as a discreet system

Variance to The network access control platform, or NAC, providing RADIUS and policy enforcement must be a discr eet software system, separate from other software systems or components.

No response

671

NAC platform scale

The proposed NAC platform must be scalable to expand support for wired and wireless authentication as the enviro nment grows.

Accept

672

Variance to nAC platform scale

Variance to The proposed NAC platform must be scalable to expand support for wired and wireless authentication a s the environment grows.

No response

673 **NAC deployable in a geographically redundant manner**

The proposed NAC platform must be deployable in a geographically redundant manner such that two separate data centers could house components of the NAC and the loss of any one data center would not degrade the ability to authenticate clients.

Accept

674 **Variance to NAC deployable in a geographically redundant manner**

Variance to The proposed NAC platform must be deployable in a geographically redundant manner such that two separate data centers could house components of the NAC and the loss of any one data center would not degrade the ability to authenticate clients.

No response

675 **NAC support for 802.1x authentication**

The proposed NAC platform must allow for the support of 802.1x EAP-PEAP and EAP-TLS authentication.

Accept

676 **Variance to nAC support for 802.1x authentication**

Variance to The proposed NAC platform must allow for the support of 802.1x EAP-PEAP and EAP-TLS authentication.

No response

677 **NAC support for MAC authentication**

The proposed NAC platform must support MAC address authentication with a web-based method for end-users to register MAC addresses for authentication.

Accept

678 **Variance to nAC support for MAC authentication**

Variance to MAC address authentication with a web-based method for end-users to register MAC addresses for authentication.

No response

679 **NAC support for captive portal authentication**

The proposed NAC platform must support a captive-portal feature to authenticate users via a web page in the absence of all other authentication options; i.e. guest access via provided credentials or acceptance of acceptable-use policy.

Accept

680 **Variance to nAC support for captive portal authentication**

Variance to captive-portal feature to authenticate users via a web page in the absence of all other authentication options; i.e. guest access via provided credentials or acceptance of acceptable-use policy.

No response

681 **NAC support for RADIUS attributes**

The proposed NAC platform must support standard RADIUS attributes and be able to assign policies based on received attributes.

Accept

682

Variance to nAC support for RADIUS attributes

Variance to standard RADIUS attributes and be able to assign policies based on received attributes.

No response

683

NAC information regarding authentication attempts

The proposed NAC platform must provide all relevant information related to an authentication attempt, per attempt, within the NAC interface.

Accept

684

Variance to nAC information regarding authentication attempts

Variance to The proposed NAC platform must provide all relevant information related to an authentication attempt, p er attempt, within the NAC interface.

No response

685

NAC RBAC

The proposed NAC platform must allow role-based access to allow groups such as end-user support, to view authe ntication attempts for troubleshooting purposes.

Accept

686

Variance to nAC RBAC

Variance to The proposed NAC platform must allow role-based access to allow groups such as end-user support, to view authentication attempts for troubleshooting purposes.

No response

687

NAC profiling capabilities

The proposed NAC must offer profiling capabilities to identify, as best as possible, the type of device connecting an d the OS in use.

Accept

688

Variance to nAC profiling capabilities

Variance to The proposed NAC must offer profiling capabilities to identify, as best as possible, the type of device co nnecting and the OS in use.

No response

689

NAC management of zero-configuration devices

The proposed NAC (or other component) must provide management capabilities for zero-configuration devices (i.e. Apple TVs, Google Chromecast, Amazon Fire, and etc.) allowing users to register the devices and then to enact limi tations on the visibility and access of those devices via the wired and/or wireless networks.

Accept

690

Variance to nAC management of zero-configuration devices

Variance to The proposed NAC (or other component) must provide management capabilities for zero-configuration devices (i.e. Apple TVs, Google Chromecast, Amazon Fire, and etc.) allowing users to register the devices and then to enact limitations on the visibility and access of those devices via the wired and/or wireless networks.

No response

691

NAC integration with directory services

The NAC must allow for integration with active-directory, LDAP services and other RADIUS servers via RADIUS prox y as authentication sources.

Accept

692

Variance to nAC integration with directory services

Variance to The NAC must allow for integration with active-directory, LDAP services and other RADIUS servers via R ADIUS proxy as authentication sources.

No response

693

NAC delivery of dynamic policies

The NAC must allow delivery of dynamic policies and ACLs to wired switches and wireless controllers, allowing for ce ntralization of client authorization components.

Accept

694

Variance to nAC delivery of dynamic policies

Variance to The NAC must allow delivery of dynamic policies and ACLs to wired switches and wireless controllers, all owing for centralization of client authorization components.

No response

695

NAC redundancy

The NAC solution must be sized to allow redundant components to be installed within the data centers in Lincoln an d Omaha for geographic redundancy.

Accept

696

Variance to nAC redundancy

Variance to The NAC solution must be sized to allow redundant components to be installed within the data centers i n Lincoln and Omaha for geographic redundancy.

No response

697

Required Features – Software Platforms - Monitoring & Analytics

698

Monitoring of component groups

Proposed software monitoring platforms must allow for the grouping of individual monitored hardware components; i .e. group all components within a specific building or location.

Accept

699

Variance to monitoring of component groups

Variance to Proposed software monitoring platforms must allow for the grouping of individual monitored hardware co mponents; i.e. group all components within a specific building or location.

No response

700

RBAC into monitoring solution

Proposed monitoring solutions must allow for role-based access, with limitations on the information that can be acce ssed and the scope, to allow for some interaction by front-line support personnel.

Accept

701

Variance to rBAC into monitoring solution

Variance to Proposed monitoring solutions must allow for role-based access, with limitations on the information that can be accessed and the scope, to allow for some interaction by front-line support personnel.

No response

702

Monitoring - AP information

Proposed monitoring platforms must provide the following minimum information related to wireless access-points: AP Name, Type of hardware, Connected users, LAN MAC, Individual radio information: channel, BSSID(s), SSID(s)power, number of clients and bandwidth usage, Serial number, IP Address, and Relevant information related to physical Ethernet interfaces on the AP.

Accept

703

Variance to monitoring - AP information

Variance to Proposed monitoring platforms must provide the following minimum information related to wireless access-points: AP Name, Type of hardware, Connected users, LAN MAC, Individual radio information: channel, BSSID(s), SSID(s)power, number of clients and bandwidth usage, Serial number, IP Address, and Relevant information related to physical Ethernet interfaces on the AP.

No response

704

Monitoring - Client information

Proposed monitoring platforms must provide the following minimum information related to wireless clients: Username, Assigned IPv4/IPv6 address(es), Associated SSID, MAC Address, Assigned VLAN, Associated AP, and OS and Device information.

Accept

705

Variance to monitoring - Client information

Variance to Proposed monitoring platforms must provide the following minimum information related to wireless clients: Username, Assigned IPv4/IPv6 address(es), Associated SSID, MAC Address, Assigned VLAN, Associated AP, and OS and Device information.

No response

706

Monitoring - Switch information

Proposed monitoring platforms must provide the following minimum information related to switches: Switch name, IP Address, Per-port attached MAC Addresses, Per-port number of connected users, LLDP information, and Per-port bandwidth information.

Accept

707

Variance to monitoring - Switch information

Variance to Proposed monitoring platforms must provide the following minimum information related to switches: Switch name, IP Address, Per-port attached MAC Addresses, Per-port number of connected users, LLDP information, and Per-port bandwidth information.

No response

708

Monitoring - multiple clients on a single port

Proposed monitoring platforms must provide the following minimum information related to authenticated wired clients. If multiple clients authenticate to an individual port, information for all clients must be shown. 1) Username 2) MAC Address 3) Assigned VLAN

Accept

709

Variance to monitoring - multiple clients on a single port

Variance to Proposed monitoring platforms must provide the following minimum information related to authenticated wired clients. If multiple clients authenticate to an individual port, information for all clients must be shown. 1) Username 2) MAC Address 3) Assigned VLAN

No response

710

Strongly Desired Features – Software Platforms

The following list of features are highly desirable in a proposed solution. Please simply affirm or deny that your proposed solution meets the following requirements by notating each item with “accept”, “deny”, or “variance.” Please explain any variances in your product. The Bidder cannot answer “accept” if the feature is not currently available in the proposed hardware running current general availability (production) release software. If a feature is not in production software at the time of the RFP submission, the Bidder must choose “deny” or “variance.” If a feature not in production software is described under a “variance,” it must be noted the feature is not currently available.

711

Strongly Desired Features – Software Platforms - General

712

Management software deployable in a geographically redundant manner

All software management platforms should have the ability to be deployed in a geographically redundant, manner. The University has two data centers where components of a redundant solution would reside; layer2 extension is available if needed for connectivity. Depending upon the service, activate/passive deployment is acceptable.

Accept

713

Variance to management software deployable in a geographically redundant manner

Variance to All software management platforms should have the ability to be deployed in a geographically redundant, manner. The University has two data centers where components of a redundant solution would reside; layer2 extension is available if needed for connectivity. Depending upon the service, activate/passive deployment is acceptable.

No response

714

Management software integration with DUO two factor

All software should preferably integrate with the DUO security product or leverage a secondary RADIUS server for chained authentication. Other methods may be acceptable as long as 2-factor authentication can be accommodated.

Accept

715

Variance to management software integration with DUO two factor

Variance to All software should preferably integrate with the DUO security product or leverage a secondary RADIUS server for chained authentication. Other methods may be acceptable as long as 2-factor authentication can be accommodated.

No response

716

Questions and Clarifications – Software Platforms

Participant must answer the following set of questions designed to help identify basic metrics, scaling issues, and suitability. If more than one type of switch is proposed, the values for each type must be specified.

717

Questions and Clarifications – Software Platforms - General

718 **Software scaling figures**

Please indicate scaling numbers for all proposed software components, to include number of devices and clients th at can be authenticated, monitored and managed per server instance.

All proposed software is scalable for the largest environments in the world, simply by adding additional appliances. ClearPass appliances are sold by size, up to 25,000 authenticated devices, and scale simply by adding appliances . AirWave, likewise can scale by adding additional appliances, and then can have AirWave Glass overlay to view m ultiple clusters in a single-pane-of-glass.

719 **Software Open APIs**

Please indicate any open API's that are available, and if user profile data is accessible.

Aruba has integrated open API's are built in at nearly every layer of our network architecture. This allows the Unive rsity to create a best of breed network that connects third party solutions into the core Aruba architecture. Security is kept front-of-mind, by requiring API tokens for API access.

720 **DATA CENTER NETWORK SOLUTIONS**

721 **Required Features – Data Center**

Proposed solutions must offer components which support the following list of features. Please simply affirm or deny t hat your proposed solution meets the following requirements by notating each item with "accept", "deny", or "varianc e." Please explain any variances in your product. The Bidder cannot answer "accept" if the feature is not currently a vailable in the proposed hardware running current general availability (production) release software. If a feature is n ot in production software at the time of the RFP submission, the Bidder must choose "deny" or "variance." If a featur e not in production software is described under a "variance," it must be noted the feature is not currently available.

722 **Required Features – Data Center - General Requirements**

723 **Data rate support**

Proposed solutions must have support for 1Gbps, 10Gbps, 25Gbs and 100Gbps interfaces for leaf switch.

Accept

724 **Variance to data rate support**

Variance to Proposed solutions must have support for 1Gbps, 10Gbps, 25Gbs and 100Gbps interfaces for leaf swit ch.

No response

725 **Leaf 100Gbps support**

Proposed solutions must support a minimum of four 100Gbs interfaces for each leaf switch.

Accept

726 **Variance to leaf 100Gbps support**

Variance to minimum of four 100Gbs interfaces for each leaf switch.

No response

727 **Spine 100Gbps support**

Proposed solutions must support 100Gbs for spine switches.

Accept

728 **Variance to spine 100Gbps support**

Variance to 100Gbs for spine switches.

No response

729 **Required Features – Data Center - Ethernet Bridging protocols and functions**

730 **Spanning tree support**

Proposed routers and switches must fully support IEEE 802.1D bridging, including features originally defined as 802 .1w (Rapid Spanning Tree Protocol).

Accept

731 **Variance to spanning tree support**

Variance to IEEE 802.1D bridging, including features originally defined as 802.1w (Rapid Spanning Tree Protocol).

No response

732 **Spanning tree edge-port support**

Proposed routers and switches must support a feature to configure a port as an edge-port, such that spanning-tree will transition more quickly/immediately to a forwarding mode and not generate topology-change-notifications (TCNs).

Accept

733 **Variance to spanning tree edge-port support**

Variance to feature to configure a port as an edge-port, such that spanning-tree will transition more quickly/immedia tely to a forwarding mode and not generate topology-change-notifications (TCNs).

No response

734 **Spanning tree bdpu-filter support**

Proposed routers and switches must support a per-port feature to ignore STP BPDUs (i.e. bpdu-filter), allowing the port to remain in a forwarding state.

Accept

735 **Variance to spanning tree bdpu-filter support**

Variance to per-port feature to ignore STP BPDUs (i.e. bpdu-filter), allowing the port to remain in a forwarding state.

No response

736 **Spanning tree bdpu-protect support**

Proposed routers/switches must support a per-port feature to block a port that receives a BPDU (i.e. bpdu-protect), applicable to ports configured as edge-ports.

Accept

737 **Variance to spanning tree bdpu-protect support**

Variance to per-port feature to block a port that receives a BPDU (i.e. bpdu-protect), applicable to ports configured as edge-ports.

No response

738 **802.1Q VLAN tagging support**

Proposed routers and switches must fully support IEEE 802.1Q VLAN tagging on layer 2 and layer 3 interfaces.

Accept

739 **Variance to 802.1Q VLAN tagging support**

Variance to IEEE 802.1Q VLAN tagging on layer 2 and layer 3 interfaces.

No response

740 **Jumbo frame support**

Proposed routers and switches must support jumbo frame sizes of 9,192+ bytes on all routed physical and virtual interfaces and ports operating as L2-only bridging ports.

Accept

741 **Variance to jumbo frame support**

Variance to jumbo frame sizes of 9,192+ bytes on all routed physical and virtual interfaces and ports operating as L2-only bridging ports.

No response

742 **MLAG support**

Proposed switches must support a form of multi-chassis link aggregation (i.e. MLAG or MC-LAG), between at least two switches, with control plane separation intact. Allowing for members of a downstream link-aggregate to terminate at least one member on each aggregated switch.

Accept

743 **Variance to mLAG support**

Variance to form of multi-chassis link aggregation (i.e. MLAG or MC-LAG), between at least two switches, with control plane separation intact. Allowing for members of a downstream link-aggregate to terminate at least one member on each aggregated switch.

No response

744 **MLAG LACP support**

Proposed switches must support 802.3ad compliant LACP link aggregates, including when multi-chassis link aggregation is used.

Accept

745 **Variance to mLAG LACP support**

Variance to 802.3ad compliant LACP link aggregates, including when multi-chassis link aggregation is used.

No response

746 **LACP support**

Members of an LACP aggregate must be able to terminate individually on the same router/switch or across different routers/switches.

Accept

747 **Variance to lACP support**

Variance to Members of an LACP aggregate must be able to terminate individually on the same router/switch or across different routers/switches.

No response

748 **Cross line-card LACP support**

For chassis-based switches, proposed line cards must support IEEE 802.3ad link aggregation with aggregate member ports on the same, or different, line cards.

Accept

749 **Variance to cross line-card LACP support**

Variance to IEEE 802.3ad link aggregation with aggregate member ports on the same, or different, line cards.

No response

750 **Cross stack LAG support**

If fixed configuration routers/switches supporting stacking or virtual-chassis are proposed, all routers/switches in the stack must support IEEE 802.3ad link aggregation with ports on the same or different, routers/switches in the stack.

Accept

751 **Variance to cross stack LAG support**

Variance to IEEE 802.3ad link aggregation with ports on the same or different, routers/switches in the stack.

No response

752 **No port extenders**

Proposed routers and switches must be full-featured switches and not port extenders.

Accept

753 **Variance to no port extenders**

Variance to Proposed routers and switches must be full-featured switches and not port extenders.

No response

754 **Static MAC assignment**

Proposed routers and switches must support static MAC assignment, allowing for the mapping of a MAC address to a port or series of ports.

Accept

755 **Variance to static MAC assignment**

Variance to static MAC assignment, allowing for the mapping of a MAC address to a port or series of ports.

No response

756 **Scalable layer 2 virtualization**

Proposed routers and switches must support scalable Layer 2 virtualization over a routed core (IE: over IPv4, IPv6, or MPLS)

Accept

757 **Variance to scalable layer 2 virtualization**

Variance to scalable Layer 2 virtualization over a routed core (IE: over IPv4, IPv6, or MPLS)

No response

758 **Required Features – Data Center - IPv4 / IPv6 Protocols and Functions**

759 **Routing support**

Proposed routers must support IPv4 and IPv6 unicast and multicast routing.

Accept

760 **Variance to routing support**

Variance to IPv4 and IPv6 unicast and multicast routing.

No response

761 **Unicast routing support**

Proposed switches must support OSPFv2, OSPFv3, and BGP.

Accept

762 **Variance to unicast routing support**

Variance to OSPFv2, OSPFv3, and BGP.

No response

763 **Static routing support**

Proposed routers must support static routes.

Accept

764 **Variance to static routing support**

Variance to static routes.

No response

765 **VRF support**

Proposed routers must support VRFs (virtual routing and forwarding).

Accept

766 **Variance to vRF support**

Variance to VRFs (virtual routing and forwarding).

No response

767 **Virtualization overlay support**

Proposed routers must support IPv4 and IPv6 virtualized routing through an overlay (IE: MPLS-L3VPN, VXLAN-EVPN, MPLS-EVPN, or other overlay technologies).

Accept

768 **Variance to virtualization overlay support**

Variance to IPv4 and IPv6 virtualized routing through an overlay (IE: MPLS-L3VPN, VXLAN-EVPN, MPLS-EVPN, or other overlay technologies).

No response

769 **Anti-spoofing features**

Proposed routers must support address anti-spoofing for edge services. (IE: When a router is acting as a default gateway for an IPv4/IPv6 network)

Accept

770 **Variance to anti-spoofing features**

Variance to address anti-spoofing for edge services. (IE: When a router is acting as a default gateway for an IPv4/IPv6 network)

No response

771 **Required Features – Data Center - Management Functions**

772 **SNMP support**

Proposed routers and switches must support SNMPv2c and SNMPv3.

Accept

773 **Variance to sNMP support**

Variance to SNMPv2c and SNMPv3.

No response

774 **SSH management access**

Proposed routers and switches must support remote access to the command line interface (CLI) via SSHv2.

Accept

775 **Variance to sSH management access**

Variance to remote access to the command line interface (CLI) via SSHv2.

No response

776 **SSH access control**

Proposed routers and switches must support restricting access to SSH by an ACL or equivalent protection.

Accept

777 **Variance to sSH access control**

Variance to restricting access to SSH by an ACL or equivalent protection.

No response

778 **Serial console support**

Proposed routers and switches must support access to the CLI via a serial console port, or some other method to communicate via direct physical connection.

Accept

779 **Variance to serial console support**

Variance to access to the CLI via a serial console port, or some other method to communicate via direct physical connection.

No response

780 **RADIUS or TACACS+ support**

Proposed routers and switches must support RADIUS or TACACS+ authentication for SSH and serial console users.

Accept

781 **Variance to rADIUS or TACACS+ support**

Variance to RADIUS or TACACS+ authentication for SSH and serial console users.

No response

782 **Local account failover**

Proposed routers and switches must support failover to a user account locally defined on the device, if the RADIUS or TACACS+ server is unreachable.

Accept

783 **Variance to local account failover**

Variance to failover to a user account locally defined on the device, if the RADIUS or TACACS+ server is unreachable.

No response

784 **Encryption of RADIUS or TACACS+ secrets**

Proposed routers and switches must support encryption of the RADIUS and TACACS+ shared secret stored in the configuration file.

Accept

785 **Variance to encryption of RADIUS or TACACS+ secrets**

Variance to encryption of the RADIUS and TACACS+ shared secret stored in the configuration file.

No response

786 **Local password encryption**

Proposed routers and switches must support encryption of local user passwords stored in the configuration file.

Accept

787 **Variance to local password encryption**

Variance to encryption of local user passwords stored in the configuration file.

No response

788 **Configuration backup**

Proposed routers and switches must be able to represent its configuration (such as a text file) that can be uploaded to restore a configuration.

Accept

789 **Variance to configuration backup**

Variance to Proposed routers and switches must be able to represent its configuration (such as a text file) that can be uploaded to restore a configuration.

No response

790 **Syslog support**

Proposed routers and switches must support logging to a syslog server on a configurable port other than default syslog (udp/514).

Accept

791 **Variance to syslog support**

Variance to logging to a syslog server on a configurable port other than default syslog (udp/514).

No response

792 **SNTP support**

Proposed routers and switches must preferably support NTP as described in RFC 5905, or at minimum, SNTP as described by RFC 4330.

Accept

793 **Variance to sNTP support**

Variance to Proposed routers and switches must preferably support NTP as described in RFC 5905, or at minimum, SNTP as described by RFC 4330.

No response

794 **LLDP support**

Proposed routers and switches must support IEEE 802.1ab Link-Layer Discovery Protocol (LLDP).

Accept

795 **Variance to lLDP support**

Variance to IEEE 802.1ab Link-Layer Discovery Protocol (LLDP).

No response

796 **Storm control**

Proposed routers and switches must support some form of traffic limiting/policing or storm-control per port.

Accept

797 **Variance to storm control**

Variance to some form of traffic limiting/policing or storm-control per port.

No response

798 **Interface naming**

Proposed switches must support naming of individual interfaces within the configuration and this information must be retrievable via CLI "show" commands and SNMP.

Accept

799 **Variance to interface naming**

Variance to naming of individual interfaces within the configuration and this information must be retrievable via CLI "show" commands and SNMP.

No response

800 **Encrypted file transfer**

Proposed routers and switches must support secure encrypted file transfer for uploading/downloading code or configuration files.

Accept

801 **Variance to encrypted file transfer**

Variance to secure encrypted file transfer for uploading/downloading code or configuration files.

No response

802 **Required Features – Data Center - Physical & Power Characteristics**

803

Equipment dimensions

Proposed routers and switches must be mountable in both a standard two-rail 19" communication rack (preferred) a nd a standard 19" four-post server rack.

Accept

804

Variance to equipment dimensions

Variance to Proposed routers and switches must be mountable in both a standard two-rail 19" communication rack (preferred) and a standard 19" four-post server rack.

No response

805

input voltage

Proposed routers and switches must support 120 and 208 VAC capable power supplies.

Accept

806

Variance to input voltage

Variance to 120 and 208 VAC capable power supplies.

No response

807

Power supply redundancy

Proposed routers and switches must contain N+1 power redundancy, such that if any individual power supply were t o fail or lose power, the device would continue to function without any impairment. For example, if a device requires three power supplies to function, the switch must support four power supplies such that any individual power supply could fail and the device would continue to function without impairment.

Accept

808

Variance to power supply redundancy

Variance to four power supplies such that any individual power supply could fail and the device would continue to fu nction without impairment.

No response

809

Hot swappable power supplies

Proposed routers and switches must have hot swappable power supplies.

Accept

810

Variance to hot swappable power supplies

Variance to Proposed routers and switches must have hot swappable power supplies.

No response

811

Hot swappable line cards

All modular switches must support hot swapping of line cards, without adversely affecting other cards in operation.

Accept

812

Variance to hot swappable line cards

Variance to hot swapping of line cards, without adversely affecting other cards in operation.

No response

813	**Resiliency of a stack during individual unit failure** For stackable routers and switches, a switch stack must allow for the failure of any one switch, without disabling the stack or degrading the operation of the remaining stack members. Accept
814	**Variance to resiliency of a stack during individual unit failure** Variance to For stackable routers and switches, a switch stack must allow for the failure of any one switch, without di sabling the stack or degrading the operation of the remaining stack members. *No response*
815	**Strongly Desired Features – Data Center** The following list of features are highly desirable in a proposed solution. Please simply affirm or deny that your prop osed solution meets the following requirements by notating each item with “accept”, “deny”, or “variance.” Please ex plain any variances in your product. The Bidder cannot answer “accept” if the feature is not currently available in th e proposed hardware running current general availability (production) release software. If a feature is not in product ion software at the time of the RFP submission, the Bidder must choose “deny” or “variance.” If a feature not in prod uction software is described under a “variance,” it must be noted the feature is not currently available.
816	**Strongly Desired Features – Data Center - General**
817	**Third party optics and transceivers** Proposed routers and switches should support third-party optics and transceivers. Deny
818	**Variance to third party optics and transceivers** Variance to third-party optics and transceivers. This is a potential roadmap item based upon customer desire and use case.
819	**Strongly Desired Features – Data Center - Ethernet Bridging Protocols and Functions**
820	**802.1q VLAN tag re-use** Proposed routers and switches should support the re-use of an 802.1q VLAN tag in different bridging domains for d ownstream devices. Accept
821	**Variance to 802.1q VLAN tag re-use** Variance to the re-use of an 802.1q VLAN tag in different bridging domains for downstream devices. *No response*
822	**MAC table size** Proposed routers and switches should support hardware forwarding for a minimum of 60,000 hosts (MAC table entri es) via layer 2 bridging functions, please indicate the maximum. Accept

823	**Variance to mAC table size** Variance to hardware forwarding for a minimum of 60,000 hosts (MAC table entries) via layer 2 bridging functions, pl ease indicate the maximum. The 8400 (Spine) can support 768,000 and the 8325 (Leaf) can support 98,304 MAC addresses
824	**Supported MAC entries per VLAN** Proposed routers and switches should support a minimum of 4,096 hosts, or MAC entries, in a single layer 2 VLAN. Please indicate the maximum. Accept
825	**Variance to supported MAC entries per VLAN** Variance to minimum of 4,096 hosts, or MAC entries, in a single layer 2 VLAN. Please indicate the maximum. *No response*
826	**Broadcast storm control** Proposed routers and switches should support broadcast storm control and multicast storm control for all ports oper ating as L2-only bridging ports. Accept
827	**Variance to broadcast storm control** Variance to broadcast storm control and multicast storm control for all ports operating as L2-only bridging ports. *No response*
828	**Strongly Desired Features – Data Center - IPv4 / IPv6 Protocols and Functions**
829	**Static ARP Support** Proposed routers and switches should support IPv4 static ARP entries. Deny
830	**Variance to static ARP Support** Variance to IPv4 static ARP entries. *No response*
831	**Static IPv6 ND support** Proposed routers and switches should support IPv6 static neighbor-table entries. Deny
832	**Variance to static IPv6 ND support** Variance to IPv6 static neighbor-table entries. *No response*
833	**IPv4 and IPv6 feature parity in forwarding** Proposed routers and switches should have feature parity between IPv4 and IPv6 forwarding. Accept

834
Variance to iPv4 and IPv6 feature parity in forwarding

Variance to Proposed routers and switches should have feature parity between IPv4 and IPv6 forwarding.

No response

835
IPv4 and IPv6 feature parity in management

Proposed routers and switches should have feature parity between IPv4 and IPv6 management functionality.

Accept

836
Variance to iPv4 and IPv6 feature parity in management

Variance to Proposed routers and switches should have feature parity between IPv4 and IPv6 management function ality.

No response

837
Routing between virtualized ethernet networks

Routing between two different virtualized Ethernet networks should be supported (IE: Routing between two different VXLAN VNIs)

Accept

838
Variance to routing between virtualized ethernet networks

Variance to Routing between two different virtualized Ethernet networks should be supported (IE: Routing between t wo different VXLAN VNIs)

No response

839
ARP/ND suppression in overlay

Routers should support ARP/ND suppression across any overlay network.

Accept

840
Variance to aRP/ND suppression in overlay

Variance to ARP/ND suppression across any overlay network.

No response

841
Strongly Desired Features – Data Center - Management Functions

842
Zero-touch provisioning

Proposed routers and switches should support some form of zero-touch-provisioning.

Variance

843
Variance to zero-touch provisioning

Variance to some form of zero-touch-provisioning.

The proposed data center switches do not support ZTP, however NetEdit is able to apply low-touch validated confi gurations, and pre-saved configurations to new switches added to the network infrastructure.

844
Out-of-Band management

Proposed routers and switches should support an out-of-band management port.

Accept

845

Variance to out-of-Band management

Variance to an out-of-band management port.

No response

846

Control-plane-protection

Proposed routers and switches should support control plane protection. Traffic forwarding, switch adjacencies, and CLI management of the device over the serial console and out-of-band management ports should continue to functi on with high volumes of traffic. This includes, but is not limited to ARP storms, broadcast storms, DHCP relay forwar ding, and handling traffic with IP options set.

Accept

847

Variance to control-plane-protection

Variance to control plane protection. Traffic forwarding, switch adjacencies, and CLI management of the device over the serial console and out-of-band management ports should continue to function with high volumes of traffic. This i ncludes, but is not limited to ARP storms, broadcast storms, DHCP relay forwarding, and handling traffic with IP opti ons set.

No response

848

Selectable syslog facility

Proposed routers and switches should support manual assignment of syslog facilities local0 - local7.

Accept

849

Variance to selectable syslog facility

Variance to manual assignment of syslog facilities local0 - local7.

No response

850

Syslog over TCP

Proposed routers and switches should support syslog over TCP.

Accept

851

Variance to syslog over TCP

Variance to syslog over TCP.

No response

852

Logging of administrative logins

Proposed routers and switches should log usernames of authorized users to the syslog server at the time of login.

Accept

853

Variance to logging of administrative logins

Variance to Proposed routers and switches should log usernames of authorized users to the syslog server at the tim e of login.

No response

854

Logging of configuration changes

Proposed routers and switches should log the username associated with configuration changes to the syslog server at the time changes are committed.

Accept

855

Variance to logging of configuration changes

Variance to Proposed routers and switches should log the username associated with configuration changes to the s yslog server at the time changes are committed.

No response

856

Syslog documentation

Syslog documentation should be provided for all syslog messages encountered during normal operation.

Accept

857

Variance to syslog documentation

Variance to Syslog documentation should be provided for all syslog messages encountered during normal operatio n.

https://support.hpe.com/hpsc/doc/public/display?docId=emr_na-a00075295en_us&docLocale=en_US

858

SNMP access control

Proposed routers and switches should support restricting SNMP access by an access control list or equivalent prote ction.

Accept

859

Variance to sNMP access control

Variance to restricting SNMP access by an access control list or equivalent protection.

No response

860

SNMP interface attributes

Proposed routers and switches should represent the following information as objects that can be queried via SNMP: 1) Status of physical devices (chassis, fan trays, power supplies, line cards, and etc.). 2) Status of resources (CPU, memory, and etc.). 3) Status and statistics of internal processes. 4) Status of physical interfaces, sub-interfaces, an d physical and virtual interfaces. 5) Traffic and error counters for physical interfaces, sub-interfaces, and physical a nd virtual interfaces.

Accept

861

Variance to sNMP interface attributes

Variance to Proposed routers and switches should represent the following information as objects that can be querie d via SNMP: 1) Status of physical devices (chassis, fan trays, power supplies, line cards, and etc.). 2) Status of reso urces (CPU, memory, and etc.). 3) Status and statistics of internal processes. 4) Status of physical interfaces, sub-i nterfaces, and physical and virtual interfaces. 5) Traffic and error counters for physical interfaces, sub-interfaces, a nd physical and virtual interfaces.

No response

862

SNMP inventory and optic light levels

Proposed routers and switches should represent the following information as objects that can be queried via SNMP. 1) Transmit and receive light levels on optical transceivers. 2) Serial number and slot position of every field replace able part.

Accept

863

Variance to sNMP inventory and optic light levels

Variance to Proposed routers and switches should represent the following information as objects that can be querie d via SNMP. 1) Transmit and receive light levels on optical transceivers. 2) Serial number and slot position of every f ield replaceable part.

No response

864	**Optical power monitoring** All optical transceivers should report transmit and receive light levels. Accept
865	**Variance to optical power monitoring** Variance to All optical transceivers should report transmit and receive light levels. *No response*
866	**Interface counter update frequency** Proposed routers and switches should support high frequency updates for interface counters (1-5 seconds preferred). Accept
867	**Variance to interface counter update frequency** Variance to high frequency updates for interface counters (1-5 seconds preferred). *No response*
868	**Role-based access based on RADIUS attribute** Proposed routers and switches should support assigning role based administrative access by using a returned RADIUS attribute such that the router/switch restrict the execution of CLI commands based on the returned role code. Accept
869	**Variance to role-based access based on RADIUS attribute** Variance to assigning role based administrative access by using a returned RADIUS attribute such that the router/switch restrict the execution of CLI commands based on the returned role code. *No response*
870	**Strongly Desired Features – Data Center - Physical & Power Characteristics**
871	**Hot swappable fans** Any replaceable fans should be hot-swappable. Accept
872	**Variance to hot swappable fans** Variance to Any replaceable fans should be hot-swappable. *No response*
873	**Questions and Clarifications - Datacenter** Participant must answer the following set of questions designed to help identify basic metrics, scaling issues, and suitability. If more than one type of router or switch is proposed, the values for each type must be specified
874	**Questions and Clarifications - Datacenter - Architecture**

875

Block architecture diagram

Describe the architecture and provide a block diagram of that includes major components such as ASICs (Application Specific Integrated Circuit), Memory, CPU, network Modules, stack interface, etc.

Please see attachments "1213 8325 Architecture" and "1213 8400 Architecture"

876

Architecture - layer 2 decisions

Describe where in the architecture layer 2 decisions are made.

When a packet comes into the switch it goes through the MAC PHY ingress, which is the physical Ethernet connection to the line card. The packet gets parsed at the ingress pipeline so the line card can look at some of the information in the packet. The packet doesn't fully de-encapsulate the packet but it may pop off some labels. The lookup is where its layer 2 and layer 3 headers are de-encapsulated and looks at the items in the packet. Using the TCAMs and the exact match DB to figure out where to send the packet, and what should be done with the packet. The lookup does not actually decide where to send the packet it just checks to see what should be done with the packet. The forwarding Resolution decides what to do with the packet by using the information gathered by the lookup.

877

Architecture - layer 3 decisions

Describe where in the architecture layer 3 decisions are made.

When a packet comes into the switch it goes through the MAC PHY ingress, which is the physical Ethernet connection to the line card. The packet gets parsed at the ingress pipeline so the line card can look at some of the information in the packet. The packet doesn't fully de-encapsulate the packet but it may pop off some labels. The lookup is where its layer 2 and layer 3 headers are de-encapsulated and looks at the items in the packet. Using the TCAMs and the exact match DB to figure out where to send the packet, and what should be done with the packet. The lookup does not actually decide where to send the packet it just checks to see what should be done with the packet. The forwarding Resolution decides what to do with the packet by using the information gathered by the lookup.

878

Architecture - ACL decisions

Describe where in the architecture ACLs (Access Control Lists) (V4 and V6) are made

As each line card has its own ASIC, resources are consumed only on the line card on which a port ACL or policy is applied

879

CPU Memory

How much memory is available for the CPU?

There are multiple CPUs within the 8400, the management module has a CPU and each line card has a CPU (LC CPU). THe Management module is an intel broadwell CPU, with 32GB of DRAM and 120GB of SSD. LC CPU memory varys from 1.5GByte to 3.0GByte. The 8325 contains a Intel Broadwell 2.2GhZ CPU with 16Gb DDR4 RAM, 64bit w/ECC.

880

Buffer location and buffer sharing

Describe where buffer is located in the architecture and how it is shared.

The 8400 contains the buffers on the line card with 3x GDDR5 memory chips. LC Buffer size is 1.5GByte for >100 Gbe LCs and 3GByte for 100GB LC.

881

Ports served by a single ASIC

Describe how many ports are serviced from a single ASIC

Each line card has it's own ASIC.

8.8.2 Packet walk within a single ASIC

Describe a packet walk through for data entering and exiting on the same ASIC.

When a packet comes into the switch it goes through the MAC PHY ingress, which is the physical Ethernet connection to the line card. The packet gets parsed at the ingress pipeline so the line card can look at some of the information in the packet. The packet doesn't fully de-encapsulate the packet but it may pop off some labels. The lookup is where its layer 2 and layer 3 headers are de-encapsulated and looks at the items in the packet. Using the TCAMs and the exact match DB to figure out where to send the packet, and what should be done with the packet. The lookup does not actually decide where to send the packet it just checks to see what should be done with the packet. The forwarding Resolution decides what to do with the packet by using the information gathered by the lookup.

Next the packet is sent to the traffic manager works, the traffic manager works on a system of credits. In order for the packet to be sent out of the ingress buffer where it is now to the egress buffer of another line card. The egress buffer on each line card has to let the ingress buffers know how much traffic it has in its queue, this is done by sending credits to each ingress buffer. Once the ingress buffer where the packet is being held gets enough credits from the egress buffer the packet is trying go to, it will then send the packet to the fabric module then to egress buffer of the destination line card. If the packet is going to the same line card the Packet is still scheduled but instead of being sent to the fabric, queue it is sent to the local egress queue.

Packets coming in to the egress buffer then will be moved to the egress pipeline where the mac addresses may be modify to the correct destination mac if necessary. Lookups are also done using the internal TCAM and the Exact match DB to decide what port to send the packet out to of the line card to the device the packet was destine to.

8.8.3 Packet walk within a single switch

Describe a packet walk through for data entering and exiting from a different ASIC on the same switch.

When a packet comes into the switch it goes through the MAC PHY ingress, which is the physical Ethernet connection to the line card. The packet gets parsed at the ingress pipeline so the line card can look at some of the information in the packet. The packet doesn't fully de-encapsulate the packet but it may pop off some labels. The lookup is where its layer 2 and layer 3 headers are de-encapsulated and looks at the items in the packet. Using the TCAMs and the exact match DB to figure out where to send the packet, and what should be done with the packet. The lookup does not actually decide where to send the packet it just checks to see what should be done with the packet. The forwarding Resolution decides what to do with the packet by using the information gathered by the lookup.

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Packets coming in to the egress buffer then will be moved to the egress pipeline where the mac addresses may be modify to the correct destination mac if necessary. Lookups are also done using the internal TCAM and the Exact match DB to decide what port to send the packet out to of the line card to the device the packet was destine to.

884

Packet walk through different units in a stack

Describe a packet walk through for data entering and exiting via another switch on the stack.

When a packet comes into the switch it goes through the MAC PHY ingress, which is the physical Ethernet connect ion to the line card. The packet gets parsed at the ingress pipeline so the line card can look at some of the inform ation in the packet. The packet doesn't fully de-encapsulate the packet but it may pop off some labels. The lookup is where its layer 2 and layer 3 headers are de-encapsulated and looks at the items in the packet. Using the TCAM s and the exact match DB to figure out where to send the packet, and what should be done with the packet. The lo okup does not actually decide where to send the packet it just checks to see what should be done with the packet. The forwarding Resolution decides what to do with the packet by using the information gathered by the lookup.

Next the packet is sent to the traffic manager works, the traffic manager works on a system of credits. In order for t he packet to be sent out of the ingress buffer where it is now to the egress buffer of another line card. The egress buffer on each line card has to let the ingress buffers know how much traffic it has in its queue, this is done by sen ding credits to each ingress buffer. Once the ingress buffer where the packet is being held gets enough credits fro m the egress buffer the packet is trying go to, it will then send the packet to the fabric module then to egress buffe r of the destination line card. If the packet is going to the same line card the Packet is still scheduled but instead of being sent to the fabric, queue it is sent to the local egress queue.

Packets coming in to the egress buffer then will be moved to the egress pipeline where the mac addresses may be modify to the correct destination mac if necessary. Lookups are also done using the internal TCAM and the Exact match DB to decide what port to send the packet out to of the line card to the device the packet was destine to.

885

Architecture - overbooked components

Describe where the architecture is overbooked.

The Aruba 8400 and 8325 are designed with an excess of resources to perform exceptionally well with current net work demands and have room to expand for future network demands.

886

Architecture -other features

Describe any other architectural features that were not asked about that are important.

The fabric is future proof for future growth and high demand line-cards that are not yet on the market. Current line cards utilize 12 SERDES : 300GB/s, but the fabric has a maximum capacity of 16 SERDES : 400GB/s.

887

Built in redundancy

Describe any built-in redundancy for a single switch.

Redundancy is built in throughout the hardware and the software. The ArubaOS-CX is essentially network-as-a-mi cro-service. Meaning that the OS is composed of micro-services that are individually resilient and individually resta rtable. If a micro-service fails, it restarts, and simply attaches to the database and retrieves both its persistent and ephemeral state. The hardware itself has redundant power-supplies, fan trays, and management modules. All item s are hot-swappable and with the exception of the backplane itself, field replaceable.

888

Additional redundancy

Describe any additional redundancy gained by these switches.

When deployed in VSX pairs the switches become even more resilient ensuring that live upgrades are possible, so that the network isn't interrupted even for firmware upgrades.

889

On-Board memory

Describe the quantity and type of onboard memory (DRAM/Flash/disk/etc.).

The 8325 has 16GB DDR4 RAM, 64GB m.2 SSD, 4GB eUSB Industrial Grade, and SPI Flash.

The 8400 line cards have 3x GDDR5 memory chips. The management module has 32GB of DRAM and 120Gb of SSD.

890

Available hardware upgrades

Describe any hardware upgrades that may be purchased for the switch aside from 'network modules'.

Hardware upgrades may be released in the future, but presently there are no additional hardware upgrades that a re not included with the core chassis or line cards.

891

Questions and Clarifications - Datacenter - Interface Requirements

892

Spine 100Gbps port densities

What are the 100 Gig port densities for the spine node?

Fully populated with 100GbE line cards the 8400 has a capacity of 48 100GbE QSFP28 ports.

893

Types of 10G optics

What 10 Gig optics are available, how many strands of SPF+, QSFP+ fiber are required, and what are their rated di stances?

10G ports are SFP+

The following are the supported transceivers:
Aruba 10GBASE-T SFP+ RJ45 30 m Cat6A transceiver1
Aruba 10G SFP+ LC SR 300 m OM3 MMF transceiver
Aruba 10G SFP+ LC LR 10 km SMF transceiver
Aruba 10G SFP+ LC LRM 220 m OM2 MMF transceiver
Aruba 10G SFP+ LC ER 40 km SMF transceiver
Aruba 10G SFP+ to SFP+ 1 m Direct Attach Copper (DAC) cable
Aruba 10G SFP+ to SFP+ 3 m DAC cable
Aruba 10G SFP+ to SFP+ 7 m DAC cable

894

Types of 100G optics

What 100 Gig optics are available, how many strands of QSFP28 fiber are required, and what are their rated distan ces?

HPE X241 100GBase QSFP28 to QSFP28 5 m DAC cable
HPE X151 100 GbE QSFP28 MPO SR4 MMF 12-strand transceiver
HPE X151 100 GbE QSFP28 LC LR4 SMF 2-strand transceiver

895

Spine and leaf port buffers

What is the size of the port buffers on spine and leaf nodes?

Spine (8400): LC Buffery memory is used dynamically between ports, 32 port 10Gb SFP/SFP+ has 1.5Gbyte of bu ffer memory. 8p 40GbE QSFP+ has 1.5Gbyte of buffer memory. 6p 40/100GbE QSFP28 has 3Gbyte of buffer me mory.

Leaf (8325): has 32MBytes of internal buffer in the packet processor.

896

Leaf interface options and speeds

What are the leaf switch interface options and what speeds do they support?

The Aruba 8325 is available with 1/10/25GbE and 40/100GbE connectivity.

897

Spine oversubscription

Are the interfaces oversubscribed on the Spine?

No. All lines are full line-rate.

898 **Leaf oversubscription**

Are the interfaces oversubscribed on the Leaf/Top of Rack? If so, describe.

No. All lines are full line-rate.

899 **SFP+ support for 1Gbps**

On your leaf switch, do your 10 Gig SFP+ ports support 1Gig and 10 Gig transceivers?

Yes.

900 **Modules available**

Describe what modules/interface cards are available for each switch/chassis.

The 8400 chassis supports the following line cards:
Aruba 8400 32-port 10 GbE SFP/SFP+ with MACsec advanced module
Aruba 8400 8-port 40 GbE QSFP+ advanced module
Aruba 8400 6-port 40/100 GbE QSFP28 advanced module

The 8325 is available in the following fixed-configurations:
Aruba 8325-48Y8C 48p 25G SFP/+/28 8p 100G QSFP+/28 front-to-back 6 fans and 2 power supply bundle
Aruba 8325-48Y8C 48p 25G SFP/+/28 8p 100G QSFP+/28 back-to-front 6 fans and 2 power supply bundle
Aruba 8325-32C 32-port 100G QSFP+/QSFP28 front-to-back 6 fans and 2 power supply bundle
Aruba 8325-32C 32-port 100G QSFP+/QSFP28 back-to-front 6 fans and 2 power supply bundle

901 **Hot swapping of modules**

Are modules hot swappable?

Yes. All modules are hot-swappable

902 **Questions and Clarifications - Datacenter - Resource Limits**

903 **FIB size**

What is your max count for FIB (Forwarding Information Base) for the solution?

The 8400 supports 768,000 addresses. They 8325 supports 98,304 addresses.

904 **Route table size**

Describe the maximum route table size of proposed routers & switches?

The 8400 supports 1,011,712 IPv4 routes and 524,288 IPv6 routes. They 8325 supports 28,658 IPv4 Routes and 12,289 IPv6 routes.

905 **Switching and routing performance**

Describe the switching and routing performance, packets per second, etc.

The 8400 supports 19.2Tbps switching (1.2Tbps/slot) capacity
The 8325 supports 6.4Tbps with 2,000Mpps capacity.

906 **Memory available on spine and leaf nodes**

How much storage and memory is available on the Spine and Leaf nodes?

The 8400 has 120Gb of storage in SSD per management module
The 8325 has a 64Gb m.2 SSD

907 **VRF scale**

How many VRFs (virtual routing and forwarding) does the solution support?

The 8400 supports 32 VRFs
The 8325 supports 32 VRFs

908 **VRF scale licensing costs**

Does the solution require any licensing to use VRFs? If so, provide details including quantity and costs, if any.

No licensing is required for any functionality on Aruba switches.

909 **VNI Scaling**

For VXLAN, how many VNIs do you support?

The proposed switches support up to 4,039 VNIs.

910 **Spine scaling**

What is the maximum number of Spine nodes?

The current code to the Aruba 8325 Leaf switches enables support for 8-way ECMP.
Since each leaf connects to each spine, we should limit the number of spine switches to the current supported EC MP limits of attached leaf switches.

911 **Max distance between spines**

What is the maximum distance between Spine nodes?

The Aruba 8400/8325 support standard 10/25/40/100GbE optics and DACs.
The distance will be limited to the optical protocol chosen.
Current Aruba DAC limits will be 3 meters for 100G and 5 meters for 40GbE or 25GbE interfaces.

912 **Questions and Clarifications - Datacenter - Protocol Support**

913 **VXLAN Layer 2 terminations**

Does the solution support VXLAN Layer 2 termination? If so, how many?

The Aruba 8325 supports (centralized L3 gateway).

914 **VXLAN Layer 3 terminations**

Does the solution support VXLAN Layer 3 termination? If so how many?

The Aruba 8325 supports (centralized L3 gateway).

915 **IGMP snooping**

Does the solution support IGMP (internet group management protocol)?

Yes

916 **VXLAN Layer 2 and Layer 3 termination**

Can you terminate VXLAN Layer 2 and Layer 3 on the same device? If not when will it on this hardware?

The Aruba 8325 supports (centralized L3 gateway).

917 **MPLS support**

Does the solution support MPLS (multiprotocol label switching) protocol?

No.

918	**LDP support** Does the solution support LDP (label distribution protocol) protocol? No.
919	**Questions and Clarifications - Datacenter - Software Features**
920	**Leaf Layer 3 VXLAN** Do the leaf nodes support layer 3 VXLAN routing locally on the node? The Aruba 8325 supports (centralized L3 gateway).
921	**Inter-VLAN routing** Where in the solution does inter-VLAN/network and Inter-vlan/VRF routing occur within the data center? The Aruba 8325 supports centralized L3 gateway functionality so a border leaf switch can perform the Inter-VLAN/ VRF routing.
922	**Leaf local switching** On the top of rack switch, when two servers are on the same switch and VLAN/network communicate, does it switch l ocally? For overlay traffic and when using a centralized L3 gateway solution, overlay traffic within a rack will be bridged wit hin that rack, but if traffic needs to cross a network segment then it will be forwarded to the centralized L3 gateway which will handle that function. Underlay traffic will be routed at ToR/Leaf locally.
923	**TOR local switching** On the leaf switch, when two servers are on the same switch and VLAN/network communicate, does it switch locally? For overlay traffic and when using a centralized L3 gateway solution, overlay traffic within a rack will be bridged wit hin that rack, but if traffic needs to cross a network segment then it will be forwarded to the centralized L3 gateway which will handle that function. Underlay traffic will be routed at ToR/Leaf locally.
924	**Leaf local routing** On the leaf switch when two servers on the same switch but on different VLAN/network, does it switch/route locally? For overlay traffic and when using a centralized L3 gateway solution, overlay traffic within a rack will be bridged wit hin that rack, but if traffic needs to cross a network segment then it will be forwarded to the centralized L3 gateway which will handle that function. Underlay traffic will be routed at ToR/Leaf locally.
925	**Questions and Clarifications - Datacenter - Management Access and Authentication**

926

Configuration method

How do you configure your solution (CLI, GUI, API, etc.)?

CLI, API, and NetEdit (GUI) are all supported.

NetEdit runs as an Open Virtualization Application (OVA) virtual machine (for example, VMware's ESXi) on a server.
NetEdit supports switches running ArubaOS-CX, including Aruba 8400 and 8320.
To use NetEdit, you must first import your Aruba OS-CX network device configurations. When NetEdit is made awar e of a new switch, it will interrogate the switch configuration, hardware inventory and neighbor information.
A user-friendly web-based UI allows network admins to easily interpret the status of network devices. A customizabl e application dashboard provides quick visibility into information and metrics that matter most to you.
NetEdit ensures that there is a complete history of changes for all devices, targeting all configuration and hardwar e changes.

927

GUI management

Describe if GUI management application is available for configuration of Spine Leaf network along with its features.

NetEdit provides automation of search, edit, validation, deployment and audit for network configurations.
Search
Using Search, you can quickly search all switch configurations, including hardware and software versions, to find t he group of switches that require configuration changes or investigation. You can also identify inconsistencies and errors, such as security policy violations.
For example, you can identify configurations of all switches of a certain type, in a particular location, where the con figuration has changed within a selected period of time.
Edit
The Edit feature lets you change multiple configurations at once using complete knowledge of each configuration fi le. Using Edit, you can take advantage of contextual insights that are automatically displayed.
For example, you can use Edit to set the NTP or the RADIUS server address for all relevant switches, or to set an ACL entry on all access switches. The Edit feature also includes command completion, syntax highlighting and vali dation.
Validate
Using Validate, you can continuously monitor and ensure conformance to corporate policies. You can perform valid ation checks on all configuration changes, including those made directly on the switch (i.e., outside of NetEdit).
For example, you can verify that all management IP addresses are on the management subnetwork, or that all rout ers running OSPF are logging adjacency changes. Validation tests can easily be customized and extended based on your existing knowledge of configuration commands.
Deploy
Using Deploy, you can stage a deployment (or a rollback) on multiple switches, and validate the correct operation of switches after changes. For instance, you can determine whether a change is working properly before deployin g it more widely, or you can quickly back out changes if there is a problem.
Deploy automatically collects network and services state information before and after a change, and intelligently di splays the difference. This lets you decide whether to keep or rollback the change within your allocated change wi ndow.
Audit
The Audit feature records all hardware and software versions, as well as other configuration changes. You can the n search and view all changes, or groups of changes.
This allows you to track changes to hardware, software, and configurations (whether made through NetEdit or dire ctly on the switch) with automated versioning. You can perform these rollbacks selectively, based upon factors suc h as the location of the switches or the dates of the changes.

928

Supported operating systems

If the solution uses a management application (GUI), what client operating systems are supported?

NetEdit supports ArubaOS-CX

929

CLI and GUI feature parity

Describe feature parity between CLI and GUI management application.

Full feature parity exists between NetEdit and CLI

930

SSH command and interactive support

Does the SSH access support remote command as well as interactive access?

Yes.

931

Telnet support

Can you access the CLI via Telnet?

Yes

932

Disabling of telnet

Can Telnet be disabled?

Yes

933

API support

Can the solution be managed by an API? Describe APIs

Yes. The API guide is available here: https://support.hpe.com/hpsc/doc/public/display?docId=emr_na-a00075250en_us&docLocale=en_US

Switches running the ArubaOS-CX software are fully programmable with a REST (Representational State Transfer) API, allowing easy integration with other devices both on premises and in the cloud. This programmability—combined with the Aruba Network Analytics Engine—accelerates network administrator understanding of and response to network issues.
The ArubaOS-CX REST API enables programmatic access to the ArubaOS-CX configuration and state database at the heart of the switch. By using a structured model, changes to the content and formatting of the CLI output do not affect the programs you write. And because the configuration is stored in a structured database instead of a text file, rolling back changes is easier than ever, thus dramatically reducing a risk of downtime and performance issues.
The ArubaOS-CX REST API is a web service that performs operations on switch resources using HTTPS POST, GET, PUT, and DELETE methods.
A switch resource is indicated by its URI. A URI can be made up of several components, including the host name or IP address, port number, the path, and an optional query string. The ArubaOS-CX operating system includes the ArubaOS-CX REST API Reference, which is a web interface based on the Swagger UI. The ArubaOS-CX REST API Reference provides the reference documentation for the REST API, including resources URIs, models, methods, and errors.

934

Two-factor support

Describe your system's support for two-factor authentication using SAML 2.0

Two-factor authentication is available for added security. In two-factor authentication, X.509 certificate-based authentication is combined with RADIUS authentication. When a user establishes an SSH connection to the switch, two factor-authentication occurs as follows:
• The username in the user's X.509 certificate is validated against the local user accounts on the switch.
• The username and password are validated against the accounts on the RADIUS server and the configured trust anchors.

935

SAML support

Do you support two-factor authentication using SAML 2.0 for the CLI or HTTP management interface?

Two-factor authentication is available for added security. In two-factor authentication, X.509 certificate-based authentication is combined with RADIUS authentication. When a user establishes an SSH connection to the switch, two factor-authentication occurs as follows:
• The username in the user's X.509 certificate is validated against the local user accounts on the switch.
• The username and password are validated against the accounts on the RADIUS server and the configured trust anchors.

936 **Questions and Clarifications - Datacenter - Troubleshooting**

937 **Packet capture support**

Does the solution support packet capture? Describe what devices and how it works.

Yes, via port mirroring to a capture station, or via tshark within AOS-CX

938 **VXLAN troubleshooting**

What troubleshooting tools are available for VXLAN?

Configuration validation is possible through NetEdit and VXLAN documentation is available online. https://support.hpe.com/hpsc/doc/public/display?docId=a00075254en_us

939 **Dropped packet troubleshooting**

What tools and counters are available to show why packets are dropped on an interface?

Interface, packet, routing counters are available for troubleshooting.

940 **Local log sizes**

How many log entries can be stored locally on each model specified in the solution?

Logs can be exported to external storage, size could depend on storage size.
Log file size is 100 MB by default with a max size of 200 MB and is rotated when log file size is full.

941 **Questions and Clarifications - Datacenter - Power and Physical**

942 **Supported types of power**

What are the power types and quantity for the top of rack, spine, and leaf switches?

The Aruba 8400 (spine) supports up to four (4) Aruba x382 54VDC 2700W AC PSU
The Aruba 8325 (leaf) supports dual 650W 100-240VAC power supplies

943 **AC and DC support**

Are both AC and DC power supply options available?

AC only.

944 **Power supply efficiencies**

What are the power efficiencies of the power supplies?

The 8400 has an 80 plus Silver rating

945 **Redundant power supplies**

Does all of the hardware support redundant power supplies?

Yes

946 **Air filters**

Are there any air filters for the equipment?

No

947 **Hot swappable power supplies**

Are the power supplies hot swappable?

Yes

948 **Front-to-back cooling**

Do the items in the solution support front to back cooling?

Yes

949 **Questions and Clarifications - Datacenter - Warranty and Paid Support**

950 **Hardware and software warranty**

Describe the system warranty for hardware and software.

The switches have a warranty that endures until 5 years after End of Sale (EoS) date. The switches include a RMA of NBD ship. with included software updates, 1 year of updates after EoS, and 3 years of vulnerability patches afte r EoS. TAC support is 8x5 for 90 days.

951 **Hardware warranty and duration**

How long does the hardware warranty last?

5 years

952 **Software warranty and duration**

How long does the software warranty last?

5 years

953 **Warranty start time**

When do the warranties start?

Warranty starts from the date of purchase and lasts 5 years from end of sale.

954 **Paid support**

Is paid support required for support (hardware replacement, TAC, software upgrades, etc.) after the warranty expire s?

Paid support is not required, although recommended

955 **Support options**

List the available options for hardware and software support and their associated costs

Options include:
Warranty

Foundation care includes 24x7 TAC access, advanced hardware replacement, all software releases, and access t o the Aruba Support Center. Pricing depends on which SLA is purchased.

Foundation care NBD parts-only
Foundation care 4 hour parts-only
Foundation care NDB on-site support
Foundation care 4 hour on-site support

956 **Hardware replacement without paid support**

What options do you have for hardware replacement without paid support and no warranty?

Depending on purchase agreements and duration, same or similar discounting may apply. This would need to be mutually agreed upon during contract negotiations.

957

RMA process

Describe your RMA process. Must we return hardware before a replacement is shipped?

To obtain a Return Material Authorization (RMA) number, contact HPE Aruba TAC and provide the following information. Under Standard Warranty or LLW (Limited Lifetime Warranty) hardware RMA's are handled via Best Effort Advanced Replacement. Out of warranty and/or expired contract hardware requires Service Renewal prior to an RMA.
TAC only handles defective RMA’s under proper entitlement. Anything else should go to Sales including evaluation.
• Product model number for the defective hardware
• Product serial number for the defective hardware
• System serial number of the base unit
• Description of failure and troubleshooting performed to isolate cause
• Customer (or recipient) ship-to address
• Contact name
• Contact phone, fax, and e-mail
• Appropriate diagnostic data as required by Aruba Technical Support
• All DOA’s (Dead on Arrival) within 30 days from ship date from Aruba will be entitled for a next business day advance replacement.
• LLW is covered only for certain products. See below for details.
http://www.arubanetworks.com/support-services/product-warranties/

958

Questions and Clarifications - Datacenter - Shipping

959

Demo and education

Will you ship us an agreed upon small selection of hardware for configuration development and education once we select you?

Aruba would be happy to accommodate loaner equipment, or PoC equipment.

960

Questions and Clarifications - Datacenter - General Solution Requirements

961

Multi-tenancy

Describe how your system can support multiple tenancy for system administration.

Dynamic segmentation and policy-based role enforcement allows for network segmentation and multi-tenancy for system administration by being able to restrict admin access to a particular set of nodes, or to particular functions.

962

Splunk integration

Does the solution integrate with Splunk?

Aruba ClearPass has a Splunk integration

963

Options for DCI

With two separate data centers, what are the options for data center interconnect?

DCI connections can use standard routing between the DCs.
If L2 extension is required and the fiber is owned by customer then ERPS can be used to connect multiple locations and enable L2 traffic.

964

Flow monitoring support

Does the solution have sFlow/Netflow support? If so, what sample rate do you support 1:1 1:2, etc.?

Yes sFlow is supported. Sampling by defaul is 1 in every 4096 packets, however it is adjustable from 1 in every 1 to 1000000000

965 **Flow versions supported**

What versions of sFlow/Netflow does the solution support?

sFlow

966 **Questions and Clarifications - Datacenter - Software Licensing**

967 **Software licensing requirements**

Does the solution require licensing of software features?

No. Aruba switches are license free. Purchasing the switch unlocks all features.

968 **Licensing model**

Describe how the solution and the individual items are licensed.

All Aruba swiches are license free

969 **Questions and Clarifications - Datacenter - General Security**

970 **CPU rate limiting**

Describe any support you have for limiting CPU cycles to out of control processes.

The Aruba switches feature Control Plane Policing (CoPP) which can limit access to the CPU, The CoPP guide is available here: https://support.hpe.com/hpsc/doc/public/display?docId=emr_na-a00061973en_us&docLocale=en_US

971 **Stateful ACL support**

Describe your on-switch capabilities for stateful access lists.

The Aruba 8325s and 8400s support 4K and 16K ACLs, respectively.

972 **Hardware processing of ACLs**

Are access lists processed in hardware, on the switch's CPU or both? Describe when each would be used.

On hardware via the ASIC and CPU.

973 **Other security features**

Describe any additional security features that are important in your solution.

A major differentiator in the Aruba solution is that security is built into all aspects of our networking solutions. When used in conjunction with other Aruba products, the network becomes inherently secure.

974 **Questions and Clarifications - Datacenter - Roadmap and System Lifetime**

975 **Product lifecycle**

Where in the product lifecycle is your current system, both hardware and software?

8400 was introduced in November 2017 and the 8325 was introduced in November 2018. ArubaOS-CX (the software) originated in November 2017.

976 **First date of production**

What was the first date of production of your devices?

8400 was introduced in November 2017 and the 8325 was introduced in November 2018.

977

System age

How long has the system been sold?

8400 was introduced in November 2017 and the 8325 was introduced in November 2018.

978

Estimated end-of-sale

What is the estimated earliest end-of sales date for your devices?

There are no prepared EOS plan, and one is not in place or being prepared a Minimum of 4 year life shall be expe cted with no upper limit.

979

Estimated end-of-support for software

What is the estimated earliest end-of-software support date?

Support is offered for 5 years after the hardware is discontinued. A minimum of 9 years of software support is expe cted.

980

Estimated end-of-support for hardware

What is your estimated earliest end-of-hardware support date for your devices?

There are no prepared EOS plan, and one is not in place or being prepared a Minimum of 4 year life shall be expe cted with no upper limit.

981

Estimated end-of-support for security and vulnerability patching

What is your estimated earliest end of security and vulnerability support date?

Support is offered for 5 years after the hardware is discontinued. A minimum of 9 years of software support is expe cted.

982

Estimated end-of-support for application

What is your estimated end of application support date (if an application used is considered separate from the stan dard operating system for the system)?

N/A

983

Feature roadmap

Detail your new features/functionality over the next 12 months for your devices and software.

Roadmaps are considered proprietary and highly confidential. Aruba does not include product roadmaps in RFP r esponses. The Aruba account team would be pleased to provide a roadmap presentation on-site under NDA.

984

Questions and Clarifications - Datacenter - TAC/Support

985

Service Level Agreement

Provide your Service Level Agreement (SLA). Upload a copy of your SLA to the Attachments section of this RFP.

Please see attachment 985 Foundation Care

986

Technical Assistance Method

How is your Technical Assistance Center contacted?

Aruba TAC can be contact via phone or online.

987

Questions and Clarifications - Datacenter - Training

988

Install training

What training is required for staff whose role is to primarily install the systems and performs minimal configuration?

Aruba has multi-tier education for various levels of skill. We do not require training, but do highly recommend it.

989

Configuration training

What training is required for staff whose role is to primarily configure this system?

Aruba has multi-tier education for various levels of skill. We do not require training, but do highly recommend it.

990

Training location

Where is your training offered? On-site, online, etc.

Aruba offers on-site, online, and virtual instructor-led training

991

Online training

Is there an online training lab available? Is it at no cost to us?

ArubaOS-CX is available with an OVA for training and simulation purposes. The OVA is available for download thro ugh the Aruba Support Portal.

992

Third party training

Is there third-party approved training that we could utilize? Provide information of some.

Aruba recommends our Aruba-branded training.

993

Questions and Clarifications - Datacenter - Automation and Orchestration

994

Network automation and orchestration support

Describe what network automation and orchestration software packages the switches work with.

Aruba is committed to open industry-standard protocols, so there are many software applications that the hardwar e can integrate with. Aruba is proposing Aruba NetEdit to provide automation and orchestration of configuration an d upgrade.

995

Multi-tenancy support

Describe your support for multi-tenancy with your automation and orchestration solution.

Aruba ClearPass and the switch RBAC controls allow for delegation of admin controls.

996

Multi-tenancy access control

With your multi-tenancy solution, can we limit which ports a user can modify? For example, user A can modify ports 1,3, 5 and user B can modify ports 2, 4 and 32 and user C can modify all the remaining ports?

Yes

997

Super-user support

Does your multi-tenancy solution have a concept of a super-user who can modify configuration anywhere? If yes, d escribe.

Yes, RBAC can establish a user as having full admin privilege

998

API support

What APIs do you support for automation and orchestration?

The full API guide is available here: https://support.hpe.com/hpsc/doc/public/display?docId=emr_na-a00075250en _us&docLocale=en_US

999

On-board scripting

Do you support onboard scripting? If so, what 'languages' do you support?

Python and Ansible are supported

1000

Misc. information

What other information should we know about your automation and orchestration implementation that would be helpful?

NetEdit runs as an Open Virtualization Application (OVA) virtual machine (for example, VMware's ESXi) on a server.
NetEdit supports switches running ArubaOS-CX, including Aruba 8400 and 8320.
To use NetEdit, you must first import your Aruba OS-CX network device configurations. When NetEdit is made aware of a new switch, it will interrogate the switch configuration, hardware inventory and neighbor information.
A user-friendly web-based UI allows network admins to easily interpret the status of network devices. A customizable application dashboard provides quick visibility into information and metrics that matter most to you.
NetEdit ensures that there is a complete history of changes for all devices, targeting all configuration and hardware changes.

NetEdit provides automation of search, edit, validation, deployment and audit for network configurations.
Search
Using Search, you can quickly search all switch configurations, including hardware and software versions, to find the group of switches that require configuration changes or investigation. You can also identify inconsistencies and errors, such as security policy violations.
For example, you can identify configurations of all switches of a certain type, in a particular location, where the configuration has changed within a selected period of time.
Edit
The Edit feature lets you change multiple configurations at once using complete knowledge of each configuration file. Using Edit, you can take advantage of contextual insights that are automatically displayed.
For example, you can use Edit to set the NTP or the RADIUS server address for all relevant switches, or to set an ACL entry on all access switches. The Edit feature also includes command completion, syntax highlighting and validation.
Validate
Using Validate, you can continuously monitor and ensure conformance to corporate policies. You can perform validation checks on all configuration changes, including those made directly on the switch (i.e., outside of NetEdit).
For example, you can verify that all management IP addresses are on the management subnetwork, or that all routers running OSPF are logging adjacency changes. Validation tests can easily be customized and extended based on your existing knowledge of configuration commands.
Deploy
Using Deploy, you can stage a deployment (or a rollback) on multiple switches, and validate the correct operation of switches after changes. For instance, you can determine whether a change is working properly before deploying it more widely, or you can quickly back out changes if there is a problem.
Deploy automatically collects network and services state information before and after a change, and intelligently displays the difference. This lets you decide whether to keep or rollback the change within your allocated change window.
Audit
The Audit feature records all hardware and software versions, as well as other configuration changes. You can then search and view all changes, or groups of changes.
This allows you to track changes to hardware, software, and configurations (whether made through NetEdit or directly on the switch) with automated versioning. You can perform these rollbacks selectively, based upon factors such as the location of the switches or the dates of the changes.

1001

CAMPUS BACKBONE SOLUTIONS

1002	**Required Features – Campus Backbone** Proposed solutions must offer components which support the following list of features. Please simply affirm or deny that your proposed solution meets the following requirements by notating each item with “accept”, “deny”, or “variance.” Please explain any variances in your product. The Bidder cannot answer “accept” if the feature is not currently available in the proposed hardware running current general availability (production) release software. If a feature is not in production software at the time of the RFP submission, the Bidder must choose “deny” or “variance.” If a feature not in production software is described under a “variance,” it must be noted the feature is not currently available.
1003	**Required Features – Campus Backbone - General Requirements**
1004	**Downstream device data rate support** Proposed solutions must include support for 1Gbps, 10Gbps service to downstream devices (IE: access switches). Accept
1005	**Variance to downstream device data rate support** Variance to Proposed solutions must include support for 1Gbps, 10Gbps service to downstream devices (IE: access switches). *No response*
1006	**Backbone data rate support** Proposed solutions must include support for 10Gbps and 100Gbps backbone connectivity. Accept
1007	**Variance to backbone data rate support** Variance to Proposed solutions must include support for 10Gbps and 100Gbps backbone connectivity. *No response*
1008	**Required Features – Campus Backbone - Ethernet Bridging protocols and functions**
1009	**Spanning tree support** Proposed routers and switches must fully support IEEE 802.1D bridging, including features originally defined as 802.1w (Rapid Spanning Tree Protocol). RSTP is used on some campus’s current switches. Accept
1010	**Variance to spanning tree support** Variance to IEEE 802.1D bridging, including features originally defined as 802.1w (Rapid Spanning Tree Protocol). RSTP is used on some campus’s current switches. *No response*
1011	**Spanning tree edge-port support** Proposed routers and switches must support a feature to configure a port as an edge-port, such that spanning-tree will transition more quickly/immediately to a forwarding mode and not generate topology-change-notifications (TCNs). Accept

1012 **Variance to spanning tree edge-port support**

Variance to feature to configure a port as an edge-port, such that spanning-tree will transition more quickly/immedia tely to a forwarding mode and not generate topology-change-notifications (TCNs).

No response

1013 **Spanning tree bpdu-filter support**

Proposed routers and switches must support a per-port feature to ignore STP BPDUs (i.e. bpdu-filter), allowing the port to remain in a forwarding state.

Accept

1014 **Variance to spanning tree bpdu-filter support**

Variance to per-port feature to ignore STP BPDUs (i.e. bpdu-filter), allowing the port to remain in a forwarding state.

No response

1015 **Spanning tree bpdu-protect support**

Proposed routers/switches must support a per-port feature to block a port that receives a BPDU (i.e. bpdu-protect), applicable to ports configured as edge-ports.

Accept

1016 **Variance to spanning tree bpdu-protect support**

Variance to per-port feature to block a port that receives a BPDU (i.e. bpdu-protect), applicable to ports configured as edge-ports.

No response

1017 **IEEE 802.1Q VLAN tagging support**

Proposed routers and switches must fully support IEEE 802.1Q VLAN tagging on layer 2 and layer 3 interfaces.

Accept

1018 **Variance to iEEE 802.1Q VLAN tagging support**

Variance to IEEE 802.1Q VLAN tagging on layer 2 and layer 3 interfaces.

No response

1019 **Jumbo frame support**

Proposed routers and switches must support jumbo frame sizes of 9,192+ bytes on all routed physical and virtual int erfaces and ports operating as L2-only bridging ports.

Accept

1020 **Variance to jumbo frame support**

Variance to jumbo frame sizes of 9,192+ bytes on all routed physical and virtual interfaces and ports operating as L 2-only bridging ports.

No response

1021 **MLAG support**

Proposed switches must support a form of multi-chassis link aggregation (i.e. MLAG or MC-LAG), between at least t wo switches, with control plane separation intact. Allowing for members of a downstream link-aggregate to terminate at least one member on each aggregated switch.

Accept

1022

Variance to mLAG support

Variance to form of multi-chassis link aggregation (i.e. MLAG or MC-LAG), between at least two switches, with contr ol plane separation intact. Allowing for members of a downstream link-aggregate to terminate at least one member o n each aggregated switch.

No response

1023

LACP support

Proposed switches must support 802.3ad compliant LACP link aggregates, including when multi-chassis link aggreg ation is used.

Accept

1024

Variance to IACP support

Variance to 802.3ad compliant LACP link aggregates, including when multi-chassis link aggregation is used.

No response

1025

Support for LAG across line cards

For chassis-based switches, proposed line cards must support IEEE 802.3ad link aggregation with aggregate memb er ports on the same, or different line cards.

Accept

1026

Variance to support for LAG across line cards

Variance to IEEE 802.3ad link aggregation with aggregate member ports on the same, or different line cards.

No response

1027

Support for LAG across stack

If fixed configuration routers/switches supporting stacking or virtual-chassis are proposed, all routers/switches in the stack must support IEEE 802.3ad link aggregation with ports on the same or different routers/switches in the stack.

Accept

1028

Variance to support for LAG across stack

Variance to IEEE 802.3ad link aggregation with ports on the same or different routers/switches in the stack.

No response

1029

Not port extenders

Proposed routers and switches must be full-featured switches and not port extenders.

Accept

1030

Variance to not port extenders

Variance to Proposed routers and switches must be full-featured switches and not port extenders.

No response

1031

Static MAC assignment

Proposed routers and switches must support static MAC assignment, allowing for the mapping of a MAC address to a port or series of ports.

Accept

1032 **Variance to static MAC assignment**

Variance to static MAC assignment, allowing for the mapping of a MAC address to a port or series of ports.

No response

1033 **Layer 2 virtualization over routed core**

Proposed routers and switches must support scalable Layer 2 virtualization over a routed core (IE: over IPv4, IPv6, or MPLS)

Accept

1034 **Variance to layer 2 virtualization over routed core**

Variance to scalable Layer 2 virtualization over a routed core (IE: over IPv4, IPv6, or MPLS)

No response

1035 **Storm control**

Proposed routers and switches must support some form of traffic limiting/policing or storm-control per port.

Accept

1036 **Variance to storm control**

Variance to some form of traffic limiting/policing or storm-control per port.

No response

1037 **Required Features – Campus Backbone - IPv4 / IPv6 Protocols and Functions**

1038 **IPv4 and IPv6 routing**

Proposed routers must support IPv4 and IPv6 routing.

Accept

1039 **Variance to iPv4 and IPv6 routing**

Variance to IPv4 and IPv6 routing.

No response

1040 **Unicast and multicast routing**

Proposed routers must support unicast and multicast routing.

Accept

1041 **Variance to unicast and multicast routing**

Variance to unicast and multicast routing.

No response

1042 **Routing protocol support**

Proposed routers must support OSPFv2, OSPFv3, and BGP.

Accept

1043 **Variance to routing protocol support**

Variance to OSPFv2, OSPFv3, and BGP.

No response

1044	**Static route support** Proposed routers must support static routes. Accept
1045	**Variance to static route support** Variance to static routes. *No response*
1046	**VRF support** Proposed routers must support VRFs (virtual routing and forwarding). Accept
1047	**Variance to vRF support** Variance to VRFs (virtual routing and forwarding). *No response*
1048	**Virtualized Layer 3 support** Proposed routers must support IPv4 and IPv6 virtualized routing through an overlay (IE: MPLS-L3VPN, VXLAN-EVPN, MPLS-EVPN, or other overlay technologies). Accept
1049	**Variance to virtualized Layer 3 support** Variance to IPv4 and IPv6 virtualized routing through an overlay (IE: MPLS-L3VPN, VXLAN-EVPN, MPLS-EVPN, or other overlay technologies). *No response*
1050	**Edge provisioning of Layer 2 and Layer 3 services** Proposed routers must support edge-provisioned virtualized Layer 2 and Layer 3 services. Accept
1051	**Variance to edge provisioning of Layer 2 and Layer 3 services** Variance to edge-provisioned virtualized Layer 2 and Layer 3 services. *No response*
1052	**Anti-spoofing features** Proposed routers must support address anti-spoofing for edge services (IE: For used when a router is acting as a default gateway for an IPv4/IPv6 network). Accept
1053	**Variance to anti-spoofing features** Variance to address anti-spoofing for edge services (IE: For used when a router is acting as a default gateway for an IPv4/IPv6 network). *No response*
1054	**Required Features – Campus Backbone - Management Functions**

1055

SNMP support

Proposed routers and switches must support SNMPv2c and SNMPv3.

Accept

1056

Variance to sNMP support

Variance to SNMPv2c and SNMPv3.

No response

1057

SSH support

Proposed routers and switches must support remote access to the command line interface (CLI) via SSHv2.

Accept

1058

Variance to sSH support

Variance to remote access to the command line interface (CLI) via SSHv2.

No response

1059

SSH access control

Proposed routers and switches must support restricting access to SSH by an ACL or equivalent protection.

Accept

1060

Variance to sSH access control

Variance to restricting access to SSH by an ACL or equivalent protection.

No response

1061

SNMP access control

Proposed routers and switches must support restricting SNMP access by an access control list or equivalent protection.

Accept

1062

Variance to sNMP access control

Variance to restricting SNMP access by an access control list or equivalent protection.

No response

1063

Serial console support

Proposed routers and switches must support access to the CLI via a serial console port, or some other method via direct physical connection.

Accept

1064

Variance to serial console support

Variance to access to the CLI via a serial console port, or some other method via direct physical connection.

No response

1065

RADIUS or TACACS+ support

Proposed routers and switches must support RADIUS or TACACS+ authentication for SSH and serial console administrators.

Accept

1066

Variance to rADIUS or TACACS+ support

Variance to RADIUS or TACACS+ authentication for SSH and serial console administrators.

No response

1067

Local account failover

Proposed routers and switches must support failover to a user account locally defined on the device, if the RADIUS or TACACS+ server is unreachable.

Accept

1068

Variance to local account failover

Variance to failover to a user account locally defined on the device, if the RADIUS or TACACS+ server is unreachable.

No response

1069

Encryption of RADIUS or TACACS+ secrets

Proposed routers and switches must support encryption of the RADIUS and TACACS+ shared secret stored in the configuration file.

Accept

1070

Variance to encryption of RADIUS or TACACS+ secrets

Variance to encryption of the RADIUS and TACACS+ shared secret stored in the configuration file.

No response

1071

Encryption of local user passwords

Proposed routers and switches must support encryption of local user passwords stored in the configuration file.

Accept

1072

Variance to encryption of local user passwords

Variance to encryption of local user passwords stored in the configuration file.

No response

1073

Configuration backup

Proposed routers and switches must be able to represent its configuration (such as a text file) that can be uploaded to restore a configuration.

Accept

1074

Variance to configuration backup

Variance to Proposed routers and switches must be able to represent its configuration (such as a text file) that can be uploaded to restore a configuration.

No response

1075

Syslog support

Proposed routers and switches must support logging to a syslog server on a configurable port other than default syslog (udp/514).

Accept

1076

Variance to syslog support

Variance to logging to a syslog server on a configurable port other than default syslog (udp/514).

No response

1077

NTP support

Proposed routers and switches must support NTP as described in RFC 5905 or SNTP as described by RFC 4330.

Accept

1078

Variance to nTP support

Variance to NTP as described in RFC 5905 or SNTP as described by RFC 4330.

No response

1079

LLDP support

Proposed routers and switches must support IEEE 802.1ab Link-Layer Discovery Protocol (LLDP).

Accept

1080

Variance to lLDP support

Variance to IEEE 802.1ab Link-Layer Discovery Protocol (LLDP).

No response

1081

Naming of interfaces

Proposed switches must support naming of individual interfaces within the configuration and this information must b e retrievable via CLI "show" commands and SNMP.

Accept

1082

Variance to naming of interfaces

Variance to naming of individual interfaces within the configuration and this information must be retrievable via CLI " show" commands and SNMP.

No response

1083

Encrypted file transfer

Proposed routers and switches must support encrypted file transfer for uploading/download code or configuration fil es.

Accept

1084

Variance to encrypted file transfer

Variance to encrypted file transfer for uploading/download code or configuration files.

No response

1085

Required Features – Campus Backbone - Physical & Power Characteristics

1086

Physical router and switch dimensions

Proposed routers and switches must be mountable in both a standard two-rail 19" communication rack and a standa rd 19" four-post server rack.

Accept

1087 **Variance to physical router and switch dimensions**

Variance to Proposed routers and switches must be mountable in both a standard two-rail 19" communication rack a nd a standard 19" four-post server rack.

No response

1088 **Input voltage**

Proposed routers and switches must support 120 and 208 VAC capable power supplies.

Accept

1089 **Variance to input voltage**

Variance to 120 and 208 VAC capable power supplies.

No response

1090 **Power supply redundancy**

Proposed routers and switches must contain N+1 power redundancy, such that if any individual power supply were t o fail or lose power, the device would continue to function without any impairment. For example, if a device requires three power supplies to function, the switch must support four power supplies such that any individual power supply could fail and the device would continue to function without impairment.

Accept

1091 **Variance to power supply redundancy**

Variance to four power supplies such that any individual power supply could fail and the device would continue to fu nction without impairment.

No response

1092 **Hot swappable power supplies**

Proposed routers and switches must have hot swappable power supplies.

Accept

1093 **Variance to hot swappable power supplies**

Variance to Proposed routers and switches must have hot swappable power supplies.

No response

1094 **Hot swappable modules**

Proposed modular routers and switches must support hot swapping of modules, without adversely affecting other m odules in operation.

Accept

1095 **Variance to hot swappable modules**

Variance to hot swapping of modules, without adversely affecting other modules in operation.

No response

1096 **Stack behavior during individual member failure**

Proposed stackable routers and switches must allow for the failure of any one router/switch, without disabling the st ack or degrading the operation of the remaining stack members.

Accept

1097 **Variance to stack behavior during individual member failure**

Variance to Proposed stackable routers and switches must allow for the failure of any one router/switch, without disa bling the stack or degrading the operation of the remaining stack members.

No response

1098 **Replacement of stack members**

Proposed stackable routers and switches must be replaceable without disabling the stack nor degrading the operati on of the remaining stack members.

Accept

1099 **Variance to replacement of stack members**

Variance to Proposed stackable routers and switches must be replaceable without disabling the stack nor degrading the operation of the remaining stack members.

No response

1100 **Hot swappable fans**

Replaceable fans must be hot-swappable.

Accept

1101 **Variance to hot swappable fans**

Variance to Replaceable fans must be hot-swappable.

No response

1102 **Strongly Desired Features – Campus Backbone**

The following list of features are highly desirable in a proposed solution. Please simply affirm or deny that your prop osed solution meets the following requirements by notating each item with “accept”, “deny”, or “variance.” Please ex plain any variances in your product. The Bidder cannot answer “accept” if the feature is not currently available in th e proposed hardware running current general availability (production) release software. If a feature is not in product ion software at the time of the RFP submission, the Bidder must choose “deny” or “variance.” If a feature not in prod uction software is described under a “variance,” it must be noted the feature is not currently available.

1103 **Strongly Desired Features – Campus Backbone - General**

1104 **Third party optics and transceivers**

Proposed routers and switches should support third-party optics and transceivers.

Variance

1105 **Variance to third party optics and transceivers**

Variance to third-party optics and transceivers.

Only the 3810M switches will operate with third party transceivers. The 8400 and 8325 will not. The 3810M is prop osed for Lincoln Region C and Kearny

1106 **Strongly Desired Features – Campus Backbone - Ethernet Bridging Protocols and Functions**

1107	**802.1q VLAN tag re-use** Proposed routers and switches should support the re-use of an 802.1q VLAN tag in different bridging domains for downstream devices. Accept
1108	**Variance to 802.1q VLAN tag re-use** Variance to the re-use of an 802.1q VLAN tag in different bridging domains for downstream devices. *No response*
1109	**Loop protection features** Proposed routers/switches should support a loop protection feature, independent of STP, to disable a port where a loop has been detected on a down-stream switch. Accept
1110	**Variance to loop protection features** Variance to loop protection feature, independent of STP, to disable a port where a loop has been detected on a down-stream switch. *No response*
1111	**MAC table size** Proposed routers and switches should support hardware forwarding for a minimum of 60,000 hosts (MAC table entries) via layer 2 bridging functions, please indicate the maximum. Accept
1112	**Variance to mAC table size** Variance to hardware forwarding for a minimum of 60,000 hosts (MAC table entries) via layer 2 bridging functions, please indicate the maximum. *No response*
1113	**MAC table size per VLAN** Proposed routers and switches should support a minimum of 4,096 hosts, or MAC entries, in a single layer 2 VLAN. Please indicate the maximum. Accept
1114	**Variance to mAC table size per VLAN** Variance to minimum of 4,096 hosts, or MAC entries, in a single layer 2 VLAN. Please indicate the maximum. *No response*
1115	**Broadcast storm control** Proposed routers and switches should support broadcast storm control and multicast storm control for all ports operating as L2-only bridging ports. Accept
1116	**Variance to broadcast storm control** Variance to broadcast storm control and multicast storm control for all ports operating as L2-only bridging ports. *No response*

1117	**Strongly Desired Features – Campus Backbone - IPv4 / IPv6 Protocols and Functions**
1118	**Static ARP** Proposed routers and switches should support IPv4 static ARP entries. Deny
1119	**Variance to static ARP** Variance to IPv4 static ARP entries. *No response*
1120	**Static IPv6 ND** Proposed routers and switches should support IPv6 static neighbor-table entries. Deny
1121	**Variance to static IPv6 ND** Variance to IPv6 static neighbor-table entries. *No response*
1122	**IPv4 and IPv6 feature parity in forwarding** Proposed routers and switches should have feature parity between IPv4 and IPv6 forwarding. Accept
1123	**Variance to iPv4 and IPv6 feature parity in forwarding** Variance to Proposed routers and switches should have feature parity between IPv4 and IPv6 forwarding. *No response*
1124	**IPv4 and IPv6 feature parity in forwarding** Proposed routers and switches should have feature parity between IPv4 and IPv6 management functionality. Accept
1125	**Variance to iPv4 and IPv6 feature parity in forwarding** Variance to Proposed routers and switches should have feature parity between IPv4 and IPv6 management function ality. *No response*
1126	**Routing between virtualized ethernet networks** Routing between two different virtualized Ethernet networks should be supported (IE: Routing between two different VLANs or VXLAN VNIs) Accept
1127	**Variance to routing between virtualized ethernet networks** Variance to Routing between two different virtualized Ethernet networks should be supported (IE: Routing between t wo different VLANs or VXLAN VNIs) *No response*

1128	**ARP/ND suppression in overlay** Routers should support ARP/ND suppression across supported overlay networks. Accept
1129	**Variance to aRP/ND suppression in overlay** Variance to ARP/ND suppression across supported overlay networks. *No response*
1130	**Strongly Desired Features – Campus Backbone - Management Functions**
1131	**Zero-Touch-Provisioning** Proposed routers and switches should support some form of zero-touch-provisioning. Variance
1132	**Variance to zero-Touch-Provisioning** Variance to some form of zero-touch-provisioning. The 3810M will support ZTP, but not the 8325 and 8400.
1133	**Out-of-Band management** Proposed routers and switches should support an out-of-band management port. Accept
1134	**Variance to out-of-Band management** Variance to an out-of-band management port. *No response*
1135	**Control-plane-protection** Proposed routers and switches should support control plane protection. Traffic forwarding, switch adjacencies, and CLI management of the device over the serial console and out-of-band management ports should continue to functi on with high volumes of traffic. This includes, but is not limited to ARP storms, broadcast storms, DHCP relay forwar ding, and handling traffic with IP options set. Accept
1136	**Variance to control-plane-protection** Variance to control plane protection. Traffic forwarding, switch adjacencies, and CLI management of the device over the serial console and out-of-band management ports should continue to function with high volumes of traffic. This i ncludes, but is not limited to ARP storms, broadcast storms, DHCP relay forwarding, and handling traffic with IP opti ons set. *No response*
1137	**Software upgrade process** Describe the switch software upgrade process and estimated time to complete and return to operation. Accept

1138

Variance to software upgrade process

Variance to Describe the switch software upgrade process and estimated time to complete and return to operation.

For the 3810M the upgrade process requires loading the new firmware into the secondary flash storage on the switch, then rebooting the switch to load the secondary image. The 8400 and 8325 have live upgrade when deployed in VSX pairs and do not interrupt any service to the network.

1139

Syslog facilities

Proposed routers and switches should support manual assignment of syslog facilities local0 - local7.

Accept

1140

Variance to syslog facilities

Variance to manual assignment of syslog facilities local0 - local7.

No response

1141

Syslog over TCP

Proposed routers and switches should support syslog over TCP.

Accept

1142

Variance to syslog over TCP

Variance to syslog over TCP.

No response

1143

Logging of administrative logins

Proposed routers and switches should log usernames of authorized users to the syslog server at the time of login.

Accept

1144

Variance to logging of administrative logins

Variance to Proposed routers and switches should log usernames of authorized users to the syslog server at the time of login.

No response

1145

Logging of configuration changes

Proposed routers and switches should log the username associated with configuration changes to the syslog server at the time changes are committed.

Accept

1146

Variance to logging of configuration changes

Variance to Proposed routers and switches should log the username associated with configuration changes to the syslog server at the time changes are committed.

No response

1147

Syslog documentation

Syslog documentation should be available for all syslog messages encountered during normal operation.

Accept

1148

Variance to syslog documentation

Variance to Syslog documentation should be available for all syslog messages encountered during normal operation.

No response

1149

SNMP MIB support

Proposed routers and switches should represent the following information as objects that can be queried via SNMP: 1) Status of physical devices (chassis, fan trays, power supplies, line cards, and etc.). 2) Status of resources (CPU, memory, and etc.). 3) Status and statistics of internal processes. 4) Status of physical interfaces, sub-interfaces, and physical and virtual interfaces. 5) Traffic and error counters for physical interfaces, sub-interfaces, and physical and virtual interfaces.

Accept

1150

Variance to sNMP MIB support

Variance to Proposed routers and switches should represent the following information as objects that can be queried via SNMP: 1) Status of physical devices (chassis, fan trays, power supplies, line cards, and etc.). 2) Status of resources (CPU, memory, and etc.). 3) Status and statistics of internal processes. 4) Status of physical interfaces, sub-interfaces, and physical and virtual interfaces. 5) Traffic and error counters for physical interfaces, sub-interfaces, and physical and virtual interfaces.

No response

1151

Optical power monitoring

All optical transceivers should report transmit and receive light levels.

Accept

1152

Variance to optical power monitoring

Variance to All optical transceivers should report transmit and receive light levels.

No response

1153

SNMP MIB support

Proposed routers and switches should represent the following information as objects that can be queried via SNMP. 1) Transmit and receive light levels on optical transceivers. 2) Serial number and slot position of every field replaceable part.

Accept

1154

Variance to sNMP MIB support

Variance to Proposed routers and switches should represent the following information as objects that can be queried via SNMP. 1) Transmit and receive light levels on optical transceivers. 2) Serial number and slot position of every field replaceable part.

No response

1155

Interface counter update frequency

Proposed routers and switches should support high frequency updates for interface counters (1-5 seconds preferred).

Accept

1156

Variance to interface counter update frequency

Variance to high frequency updates for interface counters (1-5 seconds preferred).

No response

1157

Role-based access based on RADIUS attribute

Proposed routers and switches should support assigning role based administrative access by using a returned RADIUS or TACACS+ attribute such that the router/switch restrict the execution of CLI commands based on the returned role code.

Accept

1158

Variance to role-based access based on RADIUS attribute

Variance to assigning role based administrative access by using a returned RADIUS or TACACS+ attribute such that the router/switch restrict the execution of CLI commands based on the returned role code.

No response

1159

Strongly Desired Features – Campus Backbone - Physical & Power Characteristics

1160

Airflow options

Proposed routers and switches should include airflow options for both port-side exhaust or port-side intake. Can airflow direction be modified?

Deny

1161

Variance to airflow options

Variance to Proposed routers and switches should include airflow options for both port-side exhaust or port-side intake. Can airflow direction be modified?

Airflow is fixed

1162

Questions and Clarifications – Campus Backbone

Participant must answer the following set of questions designed to help identify basic metrics, scaling issues, and suitability. If more than one type of router or switch is proposed, the values for each type must be specified.

1163

Questions and Clarifications – Campus Backbone - General

1164

Downstream device rate support

Describe any support for 25Gbps, 40Gbps, or 100Gbps services to downstream devices (access/aggregation switching).

The 8400 and 8325 both support 1/10GbE and 40/100GbE connectivity. The 8325 also supports 25GbE

1165

Backbone link rate support

Describe any support for backbone speeds higher than 100Gbps.

No speeds higher than 100GbE exist at this time, but additional line cards are possible in the future.

1166

Blocking within a chassis

Describe any situation in a chassis where traffic forwarding may be blocking.

The proposed switches are all non-blocking

1167

Software development location

In what country is the proposed equipment's software developed and maintained?

USA

1168 **Hardware development location**

In what country is the proposed equipment's hardware developed?

USA

1169 **Hardware manufacture location**

In what country is the proposed equipment's hardware manufactured and assembled?

Singapore

1170 **Questions and Clarifications – Campus Backbone - Ethernet Bridging Protocols and Functions**

1171 **MAC scaling characteristics**

What is the maximum number of MAC address forwarding entries that can exist on a system?

The 8400 can support up to 768,000 MAC addresses. The 8325 can support up to 98,304 MAC addresses and th e 3810M can support up to 64,000 MAC addresses.

1172 **Ethernet virtualization limitations**

Describe any scaling limitations of Layer 2 (Ethernet) virtualization supported, including any limitations when virtualiz ed in a routed overlay.

The Aruba switches support up to 4K VLANs. Aruba 8325 – 1k L3 VTEPS

1173 **MAC control-plane interaction**

In a virtualized layer 2 service, are MAC forwarding information shared with other routers through a control-plane m echanism? If so, describe the mechanism.

The Aruba 8325 VTEP switches support flooding of MAC addresses to peered VTEP so they can reach each route r

1174 **Other system limitations**

Describe any other system limitations that may exist.

N/A

1175 **Questions and Clarifications – Campus Backbone - IPv4 / IPv6 Protocols and Functions**

1176 **FIB scale**

What is the maximum number of FIB (Forwarding Information Base) entries that exist?

The routing table for the 3810M is IPv4: 10,000 entries and IPv6 5000 entries. For the 8400, IPv4 routes: 1,011,71 2. IPv6 524,288. The 8325 supports IPv4 28,658 routes and IPv6 12,289.

1177 **FIB sharing**

Is the FIB table shared between protocols (IE: IPv4 prefix routes, IPv4 host routes, IPv6 prefix routes, IPv6 host rout es, and Ethernet bridging)? If so, do any types of entries consume more FIB space than another type of entry?

They are separate tables

1178 **FIB allocation method**

If the FIB table is shared, can this allocation be changed? Is a system reboot required to change the allocation?

No, it cannot be changed. Not shared though.

1179

RIB scale

Describe the maximum route table size.

The routing table for the 3810M is IPv4: 10,000 entries and IPv6 5000 entries. For the 8400, IPv4 routes: 1,011,712. IPv6 524,288. The 8325 supports IPv4 28,658 routes and IPv6 12,289.

1180

Routing and switching performance

Describe the switching and routing performance in bytes per second, packets per second, etc.

The 8400 has a 19.2Tbps (1.2Tbps/slot) switching capacity and up to 7.132BPPS. The 8325 has a 6.4Tbps switching capacity and up to 2,000Mpps. The 3810M has a switching capacity of 480 Gbps and up to 285.7Mpps.

1181

VRF scale

Describe the number of VRF (virtual routing and forwarding) instances supported by proposed routers and any licensing required.

The 8400 and the 8325 supports up to 32 VRFs. The 3810M does not support VRF.

1182

Anycast gateway support

Describe anycast gateway support. (IE: When multihoming a service, can either router in an MC-LAG act as the default gateway?)

The Aruba switches support VSX which enables Anycast IP for SVIs which connect to attached hosts. The hosts will point to the anycast address as the GW, while both switches in the VSX pair will listen to and respond to that address.
The switches also support Multicast PIM Anycast RP functionality which allows multiple RPs to share the same Anycast RP address which attached devices will be configured to use. This enables HA and active/active sessions.

1183

ARP/ND control-plane interaction

Describe if and how ARP/ND information is shared with other routers.

A gratuitous ARP is periodically sent out to other neighbors on each subnet.

1184

Layer 3 virtualization scaling limitations

Describe any scaling limitations of Layer3 (IPv4 and IPv6) virtualization.

Depending on the mode, the Aruba 8325 VTEPs can support up to 32K overlay hosts (and 12K Underlay hosts), or 12K overlay hosts (and 32K Underlay hosts).

1185

NSR support

Describe which routing protocols support NSR (Non Stop Routing).

The Aruba 8400/8325 both support Graceful Restart when used with OSPF and BGP.

1186

Symmetric and Asymmetric VXLAN routing

If VXLAN routing is supported, is symmetric and asymmetric VXLAN routing supported?

The Aruba 8325 currently supports Asymmetric VXLAN routing.

1187

VTEP and VNI scale

If VXLAN is supported, indicate the maximum number of VTEPs and VNIs supported.

Up to 4039 VNIs and 256 VTEPs

1188

BUM traffic replication in a single site deployment

If EVPN or a similar technology is supported, describe how BUM (Broadcast, Unknown unicast, Multicast) traffic is replicated in a single-site deployment. (IE: Is Head-End-Replication utilized, or multicast in an underlay deployment?)

In overlay environments, the Aruba 8325 leverages head-end replication to transmit BUM traffic.

1189	**BUM traffic replication in a multi-site deployment** If EVPN or a similar technology is supported, describe how BUM (Broadcast, Unknown unicast, Multicast) traffic is replicated in a multi-site deployment. (IE: Is a designated forwarder used when multiple sites exist?) Not supported.
1190	**Questions and Clarifications – Campus Backbone - Management Functions**
1191	**Software upgrade process** Describe the switch software upgrade process including the ISSU or hitless upgrade process if any and estimated time to complete. Please also include any restrictions or caveats to these processes. The 8400 and 8325 utilize live upgrade when deployed in VSX pairs. If a single switch is deployed, not linked in a VSX pair, then the update can be automated through NetEdit and would require a reboot.
1192	**Software upgrade process with MC-LAG or Virtual Chassis** Describe the software upgrade process for the routers and switches when configured as an MC-LAG or Virtual Chassis pair and indicate any downtime for one or both switches. The 8400 and 8325 utilize live upgrade when deployed in VSX pairs.
1193	**API support** Describe supported APIs and their capabilities, providing any documentation as relevant. Full API guide is available here: https://support.hpe.com/hpsc/doc/public/display?docId=emr_na-a00075250en_us&docLocale=en_US
1194	**Configuration backup format** Is there support for importing and/or exporting the switch configuration in XML or JSON format? JSON

1195

Other automation support

Describe any vendor provided tools, programming libraries, or Ansible roles that benefit automation/orchestration.

Aruba NetEdit

NetEdit provides automation of search, edit, validation, deployment and audit for network configurations.
Search
Using Search, you can quickly search all switch configurations, including hardware and software versions, to find t he group of switches that require configuration changes or investigation. You can also identify inconsistencies and errors, such as security policy violations.
For example, you can identify configurations of all switches of a certain type, in a particular location, where the con figuration has changed within a selected period of time.
Edit
The Edit feature lets you change multiple configurations at once using complete knowledge of each configuration fi le. Using Edit, you can take advantage of contextual insights that are automatically displayed.
For example, you can use Edit to set the NTP or the RADIUS server address for all relevant switches, or to set an ACL entry on all access switches. The Edit feature also includes command completion, syntax highlighting and vali dation.
Validate
Using Validate, you can continuously monitor and ensure conformance to corporate policies. You can perform valid ation checks on all configuration changes, including those made directly on the switch (i.e., outside of NetEdit).
For example, you can verify that all management IP addresses are on the management subnetwork, or that all rout ers running OSPF are logging adjacency changes. Validation tests can easily be customized and extended based on your existing knowledge of configuration commands.
Deploy
Using Deploy, you can stage a deployment (or a rollback) on multiple switches, and validate the correct operation of switches after changes. For instance, you can determine whether a change is working properly before deployin g it more widely, or you can quickly back out changes if there is a problem.
Deploy automatically collects network and services state information before and after a change, and intelligently di splays the difference. This lets you decide whether to keep or rollback the change within your allocated change wi ndow.
Audit
The Audit feature records all hardware and software versions, as well as other configuration changes. You can the n search and view all changes, or groups of changes.
This allows you to track changes to hardware, software, and configurations (whether made through NetEdit or dire ctly on the switch) with automated versioning. You can perform these rollbacks selectively, based upon factors suc h as the location of the switches or the dates of the changes.

1196

Configuration rollback support

Indicate whether the software has a provision for a "rollback" feature allowing the return of the configuration to one or more historic revisions.

Yes.

1197

Software staging

Indicate whether the routers and switches support the saving of or pre-positioning of software or configuration files i n their onboard flash memory.

Yes. Each switch has dual flash memory for a primary and secondary image

1198

Multiple software versions

Is it possible to store more than one version of the system software on routers and switches and choose which to bo ot?

Yes.

1199 **Out-of-Band management**

If the routers and switches contain an out-of-band management port, please indicate what types of management traffic are sourced from this port and can that traffic be directed to standard ports? (i.e. RADIUS, NTP, SNMP requests or sFlow/Netflow/IPFIX export?)

SSH, RADIUS, sFlow

1200 **Exclusive configuration mode**

Is there an "edit exclusive" or similar option when editing the configuration and prohibiting other users from doing the same simultaneously.

Yes. Access Control can be restricted to the number of admin sessions allowed at a time, and who has configuration authorization.

1201 **Zero-Touch-Provisioning**

If zero-touch-provisioning is supported, please detail what is required and if there are supplemental management platforms provided for this.

The 3810M supports ZTP, however the 8400 and 8325 would utilize NetEdit for a low-touch provision.

1202 **sFlow support**

If the proposed routers and switches support sFlow, what is the maximum sampling rate for a router under heavy load?

Sampling rate is adjustable from 1:1 to 1:10000000

1203 **NetFlow support**

If the proposed routers and switches support Netflow, what is the maximum sampling rate for a router under heavy load? A sampling rate of 1:1 being ideal.

1:1 is available, but would likely cause performance loss.

1204 **IPFIX support**

If the proposed routers and switches support IPFIX, what is the maximum sampling rate for a router under heavy load? A sampling rate of 1:1 being ideal.

Not Supported

1205 **Questions and Clarifications – Campus Backbone - Physical & Power Characteristics**

1206 **Physical dimensions**

Describe the dimensions of any proposed router/switch. Use industry standard “rack units” where applicable.

3810M 1RU
8325 1RU
8400 8RU

1207 **Power requirements**

Specify the power requirements of each proposed fixed or modular switch when using AC power.

8400 up to 4 PSUs 90-140 / 180-264 VAC, 16A
8325 2 PSUs 100-240 VAC, 5A low volated 3A high voltage.

1208	**Thermal output** Specify the BTU output for each standalone switch or modular chassis model in the proposed configuration for 120 V AC, 208V AC (and -48V DC operation if applicable). 8325 Max heat output is 1877 BTU/hr 8400 max heat output 13563 BTU/hr
1209	**Estimated boot time** Specify the boot time in seconds for each proposed device configuration. This should be the time it takes for the de vice to reach a full forwarding state from a powered off state without taking into consideration convergence of routin g protocols. Both switches boot in ~ 2 minutes.
1210	**Power supply efficiency** What are the power efficiencies of power supplies? 80 plus silver
1211	**Environmental tolerances** What are the environmental tolerances for temperature, humidity, and altitude? 8400 and 8325: operating temp: 32° to 104° 5-95% noncondensing | altitude 10,000ft.
1212	**Questions and Clarifications – Campus Backbone - Switch and Router Architecture**
1213	**Hardware architecture** Describe the architecture of the router and provide a block diagram of the architecture that includes major compone nts such as ASIC, Memory, CPU, network modules, stack interface, etc. See attachment "1213 8400 Architecture" and "1213 8325 Architecture"
1214	**ASIC** Describe the model of ASIC used on any proposed router or switch. The ASIC is the 7th Generation ProVision ASIC. The 8400 has fabric ASICs and line card switching ASICs. The 83 25 has a fabric ASIC and a switching ASIC.

1215

ASIC - pipeline description

Describe the forwarding pipeline on any proposed router or switch.

When a packet comes into the 8400 switch it goes through the MAC PHY ingress, which is the physical Ethernet co nnection to the line card. The packet gets parsed at the ingress pipeline so the line card can look at some of the in formation in the packet. The packet doesn't fully de-encapsulate the packet but it may pop off some labels. The lo okup is where its layer 2 and layer 3 headers are de-encapsulated and looks at the items in the packet. Using the TCAMs and the exact match DB to figure outwhere to send the packet, and what should be done with the packet. The lookup does not actually decide where to send the packet it just checks to see what should be done with the p acket. The forwarding Resolution decides what to do with the packet by using the information gathered by the look up.
Next the packet is sent to the traffic manager works, the traffic manager works on a system of credits. In order for t he packet to be sent out of the ingress buffer where it is now to the egress buffer of another line card. The egress buffer on each line card has to let the ingress buffers know how much traffic it has in its queue, this is done by sen ding credits to each ingress buffer. Once the ingress buffer where the packet is being held gets enough credits fro m the egress buffer the packet is trying go to, it will then send the packet to the fabric module then to egress buffe r of the destination line card. If the packet is going to the same line card the Packet is still scheduled but instead of being sent to the fabric, queue it is sent to the local egress queue.
Packets coming in to the egress buffer then will be moved to the egress pipeline where the mac addresses may be modify to the correct destination mac if necessary. Lookups are also done using the internal TCAM and the Exact match DB to decide what port to send the packet out to.

1216

Memory available to CPU

Describe how much memory is available to the CPU?

The 8400 management modules have an Intel Broadwell CPU with 32GB of DRAM. The 8325 has an Intel broadwe ll with 16Gb DDR4.

1217

System buffering

Describe where packet buffers are located in the architecture and how they are shared.

On the 8400 each line card has a packet buffer shared among the ports on that line card. On the 8325 there is a c entral packet buffer shared between ports

1218

Packet walk within a single ASIC

Provide a packet walk-through for data entering and exiting on the same ASIC.

When a packet comes into the switch it goes through the MAC PHY ingress, which is the physical Ethernet connect ion to the line card. The packet gets parsed at the ingress pipeline so the line card can look at some of the inform ation in the packet. The packet doesn't fully de-encapsulate the packet but it may pop off some labels. The lookup is where its layer 2 and layer 3 headers are de-encapsulated and looks at the items in the packet. Using the TCAM s and the exact match DB to figure out where to send the packet, and what should be done with the packet. The lo okup does not actually decide where to send the packet it just checks to see what should be done with the packet. The forwarding Resolution decides what to do with the packet by using the information gathered by the lookup.
Next the packet is sent to the traffic manager works, the traffic manager works on a system of credits. In order for t he packet to be sent out of the ingress buffer where it is now to the egress buffer of another line card. The egress buffer on each line card has to let the ingress buffers know how much traffic it has in its queue, this is done by sen ding credits to each ingress buffer. Once the ingress buffer where the packet is being held gets enough credits fro m the egress buffer the packet is trying go to, it will then send the packet to the fabric module then to egress buffe r of the destination line card. If the packet is going to the same line card the Packet is still scheduled but instead of being sent to the fabric, queue it is sent to the local egress queue.
Packets coming in to the egress buffer then will be moved to the egress pipeline where the mac addresses may be modify to the correct destination mac if necessary. Lookups are also done using the internal TCAM and the Exact match DB to decide what port to send the packet out to of the line card to the device the packet was destine to.

1219	**Packet walk within a single router** Provide a packet walk-through for data entering and exiting from a different ASIC line card of on the same router. When a packet comes into the switch it goes through the MAC PHY ingress, which is the physical Ethernet connect ion to the line card. The packet gets parsed at the ingress pipeline so the line card can look at some of the inform ation in the packet. The packet doesn't fully de-encapsulate the packet but it may pop off some labels. The lookup is where its layer 2 and layer 3 headers are de-encapsulated and looks at the items in the packet. Using the TCAM s and the exact match DB to figure out where to send the packet, and what should be done with the packet. The lo okup does not actually decide where to send the packet it just checks to see what should be done with the packet. The forwarding Resolution decides what to do with the packet by using the information gathered by the lookup. Next the packet is sent to the traffic manager works, the traffic manager works on a system of credits. In order for t he packet to be sent out of the ingress buffer where it is now to the egress buffer of another line card. The egress buffer on each line card has to let the ingress buffers know how much traffic it has in its queue, this is done by sen ding credits to each ingress buffer. Once the ingress buffer where the packet is being held gets enough credits fro m the egress buffer the packet is trying go to, it will then send the packet to the fabric module then to egress buffe r of the destination line card. If the packet is going to the same line card the Packet is still scheduled but instead of being sent to the fabric, queue it is sent to the local egress queue. Packets coming in to the egress buffer then will be moved to the egress pipeline where the mac addresses may be modify to the correct destination mac if necessary. Lookups are also done using the internal TCAM and the Exact match DB to decide what port to send the packet out to of the line card to the device the packet was destine to.
12220	**Other aspects** Describe any other architectural features that you feel are important. N/A
12221	**System upgrades** Describe any hardware upgrades that may be purchased for the router aside from network modules. For example, Memory, Flash, Processors, etc. No additional hardware upgrades are available.
12222	**Control plane redundancy** Describe any control plane redundancy do you have? The 8400 has optional dual management modules and can be deployed in VSX pairs.
12223	**Master Price List** Bidder must propose a Master Pricing Agreement for hardware and related pricing, which meets the objective and c riteria of this RFP. Include at a minimum the following columns for each equipment, software, maintenance, support, or services available under the agreement: Part Number, Description, Manufacturer List Price, Percentage % Disco unt, Discount Price Yes, I have uploaded Master Price
12224	**Attachment A Unified Edge** Inventory list below indicates the inventory that is currently installed across the NU system. We are requesting bids for models that are suitable replacements for these models meeting the specifications listed in the RFP. Utilizing as few AP models and controllers as possible. In addition, a network access and control policy management solution m ust be included. Yes, I can provide

1225	**Attachment B Campus Backbone** University of Nebraska has four campus networks located in Curtis, Kearney, Lincoln, and Omaha. Each campus net work will be interconnected with the University operated Wide Area Network in 2 distinct physical locations, with the exception of the Curtis campus. The operation of the campus network should not be dependent on the equipment in any single interconnections. Attachment B to create a comparative pricing proposal for Campus Backbone networking. Pricing for the Campus B ackbone proposals should include any licenses necessary to support features listed as required in this RFP. Yes, I can provide
1226	**Attachment D Data Center Network** University of Nebraska has two main Data Centers (DC), one in Lincoln (Nebraska Hall – NH) and one in Omaha (Ti erpoint). The University owns and operates a 100G capable WAN/MPLS network and DWDM transport between the se sites. The DC's connect into the WAN routers for inter-DC, campus and external connectivity. Attachment D to create a comparative pricing proposal for Data Center networking. Pricing for Data Center (DC) pr oposals should include any necessary licenses needed to support required features. This includes any graphical so ftware tools available for configuration and support of the DC network. Yes, I can provide
1227	**Attachment C** University of Nebraska has provided Logical Campus Fiber Optic Maps. Yes, I understand
1228	**Company's capability** Provide point-by-point responses in Section 1, describing in detail your company's capability of meeting the stated o bjectives and needs, while meeting the technical requirements as described. Submitted and acknowledged. Aruba has some of the largest and most complex network deployments in the world. Federal governments, military bases, stadiums, auditoriums, and airports. We have customers at the top of their v erticals, in every vertical.

1229

Company's networking deployments

Describe in detail similar networking deployments your company has executed in the past three to five years.

Kobe University

Established in 1949, Kobe University is a national academic institution based in western Japan with over 16,000 st udents. It is one of Japan's leading research universities with 10 faculties and 15 graduate schools that span 4 ca mpuses.
Aruba 8400 core switching at the foundation of a complete wireless and wired networking solution; ClearPass for w ired and wireless authentication and policy enforcement to secure access for users and IoT; AirWave for network m anagement.
• Delivers the performance needed to expand research projects in engineering, medicine and agriculture faculties with new core switching solution
• Supports 40,000 devices across campus in classrooms, cafeterias, shared spaces, and residences
• Reduces IT time and cost spent on moves, adds, and changes with centralized network and access control mana gement
• Provides IT with application usage data to easily identify the impact on the network due to upcoming projects

University of Cambridge

Founded in 1209, the University of Cambridge is among the world's oldest and most prestigious academic institutio ns, serving 18,000 students, sustaining nearly 10,000 faculty and staff and offering 31 colleges spread across mor e than 1,000 buildings.
Aruba controller-based, campus and remote Wi-Fi for indoor and outdoor; AirWave for network management; Clea rPass for policy-based access control, virtually segmenting multi-tenant networks.
• Deliver on student and faculty satisfaction and live up to its reputation as a world class academic and research or ganization
• Deliver on strategic priorities to enable research, collaboration, and innovation between CU and its affiliates
• IT services can generate its own income with no central funding by providing value-added network services and l owering the cost of operations and infrastructure

Banaras Hindu University

Established in 1916, the prestigious Banaras Hindu University (BHU) is an internationally recognized temple of lear ning. The main campus is spread over 1,300 acres and comprises of 5 institutes, 16 faculties with over 140 depart ments, about 30,000 students and 2,500 faculty members.
Aruba indoor and outdoor Wi-Fi and switching for high-density, high-performance, seamless connectivity; ClearPa ss for wireless and wired authentication and policy enforcement to secure access for users and IoT; AirWave for ne twork management
• Connected campus that allows students and staff to connect seamlessly to University network and Internet
• Increases network visibility and decreases management workloads for IT
• Simplifies and secures BYOD and guest access
• Eliminates connectivity issues and allows mobile devices to move between classrooms and other areas within the campus without any IT intervention
• Provides guests from over 70,000 eduroam member institutions across the world seamless guest connectivity
• Enable new opportunities of accelerated learning through platforms like SWAYAM

1230 **Company's networking deployments with United States**

Describe in detail similar networking deployments your company has executed in the past three to five years for an institution of higher education within the United States.

University of California, Santa Barbara

One of the 10 campuses in the University of California system, UCSB is an R1 public research institution considered among the most prestigious universities in the U.S. It serves 25,000 students on its 1,000-acre campus.
Aruba Wi-Fi and switching solution for high-performance indoor and outdoor connectivity; ArubaOS 8 for an intelligent and resilient network; ClearPass for wired and wireless authentication and policy enforcement to secure access for users and IoT; AirWave with Clarity for network management; NetInsight for AI-powered analytics and assurance
• Student satisfaction with campus mobility is significantly improved
• Allows faculty to accelerate the digital transition, ranging from adopting the classroom response app iClicker Cloud to using simulations hosted in the LMS
• Mobilizes facilities management, such as supplying real-time job status updates to eliminate 34,000+ printed work orders and months of data entry
• Assures uptime for academic offerings like UCSB's new cloud-enabled data sciences courses by reducing network troubleshooting from hours to seconds
• Enables fine-tuning of the network based on data and analytics
• Eliminated $1.25M on cabling costs by using hospitality/dorm room APs

University of Minnesota

An R1 public research institution, the University of Minnesota system serves 66,000 students across 5 regional campuses and employs 26,000 people statewide. Along with over 30 other research areas and outreach centers, the University operates facilities spanning nearly 28,000 acres.
Aruba Wi-Fi with over 10,000 location-ready indoor and outdoor access points; ArubaOS 8 for an intelligent and resilient network; ClearPass for wired and wireless authentication and policy enforcement to secure access for users and IoT; AirWave for network management; NetInsight for AI-powered analytics and assurance
• Sustains 120K unique users with a daily average of over 100K unique device connections and 75TB of traffic
• Allowed for a 1700% increase in IoT device connections
• Supports interactive online certification testing, such as thousands of healthcare students completing board exams annually
• Reduces IT workload and eliminates planned outages with centralized management and real-time network updates
• Shows device traffic on a real-time map to stay ahead of changing usage patterns and trends

1231 **Company's methodology**

Describe your methodology for providing requested services, how you organize your team and the University team, and how you ensure you deliver a quality product that meets expectations.

Aruba looks at this as a joint endeavor between Aruba, DataVizion and the University. Throughout the entire process, we want to ensure that all members are on the same page and have the same expectations of what a finished product looks like. Internally, Aruba rigorously tests our products for quality and functionality. All software goes through full regression testing, source code tested both manually and using artificial intelligence / machine learning techniques to ensure that when we release an update it is ready for enterprise-wide deployments. Our hardware endures testing rigorous enough to be deployed in military applications and meet compliance testing for deployments throughout the world.

1232 Recycling or Reuse

Supplier should clarify any services to aid in recycling or reuse (recovery) of packaging materials.

HPE aims to have our industry's most efficient and sustain¬able packaging designs. We continually innovate to us e less material, optimize shipping densities, and utilize recycled and recyclable materials—reducing the GHG emiss ions and raw materials use associated with packaging and product transportation. Our packaging innovations cont ribute to reducing the environmental footprint of HPE products. .
These principles are underpinned by HPE's General Specification for the Environment, which restricts substances of concern such as polyvinyl chloride (PVC) in our packaging, and requires 100% of materials used in HPE packag ing to be recyclable.
In 2017, we continued to reduce packaging waste without compromising product protection or customer satisfactio n. Where possible, successful packaging innovations are scaled across HPE's product lines and regions. In 2017, our packaging design teams won awards from the Singapore Packaging Agreement (SPA)** for efforts such as:
• Replacing foam packaging with air bag cushions led to an emissions reduction of 29 metric tons CO2e and saved $69,000 in waste costs
• Reusing inbound packaging and ISS shock pallets reduced emissions by 187 metric tons CO2e and saved $345, 000 in waste costs
• Replacing nonrecyclable foam with recyclable foam across multiple regions reduced emissions by 907 metric ton s CO2e and yielded a saving of $140,000 in waste costs.
We also include environmental criteria in our packaging supplier selection. We give preference to suppliers with a strong environmental performance and a commitment to source paper from responsibly managed forests.

1233 Cost Breakdown by campus

Addendum 2 request cost breakdown by campus. Bidder(s) can attach a document in the Response Attachments t ab of this RFP.

Bid Lines

1 Pricing for proposed equipment as outlined in Attachment A for Unified Edge equipment.

Quantity: 1 UOM: EA Unit Price: $12,092,068.80 Total: $12,092,068.80

Item Notes: Provide detailed listing of equipment and percentage of discount off list. Proposals for Campus Ba ckbone equipment be broken down for each campus location. Reference Addendum 2.

All pricing must be FOB destination and include shipping cost.

Supplier Notes: We have provided a line by line breakdown on the quotes in the Response Attachments section, a s well as the Master Pricing Agreement. The field for this section is the total price for Attachment A : Unified Edge Equipment for the Aruba WLAN and Aruba CX Switches less trade-in. CX is the go-f orward switch solution for Aruba Networks and brings the data center, backbone, and access layer onto one OS throughout the network. The CX platform has been out for over 2 years in the core a nd aggregation line of product, and is now available on the data center and the access layer. See response attachments for more detail on the CX platform.

Alternate 1

In the response attachments, we are providing an alternate quote for Aruba WLAN and the traditional AOS switch . We felt this proposal was important to add since this is the equipment that The University of Nebraska has been more familiar with through this engagement. This is still a viable solution, but we are proposing as an alternate to the CX line. This is the total dollar amount less trade-in.

Quantity: 1 UOM: 10,249,377.30 EA Unit Price: *No response* Total: *No response*

2	Pricing for proposed equipment as outlined in Attachment B for Campus Backbone equipment. [redacted]
3	Pricing for proposed equipment as outlined in Attachment D for Data Center equipment. [redacted]

4	Provide training to twenty (20) University personnel on the proposed products in a facility within 30 miles of the Lincoln or Omaha campuses. **Price per person.** Quantity: 20 UOM: Per Person Unit Price: $2,000.00 Total: $40,000.00 Item Notes: Bidder must provide training to twenty (20) University personnel on the proposed products in a facility within 30 miles of the Lincoln or Omaha campuses. The training may be held onsite at the University. This training shall include instruction on the operating system, configuration, and troubleshooting of equipment which is pertinent to the University's intended use. In order to preserve business continuity, two training sessions must be provided. Due to the scope of the project, training is a critical component to ensure the engineering staff are able to effectively expand and support the environment.

5	Certifications pertaining to the equipment being purchased and their supporting systems should be listed as an optional cost Price: $125.00 Total: $125.00

Response Total: $16,833,346.80

Value Add Offers

Aruba and DataVizion are invested in a partnership with the University of Nebraska for their Network Hardware Solutions project, and in good faith of our growing partnership, Aruba would like to offer the following incentives to the University of Nebraska as part of selecting Aruba and DataVizion as the chosen vendors of this RFP.

Trade-In

(Minimum value of $6,190,719.60 (as an example of all 3 bids))

Aruba and DataVizion are offering an aggressive discount towards the trade-in of existing equipment as a part of this RFP response. With a bulk purchase, The University of Nebraska will be offered a massive trade-in discount for the existing infrastructure. This trade-in effort is in place to maximize the buying power and move to the upgraded Aruba environment at a faster pace in order to increase the quality of the user-experience and add security for Nebraska's students, faculty, and guests. DataVizion will take trade-in as they decommission each site so the university can continue to operate on the current environment until ready for the Aruba technology.

NetInsight during the Deployment Phase

(5 year value of $1,050,000)

During the deployment phase, Aruba is going to include our Network Analytics and Assurance platform. This enables the University of Nebraska to dynamically adjust configurations to optimize Wi-Fi performance. Our world is data-driven, why shouldn't your network be? Aruba NetInsight is a purpose-built cloud-based machine learning analytics solution that automatically analyzes how evolving networks perform. By combining deep networking knowledge, innovative data extraction, and a powerful analytics engine, Aruba takes a unique approach to continuously improving the quality of experience for users and the Internet of Things (IoT) and, NetInsight is the only solution that provides peer benchmarking comparisons at an environment level that goes beyond the size or type of organization. Comparing how a network is performing across like for like spaces is something the competition cannot deliver.

One of the biggest challenges today is addressing the constant changing demands on the network as new IoT devices, cloud and voice apps and services are utilized. With traditional monitoring tools, IT only gets a static snapshot of how the network is performing at any point in time. With tools that continuously learn and adapt to evolving network

environments, it is easier to understand the effects that roaming can have on a network, or how wireless traffic from new IoT devices affects the productivity of user voice or video traffic. Continuous baselining, peer benchmarking and site to site comparisons gives IT knowledge that would be difficult to acquire.

Intelligence through Machine Learning

Instead of reacting to system alerts and user complaints after a problem occurs, new machine learning based solutions allow you proactively see what happens as users roam and new devices connect anywhere on the network.

The amount of data that IT must process and analyze to find and solve connectivity and performance issues makes managing the network increasingly more difficult. As problems arise, the limited visibility and intelligence provided by network monitoring solutions that IT is dealing with today means the lack of a consolidated perspective of what is wrong. Manual analysis and reactive configuration changes are the status quo. By leveraging new technology to automatically find potential problems and speed up time to resolution, IT organizations can shift from a break-fix model to one that allows them to focus on delivering more strategic business initiatives.

Proactive Monitoring

The simplest method to staying ahead of business disruptions is identifying early warning signs. However, legacy monitoring tools only generate alerts after something breaks, forcing network operations to function in a very reactive mode. In contrast, through constant monitoring and automatically establishing baselines for how your network performs and what is considered normal, tools based on machine learning can easily tag deviations, analyze the impact, and deliver insights. This enables IT to identify problems before they impact users.

Prescriptive Analytics

Resolving problems quickly is as critical as finding them early. Very often, even highly-skilled IT experts spend a large amount of time manually analyzing enormous amounts of data from disparate systems to diagnose problems. Unfortunately, fixing complicated network issues becomes an exercise in trial and error. Advanced network analytics and assurance tools based on machine learning intelligence can not only detect patterns, but identify root causes automatically, and more importantly provide validated recommendations that help solve immediate and foreseeable issues. Prescriptive guidance allows IT to easily eliminate the complexity of managing and maintaining today's mission-critical networks.

Adaptive Assurance

One of the biggest challenges today is addressing the constant changing demands on the network as new IoT devices, cloud and voice apps and services are utilized. With traditional monitoring tools, IT only gets a static snapshot of how the network is performing at any point in time. With tools that continuously learn and adapt to evolving network environments, it is easier to understand the effects that roaming can have on a network, or how wireless traffic from new IoT devices affects the productivity of user voice or video traffic. Continuous baselining, peer benchmarking and site to site comparisons gives IT knowledge that would be difficult to acquire.

Nebraska's first year of support is on us

(minimum value of $261,441.05)

We understand deployment takes time, and the University shouldn't pay for support when the equipment is staged and waiting for deployment. We have included an additional year of support at no charge to help offset the deployment period, alleviating some of the pressure facing a new roll-out.

Please note that the first year of support will be included for the first order that is placed for this project and will have a "Day 1 Contract" started 12 months from initial order

Aruba Certified Resident Engineer from DataVizion

(Value of $325,000 and offered at a minimum of the sale of the Unified Edge solution)

DataVizion will be the first line of defense for Aruba related networking tasks. As Nebraska's Resident Engineer Team, we are committed to the success of your organization. Below are deliverables you can expect of us as your partner:

- Dedicated Onsite Resident Engineer - 3 days per week
- Remote Resident Engineering Team – 5 days per week
- Aruba TAC Case ownership and follow-up
- Internal escalation points
- Aruba network troubleshooting and resolution
- Knowledge Transfer
    - The resident Engineering team will not replace formalized training. The Nebraska staff will gain knowledge over time through exposure and hands on experience.
- Bi-weekly Cadence Calls

The onsite resident engineer will have access to the DataVizion's internal resources as needed. Nebraska will benefit by not having just one resident engineer, but an entire team comprised of individuals who will be familiar with Nebraska's upgraded Aruba Network.

Atmosphere Passes w/Training (4 Passes)

($10,000 value)

Atmosphere is Aruba's annual user conference. This conference is held in the Americas, EMEA and APAC. The conference is designed "for engineers, by engineers", and is the premier conference for you to stay up-to-date with the latest innovations, develop new skills and learn best practices, and to see where technology is going in the networking and security space.

Imagine an opportunity to meet and rub shoulders with over 3,000 of your peers to learn, collaborate, and influence the direction of Aruba solutions for the future. Only at Atmosphere can you directly interface with those that build the industry's best enterprise-class technologies in WLAN, LAN, software, security, location services, and analytics & assurance.

With over 100 breakout sessions to choose from, you can customize your agenda to meet your organization's needs. In addition to learning from Aruba product experts, customers and partners, Atmosphere is a conference where you can connect and network with peers and other industry leaders.

At Atmosphere, you'll be able to:

- Stay on top of what's happening in networking and security
- Take your skills and know-how to the next level
- Learn how to automate and simplify network operations
- Get certified by the industry leader to increase your value to the organization
- Connect with and learn from your peers

Atmosphere has various tracks that you can attend based on your interests:

Airheads Community - Designed by engineers for engineers, the Airheads sessions lay out Aruba's technical vision and latest innovations at today's evolving Network Edge. Experience an immersive environment that allows you to learn, share and grow.

Technical tracks and hands-on Airheads sessions at Atmosphere are designed and delivered by your industry peers, Aruba engineers, product managers and technical experts to help you better understand emerging technologies, design principles and how to better optimize your existing infrastructure.

Technical Training - Complement your attendance with technical training in one of 9 areas. These in-depth sessions span 2 days and contain a mix of labs and lectures. Note that space is limited and attendees must register early to

Higher Education Customer Advisory Council

At Aruba Networks, we pride ourselves on our “Customer First - Customer Last” mentality, so we have formed a Higher Education Customer Advisory Council. As a part of this solution, Aruba Networks would like to formally invite **Andrew Buker** of the University of Nebraska to participate as an active board member. This board assists in driving innovation in the needs of Higher Education as it related to mobility and security.

Quarterly Executive Sponsor Briefings

As a part of this solution, Aruba would like to offer an Executive Sponsor for quarterly briefings on industry trends, Aruba futures, and voice of the customer engagements. Executive Sponsor to be assigned after contract completion.

Onsite Training Benefits

(Value of $72,000)

As a part of this solution, the University of Nebraska will receive three separate onsite training classes to make sure the team is up to the task of managing their new network. Aruba recommends a maximum class size of 12 individuals in order to optimize class participation and maximize learning. This ensures that all students have their own lab equipment and get the full experience. We want to ensure that University of Nebraska staff is fully trained and equipped to handle their network for many years to come.

University Curriculum Program (Aruba Academy)

(Value TBD)

The Aruba Academy Express was created to accelerate adopting Aruba technology at various educational institutions (universities, colleges, vocational schools, etc). It is a self-service, friction free program that provides access to the Aruba online courses. The Aruba Academy Express portal provides access to the Aruba Education Services curriculum to approved educational institutions that show interest. Faculty members and instructors from Higher Education, Vocational Schools, and K-12 institutions can access the portal after they register and sign a partnership agreement with us. Once the professors are certified and become Academy approved instructors, they will work with the Aruba Academy team and Samir Mahir, the Aruba Academy Manager. Students who achieve Aruba certifications will be offered internships and graduate placement opportunities with Aruba and our Aruba Partners.

Atmosphere Spotlight on Nebraska moving to Aruba

(Fantastic marketing opportunity)

Atmosphere is the premier conference in the networking community, and a place where thought leaders and organizations come together to network, learn, and grow. Only our top customers are able to grace the stage of ATM to tell their personal story around innovation and moving to Aruba.

Aruba Networks would like to invite Andrew Buker of the University of Nebraska to take center stage at ATM20 to share the move to WiFi 6, ClearPass, and OS-CX from the data center to the edge. This will be the biggest story in the Aruba Community this year and deserves the spotlight in front of 4,000 Airheads and numerous media outlets this spring.

University of Nebraska Case Study

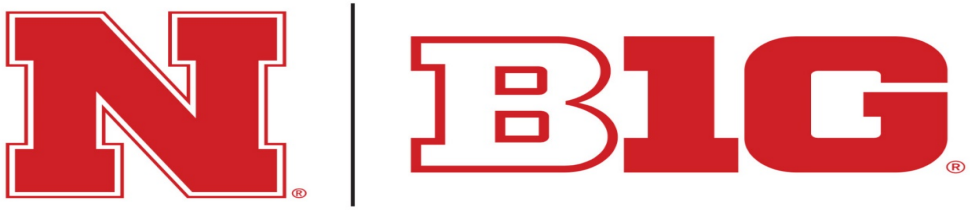
(Fantastic marketing value)

The University of Nebraska will be featured in a major case study highlighting innovation and convergence into one IT system across the state. In partnership with Nebraska, Aruba Networks will showcase the solutions and outcomes for our entire community and beyond. This publication will display the forward-looking leadership that is bringing Nebraska to the next level as it relates to service and experience for their students, faculty, and guests.

5 Years of Flexible Payment Options

(Minimum value of $2,100,000)

Aruba Networks and DataVizion are offering 5 years of payments NOT TO EXCEED the cash value of the purchase on the entire data center, backbone, and access solutions in order to maximize discounts, take advantage of extended support, and rapid deployment time with their partner, DataVizion. This program will allow Nebraska to operationalize this capital purchase and get all of the technology they need to optimize the network for students and faculty.



Network Hardware Solutions - Master Pricing Agreement

Wireless

Item	Descrpition	Quantity	List Price	Ext List	Discount %	Net Price
JZ407AAE	Aruba ClearPass New Licensing Access 50K Concurrent Endpoints E-LTU	1	$ 400,000.00	$ 400,000.00	58%	$ 168,000.00
JW470AAE	Aruba ClearPass Guest Custom Skin Delivery E-LTU	1	$ 4,500.00	$ 4,500.00	58%	$ 1,890.00
JW784A	Aruba 7240XM (US) 4p 10GBase-X (SFP+) 2p Dual Pers (10/100/1000BASE-T or SFP) Controller	6	$ 41,995.00	$ 251,970.00	58%	$ 105,827.40
JW657A	Aruba PSU-350-AC 7200 Series S3500-24T S3500-48T and S3500-24F 350W AC Power Supply	6	$ 520.00	$ 3,120.00	58%	$ 1,310.40
JW124A	PC-AC-NA North America AC Power Cord	12	$ 5.00	$ 60.00	58%	$ 25.20
JY898AAE	Aruba MM-VA-10K Mobility Master Virtual Appliance with Support for up to 10000 Devices E-LTU	1	$ 48,995.00	$ 48,995.00	58%	$ 20,577.90
JW471AAE	Aruba LIC-ENT Enterprise (LIC-AP LIC-PEF LIC-RFP and LIC-AW) Licence Bundle E-LTU	4799	$ 300.00	$ 1,439,700.00	58%	$ 604,674.00
JZ088A	Aruba AP-303HR (US) 802.11ac Dual 2x2:2 Radio Remote AP Bundle	1089	$ 625.00	$ 680,625.00	58%	$ 285,862.50
JZ173A	Aruba AP-375 (US) 802.11n/ac Dual 2x2:2/4x4:4 Radio Integrated Omni Antenna Outdoor AP	66	$ 2,095.00	$ 138,270.00	58%	$ 58,073.40
JW052A	AP-270-MNT-V1 AP-270 Series Outdoor Pole/Wall Long Mount Kit	66	$ 160.00	$ 10,560.00	58%	$ 4,435.20
JZ183A	Aruba AP-377 (US) 802.11n/ac Dual 2x2:2/4x4:4 Radio Integrated Directional Antenna Outdoor AP	54	$ 2,095.00	$ 113,130.00	58%	$ 47,514.60
JW054A	AP-270-MNT-H1 AP-270 Series Outdoor AP Hanging or Tilt Install Mount Kit	54	$ 135.00	$ 7,290.00	58%	$ 3,061.80
JZ153A	Aruba AP-318 (US) 802.11n/ac Dual 2x2:2/4x4:4 Radio 6xRPSMA Connectors Indoor Hardened AP	19	$ 1,465.00	$ 27,835.00	58%	$ 11,690.70
JW009A	AP-ANT-1W 2.4-2.5GHz (4dBi)/4.9-5.875GHz (6dBi) Hi Gain Dual-band Omni-Dir Indoor Antenna	1778	$ 35.00	$ 62,230.00	58%	$ 26,136.60
JW046A	AP-220-MNT-W1 Flat Surface Wall/Ceiling Black AP Basic Flat Surface Mount Kit	19	$ 30.00	$ 570.00	58%	$ 239.40
Q9H63A	Aruba AP-515 (US) Dual Radio 4x4:4 + 2x2:2 802.11ax Internal Antennas Unified Campus AP	3169	$ 1,150.00	$ 3,644,350.00	58%	$ 1,530,627.00
Q9H58A	Aruba AP-514 (US) Dual Radio 4x4:4 + 2x2:2 802.11ax External Antennas Unified Campus AP	397	$ 1,150.00	$ 456,550.00	58%	$ 191,751.00
JZ332A	Aruba AP-534 (US) Dual Radio 4x4:4 802.11ax External Antennas Unified Campus AP	19	$ 1,570.00	$ 29,830.00	58%	$ 12,528.60
JZ357A	Aruba AP-555 (US) Dual Radio 8x8:8 / 4x4:4 802.11ax Internal Antennas Unified Campus AP	1882	$ 1,990.00	$ 3,745,180.00	58%	$ 1,572,975.60
JW834A	Aruba 7240XM (US) 4p 10GBase-X (SFP+) 2p Dual Pers (10/100/1000BASE-T or SFP) Cntrlr 16GB Upgrade	2	$ 3,145.00	$ 6,290.00	58%	$ 2,641.80
JZ399AAE	Aruba ClearPass Cx000V VM-Based Appliance E-LTU	5	$ 4,000.00	$ 20,000.00	58%	$ 8,400.00
JZ370A	AP-MNT-MP10-A Campus AP mount bracket kit (10-pack) type A: suspended ceiling rail, flat 9/16	219	$ 205.00	$ 44,895.00	58%	$ 18,855.90
Q9G69A	AP-MNT-MP10-B Campus AP mount bracket kit (10-pack) type B: suspended ceiling rail, flat 15/16	164	$ 205.00	$ 33,620.00	58%	$ 14,120.40
Q9G70A	AP-MNT-MP10-C Campus AP mount bracket kit (10-pack) type C: suspended ceiling rail, profile 9/16	27	$ 205.00	$ 5,535.00	58%	$ 2,324.70
R1C72A	AP-MNT-MP10-E Campus AP mount bracket kit (10-pack) type E: wall-box	137	$ 310.00	$ 42,470.00	58%	$ 17,837.40
	Total			$ -		$ -

Support

				$ -		$ -
H9WE9E	Aruba 5 Year Foundation Care 24x7 Education/Retail ClearPass NL AC 50K CE E-LTU Service For PN: JZ407AAE	1	$ 75,203.00	$ 75,203.00	10%	$ 67,682.70
H8AN2E	Aruba 5 Year Foundation Care Next Business Day Exchange Education/Retail 7240XM Controller Service For PN: JW784A	6	$ 14,176.00	$ 85,056.00	10%	$ 76,550.40
H6SD1E	Aruba 5 Year Foundation Care Next Business Day Exchange PSU-350-AC Service For PN: JW657A	6	$ 85.00	$ 510.00	10%	$ 459.00
H8UG5E	Aruba 5 Year Foundation Care 24x7 Education/Retail MM-VA-10K ELTU Service For PN: JY898AAE	1	$ 18,275.00	$ 18,275.00	10%	$ 16,447.50
H8FN3E	Aruba 5 Year Foundation Care 24X7 Education/Retail License Controller Bundle Service For PN: JW471AAE	4799	$ 112.00	$ 537,488.00	10%	$ 483,739.20
H9WY9E	Aruba 5 Year Foundation Care 24x7 Education/Retail ClearPass Cx000V VM Appl E-LTU Service For PN: JZ399AAE	5	$ 756.00	$ 3,780.00	10%	$ 3,402.00
	Total			$ -		$ -

Switching

				$ -		$ -
R0X29A	Aruba 6405 96-port 1GbE Class 4 PoE and 4-port SFP56 Switch	211	$ 32,500.00	$ 6,857,500.00	58%	$ 2,880,150.00
R0X36A	Aruba 6400 3000W Power Supply with C20 Inlet Adapter	422	$ 4,000.00	$ 1,688,000.00	58%	$ 708,960.00
R0X37A	Aruba 6400 4-port Rack Mount Kit	211	$ 1,000.00	$ 211,000.00	58%	$ 88,620.00
R0X38A	Aruba 6400 48-port 1GbE Class 4 PoE Module	337	$ 9,000.00	$ 3,033,000.00	58%	$ 1,273,860.00
R0X41A	Aruba 6400 48-port Smart Rate 1/2.5/5 GbE Class 6 and 4 port SFP56 module	85	$ 13,000.00	$ 1,105,000.00	58%	$ 464,100.00
R0X29A	Aruba 6405 96-port 1GbE Class 4 PoE and 4-port SFP56 Switch	5	$ 32,500.00	$ 162,500.00	58%	$ 68,250.00
R0X36A	Aruba 6400 3000W Power Supply with C20 Inlet Adapter	10	$ 4,000.00	$ 40,000.00	58%	$ 16,800.00
R0X37A	Aruba 6400 4-port Rack Mount Kit	5	$ 1,000.00	$ 5,000.00	58%	$ 2,100.00
R0X38A	Aruba 6400 48-port 1GbE Class 4 PoE Module	10	$ 9,000.00	$ 90,000.00	58%	$ 37,800.00
R0X41A	Aruba 6400 48-port Smart Rate 1/2.5/5 GbE Class 6 and 4 port SFP56 module	5	$ 13,000.00	$ 65,000.00	58%	$ 27,300.00
JL661A	Aruba 6300M 48-port 1GbE Class 4 PoE and 4 port SFP56 Switch	428	$ 12,500.00	$ 5,350,000.00	58%	$ 2,247,000.00
JL659A	Aruba 6300M 48-port SmartRate 1/2.5/5 Class 6 PoE and 4-port SFP56 Switch	48	$ 17,000.00	$ 816,000.00	58%	$ 342,720.00
JL087A	Aruba X372 54VDC 1050W Power Supply	428	$ 985.00	$ 421,580.00	58%	$ 177,063.60
JL670A	Aruba X372 54VDC 1600W 110-240CVAC Power Supply	48	$ 2,000.00	$ 96,000.00	58%	$ 40,320.00
R0M46A	Aruba 50G SFP56 to SFP56 0.65m DAC Cable	53	$ 400.00	$ 21,200.00	58%	$ 8,904.00
JL662A	Aruba 6300M 24-port 1GbE Class 4 PoE and 4-port SFP56 Switch	558	$ 7,500.00	$ 4,185,000.00	58%	$ 1,757,700.00
JL660A	Aruba 6300M 24-port SmartRate 1/2.5/5 Class 6 PoE and 4-port SFP56 Switch	64	$ 13,500.00	$ 864,000.00	58%	$ 362,880.00
JL087A	Aruba X372 54VDC 1050W Power Supply	558	$ 985.00	$ 549,630.00	58%	$ 230,844.60

UNL Network Hardware Solutions - Master Price Agreement

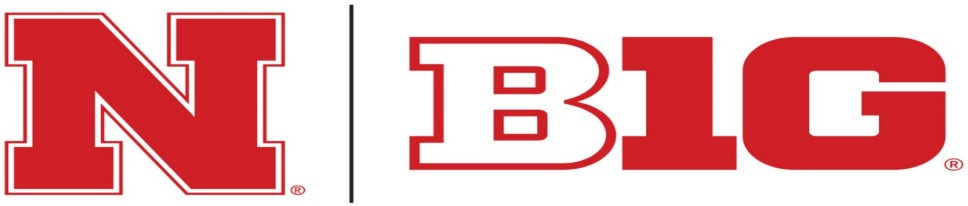
JL670A	Aruba X372 54VDC 1600W 110-240CVAC Power Supply	64	$ 2,000.00	$ 128,000.00	58%	$	53,760.00
R0M46A	Aruba 50G SFP56 to SFP56 0.65m DAC Cable	622	$ 400.00	$ 248,800.00	58%	$	104,496.00
JL658A	Aruba 6300M 24-port SFP+ and 4-port SFP56 Switch	36	$ 17,000.00	$ 612,000.00	58%	$	257,040.00
JL087A	Aruba X372 54VDC 1050W Power Supply	36	$ 985.00	$ 35,460.00	58%	$	14,893.20
JL662A	Aruba 6300M 24-port 1GbE Class 4 PoE and 4-port SFP56 Switch	11	$ 7,500.00	$ 82,500.00	58%	$	34,650.00
JL087A	Aruba X372 54VDC 1050W Power Supply	11	$ 985.00	$ 10,835.00	58%	$	4,550.70
JL581A	Aruba 8320 48 1G/10GBase-T, 6 QSFP+ 40GbE ports	9	$ 27,820.00	$ 250,380.00	58%	**$**	**105,159.60**
						$	16,669,584.00
Trade-In						$	(4,577,515.20)
						$	**12,092,068.80**

UNL Network Hardware Solutions - Master Price Agreement

Network Hardware Solutions - Master Pricing Agreement

Item	Descrpition	Quantity	List Price	Extended List	Discount %	Net Price
JZ407AAE	Aruba ClearPass New Licensing Access 50K Concurrent Endpoints E-LTU	1	$ 400,000.00	$ 400,000.00	58%	$ 168,000.00
JW470AAE	Aruba ClearPass Guest Custom Skin Delivery E-LTU	1	$ 4,500.00	$ 4,500.00	58%	$ 1,890.00
JW784A	Aruba 7240XM (US) 4p 10GBase-X (SFP+) 2p Dual Pers (10/100/1000BASE-T or SFP) Controller	6	$ 41,995.00	$ 251,970.00	58%	$ 105,827.40
JW657A	Aruba PSU-350-AC 7200 Series S3500-24T S3500-48T and S3500-24F 350W AC Power Supply	6	$ 520.00	$ 3,120.00	58%	$ 1,310.40
JW124A	PC-AC-NA North America AC Power Cord	12	$ 5.00	$ 60.00	58%	$ 25.20
JY898AAE	Aruba MM-VA-10K Mobility Master Virtual Appliance with Support for up to 10000 Devices E-LTU	1	$ 48,995.00	$ 48,995.00	58%	$ 20,577.90
JW471AAE	Aruba LIC-ENT Enterprise (LIC-AP LIC-PEF LIC-RFP and LIC-AW) Licence Bundle E-LTU	4799	$ 300.00	$ 1,439,700.00	58%	$ 604,674.00
JZ088A	Aruba AP-303HR (US) 802.11ac Dual 2x2:2 Radio Remote AP Bundle	1089	$ 625.00	$ 680,625.00	58%	$ 285,862.50
JZ173A	Aruba AP-375 (US) 802.11n/ac Dual 2x2:2/4x4:4 Radio Integrated Omni Antenna Outdoor AP	66	$ 2,095.00	$ 138,270.00	58%	$ 58,073.40
JW052A	AP-270-MNT-V1 AP-270 Series Outdoor Pole/Wall Long Mount Kit	66	$ 160.00	$ 10,560.00	58%	$ 4,435.20
JZ183A	Aruba AP-377 (US) 802.11n/ac Dual 2x2:2/4x4:4 Radio Integrated Directional Antenna Outdoor AP	54	$ 2,095.00	$ 113,130.00	58%	$ 47,514.60
JW054A	AP-270-MNT-H1 AP-270 Series Outdoor AP Hanging or Tilt Install Mount Kit	54	$ 135.00	$ 7,290.00	58%	$ 3,061.80
JZ153A	Aruba AP-318 (US) 802.11n/ac Dual 2x2:2/4x4:4 Radio 6xRPSMA Connectors Indoor Hardened AP	19	$ 1,465.00	$ 27,835.00	58%	$ 11,690.70
JW009A	AP-ANT-1W 2.4-2.5GHz (4dBi)/4.9-5.875GHz (6dBi) Hi Gain Dual-band Omni-Dir Indoor Antenna	1778	$ 35.00	$ 62,230.00	58%	$ 26,136.60
JW046A	AP-220-MNT-W1 Flat Surface Wall/Ceiling Black AP Basic Flat Surface Mount Kit	19	$ 30.00	$ 570.00	58%	$ 239.40
Q9H63A	Aruba AP-515 (US) Dual Radio 4x4:4 + 2x2:2 802.11ax Internal Antennas Unified Campus AP	3169	$ 1,150.00	$ 3,644,350.00	58%	$ 1,530,627.00
Q9H58A	Aruba AP-514 (US) Dual Radio 4x4:4 + 2x2:2 802.11ax External Antennas Unified Campus AP	397	$ 1,150.00	$ 456,550.00	58%	$ 191,751.00
JZ332A	Aruba AP-534 (US) Dual Radio 4x4:4 802.11ax External Antennas Unified Campus AP	19	$ 1,570.00	$ 29,830.00	58%	$ 12,528.60
JZ357A	Aruba AP-555 (US) Dual Radio 8x8:8 / 4x4:4 802.11ax Internal Antennas Unified Campus AP	1882	$ 1,990.00	$ 3,745,180.00	58%	$ 1,572,975.60
JW834A	Aruba 7240XM (US) 4p 10GBase-X (SFP+) 2p Dual Pers (10/100/1000BASE-T or SFP) Cntrlr 16GB Upgrade	2	$ 3,145.00	$ 6,290.00	58%	$ 2,641.80
JZ399AAE	Aruba ClearPass Cx000V VM-Based Appliance E-LTU	5	$ 4,000.00	$ 20,000.00	58%	$ 8,400.00
JZ370A	AP-MNT-MP10-A Campus AP mount bracket kit (10-pack) type A: suspended ceiling rail, flat 9/16	219	$ 205.00	$ 44,895.00	58%	$ 18,855.90
Q9G69A	AP-MNT-MP10-B Campus AP mount bracket kit (10-pack) type B: suspended ceiling rail, flat 15/16	164	$ 205.00	$ 33,620.00	58%	$ 14,120.40
Q9G70A	AP-MNT-MP10-C Campus AP mount bracket kit (10-pack) type C: suspended ceiling rail, profile 9/16	27	$ 205.00	$ 5,535.00	58%	$ 2,324.70
R1C72A	AP-MNT-MP10-E Campus AP mount bracket kit (10-pack) type E: wall-box	137	$ 310.00	$ 42,470.00	58%	$ 17,837.40
				$ -		$ -
				$ -		$ -
H9WE9E	Aruba 5 Year Foundation Care 24x7 Education/Retail ClearPass NL AC 50K CE E-LTU Service For PN: JZ407AAE	1	$ 75,203.00	$ 75,203.00	10%	$ 67,682.70
H8AN2E	Aruba 5 Year Foundation Care Next Business Day Exchange Education/Retail 7240XM Controller Service For PN: JW784A	6	$ 14,176.00	$ 85,056.00	10%	$ 76,550.40
H6SD1E	Aruba 5 Year Foundation Care Next Business Day Exchange PSU-350-AC Service For PN: JW657A	6	$ 85.00	$ 510.00	10%	$ 459.00
H8UG5E	Aruba 5 Year Foundation Care 24x7 Education/Retail MM-VA-10K ELTU Service For PN: JY898AAE	1	$ 18,275.00	$ 18,275.00	10%	$ 16,447.50
H8FN3E	Aruba 5 Year Foundation Care 24X7 Education/Retail License Controller Bundle Service For PN: JW471AAE	4799	$ 112.00	$ 537,488.00	10%	$ 483,739.20
H9WY9E	Aruba 5 Year Foundation Care 24x7 Education/Retail ClearPass Cx000V VM Appl E-LTU Service For PN: JZ399AAE	5	$ 756.00	$ 3,780.00	10%	$ 3,402.00
				$ -		$ -
				$ -		$ -
JL320A	Aruba 2930M 24G PoE+ 1-slot Switch	593	$ 3,620.00	$ 2,146,660.00	58%	$ 901,597.20
JL086A#ABA	Aruba X372 54VDC 680W 100-240VAC Power Supply	1012	$ 670.00	$ 678,040.00	58%	$ 284,776.80
JL325A	Aruba 2930 2-port Stacking Module	1003	$ 1,070.00	$ 1,073,210.00	58%	$ 450,748.20
JL083A	Aruba 3810M/2930M 4-port 100M/1G/10G SFP+ MACsec Module	1110	$ 1,325.00	$ 1,470,750.00	58%	$ 617,715.00
JL258A#ABA	Aruba 2930F 8G PoE+ 2SFP+ Switch	39	$ 1,680.00	$ 65,520.00	58%	$ 27,518.40
JL073A	Aruba 3810M 24G PoE+ 1-slot Switch	9	$ 4,900.00	$ 44,100.00	58%	$ 18,522.00
JL084A	Aruba 3810M 4-port Stacking Module	107	$ 1,155.00	$ 123,585.00	58%	$ 51,905.70
JL075A	Aruba 3810M 16SFP+ 2-slot Switch	98	$ 12,125.00	$ 1,188,250.00	58%	$ 499,065.00
JL085A#ABA	Aruba X371 12VDC 250W 100-240VAC Power Supply	98	$ 460.00	$ 45,080.00	58%	$ 18,933.60
JL479A#ABA	Aruba 8320 48p 10G SFP/SFP+ and 6p 40G QSFP+ with X472 5 Fans 2 Power Supply Switch Bundle	5	$ 26,245.00	$ 131,225.00	58%	$ 55,114.50
J9822A	Aruba 5412R zl2 Switch	216	$ 4,830.00	$ 1,043,280.00	58%	$ 438,177.60
J9830B#ABA	Aruba 5400R 2750W PoE+ zl2 Power Supply	12	$ 2,730.00	$ 32,760.00	58%	$ 13,759.20
J9990A	Aruba 20-port 10/100/1000BASE-T PoE+ / 4-port 1G/10GbE SFP+ MACsec v3 zl2 Module	216	$ 4,200.00	$ 907,200.00	58%	$ 381,024.00
J9991A	Aruba 20-port 10/100/1000BASE-T PoE+ / 4-port 1/2.5/5/10GBASE-T PoE+ MACsec v3 zl2 Module	1080	$ 5,049.00	$ 5,452,920.00	58%	$ 2,290,226.40
J9986A	Aruba 24-port 10/100/1000BASE-T PoE+ MACsec v3 zl2 Module	456	$ 3,780.00	$ 1,723,680.00	58%	$ 723,945.60
J9829A#ABA	Aruba 5400R 1100W PoE+ zl2 Power Supply	420	$ 1,290.00	$ 541,800.00	58%	$ 227,556.00
JL323A	Aruba 2930M 40G 8 HPE Smart Rate PoE+ 1-slot Switch	410	$ 9,830.00	$ 4,030,300.00	58%	$ 1,692,726.00
				$ -		$ -
				$ -		$ -

H8XP1E	HPE 5 Year Foundation Care Next Business Day Exchange Aruba 8320 Switch Service For PN: JL479A#ABA	5	$ 5,848.00	$ 29,240.00	10%	$	26,316.00
						$	14,079,289.50
						$	(3,829,912.20)
						$	10,249,377.30



Network Hardware Solutions - Master Pricing Agreement

Item	Descrpition	Quantity	List Price	Extended List	Discount %	Net Price
Hardware						
JL624A#ABA	Aruba 8325-48Y8C 48p 25G SFP/+/28 8p 100G QSFP+/28 Front-to-Back 6 Fans and 2 PSU Bundle	6	$ 36,795.00	$ 220,770.00	58%	$ 92,723.40
JL482B	Aruba X472 2-post Rack Kit	6	$ 95.00	$ 570.00	58%	$ 239.40
JL626A#ABA	Aruba 8325-32C 32-port 100G QSFP+/QSFP28 Front-to-Back 6 Fans and 2 Power Supply Bundle	6	$ 38,395.00	$ 230,370.00	58%	$ 96,755.40
JL482B	Aruba X472 2-post Rack Kit	6	$ 95.00	$ 570.00	58%	$ 239.40
JL375A	Aruba 8400 8-slot Chassis/3xFan Trays/18xFans/Cable Manager/X462 Bundle	6	$ 27,295.00	$ 163,770.00	58%	$ 68,783.40
JL372A#B2E	Aruba X382 54VDC 2700W AC Power Supply	6	$ 3,150.00	$ 18,900.00	58%	$ 7,938.00
JL366A	Aruba 8400X 6-port 40GbE/100GbE QSFP28 Advanced Module	6	$ 26,245.00	$ 157,470.00	58%	$ 66,137.40
JL310A	Aruba 100G QSFP28 LC LR4 10km SMF 2-strand Transceiver	6	$ 31,495.00	$ 188,970.00	58%	$ 79,367.40
JL309A	Aruba 100G QSFP28 MPO SR4 100m 12-fiber MPO OM3 MMF Transceiver	6	$ 2,095.00	$ 12,570.00	58%	$ 5,279.40
JL363A	Aruba 8400X 32-port 10GbE SFP/SFP+ with MACsec Advanced Module	6	$ 36,745.00	$ 220,470.00	58%	$ 92,597.40
JL368A	Aruba 8400 Management Module	6	$ 15,750.00	$ 94,500.00	58%	$ 39,690.00
JL367A	Aruba 8400X 7.2Tbps Fabric Module	6	$ 10,500.00	$ 63,000.00	58%	$ 26,460.00
JL307A	Aruba 100G QSFP28 to QSFP28 3m Direct Attach Copper Cable	6	$ 630.00	$ 3,780.00	58%	$ 1,587.60
						$ 577,798.20

Current Configuration			Datavision (CX Series)		
Model	Qty	Port Count	Model	Price/ea	Ext Price
IE-2000-4TS-G-B	3	4	2930F-8P	$705.60	$2,116.80
IE-2000-8TC-G-B	4	8	2930F-8P	$705.60	$2,822.40
IE-3000-8TC	7	8	2930F-8P	$705.60	$4,939.20
WS-C2940-8TT-S	1	8	2930F-8P	$705.60	$705.60
WS-C2960-8TC-L	1	8	2930F-8P	$705.60	$705.60
WS-C2960G-8TC-L	6	8	2930F-8P	$705.60	$4,233.60
WS-C3560CG-8PC-S	11	8	2930F-8P	$705.60	$7,761.60
WS-C3560CX-8PC-S	6	8	2930F-8P	$705.60	$4,233.60
WS-C3560C-12PC-S	7	12	6300M-1Gb-24P	$4,145.40	$29,017.80
WS-C3560CX-12PC-S	4	12	6300M-1Gb-24P	$4,145.40	$16,581.60
WS-C3560E-12D-S	7	12	6300M-1Gb-24P	$4,145.40	$29,017.80
WS-C3750G-12S-S	17	12	6300M-1Gb-24P	$4,145.40	$70,471.80
WS-C3750X-12S-S	7	12	6300M-1Gb-24P	$4,145.40	$29,017.80
WS-C3850-12S	1	12	6300M-1Gb-24P	$4,145.40	$4,145.40
WS-C3850-12S-S	2	12	6300M-1Gb-24P	$4,145.40	$8,290.80
IE-2000-16TC-G-E	4	16	6300M-1Gb-24P	$4,145.40	$16,581.60
71K91L4-24	9	24	6300M-1Gb-24P	$4,145.40	$37,308.60
B3G124-24P	2	24	6300M-1Gb-24P	$4,145.40	$8,290.80
B5G124-24P2	12	24	6300M-1Gb-24P	$4,145.40	$49,744.80
C3G124-24	1	24	6300M-1Gb-24P	$4,145.40	$4,145.40
C5G124-24	2	24	6300M-1Gb-24P	$4,145.40	$8,290.80
C5G124x24P2	10	24	6300M-1Gb-24P	$4,145.40	$41,454.00
IE-3010-16S-8PC	1	24	6300M-1Gb-24P	$4,145.40	$4,145.40
summitX450G2-24p-10G4	1	24	6300M-1Gb-24P	$4,145.40	$4,145.40
WS-C2960-24TC-L	8	24	6300M-1Gb-24P	$4,145.40	$33,163.20
WS-C2960G-24TC-L	11	24	6300M-1Gb-24P	$4,145.40	$45,599.40
WS-C2960S-24PS-L	40	24	6300M-1Gb-24P	$4,145.40	$165,816.00
WS-C2960S-24TS-L	2	24	6300M-1Gb-24P	$4,145.40	$8,290.80
WS-C2960X-24PD-L	37	24	6300M-1Gb-24P	$4,145.40	$153,379.80
WS-C2960X-24PS-L	73	24	6300M-1Gb-24P	$4,145.40	$302,614.20
WS-C3560-24PS-S	1	24	6300M-1Gb-24P	$4,145.40	$4,145.40
WS-C3560E-24PD-S	11	24	6300M-1Gb-24P	$4,145.40	$45,599.40
WS-C3560X-24T-L	8	24	6300M-1Gb-24P	$4,145.40	$33,163.20
WS-C3560X-24T-S	1	24	6300M-1Gb-24P	$4,145.40	$4,145.40
WS-C3750-24PS-S	117	24	6300M-1Gb-24P	$4,145.40	$485,011.80
WS-C3750-24TS-S	9	24	6300M-1Gb-24P	$4,145.40	$37,308.60
WS-C3750E-24PD-S	24	24	6300M-1Gb-24P	$4,145.40	$99,489.60
WS-C3750E-24TD-S	6	24	6300M-1Gb-24P	$4,145.40	$24,872.40
WS-C3750G-24PS-S	36	24	6300M-1Gb-24P	$4,145.40	$149,234.40
WS-C3750G-24TS-S	4	24	6300M-1Gb-24P	$4,145.40	$16,581.60
WS-C3750V2-24PS-S	84	24	6300M-1Gb-24P	$4,145.40	$348,213.60
WS-C3750X-24P-S	72	24	6300M-1Gb-24P	$4,145.40	$298,468.80
WS-C3750X-24T-L	1	24	6300M-1Gb-24P	$4,145.40	$4,145.40
WS-C3850-24S-S	1	24	6300M-1Gb-24P	$4,145.40	$4,145.40
B3G124-48P	3	48	6300M-1Gb-48P	$6,245.40	$18,736.20
B5G124-48P2	15	48	6300M-1Gb-48P	$6,245.40	$93,681.00
C3G124-48	3	48	6300M-1Gb-48P	$6,245.40	$18,736.20

C5G124x48	94	48	6300M-1Gb-48P	$6,245.40	$587,067.60
C5G124x48P2	52	48	6300M-1Gb-48P	$6,245.40	$324,760.80
summitX450G2-48p-10G4	28	48	6300M-1Gb-48P	$6,245.40	$174,871.20
summitX670G2-48x-4q	5	48	6300M-1Gb-48P	$6,245.40	$31,227.00
WS-C2960G-48TC-L	14	48	6300M-1Gb-48P	$6,245.40	$87,435.60
WS-C2960S-48FPS-L	35	48	6300M-1Gb-48P	$6,245.40	$218,589.00
WS-C2960S-48LPS-L	29	48	6300M-1Gb-48P	$6,245.40	$181,116.60
WS-C2960S-48TS-L	5	48	6300M-1Gb-48P	$6,245.40	$31,227.00
WS-C2960X-48FPD-L	33	48	6300M-1Gb-48P	$6,245.40	$206,098.20
WS-C2960X-48FPS-L	68	48	6300M-1Gb-48P	$6,245.40	$424,687.20
WS-C3560G-48PS-S	2	48	6300M-1Gb-48P	$6,245.40	$12,490.80
WS-C3560X-48T-L	3	48	6300M-1Gb-48P	$6,245.40	$18,736.20
WS-C3750X-48P-S	31	48	6300M-1Gb-48P	$6,245.40	$193,607.40
WS-C3850-48P-L	8	48	6300M-1Gb-48P	$6,245.40	$49,963.20
WS-C3850-48P-S	32	48	6300M-1Gb-48P	$6,245.40	$199,852.80
WS-C3850-48U-L	21	48	6300M-1Gb-48P	$6,245.40	$131,153.40
S4	1	Chassis			
WS-C4506-E (208 w/ 4 blades)	832	Chassis	6300M-1Gb-48P	$6,245.40	$5,196,172.80
WS-C4510R+E (3 w/ 4 blades)	12	Chassis	6300M-1Gb-48P	$6,245.40	$74,944.80
WS-C6506-E (1 w/5 blades)	5	Chassis	6300M-1Gb-48P	$6,245.40	$31,227.00
WS-C6509-E (1 w/5 blades)	5	Chassis	6300M-1Gb-48P	$6,245.40	$31,227.00
WS-C6513-E (2 w/12 blades)	24	Chassis	6300M-1Gb-48P	$6,245.40	$149,889.60
Wired Total	**2032**				**$11,139,055.20**

Current Configuration			Datavision (CX Series)		
Model	Qty	Port Count	Model	Price/ea	Ext Price
AIR-CT5520-K9	7				$0.00
WS-SVC-WISM2-K9	4		7240XM	$30,395.00	$121,580.00
Aruba 7240	**2**		7240XM	$30,395.00	$60,790.00
XMS Model 9000	1		Mobility Manager	$37,026.00	$37,026.00
	1		ClearPass 50K	$235,683.00	$235,683.00
	5		ClearPass Cx000V VM	$2,360.00	$11,800.00
	5836		Enterprise License	$126.00	$735,336.00
AIR-AP1562D-B-K9	50				$0.00
AIR-AP1562E-B-K9	2				$0.00
AIR-AP1562I-B-K9	18				$0.00
AIR-AP1572EAC-B-K9	2				$0.00
AIR-AP1810W-B-K9	273				$0.00
AIR-AP1815W-B-K9	66				$0.00
AIR-AP2702I-UXK9	289				$0.00
AIR-AP2802E-B-K9	19				$0.00
AIR-AP2802I-B-K9	1715				$0.00
AIR-AP3802P-B-K9	4				$0.00
AIR-CAP1532I-A-K9	27				$0.00
AIR-CAP1552EU-A-K9	1				$0.00
AIR-CAP2602E-A-K9	1				$0.00
AIR-CAP2602I-A-K9	914				$0.00
AIR-CAP2702I-A-K9	782				$0.00
AIR-CAP2702I-B-K9	240				$0.00

AIR-CAP3502I-A-K9	60				$0.00
AIR-CAP3602E-A-K9	2				$0.00
AIR-CAP3602I-A-K9	25				$0.00
AIR-CAP3702I-A-K9	40				$0.00
AIR-CAP3702P-A-K9	8				$0.00
AIR-CAP702I-A-K9	1				$0.00
AIR-CAP702W-A-K9	698				$0.00
AIR-LAP1142N-A-K9	352				$0.00
AIR-LAP1242AG-A-K9	19				$0.00
AIR-LAP1252AG-A-K9	53				$0.00
IW3702-4E-B-K9	4				$0.00
Aruba AP 104	394				$0.00
Aruba AP 105	153				$0.00
Aruba AP 205	2				$0.00
Aruba AP 205H	52				$0.00
Aruba AP 225	13				$0.00
Aruba AP 275	13				$0.00
Aruba AP 303H	343				$0.00
Aruba AP 315	230				$0.00
Aruba AP 365	3				$0.00
XR2425H	3				$0.00
XR2426	6				$0.00
XR4826	1				$0.00
XR620	163				$0.00
	92				$0.00
	1439		AP 303H	$262.50	$377,737.50
	5609				$0.00
	5609				
	89		AP 375	$879.90	$78,311.10
	2		AP 377	$879.90	$1,759.80
	381		AP 514	$483.00	$184,023.00
	4968		AP 515	$483.00	$2,399,544.00
	261		AP 555	$835.80	$218,143.80
					$0.00
Wireless Total					**$4,461,734.20**

Total **$15,600,789.40**

UNIVERSITY OF NEBRASKA
MASTER AGREEMENT

This Master Agreement sets forth the terms between The Board of Regents of the University of Nebraska a public body corporate and governing body of the University of Nebraska for and on behalf of Information Technology Services, having an address at 3835 Holdrege Street, Lincoln, NE 68583 (the "University") and DataVizion, LLC, having an address at 5760 Cornhusker Hwy, Lincoln, NE 68507 (the "Service Provider") with regard to the performance by Service Provider of the services contemplated herein.

RECITALS

WHEREAS, the University desires to obtain the services of the Service Provider; and

WHEREAS, the Service Provider claims to have expertise and experience to provide such services for the University;

THEREFORE, the University and the Service Provider hereby agree to the following terms, obligations and conditions:

1. Description of Services. The Service Provider agrees to perform such professional services, with the standard of professional care and skill customarily provided in the performance of such services, and shall use its best efforts to render the services and provide the deliverables identified in an attached proposal and/or scope of work for each engagement which references this Master Agreement. The Service Provider agrees to perform the Services to the satisfaction of the University during the term of this Agreement. The attachments, appendices, addendums, any exhibits and schedules hereto are an integral part of this Agreement and are deemed incorporated by reference herein.

2. Payment. In full consideration for the Services performed by the Service Provider under this indefinite quantity-indefinite delivery Agreement and each engagement, the University shall pay or cause to be paid to the Service Provider the invoiced amount for each engagement. Along with its invoice, the Service Provider shall submit adequate receipts and documentation as requested by the University to support reimbursement of all previously agreed upon incidental or reimbursable expenses. All payments due Service Provider shall be made on a net 30 day basis. The Service Provider agrees that it is solely responsible for payment of income, social security, and other employment taxes due to the proper taxing authorities, and that the University will not deduct such taxes from any payments to the Service Provider hereunder, unless required by law.

3. Term. The term of this agreement shall begin on the date fully executed and remain in place for five years (60 months). The contract may be renewed, by mutual agreement of both parties, in writing for five (5) additional one (1) year periods upon completion of the initial base contract period, provided written mutual concurrence of both parties is exercised in writing prior to the expiration of the existing contract. The length of the contract in its entirety will not exceed ten (10) years. The University of Nebraska reserves the right to contract certain work as needed to provide emergency or timely services, introduction of new technology and/or as a result of general market conditions.

4. Confidentiality. "Confidential Information" shall mean any materials, written information, and data marked "Confidential" by the University or non-written information and data disclosed by the University that is identified at the time of disclosure to the Service Provider as confidential and is reduced to writing and transmitted to the Service Provider within thirty (30) days of such non-written disclosure. The Service Provider agrees to use the same degree of care it uses to protect its own confidential information and, to the extent permitted by law, to maintain the Confidential Information in strict confidence for a period of three (3) years from the date of termination of this Agreement. The obligations of this paragraph do not apply to information in the public domain or information that is independently known, obtained or discovered by the Service Provider, or that is hereafter supplied to the Service Provider by a third party without restriction.

5. Ownership of Work Product and Intellectual Property Rights. The Service Provider shall have no interest in the deliverables provided under this Agreement, and the University shall be the sole owner of all such deliverables, including all works authored, produced, developed or reduced to practice by the Service Provider during its' performance of the Services (the "Work Product"). Furthermore, the University shall be the sole owner of any and all intellectual property rights, including without limitation, all patent, copyright, trademark and trade secrets rights in and to the Work Product. The University shall have the right to secure

appropriate registration and protection for any and all intellectual property rights in and to the Work Product. Accordingly, the Service Provider hereby expressly assigns all right, title and interest in and to the Work Product, including any and all patent, copyright, trademark and/or trade secret rights thereto, to the University, and agrees to execute all documents required to evidence such assignment. Without limiting the foregoing, the Service Provider hereby grants to the University the sole and exclusive right throughout the world, in all languages, and in perpetuity, to use the Work Product pursuant to this Agreement. The Service Provider also hereby waives any and all claims it may now or hereafter have in any jurisdiction to so-called "moral rights" or rights of "droit moral" with respect to the use, results and/or proceeds of the Service Provider's services and Work Product. This provision shall survive the termination of this Agreement.

6. Termination. In the event that either party commits a material breach of this Agreement and fails to remedy or cure such breach within thirty (30) days after receipt of written notice thereof from the non-breaching party, the non-breaching party may, at its option and in addition to any other remedies which it may have at law or in equity, terminate this Agreement by sending written notice of termination to the other party. Such termination shall be effective as of the date of its receipt. Additionally, the University may terminate this Agreement for its convenience upon sixty (60) days prior written notice to the Service Provider. Upon any termination, the University shall promptly pay the Service Provider for all services rendered and costs incurred up to and including the effective date of termination.

7. Representations and Warranties. The Service Provider represents and warrants that in performing the Services it will not be in breach of any agreement with a third party. The Service Provider also represents and warrants that no third party has any rights in, to, or arising out of, the Work Product rendered pursuant to the performance of the Services. The Service Provider agrees to hold University and its respective assigns and licensees harmless from any loss, damage or expense, including court costs and reasonable attorneys' fees, that University and its assigns and licensees may suffer as a result of a breach or alleged breach of the foregoing warranties or as a result of claims or actions of any kind or nature resulting from the provision of the Services or any use of the Work Product.

Each party warrants and represents that it has full power and authority to enter into and perform this Agreement, and that the person signing this Agreement on behalf of each party has been properly authorized and empowered to enter into this Agreement.

8. Independent Service Provider. The Service Provider is an independent Service Provider and is solely responsible for maintenance and payment of any and all taxes, insurances and the like that may be required by federal, state or local law with respect to any sums paid hereunder. The Service Provider is not the University's agent or representative and has no authority to bind or commit the University to any agreements or other obligations.

9. Liability. Service Provider agrees to indemnify and hold the University, its regents, officers, employees, agents and students, harmless from any loss, claim, damage or liability of any kind arising out of or in connection with the performance of the Services by the Service Provider.

10. Insurance. The Service Provider shall at its own expense obtain and maintain throughout the term of this Agreement general commercial liability insurance against claims for bodily injury, death and property damage with limits of not less than one million dollars ($1,000,000) per occurrence, and three million dollars ($3,000,000) general aggregate, naming The Board of Regents of the University of Nebraska as an additional insured, to cover such liability caused by, or arising out of, activities of the Service Provider and its agents and/or employees while engaged in or preparing for the provision of the Services. The Service Provider shall furnish to the University certificates of insurance evidencing that such insurance has been procured prior to commencement of such work.

11. Assignment. This Agreement is non-assignable and non-transferrable. Any attempt by either party to assign its obligations hereunder shall be void.

12. Amendment. This Agreement constitutes the entire understanding between the Service Provider and the University with respect to the subject matter hereof and may not be amended except by an agreement signed by the Service Provider and an authorized representative of the University.

13. Governing Law and Forum. This Agreement shall be governed by the laws of the State of Nebraska without giving effect to its conflicts of laws provisions. Any legal actions brought by either party hereunder shall be in the District Court of Lancaster County, Nebraska.

14. Conflict of Interest. No article or service shall be purchased from any University faculty or staff member without prior approval by the Vice Chancellor of Business and Finance and any such approved purchase shall comply fully with the requirements of the

conflict of interest provisions of the Nebraska Political Accountability and Disclosure Act, Neb. Rev. Stat., §§ 49-1493 through 49-14,104.

Service Provider certifies, to the best of its knowledge and belief, that there are no potential organizational conflicts of interest related to this Agreement. If Service Provider cannot so certify, it shall provide a disclosure statement to the University, which describes all relevant information concerning any potential conflict of interest under this Agreement. In the event the potential conflict of interest cannot be resolved, the University may declare this Agreement void and of no further force or effect and the University shall have no further obligations hereunder.

15. Personal Use Prohibited. University funds shall not be expended for articles or services which are for the personal use of staff or faculty members.

16. Work Status Verification. The Service Provider and its subcontractors shall use a federal immigration verification system to determine the work eligibility status of new employees physically performing services within the State of Nebraska pursuant to Neb. Rev. Stat. §§ 4-108 to 4-114 as amended.

17. Debarment List. No contract shall be awarded to any Service Provider/Bidder listed on the General Services Administration's List of Parties Excluded from Federal Procurement or Nonprocurement Programs in accordance with Executive Orders 12549 and 12689, "Debarment and Suspension," (the "Debarment List"). For contracts which in the aggregate exceed $25,000, Service Provider/Bidder specifically warrants and represents that it is not included on the Debarment List. Service Provider/Bidder further agrees that should it be included on the Debarment List at the time the contract/proposal is awarded, or at any time during which it performs its contractual obligations pursuant to the contract, such listing shall be considered a material breach of the contract between the University and the Service Provider.

18. Change Proposals. Material changes in scope, rush delivery, rework of items already approved or requests for additional revision cycles, services and/or deliverables beyond those listed herein hereafter known as change orders, shall not be effective until authorized representatives of both Parties execute a mutually acceptable written change order to this Agreement. Any fees arising from change orders, additional services, or deliverables not reflected herein will be invoiced upon completion. Change orders agreed to by email shall be valid and enforceable as if made part of this Agreement.

19. Taxpayer Transparency Act. Pursuant to Nebraska's Taxpayer Transparency Act (Neb. Rev. Stat. §84-602.01, as may be amended), as of July 1, 2014, the University of Nebraska is required to provide the Nebraska Department of Administrative Services with a copy of each contract that is a basis for an expenditure of state funds, including any documents incorporated by reference in the contract. Copies of all such contracts and documents are published by the Nebraska Department of Administrative Services at www.nebraskaspending.gov. It shall be the sole responsibility of the Service Provider to notify the University of any redactions to such contracts and documents under Neb. Rev. Stat. 84-712.05(3) prior to contract execution.

20. Vietnam Era Veterans' Readjustment Assistance Act (VEVRAA). If applicable, this Service Provider and subcontractors shall abide by the requirements of 41 CFR 60-300.5(a). This regulation prohibits discrimination against qualified protected veterans, and requires affirmative action by covered prime Service Providers and subcontractors to employ and advance in employment qualified protected veterans.

21. SECTION 503. If applicable, this Service Provider and any subcontractor shall abide by the requirements of 41 CFR 60-741.5(a). This regulation prohibits discrimination against qualified individuals on the basis of disability, and requires affirmative action by covered prime Service Providers to employ and advance in employment qualified individuals with disabilities.

22. Nondiscrimination. In accordance with the Nebraska Fair Employment Practice Act, Neb. Rev. Stat. §48-1122, Service Provider agrees that neither it nor any of its subcontractors shall discriminate against any employee, or applicant for employment to be employed in the performance of this Agreement, with respect to hire, tenure, terms, conditions or privilege of employment because of the race, color, religion, sex, disability, or national origin of the employee or applicant.

23. Logos or University Marks. The Service Provider shall not use or display any University campus name, logo, trademark, servicemark (individually a "Mark" and collectively the "Marks") and/or other indicia designated by the University as a source identifier, unless expressly authorized in writing by the University. Any unauthorized use of University Marks is expressly prohibited.

24. Right to Audit Privilege. The University reserves the right to audit or inspect work performed by the Service Provider under this Agreement. The University

may participate directly or through an appointed representative, e.g. external auditor, in order to verify that the Services related to this agreement have been performed in accordance to the procedures indicated.

25. Continuation of Services. Service Provider agrees to continue to honor its ongoing obligations under this Agreement without interruption in the event of a bona fide dispute concerning payment or a dispute concerning any provision of this Agreement which may include time spent negotiating renewals.

26. Purchase Order Requirement. A Purchase Order shall be issued by the University to the Service Provider for payment in accordance with the terms of this Agreement. All invoice(s) submitted by the Service Provider shall make reference to the appropriate Purchase Order number to be eligible for payment.

27. Compliance. Service Provider will comply with all applicable laws, rules, regulations, ordinances and University policies in providing the Services.

AGREED AND ACCEPTED:

DataVizion, LLC.:

By: _____

Printed Name:_____

Title:_____

Board of Regents of the University of Nebraska:

By: _____
Walter E. Carter, President

Attest: _____
Carmen K. Maurer, Corporation Secretary

Notice. Any notice to either party hereunder shall be in writing and shall be served either personally or by registered or certified mail addressed to the following individuals:

To the Service Provider:
Kelly Schrad
DataVizion, LLC
5760 Cornhusker Highway
Lincoln, NE 68507

To the University:
University of Nebraska
3835 Holdrege Street
Lincoln, NE 68583
Attn: General Counsel

with a copy to:
University of Nebraska
6001 Dodge Street
Omaha, NE 68182
Attn: Andrew Buker

Appendix A – UNIVERSITY OF NEBRASKA TECHNOLOGY
Software/Services Standardized Agreement Language

Introduction

The purpose of this document is to incorporate specific terms and conditions pertinent to technology at the University of Nebraska. This document addresses select topics of particular importance to Information Technology Services ("ITS") in order to be compliant with Board of Regents Policies, as well as Nebraska State laws.

1. PILOT PROGRAM

ITS, at its sole discretion, may elect to conduct trial programs and/or proof of concepts under this Agreement ("Pilot Program"). If, after conducting a trial or proof of concept, ITS elects to continue with the full deployment, negotiations between ITS and the Service Provider regarding the requirements of the full deployment including all applicable royalties, fees, work plan, and appropriate timeline will occur. ITS makes no guarantee that such negotiations will occur. There may be fees related to the Pilot Program which will be negotiated between Service Provider and ITS on a case by case basis.

2. OWNERSHIP AND PROPRIETARY RIGHTS

2.1 Service Provider owns and retains all right, title and interest in Service Provider-Owned Materials. ITS owns and retains all right, title and interest in ITS's Owned Materials. ITS Students own and retain all right, title and interest in ITS Student-Owned Material. ITS acknowledges and agrees that, unless otherwise agreed by Service Provider in writing, Service Provider is the sole and exclusive owner of all rights, including but not limited to all patent rights, copyrights, trade secrets, trademarks, and other proprietary rights in the systems, programs, specifications, user documentation, and other Service Provider-Owned Materials used by Service Provider in the course of its provision of services hereunder. ITS also acknowledges and agrees that in entering into this Agreement, ITS acquires no ownership rights in Service Provider-Owned Materials. ITS shall not copy, transfer, sell, distribute, assign, display, or otherwise make Service Provider-Owned Materials available to third parties. Service Provider acquires no rights of ownership in or to the ITS owned Materials or the Student-Owned Materials; or anything that is provided to Service Provider by ITS, including but not limited to business processes, software and related documentation. Any modifications or enhancements to the ITS Owned Materials or the Student-Owned Materials including those suggested or implemented by Service Provider, shall belong to ITS. Service Provider agrees that its rights to use any such materials or data provided by ITS, including all ITS-owned Materials is limited to such use as is necessary to permit Service Provider to perform Services and obligations in this Agreement.

2.2 ITS has the responsibility for providing Service Provider with the copyright notice language to appear on websites, delivered course content and/or assessments, and on any related practice and/or demonstration materials. Service Provider will have the responsibility for ensuring that the copyright notice language provided to Service Provider by ITS will appear as provided on any applicable materials. Any copyright notice language or other language acknowledging Service Provider's ownership or other legal rights of Service Provider which appears on websites, course content and/or assessments, and in any practice and/or demonstrational materials will be limited to such language as is necessary to protect Service Provider's legal rights. Unless provided to Service Provider by ITS, no language acknowledging the legal rights of any third party shall appear on materials without the prior written consent of ITS.

2.3 Notwithstanding anything in the Agreement to the contrary, any and all Deliverables shall be the sole and exclusive property of ITS. Notwithstanding the foregoing, the intellectual capital (including without limitation, ideas, methodologies, processes, inventions and tools) developed or possessed by Service Provider prior to, or acquired during, the performance of the Scope of Work shall be Service Provider-Owned Material.

2.4 Upon ITS's request or upon the expiration or termination of this Agreement, Service Provider shall deliver or return all copies of the Work to ITS. Service Provider is permitted, subject to its obligations of confidentiality, to retain one copy of the Work for archival purposes and to defend its work product.

2.5 Service Provider and ITS intend this Agreement to be a contract for services and each considers any tangible work products identified as Deliverables ("Deliverables") during the Term or Terms of this Agreement to be a work made for hire. If for any reasons the Deliverables would not be considered a work made for hire under applicable law, Service Provider does hereby sell, assign and transfer to ITS, its successors, and assigns, the entire right, title and interest in and to the copyright and any registrations and copyright applications relating thereto and renewals and extensions thereof, and in and to all works based upon, derived from or incorporating the Deliverables, and in and to all income, royalties damages, claims and payments now or hereafter due or payable with respect thereto, and in and to all causes of action, either in law or equity for past, present, or future infringement based on the copyrights, and in and to all rights corresponding to the foregoing throughout the world. Service Provider agrees to execute all documents and to perform such other proper acts as ITS may deem necessary to secure for ITS the rights in the Deliverables.

2.6 Other than Deliverables and Service Provider-Owned Materials, the tangible property and work products created by Service Provider pursuant to this Agreement ("Work Product") shall mutually belong to ITS and Service Provider and each shall be free to use such Work Product without permission of or payment of royalty to the other. As to tangible products and work products identified as Deliverables during the Term or Terms of this Agreement, all Deliverables shall be owned exclusively by ITS.

2.7 ITS recognizes that Service Provider's business depends substantially upon the accumulation of learning, knowledge, data, techniques, tools, processes, and generic materials that it utilizes and develops in its engagements. ITS's business also depends substantially upon the accumulation and application of learning, knowledge, data, techniques, tools, processes, and generic materials that it utilizes and develops through collaboration with Service Providers and other service providers. Accordingly, to the extent material that is used in, enhanced, or developed in the course of providing Services hereunder is of a general abstract character, or may be generically re-used, and does not contain Confidential Information of ITS, then Service Provider will own such material including, without limitation: methodologies; delivery strategies, approaches and practices; generic software tools, routines, and components; generic content, research and background materials; training materials; application building blocks; templates; analytical models; project tools; development tools; inventions; solutions and descriptions thereof; ideas; and know-how (collectively "Know-how") developed by Service Provider and ITS will own the Know-how developed by ITS. To the extent such Know-how is contained or reflected in the Work Product, each party hereby grants the other a fully paid up, perpetual license to use such Know-how. Neither party will sublicense or sell Know-How of the other party to any third party, and will not use or exploit the Know-How of the other party to compete with the information technology and professional services of Service Provider or the educational services and delivery of the ITS.

3. DATA USE

As between the parties, ITS will own, or retain all of its rights in, all data and information that ITS provides to the Service Provider, as well as all data managed by Service Provider on behalf of ITS, including all output, reports, logs, analyses, and other materials relating to or generated by the Services, even if generated by the Service Provider, as well as all data obtained or extracted through ITS's or Service Provider's use of the Services (collectively, the ITS Data). The ITS Data also includes all data and information provided directly to Service Provider by ITS students and employees, and includes personal data, metadata, and user content. The ITS Data will be ITS's Intellectual Property and Service Provider will treat it as ITS's confidential and proprietary information. Service Provider will not use, access, disclose, or license or provide to third parties, any ITS Data, or materials derived therefrom, except: (i) to the extent necessary to fulfill Service Provider's obligations to ITS hereunder; or (ii) as authorized in writing by ITS. Without limiting the generality of the foregoing, Service Provider may not use any ITS Data, whether or not aggregated or de-identified, for product development, marketing, profiling, benchmarking, or product demonstrations, without, in each case, ITS's prior written consent. Upon request by ITS, Service Provider will deliver, destroy, and/or make available to ITS, any or all of the ITS Data.

4. PROPRIETARY AND CONFIDENTIAL INFORMATION

4.1 Service Provider acknowledges and understands that in connection with this Agreement, the performance of the Scope of Work and otherwise, Service Provider has had or shall have access to, has

obtained or shall obtain, or has been or shall be given the ITS's Confidential Information (as defined herein). For purposes of this Agreement, "Confidential Information" means all information provided by ITS, or ITS Students to Service Provider, including without limitation information concerning the ITS's business strategies, political and legislative affairs, students, employees, vendors, Service Providers, student records, customer lists, finances, properties, methods of operation, computer and telecommunications systems, software and documentation, student materials, student name and other identifying information which is generated by the student, such as biometrics. Confidential Information includes information in any and all formats and media, including without limitation oral communication, and includes the originals and any and all copies and derivatives of such information. Service Provider shall comply with all applicable federal, state and local laws restricting access, use and disclosure of protected information.

4.2 Service Provider shall use the Confidential Information only if and when required for the performance of the Services, and for no other purpose whatsoever, and only by Service Provider employees engaged in that performance. Service Provider may also share Confidential Information with its corporate affiliates and with agents and Service Providers who are bound by similar obligations of confidentiality and who need such information as part of Service Provider's performance under this Agreement. Service Provider shall forward any request for disclosure of Confidential Information to:

Information Technology Services
Canfield Administration Building North (ADMN) 332
Lincoln, NE 68588-0435

4.3 Service Provider acknowledges and understands that ITS is required to protect certain Confidential Information from disclosure under applicable law, including but not limited to the Family Educational Rights and Privacy Act ("FERPA"), the Gramm Leach Bliley Act ("GLBA"), or the Nebraska Public Records Law, including regulations promulgated thereunder, as the laws and regulations may be amended from time to time. The Confidential Information that is protected under FERPA was provided to the Service Provider as it is handling an institution service or function that would ordinarily be performed by ITS's employees. Service Provider agrees that it shall be obligated to protect the Confidential Information in its possession or control in accordance with the Privacy Laws and as a "school official" under FERPA. The Service Provider further agrees that it is subject to the requirements governing the use and re-disclosure of personally identifiable information from education records as provided in FERPA.

4.4 Service Provider may disclose Confidential Information as required by legal process. If Service Provider is required by legal process to disclose Confidential Information, Service Provider shall immediately notify ITS, and before disclosing such information shall allow ITS reasonable time to take appropriate legal action to prevent disclosure of the Confidential Information.

4.5 Service Provider's obligations with respect to Confidential Information shall survive the expiration or the termination of this Agreement.

4.6 Service Provider acknowledges that its failure to comply fully with the restrictions placed upon use, disclosure and access to Confidential Information may cause ITS grievous irreparable harm and injury. Therefore, any failure to comply with the requirements of this section may be a material breach of this Agreement.

4.7 Except to the extent otherwise required by applicable law or professional standards, the obligations under this section do not apply to information that (1) is or becomes generally known to the public, other than as a result of disclosure by Service Provider, (2) had been previously possessed by Service Provider without restriction against disclosure at the time of receipt by Service Provider, (3) was independently developed by Service Provider without violation of this Agreement, or (4) Service Provider and ITS agree in writing to disclose. To the extent allowed by Nebraska State Law, each party shall be deemed to have met its nondisclosure obligations under this section as long as it exercises the same level of care to protect the other's information as it exercises to protect its own Confidential Information.

4.8 Service Provider agrees to use Student-Owned Materials, ITS Owned Materials and ITS's Confidential Information only as necessary to perform its responsibilities under this Agreement, keep it confidential in

accordance with this Agreement and use reasonable commercial efforts to prevent and protect the contents of these materials, or any parts of them, from unauthorized disclosure. Further, Service Provider will take industry standard measures to protect the security and confidentiality of such information including controlled and audited access to any location where such confidential and proprietary data and materials reside while in the custody of Service Provider and employing security measures to prevent system attacks (e.g., hacker and virus attacks).

4.9 Upon termination, cancellation, expiration or other conclusion of the Agreement, Service Provider shall return all Confidential Information to ITS or, if return is not feasible, destroy any and all Confidential Information without the prior written authorization from ITS. If the Service Provider destroys the information, the Service Provider shall provide ITS with a certificate confirming the date of destruction of the data. Any data referred to in this section that is still within Service Provider's actual or constructive control shall be subject to the terms of this Agreement in perpetuity.

4.10 ITS will implement security measures at its offices and all other associated facilities to ensure the confidentiality of Service Provider's Confidential Information and materials in manner like that provided by ITS for its own information and materials identified as confidential under this Agreement. Unless otherwise provided by separate agreement, upon termination of this Agreement, ITS shall return to Service Provider all Service Provider-Owned Materials, including software, Source Code, and/or documentation provided to ITS by Service Provider; alternatively, and at Service Provider's option, ITS shall destroy any or all of the aforementioned beyond recoverability. ITS shall not retain any electronic or other copies of any Service Provider-Owned Materials or other Service Provider Proprietary and Confidential Information absent of prior written authorization from Service Provider.

4.11 Service Provider agrees to abide by the limitation on re-disclosure of personally identifiable information (PII) from education set forth in The Family Educational Rights and Privacy Act and with the terms set forth below. 34 CFR 99.33 (a)(2) states that the officers, employees and agents of a party that receives education record information from ITS may use the information but only for the purposes for which the disclosure of the information was made. Further, Service Provider agrees to protect all ITS sensitive data including all PII, financial, corporate business intelligence or intellectual property of ITS faculty, staff, and employees in accordance with generally accepted Information Security standards and best practices.

5. SOFTWARE

Service Provider hereby Warrants and Represents:

A. That it shall perform all of the Work in a professional manner in accordance with industry standards for software development and related services, and that the software development and related services will conform to the specifications in the Agreement.

B. Service Provider is the owner or authorized user of Service Provider software and all of its components, and Service Provider software and all of its components, to the best of Service Provider's knowledge, do not violate any patent, trademark, trade secret, copyright or any other right of ownership of any third party.

C. Service Provider software and its components are equipped and/or designed with systems intended to prevent industry known system attacks (e.g., hacker and virus attacks) and unauthorized access to Confidential Information.

D. Service Provider has used industry standards for vulnerability testing and software quality code reviews to ensure that software is free of any and all "time bombs," computer viruses, copy protect mechanisms or any disclosed or undisclosed features which may disable Service Provider software or render it incapable of operation (whether after a certain time, after transfer to another central processing unit, or otherwise).

6. TERMINATION

6.1 The University may terminate this Agreement upon thirty (30) days' written notice. Following termination, the University shall retain the right to (a) use the Software on the number of devices specified on Unified Edge Master Pricing Agreement for its own internal business purposes, (b) use and make copies of all Documentation; and (c) make a reasonable number of copies of the Software solely for back-up or archival purposes.

6.2 The University may terminate this Agreement immediately upon any breach by Service Provider of the terms of this Agreement, any Business Associate Addendum, or incorporated attachment hereto.

6.3 Service Provider may terminate this Agreement if the University intentionally and materially breaches this Agreement and then fails to correct such breach within thirty (30) days following receipt of written notice from Service Provider. In the event of an uncorrected breach by the University, the Service Provider shall be entitled to recover actual amounts owed by the University to Service Provider that accrued on or before the date of termination. Service Provider expressly waives and disclaims any right or remedy it may have to unilaterally de-install, disable or repossess any Software of any portion thereof.

6.4 The University's rights to the Software as provided in this Agreement will survive a bankruptcy claim by the Service Provider consistent with applicable laws. The rights granted under this Agreement shall be deemed a license of "intellectual property" for purposes of the United States Code, Title 11 ("Bankruptcy Code"), Section 365(n). In the event of the bankruptcy of Service Provider and a subsequent rejection of this Agreement, the University may elect to retain its license rights, subject to and in accordance with the provisions of the Bankruptcy Code or other applicable law.

6.5 The following Sections shall survive the expiration or termination of this Agreement: Grant of License; Ownership and Proprietary Rights; Warranties, Representations and covenants; Limitation of Liability; University Data; Privacy; Cyber Insurance; Termination; and Audit Rights. Any terms of this Agreement which by their nature extend beyond its termination remain in effect until fulfilled and apply to respective successors and assigns.

7. SECURITY

7.1 Service Provider will implement security measures at its offices and all other associated facilities in connection with Service Provider software to ensure the strictest confidentiality of ITS's Owned Materials, ITS's Confidential Information, and all other Confidential Information and materials. These measures will include, without limitation, encryption, use of a sign-on and access privilege system and other measures described in this Agreement, and such other measures as Service Provider deems necessary in its professional discretion. Service Provider shall impose these measures on all subcontractors used by Service Provider.

7.2 Service Provider shall endorse ITS's requirement to adhere to the University of Nebraska's (ITS) IT Security Standards (http://idm.unl.edu/authentication-services-policy). ITS is required to assess risks, ensure data integrity, and determine the level of accessibility that must be maintained. Specific activities include:

A. Identification of security, privacy, legal, and other organizational requirements for recovery of institutional resources such as data, software, hardware, configurations, and licenses at the termination of the contract.
B. Assessment of the Service Provider's security and privacy controls.
C. Including ITS's security and privacy requirements in the agreement.
D. Periodic reassessment of Service Provider services provisioned to ensure all contract obligations are being met and to manage and mitigate risk.

7.3 Service Provider shall (i) establish and maintain industry standard technical and organizational measures to help to protect against accidental damage to, or destruction, loss, or alteration of the materials; (ii) establish and maintain industry standard technical and organizational measures to help to protect against unauthorized access to the Services and materials; and (iii) establish and maintain network and internet security procedures, protocols, security gateways and firewalls with respect to the Services. Service Provider software and its components are equipped and/or designed with systems intended to prevent industry known system attacks (e.g., hacker and virus attacks) and unauthorized access to Confidential Information.

7.4 For the purposes of this article, a “Breach” has the meaning given to it under relevant Nebraska or federal law, for example; the Nebraska Financial Data Protection and Consumer Notification of Data Security Breach Act of 2006 (codified at Neb. Rev. Stat. § 87-802) (See 9.5). Service Provider’s report shall identify : (i) the nature of the unauthorized use or disclosure, (ii) the CDI used or disclosed, (iii) the identity of the individual or entity that received the unauthorized disclosure, (iv) any pertinent application, access, or security logs or analysis (v) the action(s) that the Service Provider has taken or shall take to mitigate any potentially negative effects of the unauthorized use or disclosure, and (vi) the corrective action(s) the Service Provider has taken or shall take to prevent future similar unauthorized uses or disclosures. Service Provider shall provide additional information in connection with the unauthorized disclosure reasonably requested by ITS.

In the event of a breach Service Provider agrees to promptly reimburse all costs to ITS arising from such breach, including but not limited to (i) costs of notification of individuals, (ii) credit monitoring and/or identity restoration services, (iii) time of ITS personnel responding to the breach, (iv) civil or criminal penalties levied against ITS, attorney’s fees, court costs, etc.

7.5 The contact for the ITS Computer Incident Response Team (CIRT) shall be identified as: 402-472-5700 or its-sec@nebraska.edu. Report any confirmed or suspected breach of University data to ITS’s CIRT within one hour of discovery or detection. Any confirmed or suspected computer security incidents not resulting in breach of University data shall be reported to ITS CIRT within 12 hours of discovery or detection.

7.6 ITS or an appointed audit firm (Auditors) has the right to audit Service Provider and its sub-vendors or affiliates that provide a service for the processing, transport or storage of ITS data. Audits will be at ITS’s sole expense which includes operational charges by Service Provider, except where the audit reveals material noncompliance with contract specifications, in which case the cost, inclusive of operational charges by Service Provider, will be borne by the Service Provider. In lieu of ITS or its appointed audit firm performing their own audit, if Service Provider has an external audit firm that performs a review, ITS has the right to review the controls tested as well as the results, and has the right to request additional controls to be added to the certified report for testing the controls that have an impact on its data.

7.7 The Federal Trade Commission has promulgated regulations collectively known as the “Red Flags Rule” with which ITS must comply. See 16 CFR 681. Under the Red Flags Rule, ITS must ensure that Service Provider either complies with ITS’s identity theft Program or that Service Provider has its own policies and procedures in place to detect and respond to identity theft Red Flags. Service Provider represents and warrants that is has reasonable policies and procedures in place to detect, prevent and mitigate identity theft. Service Provider shall review and comply with all relevant portions of ITS’s identity theft policy, if any, as well as any applicable ITS identity theft plan. Service Provider shall report any Red Flags that it detects in connection with the Agreement to ITS.

8. **CYBER INSURANCE**

The Service Provider agrees to purchase and maintain throughout the term of this Agreement a technology/professional liability insurance policy, including coverage for network security/data protection liability insurance (also called “cyber liability”) covering liabilities for financial loss resulting or arising from acts, errors, or omissions, in rendering technology/professional services or in connection with the specific services described in violation or infringement of any right of privacy, including breach of security and breach of security/privacy laws, rules or regulations globally, now or hereinafter constituted or amended;

Data theft, damage, unauthorized disclosure, destruction, or corruption, including without limitation, unauthorized access, unauthorized use, identity theft, theft of personally identifiable information or confidential corporate information in whatever form, transmission of a computer virus or other type of malicious code; and participation in a denial of service attack on third party computer systems;

Loss or denial of service;
No cyber terrorism exclusion;

With a minimum limit of $3,000,000 each and every claim and in the aggregate. Such coverage must include technology/professional liability including breach of contract, privacy and security liability, privacy regulatory

defense and payment of civil fines, payment of credit card provider penalties, and breach response costs (including without limitation, notification costs, forensics, credit protection services, call center services, identity theft protection services, and crisis management/public relations services).

Such insurance must explicitly address all of the foregoing without limitation if caused by an employee of the Service Provider or an independent contractor working on behalf of the Service Provider in performing services under this Agreement. Policy must provide coverage for wrongful acts, claims, and lawsuits anywhere in the world. Such insurance must include affirmative contractual liability coverage for the data breach indemnity in this Agreement for all damages, defense costs, privacy regulatory civil fines and penalties, and reasonable and necessary data breach notification, forensics, credit protection services, public relations/crisis management, and other data breach mitigation services resulting from a confidentiality or breach of security by or on behalf of the Service Provider.

9. MISCELLANEOUS TERMS

9.1 **Accessibility (**Section 508 ADAA Compliance). If the solution includes any end-user-facing human interface, such as an end-user device software component or web site form, file upload system, etc. the Service Provider hereby warrants that the products or services to be provided under this agreement comply with the accessibility guidelines of "Section 508 of the Rehabilitation Act of 1973" as amended as of the date of this agreement.

If the solution includes any end-user-facing human interface, such as an end-user device software component, web pages or site, video or audio playback, file upload system, mobile device components, etc., the Service Provider agrees to promptly respond to and resolve any complaint regarding accessibility of its products or services which is brought to its attention and the Service Provider further agrees to indemnify and hold harmless the University of Nebraska campuses and system using the Service Provider's products or services from any claim arising out of its failure to comply with the aforesaid requirements.

The University, at its discretion, may at any time test the Service Provider's products or services covered by this agreement to ensure compliance with Section 508. Testing that results in findings of non-compliance, shall result in a 25% reduction in the total cost of the products and/or services covered by this agreement if the non-compliance is not corrected within 30 days of being reported to the Service Provider in writing. All withheld amounts will be paid to the Service Provider upon correction of the non-compliance and acceptance by the University. Said acceptance not to be unreasonably withheld.

Failure to comply with these requirements shall constitute a breach and be grounds for termination of this agreement and a pro-rated refund of fees paid from the University for the remainder of original contract period.

9.2 **University & State College Participation.** In some instances, state colleges or state agencies may wish to explore the possibility of sharing in the benefits of this contract.

9.3 **Examination of Records.** ITS shall have access to and the right to examine any pertinent books, documents, papers, and electronic records such as logs of the Service Provider involving transactions and work related to this Agreement. Service Provider shall retain project records for a period of three (3) years from the date of final payment.

9.4 **Assistance with Litigation or Investigation.** E-Discovery: In order to provide ITS with the ability to be compliant with e-discovery rules, Service Provider must provide the following where "relevant data" might include any data stored regarding any person affiliated with ITS, access logs, activity logs, transaction logs, changes to access rights, etc., as detailed by the system architecture and practices provided by Service Provider.

AGREED AND ACCEPTED:

DataVizion, LLC.:

By: _____

Printed Name:_____

Title:_____

Board of Regents of the University of Nebraska:

By: _____
Walter E. Carter, President

Attest: _____
Carmen K. Maurer, Corporation Secretary

Notice. Any notice to either party hereunder shall be in writing and shall be served either personally or by registered or certified mail addressed to the following individuals:

To the Service Provider:
Kelly Schrad
DataVizion, LLC
5760 Cornhusker Highway
Lincoln, NE 68507

To the University:
University of Nebraska
3835 Holdrege Street
Lincoln, NE 68583
Attn: General Counsel

with a copy to:
University of Nebraska
6001 Dodge Street
Omaha, NE 68182
Attn: Andrew Buker

GovConnection Response
3131-19-4321
NETWORK HARDWARE SOLUTIONS
TABLE OF CONTENTS

Redacted items contained within this contract reflect inapplicable terms that the parties do not agree to as part of the award to GovConnection, Inc. for Campus Backbone and Data Center Network Solutions.

SCOPE OF WORK
University of Nebraska eBid # 3131-19-4321

The University of Nebraska has developed the following Scope of Work document in order to provide each bidder with specific and relevant background information related to this bid document.

PURPOSE
The University of Nebraska is requesting proposals from firms offering 1) Unified Edge Solutions, 2) Data Center Network Solutions, and 3) Campus Backbone Solutions for campuses in Lincoln, Omaha, Kearney, and Curtis. The intent of this Request for Proposal (RFP) and the ensuing process is to provide companies with the information, requirements, and specifications necessary for the preparation of a professional and comprehensive proposal. Three awards will be made from this RFP, one per category. Specific terms and conditions are outlined.

As used within this RFP, "Bidder" shall refer to those companies receiving and responding to this RFP. "University" shall refer to the University of Nebraska.

If the Bidder will not be selling directly to the University, it is the Bidder's responsibility to choose one reseller with whom they will partner on this project.

BACKGROUND
The unified University of Nebraska Information Technology Services team supports four University campuses; the University of Nebraska-Lincoln (UNL), the University of Nebraska at Omaha (UNO), the University of Nebraska at Kearney (UNK), and the Nebraska College of Technical Agriculture (NCTA). The unified team's goal is to align the strategic needs of the University of Nebraska and each campus.

The following values are estimates, compiled from various network management tools that we believe to be reasonably accurate in terms of existing quantities. The values may change some over time due to decommissioning of locations, remodels, renovation, or new construction.

	Lincoln	Omaha	Kearney	Curtis	Out-State	Total
Buildings	259	54	35	27	90	465
Closets (Total)	318	163	65	17	91	654
Switches (Total)	501	658	238	18	97	1,485
Ports (Total)	59,113	19,508	10,496	752	3,344	93,213
PoE Ports	48,422	19,220	5,448	536	3,344	76,950
Wireless Controllers	12	2	2	0		16
Wireless APs	4,802	972	1,203	66		7,043

The majority of the campuses are wired with CAT5E & CAT6 cabling, with limited installation of CAT-6A. Equipment currently varies by campus, as described below.

Lincoln: Edge switches are Cisco 4500 chassis with a handful of other fixed configuration models lightly interspersed. Uplinks to redundant distribution routers are a mix of 1Gbps and 10Gbps using single-mode fiber. MDF-IDF links are a mix of 1Gbps and using a mix of multi-mode and single-mode fiber. End-user connections are 1Gbps copper. Wireless is primarily Cisco 702w, 2600, 2700 and 2800 series.

Omaha: Edge switches are primarily Cisco stackable, 3800s, 3750s, and 2960s with a handful of other models lightly interspersed. Uplinks to redundant core routers are primarily 10Gbps using a mix of multi-mode and single-mode fiber. MDF-IDF links are primarily 10Gbps using a mix of multi-mode and single-mode fiber. End-user connections are 1Gbps copper, with some at 100Mbps copper. Wireless is primarily Cisco 2600, 2700 and 2800 series. Wireless in Baxter Arena is on Xirrus.

Kearney: Edge switches are primarily Extreme Networks stackable switches, Models X450, B5, C5 both POE and non-POE with a handful of other models lightly interspersed. Uplinks to redundant core routers are a mix of 1Gbps and 10Gbps using a mix of multi-mode and single-mode fiber. MDF-IDF links are a mix of 1Gbps and 10Gbps using a mix of multi-mode and single-mode fiber. End-user connections are 1Gbps copper. Wireless is primarily Aruba 104, 105, 303H and 315 series.

Out-State: These locations represent UNL County Extension and Research Centers throughout Nebraska. Edge switches are primarily Cisco 2900 series switches of both POE and non-POE models. Wireless is primarily Cisco 2700 & 2800 series.

A portion of the wired and wireless environment consists of current hardware and software, with the overall environment being significant in size. In section 6, the University is requesting that respondents evaluate existing hardware and software in Attachment A for trade-in value and/or identify opportunities to leverage or integrate existing components.

Datacenter & Campus Backbone: For background information see the Objectives, Section 1.a.

SCOPE OF WORK

1. **Description of the Goods or Services Sought**:

First, the University seeks to replace, as a unified "system", the wired and wireless network components of the University network. This refresh will include related software management platforms supporting network authentication, monitoring, and analytics. The hardware and software components must work together to provide and secure access to the network by users of the University. This refresh will seek software platforms that contribute to the security of edge, situational awareness of the environment, and analytics to identify growth and areas for improvement. The University seeks the best solution to ensure optimum operation, user satisfaction, and support of the access-layer or edge network. Preference will be given to single-vendor solutions, where all components are sourced from a single vendor, to ensure the best integration, long-term support, and development.

Secondly, the University seeks to replace the networking components of its Data Centers. This refresh will include network hardware and related software required for configuration and management. This refresh will seek components that are scalable, high performing, highly reliable, and interoperable with existing University networks. The University seeks to ensure the services hosted on these Data Center networks are capable of meeting current and future business needs of the University in terms of performance and reliability. Preference will be given to single-vendor solutions, where all components are sourced from a single vendor, to ensure the best integration, long-term support, and development.

Thirdly, the University seeks to replace campus network backbone, including core and distribution equipment across the Lincoln, Omaha, Kearney, and Curtis campuses. This refresh will include network hardware and related software required for configuration and management. This refresh will seek components that are scalable, high performing, highly reliable, and interoperable with existing University networks. The University seeks the best solution to ensure optimum operation, user satisfaction, and support to meet the academic, research, and administrative needs of the University. Preference will be given to single-vendor solutions, where all components are sourced from a single vendor, to ensure the best integration, long-term support, and development.

a. Objectives

i. Establish negotiated pricing

The University continues to grow through new construction, renovation, and expansion as well as augmentation of existing networks. It is common throughout a given year to purchase additional wireless and wired network hardware and software to meet those needs. A pricing agreement is required for the life of the hardware and software and of the contracts established through this RFP.

ii. Refresh unified edge infrastructure

Replace edge infrastructure, including wired switching, wireless access points, and associated authentication and management software to provide a "unified edge" platform across University locations.

1. Replace existing edge switches

Approximately 1388 edge switches are in scope for replacement across the Lincoln, Omaha, Kearney, and Curtis campuses. The University will seek to replace edge switches in a phased purchase and installation approach, over a period of five years.

Both modular and fixed configuration switches may be proposed at the Bidder's discretion and both will be considered.

a. Ensure adequate PoE capability

Wireless is becoming the ubiquitous method of connectivity at the University. While wired still has a place, wireless is now the preferred method of access to network services. The University has a large enterprise wireless environment, totaling nearly 7,043 access points, and growing, across the four campuses. To support continued wireless growth and increasing power needs of newer access points, the need for PoE continues to rise.

PoE is also important for many IoT devices, such as security cameras, IP phones, thin-clients, and other building control devices. These types of devices are proliferating on the wired network and require power from the edge switches.

b. Access to multi-gig capability

As users continue to prefer wireless, wireless infrastructure may consume higher bandwidth than a single 1Gbps connection can provide. Selective access to multi-gig 802.3bz/NBase-T technology will benefit forthcoming wireless infrastructure. With newer wireless standards around the corner and a potential increase in services such as Wi-Fi calling, higher bandwidth to the AP will likely be necessary.

Multi-gig also has the promise of providing greater than 1Gbps to a directly connected workstation. As multi-gigabit NICs become available, increased bandwidth options may benefit users, such as researchers who need to move large data files.

c. Ensure adequate security at the edge

Securing network access is an important initiative for the University, and identifying devices, assigning roles, and building methods for mitigation are critical going forward. Switching must have the ability to provide per-port authentication with access to advanced features, such as downloadable ACLs and SNMP or RADIUS triggered VLAN moves.

With the large BYOD environment managed by the University, multiple forms of authentication need to be supported, such as 802.1x (EAP-PEAP and EAP-TLS), MAC authentication, and captive portal authentication. Options to enforce security such as dynamic user profiles and policies are critical to micro-segmentation of individual user traffic. Also needed in an authentication platform are tools to initiate a change-of-authority to remediate compromised clients, moving them to quarantine networks or denying the client access altogether.

d. Prepare for bandwidth growth

Edge switches connect every user at the University in one way or another. There are times when a user, such as a researcher, may require a higher bandwidth option than is offered within the 1-10Gbps range. With a large managed device environment, it is also

crucial to have adequate bandwidth available for updating large volumes of wired and wireless devices. Switches performing at line rate on all ports and with options above 10Gbps for select cases, such as MDF-to-core uplinks, would also be beneficial.

2. Refresh the existing wireless infrastructure

The University is requesting proposals to accommodate a refresh of its wireless LAN infrastructure, including wireless controllers and access points.

a. In-place swap of existing wireless infrastructure

The University intends to make a one-for-one swap of its existing wireless access points as the first step in migrating from its current platform to the Bidder's platform. In most cases, access points will be replaced in conjunction with switch replacement. The University is primarily standardized on a ceiling mount deployment; however, the Bidder must consider the suitability of their access point when both wall and ceiling mounts are used.

b. Improve performance in areas of high wireless client density

The University intends to utilize the wireless network during classroom instruction, including in large lecture hall areas and in areas that contain many large classrooms in close proximity. It is highly desirable that the Bidder's solution support up to 600 concurrent wireless users in a large, single room. Other dense environments include arena, event, and conference spaces. This will require effective RF and wireless host management strategies.

c. Continue to provide stable service

Wireless is the predominant method of end-user connectivity at the edge. The existing environment is stable and user satisfaction is good, but a majority of access-point hardware is end of life and needs refreshed. Expansion will continue to fill coverage gaps on campus, increase the density of deployment, and expand into outdoor spaces.

The University is looking for a mature, stable platform with peer installations in the higher education community. There will be limited time for testing, so references provided by the Bidder will be used to help evaluate stability and suitability. The University looks to avoid controller reboots, access point reboots, and hardware or software bugs that result in service disruptions to wireless hosts.

A requirement is that the loss of any campus should not affect the wireless service on other campuses, i.e., the loss of network connectivity in Lincoln should not affect the wireless network in Omaha. The University network is architected in a redundant fashion such that a general loss of network today on any campus should not adversely affect the remaining campuses.

Controller capacity between the campuses should not be shared. Lincoln controllers should only adopt Lincoln access points, Omaha controllers should only adopt Omaha access points, and Kearney controllers should only adopt Kearney access points. Smaller locations, including Curtis and County Extension Officers, may be adopted by the controllers in Lincoln, Omaha, or Kearney. The controllers at each location must support the full number of access points indicated per campus.

The growth capacity of the controller arrangement must be specified. The controllers proposed should be proposed in a configuration that can support 35,000 concurrent wireless clients in Lincoln, 15,000 concurrent wireless clients in Omaha, and 7,000 concurrent wireless clients in Kearney.

The controllers must be proposed to support N+1 redundancy. It is desirable to have 1+1 redundancy with physical diversity. On each campus, the controllers will be deployed between two geographically diverse MDF facilities and the loss of one facility

should not degrade the operation of the wireless network. The remaining MDF should be able to support the full complement of access points and clients.

If any of the wireless components are virtualized, the University has two data centers approximately 50 miles apart. One data center in Lincoln and the other in Omaha. The data centers have the ability to stretch layer2 if required.

The vendor is welcome to present modifications to the current wireless design or propose a new design.

d. Optimize wireless configuration and coverage
It is highly desirable that the Bidder's solution provide robust and dynamic RF adjustments to optimize service and identify service coverage gaps.

e. Scalability
University wireless services currently support more than 40,000 simultaneous wireless clients near peak. Wireless usage continues to increase as more and more computing devices begin to use wireless over Ethernet, saving on wiring costs. Newer mobile and entertainment devices, and the increased use of Wi-Fi calling, also ensure that client counts will continue to grow. We anticipate annual growth of wireless devices to be between 10 – 15%.

f. Improve wireless system management
Multiple administrators must be able to manage the wireless controllers and access points efficiently. A single point of configuration for the entire installation or per campus is highly desirable. The ability to monitor the system and successfully query the wireless controllers for operational information is critical.

3. Leverage unifying software for authentication, monitoring, and analytics
Situational awareness of the status of the edge network and connected clients are important factors to managing a large network. Authentication and instrumentation for the entire edge environment will help streamline access and support; providing the ability to predict and respond to problems before they affect the network, its security, or the satisfaction of the users.

a. Authenticate and authorize all clients connecting to the University network
Authentication is a crucial component of edge access, providing real-time information for each connection. A policy-based network access platform with flexibility to provide end-user facing interfaces for device management is needed. Authentication must support multiple methods, such as 802.x EAP-TLS and EAP-PEAP, the application of role-based policies, and extensive logging of the process. Many devices that connect to the University network are not capable of 802.1x authentication. Additional methods such as a MAC registration and authentication or captive portal authentication are necessary.

b. Provide role-based access
The software platforms and associated hardware must support the assignment and enforcement of role-based access. Flexibility is key, allowing for movement of a client to a specific VLAN or assignment of a restrictive ACL are all methods to provide segmentation based on roles. The capability to modify an existing role and apply those changes to a large client population or simply change the role of a single client are necessary capabilities to manipulate the client environment to prevent and respond to security issues.

c. Standardize on a centralized policy framework
The authentication platform will be the central point for distributing role-based policies to wired and wireless networking devices; allowing for a single point of configuration and distribution of role-based policies and dynamic ACLs.

d. Situational awareness of the edge environment
The software platform should monitor all components of the edge environment, including wireless controllers, wireless access points, and edge switching. The provided data should be detailed and specific to each monitored device and provide the engineering team with data to troubleshoot connectivity issues, identify and locate clients, and track trends and statistics necessary to manage and improve the environment. The data will also be made available on a limited basis to security and support groups to query specific data based on their organizational roles. Also critical is some method to present the placement of edge devices, especially wireless access points, on top of architectural maps for location tracking and some estimation of their function and reach.

e. Authorize and limit access to consumer media or IoT devices without requiring shared broadcast domains
With the advent of IoT and the multitude of media devices, the NAC needs to provide the end-users with an ability to register and manage personal devices. The NAC, or other platforms, need to support interfaces for managing the visibility and access to a registered device. Many types of devices are found within our campuses, including Apple TV, Google Chromecast, Amazon Fire devices, and other comparable devices. Access to these devices do have limits and is not ubiquitous, however, tools are needed in the edge solution to manage these devices to the greatest extent possible.

iii. Refresh data center network infrastructure
The University is seeking proposals to replace networking infrastructure for its on-premise Data centers.

BACKGROUND: Today the University has a mixture of network equipment for Data center routing and switching at different sites. Cisco: 6506E (VSS), Nexus 5548 (vPC) w/FEX 2248, Nexus 93180 (vPC). Arista: 7504E (MC-LAG), 7150, 7050, 7010. This is mostly serving 1Gb connected hosts while 10Gb is limited to infrastructure links along with VMware servers, load balancers and storage. Traffic is segmented using vlans and 802.1q trunking across single or LAG/MC-LAG links. Inter-site DC connectivity is multiple 10G links using dark fiber or DWDM. Today network redundancy is achieved using dual chassis and VSS/vPC/MC-LAG at aggregation points and in some cases dual routed paths out of a DC. The University has recently purchased two pairs of Palo Alto firewalls to serve these two sites. **Note**: Compute, storage, firewalls, load balancers, and DWDM optical transport are outside the scope of the Data Center section of this RFP

1. Build new networking infrastructure for Data Centers at multiple sites
The University has two main Data Centers (DC), one in Omaha, NE (TierPoint) and one in Lincoln, NE (Nebraska Hall). Both sites will house active compute and storage along with redundant pairs of load balancers and firewalls at each site. These main sites will be connected directly into the NU-WAN network and separate from any campus network.

These two DC sites are 50+ miles apart. The University owns and operates a 100G capable WAN and DWDM transport between these sites. For applications that can support it, both DC's will be active and providing redundant services at the same time. For other services, one site will be primary for connectivity and the other will be secondary.

There are also auxiliary DC sites on each campus. In the future the roles of these sites could potentially change. Therefore, any proposed networking architecture should be able to

accommodate two or more inter-connected DC sites. There is a desire to use common network hardware models when possible in the main and auxiliary sites.

For this RFP the proposed network solution should focus on the two main DC's. The University can then replicate this model to other auxiliary sites if needed.

2. **Be scalable, high performance, supporting current trends and industry standards**
There is an expectation to have a DC network solution that is standards based and has a current high adoption rate, preferably within HigherEd. While open to other solutions, there is a desire for a Spine-Leaf network using a layer 3 routed underlay. Ideally the Spine to Leaf links would all be 100G. The use of VxLAN for layer 2 and layer 3 services along with EVPN is expected to be supported along with standard routing protocols such as OSPFv2/3, BGP for IPv4 and IPv6.

   The University is targeting to have 95% of servers virtualized in the future. There is an expectation that 10G will be the new connection standard, though 1G support will be needed for the foreseeable future. On the leaf switch there should be support for 1G/10G/25G/100G. The desire would be for all physical hosts to be dual connected to different leaf switches when possible using link redundancy protocols such as LACP.

   For external connectivity at each DC site, the desire would be to have a pair of switches that will be dedicated for border routing functions. These switches would connect to the NU-WAN routers for connectivity to the University and Internet. The DC firewalls at each site should also connect to these border leaf switches.

   The University is also investigating VMware NSX for possible use. While NSX is outside the scope of this RFP, any proposals should include statements of what NSX support is available in the solution.

   The University is also utilizing hybrid cloud deployments. Most activity today in this space is with AWS. In the future, DC's could be involved in terminating cloud connectivity. While providing cloud services is outside the RFP scope, proposals should highlight any features or key advantages as it relates to integrating on-prem DC resources with the cloud.

3. **Infrastructure is highly available, redundant, independent at each site**
Any proposed network solution must be highly available and redundant. The expectation is the network fabric will remain operational with the failure of any single Spine or Leaf switch. Leaf switches will be installed in pairs. There is a desire for all hardware to have redundant power supplies and fans that are field replaceable.

   Any proposed solution should have the ability to perform device software upgrades in a controlled fashion. This should allow software upgrades to happen incrementally as to not impact the entire fabric at any one site. If In-Service-Software-Upgrade (ISSU) or 'hitless upgrades' is available on any devices it should be highlighted.

   While the DC sites are interconnected, the expectation is that each site will be survivable and operate independently in the case of a total failure at one of the other sites. The overlay configuration must have the ability to control potential Broadcast, Unknown Unicast, Multicast (BUM) traffic storms from propagating between DC sites.

4. **Achieve higher operational efficiency through automation and orchestration**
There should be the option to use a vendor supplied graphical software tool for configuring, deploying, and modifying the Spine-Leaf networks.

   In addition, the proposal should state which programmability features of the solution are available using open automation tools.

5. **Provide enhanced features for network management, performance monitoring and troubleshooting**
   The ability to ensure the DC network fabrics are working optimally will be critical. This will include the ability to monitor and troubleshoot the hardware, underlay and overlay networks.

   Any features built-in into the solution, or optional products, which aid in this effort should be highlighted. This would include the ability to monitor interface buffers in real-time and the option for streaming analytics. There is also an expectation to have integration with Splunk for logging and analysis. In addition, the support for exporting network flows and port-mirroring are expected. If there are any built-in capabilities to perform packet captures within the solution those should be highlighted.

   There is the expectation that the solution has strong monitoring support for SNMP polling from network management systems. If any added capabilities or integrations with Solarwinds are available those should be highlighted

iv. Refresh campus backbone core/distribution network infrastructure

The University is requesting proposals to refresh its campus backbone core/distribution network infrastructure. The University network supports a wide variety of activities including but not limited to educational, research, and community engagement.

The University's current backbones are built on a variety of hardware platforms including Extreme X670 (5 systems), Cisco Catalyst 6807-XL systems (12 systems), Alcatel-Lucent Enterprise OS6900-X72 (22 systems), and a variety of aggregation switches. A variety of different technologies and protocols have been used to deploy networking services such as OSPF, BGP, 802.1Q VLAN trunking, and 802.1AQ Shortest Path Bridging, and VRF-Lite. The University is seeking a backbone solution that can deploy current and future services on a common platform for all campuses.

1. **Build capacity and simplify delivery of new services**
   The University is seeking to build networking capacity and simplify delivery of virtualized Layer 3 (IPv4 and IPv6 routing) and virtualized Layer 2 (Ethernet bridging) services over a routed transport. It is highly desirable that the Bidder's solution is built on modern industry standards.

2. **Utilize existing fiber optic cabling plant**
   Campus fiber optic plants were built using different topology designs. 1) A dual-hub and spoke topology 2) A hub-spoke topology for a smaller site 3) A ring of spokes topology 4) a partial mesh topology. The University is seeking a solution that can utilize the existing topologies in the short term with no or minimal changes while a future fiber optic refresh is planned. A more detailed diagram of fiber connectivity in Attachment C – Campus Fiber Optic Maps is provided.

3. **Continue to provide stable service**
   Campus network backbone provides business critical connectivity for campus services including telephone services, fire life-safety systems. Providing equipment and geographic redundancy where possible is highly desirable. Compatibility with existing and future downstream networking equipment as well as Wide-Area-Network (WAN) equipment is paramount to support a phased deployment.

4. **Scalability**
   Port-density requirements on routers vary by location and can range from as few as 6 downstream devices to 90+ downstream devices. The University will consider chassis,

modular, and fixed form routers and switches. Aggregation switching may be used in locations where applicable.

5. **Operational Effectiveness**
   The University is seeking greater operation effectiveness through the use of 1) same or similar equipment models where possible to allow for cold-spare equipment sharing and sharing of skills 2) consistent and quick deployment of infrastructure through zero-touch-provisioning 3) consistent and quick deployment of services through orchestration and automation.

2. **Proposal**
The selected Bidder must propose a Master Pricing Agreement for hardware and related pricing, which meets the objective and criteria of this RFP. Due to the quantity of hardware and replacement schedule, a subset of the equipment will be the focus of a pricing proposal for comparison.

Please reference Attachment A for a list of current Unified Edge assets and create a pricing proposal for equivalent hardware that satisfies the requirements of this RFP. Pricing for network access control licensing, and any necessary hardware, sized to support authentication for the entirety of the wireless access points and total number of switches should be included. Adequate monitoring licensing and any necessary hardware to monitor and provide analytics for the entire wired and wireless environment should be included. If possible, the solution should be designed for geographically redundant deployment.

Please reference Attachment B to create a comparative pricing proposal for Campus Backbone networking. Pricing for the Campus Backbone proposals should include any licenses necessary to support features listed as required in this RFP.

Please reference Attachment D to create a comparative pricing proposal for Data Center networking. Pricing for Data Center (DC) proposals should include any necessary licenses needed to support required features. This includes any graphical software tools available for configuration and support of the DC network.

Pricing should be reflected separately from any trade-in offers of equipment listed in Attachment A. Please list Trade-In and any additional incentives as separate line per details in Section 5.d.

Support and licensing pricing for five (5) years for all components, including software and hardware should be included.

Upon award of the RFP, the University will proceed to place an initial order of equipment, software, and licensing to begin refreshing the University network. This will begin the refresh, one building at a time, on each campus, refresh of data center networks, and of campus backbones. The University intends to begin cycling out the older equipment beginning in early 2020 and continuing as schedules and budgets permit until completion.

i. **Training**
The selected Bidder must provide pricing for training of twenty (20) University personnel on the proposed products in a facility within 30 miles of the Lincoln or Omaha campuses. The training may be held onsite at the University. This training shall include instruction on the operating system, configuration, and troubleshooting of equipment which is pertinent to the University's intended use. In order to preserve business continuity, two training sessions must be provided. Due to the scope of the project, training is a critical component to ensure the engineering staff are able to effectively expand and support the environment.

ii. **Optional Certification**
Certifications pertaining to the equipment being purchased and their supporting systems should be listed as an optional cost.

iii. **Technical Support**

It is strongly desired that, at a minimum, edge switching be accompanied by a lifetime warranty, with support and software upgrades, by the manufacturer. If this is not the case, the selected Bidder must provide technical support from the equipment manufacturer on the proposed switching hardware for a period of five (5) years. Any hardware or software not covered under a lifetime warranty should include five (5) years (60 months) of support, including software updates and next-business day parts replacement.

Any support must include online access to software upgrades, online access to the manufacturer's knowledge base, online initiation of technical support cases, phone-based initiation of technical support cases, and initial response from a technical support engineer within two hours of initiating a technical support case, and next-business-day replacement of failed hardware.

iv. **Equipment Delivery**
Equipment must be delivered within four weeks of order placement unless an estimated delivery schedule is provided within the first week after order placement. Software, virtual appliances, and/or licenses should arrive as soon as possible after order placement.

v. **Value Add**
Please describe any additional services that you would like to include at no cost to the University, such as but not limited to the items listed below:

- Tier 3 engineer availability onsite for initial implementation.
- Direct access to Tier 3 engineering for on-going support throughout the hardware and software lifecycle.
- Installation crews to accelerate conversion process to new hardware.
- Supporting software that would otherwise be purchased separately.
- Engineering assessment of wireless access placement, including high traffic areas and outside environments.

3. **Services Area/Delivery Locations/Maintenance Timeframe**:
   a. Delivery locations for equipment will be as follows:
      i. Lincoln: University of Nebraska - Lincoln
      Attn: Information Technology Services
      1321 Military Road
      Lincoln, NE 68583

      ii. Omaha: University of Nebraska at Omaha
      Attn: Information Technology Services
      601 South Saddle Creek Road
      Omaha, NE 68106

      iii. Kearney: University of Nebraska – Kearney
      Attn: Information Technology Services
      905 W 25th Street
      Kearney, NE 68849

      iv. Curtis: Will be delivered to one of the three locations listed above.

4. **Price:**

   a. Provide a comparative proposal using Attachment A, B, and D:

      i. All hardware described in section 1, including associated support and licensing for five (5) years.

      ii. All necessary related components describe in section 1, such as power-supplies, fan trays, transceivers, line cards, brackets, and etc.

iii. Any equipment relating to providing outside wireless, including associated support and licensing for five (5) years.

iv. All components for available management platforms, including associated support and licensing for five (5) years.

v. Any additional software for authenticating, monitoring, measuring, and troubleshooting the edge network environment, including associated support and licensing for five (5) years.

vi. All pricing should be provided in line item detail format.

b. In addition to the comparative proposal in 4.a, a pricing list of all hardware and components offered as a part of this RFP is required. This pricing list should be provided in Microsoft Excel format and include a list price column, a discount column with the discount percentage offered, and a net price column.

It is strongly preferred that there is not a charge for support and maintenance on spare equipment. Please indicate if the support covers hardware, software, or both. It is strongly desired that the edge switching be covered under lifetime warranty.

i. Specify any ongoing protected, flat percentage (%) discount from manufacturer's list price for future purchases, including equipment, services, licensing, and support not specified in the Bidder's response. The discount must also be applicable to all organizations where the Board of Regents of the University of Nebraska holds an ownership stake, and organizations of the Nebraska State College System. The discount structure should be firm for a minimum of five (5) years, with an option to renew for an additional five (5) one-year terms. Bidder must agree that the discount will be increased to the University if the Bidder increases discounts generally to its customers above the offered discount to the University, for relevant goods and services.

ii. The list pricing shall not increase except as part of a non-targeted, across-the-board pricing increase by the Bidder, applicable to its customers generally, for the relevant goods or services. The selected Bidder will give the University at least 90 days advance notice of any increase in the list pricing it charges to the University under the pricing agreement. Such increase shall not exceed CPI or 2% each year of the term, whichever is lower.

iii. Bidder agrees to provide at minimum a current master pricing list for applicable product categories annually no later than January 31st of each year of the contract. If product releases occur on a different schedule, catalog should be provided to the University within 30 days after major product updates.

c. Provide the cost, if any, for training described in Section 1.b.2.

d. Provide the trade-in value the Bidder is willing to provide for the equipment listed in Attachment A. The equipment cannot be guaranteed to be provided in full to the selected Bidder, instead provided as each building is refreshed. The University can provide incremental portions of the equipment during the installation process. It is the Bidder's obligation to arrange packing, pick-up and transportation, of the equipment. Trade-in shall be listed separately from the purchase cost.

e. Please indicate if proposed Value Add items in Section 1.b.6 will be at no cost. Otherwise, please indicate line item pricing for optional services.

5. **Term of Contract**:

a. **Initial Term** shall be defined as five years.

b. The University may extend the life of the contract by an additional five one-year terms beyond the Initial Term, defined as the **Extended Term**.

6. **Evaluation**:

Selection of the successful company will be based upon:

- Ability to meet technical specifications and statement of needs
- Total cost of ownership
- References
- Value-add
- Acceptance of terms and conditions

These criteria have been listed in order of importance.

7. **Proposal Response**

The Bidder's response to this proposal should include answers to the following series of questions. So that the RFP team can easily follow the questions and responses, please assure that the question is stated immediately prior to the response. In addition to point-by-point responses, you may include descriptive literature if you refer to specific contents. In reviewing the proposals, University personnel will not search through general literature. Where a question is asked, answer the question and supply any supportive detail. Any deviation from this format and sequence may result in the proposal being immediately rejected.

While responses should address all solicitation items, it is important to note that we also encourage and will consider any creative ideas for improvements or cost savings related to this transaction that may not be suggested in this document. Functional, technical, and economic solutions beyond the confines of this solicitation may also be considered.

The responses should address all solicitation items. However, the University reserves the right to consider other ideas and solutions, or only a restricted subset of the configuration discussed in this document.

All optional arrangements should be described and priced separately.

a. All proposal responses must include:

i. The name, address, phone and fax number, and email address for the duly authorized agent submitting the proposal.

ii. Full description of company, including experience, qualifications, and organizational chart.

iii. Documentation of any intent to partner with a reseller for any part or the whole of the services offered in response to this RFP.

iv. Copies of all documents that could become a part of a final Agreement arising from this process. A legal review of the Bidder's proposed Agreement terms will be part of the criteria in evaluating the Bidder's offer.

v. The Bidder must provide five reference customers. A minimum of two references must be from higher educational institutions of 20,000 students or greater within the United States using the proposed equipment in a similar manner to the University of Nebraska. However, three of these references are strongly desired.

Attachments

Attachment A – Equipment Inventory
Attachment B – Campus Backbone Pricing Proposal
Attachment C – Logical Campus Fiber Optic Maps
Attachment D – Data Center Pricing Proposal

Attachment A

Unified Edge Inventory List

The inventory list below indicates the inventory that is currently installed across the NU system. We are requesting bids for models that are suitable replacements for these models meeting the specifications listed in the RFP. Utilizing as few AP models and controllers as possible. In addition, a network access and control policy management solution must be included.

Wireless Inventory

Cisco Controller Inventory	
AIR-CT5520-K9	7
WS-SVC-WISM2-K9	4
Cisco Access point Inventory	
AIR-AP1562D-B-K9	50
AIR-AP1562E-B-K9	2
AIR-AP1562I-B-K9	18
AIR-AP1810W-B-K9	273
AIR-AP1815W-B-K9	66
AIR-AP2702I-UXK9	289
AIR-AP2802E-B-K9	19
AIR-AP2802I-B-K9	1715
AIR-CAP1532I-A-K9	27
AIR-CAP2602E-A-K9	1
AIR-CAP2602I-A-K9	914
AIR-CAP2702I-A-K9	782
AIR-CAP2702I-B-K9	240
AIR-CAP3502I-A-K9	60
AIR-CAP3602I-A-K9	25

AIR-CAP702I-A-K9	1
AIR-CAP702W-A-K9	698
AIR-LAP1142N-A-K9	352
AIR-LAP1242AG-A-K9	19
AIR-LAP1252AG-A-K9	53
IW3702-4E-B-K9	4
AIR-AP1572EAC-B-K9	2
AIR-AP3802P-B-K9	4
AIR-CAP1552EU-A-K9	1
AIR-CAP3602E-A-K9	2
AIR-CAP3702I-A-K9	40
AIR-CAP3702P-A-K9	8
Total	**5665**
Aruba Controller Inventory	
Aruba 7240	2
Aruba Access Point Inventory	
Aruba AP 365	3
Aruba AP 315	230
Aruba AP 303H	343
Aruba AP 275	13
Aruba AP 225	13
Aruba AP 205H	52
Aruba AP 205	2
Aruba AP 105	153
Aruba AP 104	394
Total	**1203**
Xirrus Controller Inventory	
XMS server Model 9000	1

Xirrus Access Point Inventory	
XR620	163
XR2426	6
XR2425H	3
XR4826	1

Wired Inventory

The inventory list below indicates the switch inventory that is currently installed across the NU system. We are requesting bids for models that are suitable replacements for these models meeting the specifications listed in the RFP. Standardizing on as few different switch models as possible.

Cisco Access switch Inventory	
WS-C4506-E	208
WS-C3750-24PS-S	117
WS-C3750V2-24PS-S	84
WS-C2960X-24PS-L	73
WS-C3750X-24P-S	72
WS-C2960X-48FPS-L	68
WS-C2960S-24PS-L	40
WS-C2960X-24PD-L	37
WS-C3750G-24PS-S	36
WS-C2960S-48FPS-L	35
WS-C2960X-48FPD-L	33
WS-C3850-48P-S	32
WS-C3750X-48P-S	31
WS-C2960S-48LPS-L	29
WS-C3750E-24PD-S	24
WS-C3850-48U-L	21
WS-C3750G-12S-S	17
WS-C2960G-48TC-L	14

WS-C2960G-24TC-L	11
WS-C3560CG-8PC-S	11
WS-C3560E-24PD-S	11
WS-C3750-24TS-S	9
WS-C2960-24TC-L	8
WS-C3560X-24T-L	8
WS-C3850-48P-L	8
IE-3000-8TC	7
WS-C3560C-12PC-S	7
WS-C3560E-12D-S	7
WS-C3750X-12S-S	7
WS-C2960G-8TC-L	6
WS-C3560CX-8PC-S	6
WS-C3750E-24TD-S	6
WS-C2960S-48TS-L	5
IE-2000-16TC-G-E	4
IE-2000-8TC-G-B	4
WS-C3560CX-12PC-S	4
WS-C3750G-24TS-S	4
IE-2000-4TS-G-B	3
WS-C3560X-48T-L	3
WS-C4510R+E	3
WS-C2960S-24TS-L	2
WS-C3560G-48PS-S	2
WS-C3850-12S-S	2
WS-C6513-E	2
IE-3010-16S-8PC	1
WS-C2940-8TT-S	1
WS-C2960-8TC-L	1
WS-C3560-24PS-S	1
WS-C3560X-24T-S	1
WS-C3750X-24T-L	1

WS-C3850-12S	1
WS-C3850-24S-S	1
WS-C6506-E	1
WS-C6509-E	1
Total	**1131**

Enterasys Switch Inventory	
71K91L4-24	9
B3G124-24P	2
B3G124-48P	3
B5G124-24P2	12
B5G124-48P2	15
C3G124-24	1
C3G124-48	3
C5G124-24	2
C5G124x24P2	10
C5G124x48	94
C5G124x48P2	52
S4	1
Total	**204**
Extreme Switch Inventory	
summitX450G2-24p-10G4	1
summitX450G2-48p-10G4	28
summitX670G2-48x-4q	5
Total	**34**

Attachment B- Campus Backbone Equipment

Campus Backbone Background

The University of Nebraska has four campus networks located in Curtis, Kearney, Lincoln, and Omaha. Each campus network will be interconnected with the University operated Wide Area Network in 2 distinct physical locations, with the exception of the Curtis campus. The operation of the campus network should not be dependent on the equipment in any single interconnections.

Campus networks will have reachability between campuses and possibly have virtualized IPv4/IPv6 or select Ethernet services spanning across campuses. Each campus network is expected to operate independently of other campus networks. Each campus network is expected to survive the failure of any single Data Center network.

For more information, please see:

- Attachment C - Logical Campus Fiber Optic Maps.
- Campus Backbone Objectives section of the RFP for required and preferred criteria for hardware.
- Data Center Networking section of the RFP.

As described in the RFP, pricing proposals seek to compare Total Cost of Ownership. Campus Backbone network hardware may be purchased and installed in phases.

Base Specifications, Support, Maintenance, and Spare Hardware

- Pricing proposals must provide an itemized cost by SKU.
- Include all hardware, software, licenses, and 5 years of maintenance.
- Include 24x7 support for routing and switching equipment.
- Include 8x5 hardware replacement for all equipment.
- Where a pair of routers or switches are specified for use, include any cabling required for connectivity between the pair of routers or switches.
- For each model of hardware, include 6 spare units. Spare units will be kept at a customer location and will be used in the event of equipment failure. University IT staff must be able to install spare equipment into a production network without contacting vendor support. (i.e. University IT staff must not be required to contact vendor support to transfer software licenses prior to putting spare hardware into production).
- Spare equipment may be used for training or testing purposes.

Service Specifications by Campus

Curtis

Routing

- Include equipment for two routers located in the same room. Each router will serve 16downstream devices. The downstream devices will connect to each router forming an MC-LAG.
- Include a total of 32x 10GBase-LR optics to connect to downstream devices.

Kearney

Routing

- Include equipment for two routers at each of 4 physical locations. Each router will serve 16downstream devices. The downstream devices will connect to each router forming an MC-LAG.
- Each router pair must support 2-4 connections to neighboring routers.
- Include a total of 128x 10GBase-LR optics to connect to downstream devices.
- Include a total of 8x 100GBase-LR optics for router-to-router connectivity to form the campus backbone.
- Include a total of 2x 100GBase-LR optics for campus-to-WAN connectivity.

Aggregation Switches

- Include equipment for a pair of aggregation switches at each of 6 locations. Each aggregation switch pair will serve 12 downstream devices. The downstream devices will connect to each aggregation switch forming an MC-LAG.
- Include a total of 144x 10GBase-LR optics to connect to downstream devices.
- Include a total of 12x 10GBase-LR optics for aggregation switch uplinks.

Lincoln

Routing – Site A

- Include equipment for a minimum of one router at each of 2 physically separate locations. Each router will serve 90 downstream devices. The downstream devices will connect to each router forming an MC-LAG.
- Each router pair must support 2-4 connections to neighboring routers at different sites.
- Include a total of 180x 10GBase-LR optics to connect to downstream devices.
- Include a total of 4x 100GBase-LR optics for router-to-router connectivity to form the campus backbone.
- Include a total of 2x 100GBase-LR optics for campus-to-WAN connectivity.

Routing – Site B

- Include equipment for a minimum of one router at each of 2 physically separate locations. Each router will serve 16 downstream devices. The downstream devices will connect to each router forming an MC-LAG.
- Each router pair must support 2-4 connections to neighboring routers at different sites.
- Include a total of 32x 10GBase-LR optics to connect to downstream devices.
- Include a total of 4x 100GBase-LR optics for router-to-router connectivity to form the campus backbone.

Routing – Site C

- Include equipment for a minimum of one router at each of 2 physically separate locations. Each router will serve 204 downstream devices. The downstream devices will connect to each router forming an MC-LAG.
- Each router pair must support 2-4 connections to neighboring routers at different sites.
- Include a total of 408x 10GBase-LR optics to connect to downstream devices.
- Include a total of 4x 100GBase-LR optics for router-to-router connectivity to form the campus backbone.
- Include a total of 2x 100GBase-LR optics for campus-to-WAN connectivity.

Aggregation Switching

- Include equipment for a pair of aggregation switches at each of 31 locations.
- A 10GBase-LR uplink from each aggregation switch to a router, forming an MC-LAG.
- Each aggregation switch pair will serve 4-10 downstream devices. The downstream devices will connect to each aggregation switch, forming an MC-LAG.
- Include a total of 204x 10GBase-LR optics to connect to downstream devices.
- Include a total of 62x 10GBase-LR optics for aggregation switch uplinks.

Omaha

Routing

- Include equipment for a pair of routers at each of 21 locations.
- Each router pair will serve 3-18 downstream devices. The downstream devices will connect to each router using 10GBase-LR optics forming an MC-LAG.
- Include a total of 368x 10GBase-LR optics to connect to downstream devices.
- Each router pair must support 2-4 connections to neighboring routers.
- Include a total of 50x 100GBase-LR optics for router-to-router connectivity to form the campus backbone.
- Include a total of 4x 100GBase-LR optics for campus-to-WAN connectivity.

Aggregation Switching

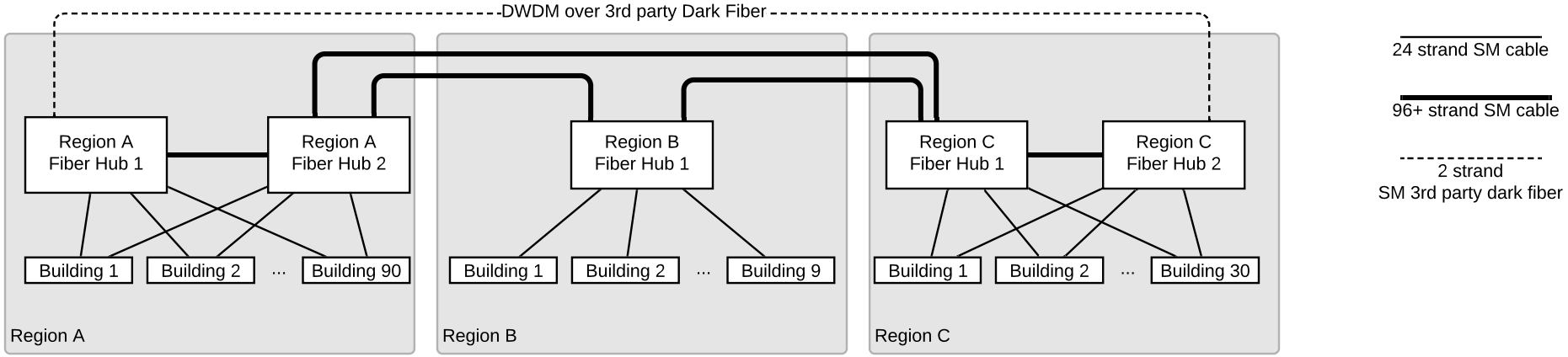
- Aggregation switching is not required for the Omaha campus backbone.

Design Variations

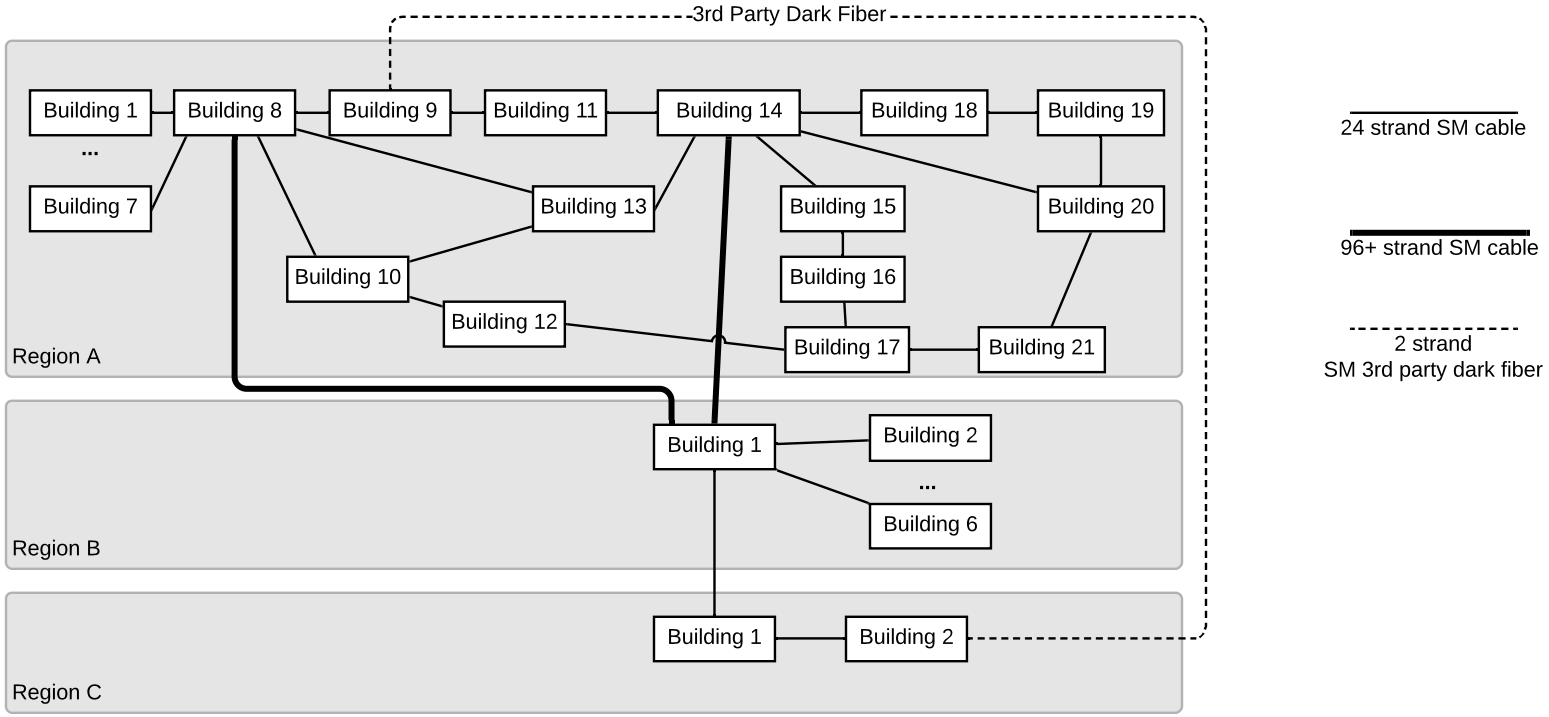
- Bidders are welcome to propose alternative configurations where appropriate.
- Bidders are welcome to propose additional equipment where role separation is desired (i.e. Separate Provider/Provider-Edge functionality), or where the addition of equipment may simplify day-to-day operations.
- Bidders are welcome to note pricing of 25Gbps capable equipment and optics where available.
- Bidders are welcome to note pricing of alternatives to specified optics where applicable. (i.e. 100GBase-CWDM4 or 100GBase-DR instead of 100GBase-LR4)

Attachment C - Campus Fiber Maps

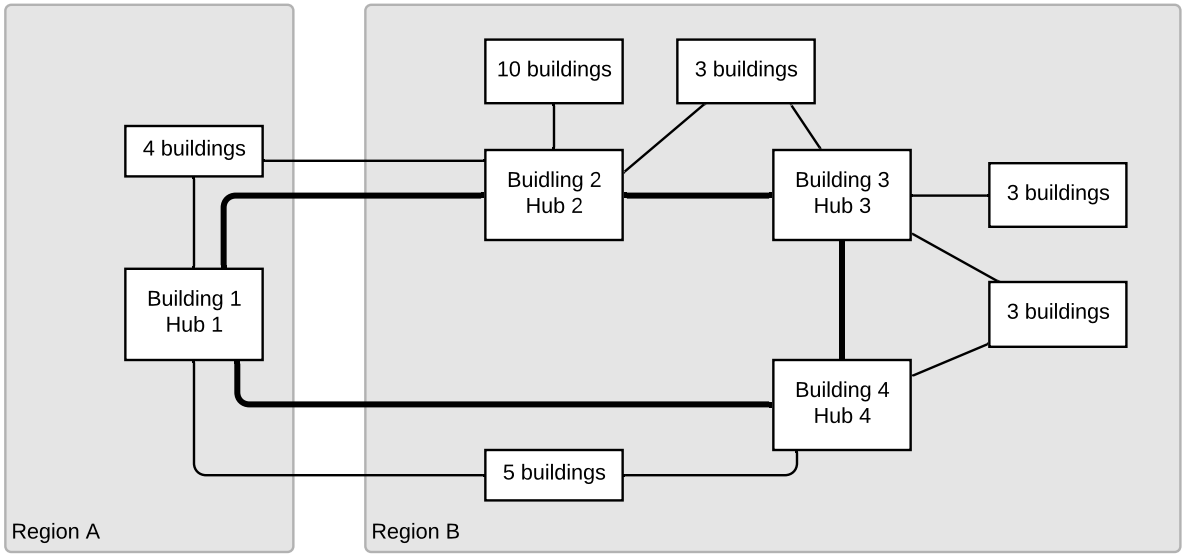
UNL Campus Fiber Model



UNO Campus Fiber Model



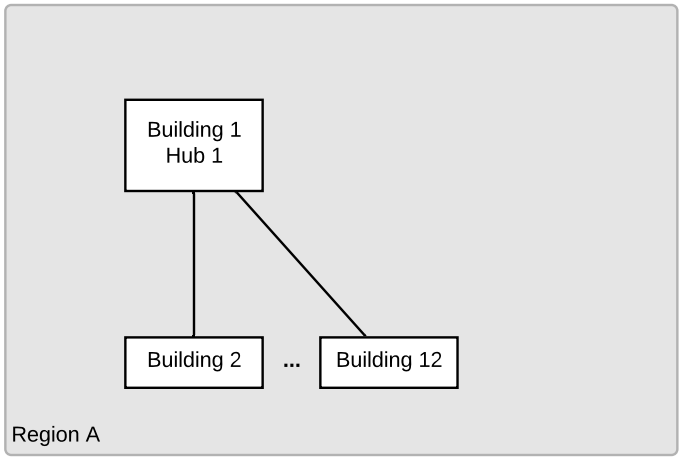
UNK Campus Fiber Model



6-24 strand

60-96 strand SM between hubs

Curtis Campus Fiber Model



6-24 strand

Attachment D – Data Center Proposal

Data Center Background

The University of Nebraska has two main Data Centers (DC), one in Lincoln (Nebraska Hall – NH) and one in Omaha (Tierpoint). The University owns and operates a 100G capable WAN/MPLS network and DWDM transport between these sites. The DC's connect into the WAN routers for inter-DC, campus and external connectivity.

Both DC's will house active compute and storage along with redundant pairs of load balancers and firewalls at each site. For applications that can support it, both DC's will be active and providing redundant services at the same time. For other services, one site will be primary for connectivity and the other will be secondary. While the DC sites are interconnected, the expectation is that each site will be survivable and operate independently in the case of a total failure at one of the other sites.

For more Data Center background please see the Objectives section of the RFP.

Data Center Proposal Summary

The University is seeking to refresh the network infrastructure inside both of its main DC's. **Please consult the RFP for sections related to the Data Center Objectives, required and strongly desired features**. The term 'leaf' is used to describe the Top of Rack switch. The 'spine' is used to describe the devices where the leaf uplinks connect to.

Some components will be highlighted in the following sections. The details for the pricing proposal will be at the end. The University desires solutions using open standards such as VxLAN and EVPN, however proposals may include vendor-specific solutions. In either case the solution must integrate with existing University networks.

DCI (Data Center Interconnect)

The University is seeking a DCI solution to provide inter-DC connectivity. The DCI needs to support the extension of Layer 2 and Layer 3 between DC sites. The DCI can utilize the University WAN (100G) for provide IP connectivity between sites. Proposals may also include DCI options that utilize direct connections between sites using the University optical transport.

Note: There are other auxiliary DC's located on each campus. In the future these auxiliary sites may serve in different roles. The proposed DCI solution should be capable of inter-connecting two to four sites. For the proposal it is only required to interconnect the two main DC's. (See Border leaf section for related information).

WAN Connectivity

The DC network at each site will need to connect to the existing WAN/MPLS routers at 100G. This will be two 100G connections per DC site, a single connection into two separate routers. The University will provide any needed fiber paths between the DC and WAN routers. The connections to the WAN will utilize **single mode** fiber. There is an expectation to be able to extend MPLS L3VPN's into the new DC VRF structure. (See Border leaf section for related information).

Firewall Connections

Each DC site will have a pair of Palo Alto firewalls in routed mode. The DC network will need to provide two 100G connections in a LAG/LACP configuration to each firewall. Assume the use of **multimode fiber** when providing interfaces. (See Border leaf section for related information).

- DC site 1 : 2 x 100G for each firewall = (4) 100G for firewalls
- DC site 2 : 2 x 100G for each firewall = (4) 100G for firewalls

Top of Rack (leaf)

There is a desire for two leaf switches in each cabinet for **general use**. The two leafs in each cabinet will be paired together to allow end hosts to connect redundantly into each switch using LACP. The leaf switch will have support for 1G/10G/25G/100G. All leaf to spine links will be 100G. Each leaf should support at least four 100G interfaces. In most cases the host interfaces will use 10G or 1G. **Assume the use of multimode fiber for Leaf to Spine links**.

- 2 leaf switches per cabinet for general use
- 48 host ports per leaf, mostly 10G or 1G
- 4 100G uplink ports per leaf minimum

Border leaf

There will be two border leafs at each DC site providing connectivity to the **WAN and DCI**. Proposals may also use the border leafs for firewall and load balancer connections. Optionally proposals may include a pair of Services leafs at each site to handle connections for firewalls and load balancers. In either case, the border or services leafs will be dedicated to their purpose and will not be providing host connections. Other features needed in the border leaf are listed in the WAN and DCI sections above.

Spine

As all spine to leaf connections will be 100G, all spine connections will be 100G. With two spines this should yield a 2.4:1 oversubscription ratio for general use leafs. This should provide acceptable performance and basic redundancy requirements. Adding more than two spines will provide more bandwidth and resiliency during times of spine maintenance or failure. Proposals may include more than two spines based on vendor recommendations.

The University has a desire to consolidate DC equipment into fewer cabinets. The pricing proposal based on 8 cabinets for general use reflects this goal. Over the next 5-7 years the University needs may change. For this reason, the University is requesting a second proposal that reflects a possible 20 cabinets (40 leafs).

(Continue to next page for Pricing Proposal)

Pricing Proposal 1 - 16 general leafs

Please provide pricing based on the following. Refer to this document and the RFP for information on desired features, interface speeds and count, fiber type, etc.

Data Center SITE 1 - (16 general leafs)

Qty	Description	Notes
16	General use leaf	Provide redundant leafs for 8 cabinets
2	Border leafs	For WAN, DCI
2*	Spines	*May propose more than 2
• For interface types, assume multimode fiber for all intra-DC links unless otherwise noted. <u>All interfaces for needed for spine and leafs should be included. This includes interfaces from leafs to WAN and firewalls</u>. • Fiber cables should not be included. • Include all licensing required for solution • Optional - Include any additional recommended equipment (ex. Leafs, etc)		

Data Center SITE 2 - (16 general leafs)

Qty	Description	Notes
16	General use leaf	Provide redundant leafs for 8 cabinets
2	Border leaf	For WAN, DCI
2*	Spines	*May propose more than 2
• For interface types, assume multimode fiber for all intra-DC links unless otherwise noted. <u>All interfaces for needed for spine and leafs should be included. This includes interfaces from leafs to WAN and firewalls</u>. • Fiber cables should not be included. • Include all licensing required for solution • Optional - Include any additional recommended equipment (ex. Leafs, etc)		

Software

Include any products that would be recommended for configuration, troubleshooting and maintenance of this solution.

Pricing Proposal 2 - 40 general leafs

Please provide pricing based on the following. Refer to this document and the RFP for information on desired features, interface speeds and count, fiber type, etc.

Data Center SITE 1 - (16 general leafs)

Qty	Description	Notes
40	General use leaf	Provide redundant leafs for 20 cabinets
2	Border leafs	For WAN, DCI
2*	Spines	*May propose more than 2
• For interface types, assume multimode fiber for all intra-DC links unless otherwise noted. <u>All interfaces for needed for spine and leafs should be included. This includes interfaces from leafs to WAN and firewalls</u>. • Fiber cables should not be included. • Include all licensing required for solution • Optional - Include any additional recommended equipment (ex. Leafs, etc)		

Data Center SITE 2 - (16 general leafs)

Qty	Description	Notes
40	General use leaf	Provide redundant leafs for 20 cabinets
2	Border leaf	For WAN, DCI
2*	Spines	*May propose more than 2
• For interface types, assume multimode fiber for all intra-DC links unless otherwise noted. <u>All interfaces for needed for spine and leafs should be included. This includes interfaces from leafs to WAN and firewalls</u>. • Fiber cables should not be included. • Include all licensing required for solution • Optional - Include any additional recommended equipment (ex. Leafs, etc)		

Software

Include any products that would be recommended for configuration, troubleshooting and maintenance of this solution.

Addendum for UNL eBid # 3131-19-431
Network Hardware Solutions RFP

Addendum # 2
Issue Date: 09/19/2019

Addendum to Attachment B – Campus Backbone

We request that proposals for Campus Backbone equipment be broken down for each campus for the purposes of cost analysis. Please reference items notes in the lines tab of the RFP.

RESPONSE TO QUESTIONS:

1. Question: The RFP doesn't call out implementation services. Will this be a part of the required response?
   UNL's RESPONSE: Include options and pricing for any available professional services or implementation services that could be provided under the resulting contract.

2. Question: Is the RFP response intended to be submitted by the partner, the Manufacturer, or in conjunction with each other?
   UNL's RESPONSE: The response is open to bids from both partners and manufacturers. If a manufacturer only sells through partners and not direct, it is preferable that the response is submitted in conjunction with a named partner.

3. Question: For the line items section, is this considered pricing for the initial purchase, or pricing for future purchases as well?
   UNL's RESPONSE: Initial and future purchases, the scope of the initial purchase and desired purchase timeline will be determined after award based on price, implementation effort, and financing options.

4. Question: Will the University look to standardize on AX technology as part of this RFP?
   UNL's RESPONSE: The University would prefer the ability to deploy and support 802.11ax technology where campus use-cases fit the standard. The University also expects the refreshes of the product catalog to include new technologies and standards as they are brought to market over the life of the contract.

5. Question: Campus backbone- UNL Campus fiber model. Does the DWDM connection at UNL require colored optics?
   UNL's RESPONSE: The DWDM connection will not require colored optics.

6. Question: if no colored optics are required, do we need single or multi-mode optics into the DWDM MUX?
   UNL's RESPONSE: If connecting to a DWDM network, single mode fiber is preferred.

7. Question: Campus backbone- UNO Campus fiber model. Are colored optic required on the 3rd party dark fiber for the connection between Region A Building 9 and Region C Building 2
   UNL's RESPONSE: Colored optics are not required on this connection.

8. Question: If no colored optics are required, do we need single or multi-mode optics into the DWDM MUX?
   UNL's RESPONSE: The service from Region A Building 9 and Region C building 2 is a dark fiber, single-mode service and as such, there is no DWDM MUX involved. Optics capable of 10km over a pair of single-mode fiber will be required.

9. Question: Can you please indicate router/hub locations?
   UNL's RESPONSE: ITS expects the most effective location for Campus Backbone routers to be in the hub locations specified in Attachment C.

10. Question: Campus backbone- Curtis Campus fiber model. How many and what type of connectivity is required at the WAN?
    UNL's RESPONSE: Two ports of 10Gbase-LR from diverse equipment are preferred.

Addendum for UNL eBid # 3131-19-431
Network Hardware Solutions RFP

11. Question: Campus backbone- UNL/UNO/UNK. All call for 100G LR connections. Can you please indicate which building these are in?
    UNL's RESPONSE: All router-to-router connections.

12. Question: Based on fiber plant models, routers and SFP counts, can you please briefly describe how you arrived at these numbers?
    UNL's RESPONSE: Regarding SFP/Optic counts in Attachment C – Campus Backbone, SFP/Optic counts were counted for Campus Backbone and Aggregation switches needed to connect to access switches. SFP/Optic counts for access switches were not included. Port density on access switching may change in the future, so the intent of these counts is to provide a comparable bid.

13. Question: Data Center/Campus Backbone -WAN/MPLS Connectivity - Do we need to have a CER and understand labels or will these be Ethernet hand-offs?
    UNL's RESPONSE: WAN hand-offs from the Data Center and Campus Backbone will be Ethernet hand-offs.

14. Question: NAC/Monitoring- Our solutions can be deployed with dedicated hardware appliances and or virtual appliances. Within this RFP, do you have a preference of hardware vs virtual?
    UNL's RESPONSE: No preference either is acceptable.

15. Question: If we were to plan our solution around virtualization, please confirm our requirements can be met. Virtualization for UNL 2 Virtual instance of: CPU: 2.6 GHz Intel Xeon E5-2640v3, Memory: 96GB, Storage: 8 300 GB 12G SAS 15K 2.5 in SC ENT HDD, Physical Cores: 16; Passmark score: 19,892, Recommended IOPS: 2,842
    UNL's RESPONSE: Requirements can be met prior to the time of deployment. It's worth noting that the University IT department offers 2 Virtual Instance hosting options 1) Virtual Instance hosting in two centralized Data Center environments 2) Virtual Instance hosting within the campus network at one or two of the fiber hub locations (internally termed Local Campus Resources). Due to the economics of scale, it tends be more cost effective to host Virtual Instances in the centralized Data Center environments and is preferred unless there is a specific site-survivability or performance benefit to having a service hosted from an LCR.

16. Question: Virtualization for UNK 1 Virtual instance of: CPU: 2.6 GHz Intel Xeon E5-2640v3, Memory: 96GB, Storage: 8 300 GB 12G SAS 15K 2.5 in SC ENT HDD, Physical Cores: 16; Passmark score: 19,892, Recommended IOPS: 2,84
    UNL's RESPONSE: See Question 15.

17. Question: UNK 1 Virtual instance of: CPU: 8 Virtual CPU's and recommended to have a Passmark score of at least 9600 or higher, Memory: 16GB, Storage: 1TB, Recommended IOPS: 40-60 read/write profile for 4K random read/write = 105
    UNL's RESPONSE: See Question 15.

18. Question: If virtual requirements cannot be met at this time, do we assume that these requirements can be met before time of deployment or will we be required to propose hardware appliances to fulfill the RFP? UNO 1 Virtual instance of: CPU: .6 GHz Intel Xeon E5-2640v3, Memory: 96GB, Storage: 8 300 GB 12G SAS 15K 2.5 in SC ENT HDD, Physical Cores: 16, Passmark Score: 19,892, Recommended IOPS: 2,842
    UNL's RESPONSE: See Question 15.

19. Question: UNO 1 Virtual instance of: CPU: 24 Virtual CPU's and recommended to have a Passmark score of at least 9900 or higher, Memory: 64GB, Storage: 1800Gb, Recommended IOPS: 40-60 read/write profile for 4K random read/write = 350
    UNL's RESPONSE: See Question 15.

20. Question: Wireless For any indoor access points, can you tell us what the mounting requirements and quantities of each are? Ex: Ceiling Grid 15/16'' Ceiling Grid 9/16'' Silhouette 9/16'' Hard Ceiling Side wall mounted.
    UNL's RESPONSE: 15/16" 30% 9/16" 40% Silhouette 5% Hard Ceiling/Side Wall 25% (Hard Ceiling/Side Wall gets a boost from Housing APs). Need flexibility to order any of the listed mounting solutions

21. Question: For any outdoor access points, can you tell us what the mounting requirements are? Ex: Mounted on side of building, Mounted to a Pole
    UNL's RESPONSE: Both options will be required to support Outdoor AP deployment.

22. Question: For any outdoor access points with external antennas, can you tell us what antenna model is being used?
    UNL's RESPONSE: Cisco. AIR-ANT2547VG-N, AIR-ANT2513P4MN.

23. Question: For any outdoor access points, can you tell us what the coverage pattern requirements are?
    UNL's RESPONSE: Both omni and directional. Varying patch & yagi style depending on requirements.

24. Question: For any outdoor access points, do you have any point to point/bridge/mesh configured? If so, can you tell us what model of AP's these are and the distance between?
    UNL's RESPONSE: No mesh presently deployed but would like to keep that possibility open.

25. Question: For any indoor AP with external antennas, can you tell us what antenna model is being used?
    UNL's RESPONSE: We have utilized 60-degree antennas. AIR-ANT2566P4W-R= we expect to increase that number and require additional antenna choices.

26. Question: Is it a requirement for us to match or beat the AIR-AP2802I-B-K9 series AP that offers Dual 5Ghz radios? Specifically, do you require to have dual 5ghz for the one to one replacement?
    UNL's RESPONSE: That would be preferable. Desire is to conduct a one for one replacement initially.

27. Question: Out of all of the AP's listed in the RFP, how many are located in very high-density locations? EX: Auditoriums, Gymnasiums, Etc.
    UNL's RESPONSE: We estimate less than 15% of covered spaces are VHD.

28. Question: Wired: What are the population requirements for 4506's?
    UNL's RESPONSE: The RFP does not request a bid for Catalyst 4506 chassis; it only notes what is currently installed. Closet port counts and can vary from 24 available access ports up to 720 available access ports. As such, chassis populations can vary widely as well. Please see Question and Answer #115.

29. Question: What are the PoE requirements for each switch?
    UNL's RESPONSE: See question #115

30. Question: What are the SFP Requirements? Please list the current SFP's being used for each switch.
    UNL's RESPONSE: Each access switch chassis or switch stack must support SFP+ or better uplinks into Campus Backbone (core or aggregation). SFP models being used vary but tend to be 1GBase-LR or 10GBase-LR. The current access network does not deliver access to clients via SFP/SFP+.

31. Question: What are the Stacking requirements? Out of 24/48 port switches, how many need to be stacked?
    UNL's RESPONSE: Vendors are not required to use 24/48 port switches but any closet that has over 1x 24/48 port switch should be in a stack configuration.

32. Question: Do you have a closet list with PoE/Port requirements as opposed to the provided list of switches?
    UNL's RESPONSE: The University does not have a per-closet breakdown of POE requirements

33. Question: Do we accommodate for a growth factor or stick to a one to one replacement?
    UNL's RESPONSE: For comparative pricing proposals, stick to a one-to-one replacement.

34. Question: Around legal docs: Would UNL agree to put a non-solicitation of employees in the master agreement?
    UNL's RESPONSE: Yes, the University would consider negotiating a mutual non-solicitation of employee's clause into the master agreement.

35. Question: If a bid bond is required, is that going to be on services and product?
    UNL's RESPONSE: No bid bond will be required

36. Question: Is a performance bond going to be required if a bid bond is required?
    UNL's RESPONSE: No performance bond will be required

37. Question: Is the Data Center WAN DWDM equipment to be replaced?
    UNL's RESPONSE: WAN and DWDM equipment is not in scope for this bid.

38. Question: How many vmware hosts or how any other hypervisor are there?
    UNL's RESPONSE: Approximately 50 VMware hypervisor hosts per data center site are expected.

39. Question: Do you also need boarder leaf to be managed by the management solution for L2 & L3 DCI?
    UNL's RESPONSE: It is preferable that DCI border leaf switches are managed through the management solution, however it is not required. If border leaf switches are not managed through the management solution, please provide a description of why.

40. Question: In the IP backbone section, it states: "Each router pair must support 2-4 connections to neighboring routers". Is it a logical connection or physical connection? Do we need to count more interfaces for this if it's not included in any actual port count?
    UNL's RESPONSE: These are physical connections to other Campus Backbone routers. These interfaces will need to be included in the port count.

41. Question: Is the campus to WAN connectivity required only in a selective location as described in the IP backbone description?
    UNL's RESPONSE: Campus Backbone to WAN connectivity is only required in selective locations in each city. We are seeking appropriate resiliency to hardware failure, site failure (fire or power), and fiber backbone damage (fiber cuts). In most cases, this would mean peering the Campus Backbone with two unique WAN routers as mentioned in Question 55.

42. Question: Do you need all switches & routers to operate at line rate or is oversubscription acceptable on certain devices?
    UNL's RESPONSE: Unified Edge switching may operate at a reasonable oversubscription rate. Typical traffic flows are North/South in these use cases. Campus Backbone may be reasonably oversubscribed. The Data Center fabric as a whole may be reasonably oversubscribed; however, it is atypical for a single leaf or spine switch in a datacenter fabric to be oversubscribed internally. If oversubscription is included in the design, please describe.

43. Question: Will solarwinds monitor all new routers and switches?
    UNL's RESPONSE: At this time, Solarwinds is the primary monitoring service in use at the University and it would be used to monitor network devices. Any additional proprietary tools would be considered if they added value beyond Solarwinds' capabilities.

44. Question: Non-Disclosure Agreement (NDA). Will the University complete a Non-Disclosure Agreement? Sub question: Will the University provide the contact information for the individual who will be signing an Electronic version?

UNL's RESPONSE: Yes, the University would be willing to sign a non-disclosure agreement within the bounds of any Statutes relevant to being a public institution. The University will provide contact information for signing after award.

45. Question: Question #1228 Company's capability in the Attributes Tab, can you please clarify what is meant by "point-by-point responses in Section 1?"
UNL's RESPONSE: In Section 1 of the SOW document, please elaborate on your company's ability to meet or exceed the stated objectives listed.

46. Question: Unified Edge: Does the University require field serviceable power supplies and fans?
UNL's RESPONSE: If the power supplies and fans are modular, the University would prefer they be field serviceable. If they are fixed, then they would not need to be field serviceable.

47. Question: What are the port counts in the referenced existing chassis? Backbone and Unified Edge.
UNL's RESPONSE: Please see Attachment A for Unified Edge port counts. Please see Attachment B for Campus Backbone port counts.

48. Question: What is University expecting for % of Multi-rate ports needed per closet?
UNL's RESPONSE: No NBase-T is deployed today, however for purposes of a comparable bid please assume 10% of all access ports will need NBase-T.

49. Question: Is the University standardizing on WIFI 6 Access Points?
UNL's RESPONSE: See Question 4

50. Question: How many Devices will be managed by Network Access and Control?
UNL's RESPONSE: Currently no devices are managed by Network Access Control and as such we are unable to estimate the number of devices that would be managed in the future. See question #138-140 for an estimated total scale for access devices.

51. Question: Will UN IT Group sign an NDA? So we can provide detailed confidential information and Roadmap information.
UNL's RESPONSE: See Question 44.

52. Question: Reseller/Manufacturer will NOT be providing any Implementation Services? Our understanding is that the requested Training of UN ITS Staff will provide the necessary knowledge transfer to accommodate this.
UNL's RESPONSE: Reseller/Manufacturer may offer implementation services as an option, however it is not required for the bid.

53. Question: Security Assessment Questionnaire Specific to this Network RFP, do we ONLY need to provide a response to Network Security NS1 – NS4? See attachment.
UNL's RESPONSE: The Network Security attachment is a standard security questionnaire used for all RFPs. Please respond to all questions.

54. Question: Scope of Work 4.a Pricing. Do you have an example of a "comparative proposal format" that you'd prefer to see for Attachment A, B & D? SOW 4.b seems pretty straightforward on what you're wanting to see.
UNL's RESPONSE: For a comparative proposal, please use a Microsoft Excel format and include list price, discount, discount percentage offered, and net price per each item as well a quantity of item specified. If it is desirable to provide supplementary materials such as diagrams, descriptions, or other write-ups, please attach those with the proposal.

55. Question: Explain or outline the current Fiber or MPLS circuit's that interconnects the three main campuses?
UNL's RESPONSE: The University operates MPLS based backbone between the three main campuses. The MPLS backbone has a current capacity of 100Gbps between Lincoln and Omaha and 20Gbps to Kearney. The MPLS PE routers hand-off services using 10Gbase-LR/SR, 100GBase-SR4/LR4, or

possibly other optics as supported by the Juniper MX10003 platform. On the diagram provided in attachment C, MPLS nodes are located at UNL Region A – Fiber Hub 2, UNL Region C Fiber Hub 1, UNO Region A Building 14, UNO Region B Building 1, UNK Region B building 4, and UNK Region B Building 2. The MPLS network is built using diverse backbone paths. These WAN routers are typically used for campus-to-campus, but are typically not used for transport within a single campus.

56. Question: What are the WAN connectivity options for the remote site (Ethernet handoff? or Fiber/Copper?) and can you please clarify. What speed is the connection? (DS1 or DS3).
    UNL's RESPONSE: Remote sites use an Ethernet handoff, typically at 1Gbase-T copper.

57. Question: Can you please clarify or outline the expectations from design, deploy, and or implementation services aspect of the project?
    UNL's RESPONSE: There is no expectation for services to be included, but Bidder may include and describe any optional implementation services offered. The University may opt to utilize services to propose designs, review designs or design modifications made by the University, configuration templates, operational practices, other services, or none of the above. In addition, the University may opt to use implementation services to speed the deployment of new or updated infrastructure depending on project need.

58. Question: What topics or Categories would you require professional services for (Datacenter, Wireless, Networking, and or Security)?
    UNL's RESPONSE: See question 57.

59. Question: Can you elaborate on what the university is anticipating for bandwidth growth, with regards to the network?
    UNL's RESPONSE: The University expects a vast majority of buildings to be connected to a campus backbone at 2x10Gbps, with select (1-5) being connected at a higher speed either through the use of link aggregation or higher speed links (25/40/100Gbps). In the future, a Science DMZ VRF may be deployed with higher speed backbone handoffs to these specialized network areas.

60. Question: Do you require a wireless site survey to address the wireless networking needs of the "areas of high wireless client density"
    UNL's RESPONSE: No, that is not part of the proposal requirements. Any services to conduct wireless site surveys could be included as an optional item and would be allowed.

61. Question: Can you please share any existing Visio or network diagrams/ topology maps for all aspect of the RFP. Datacenter, Backbone, Wireless, Campus?
    UNL's RESPONSE: Please see attachment C for a diagram of the fiber optic backbone that can be used in the Campus Backbone.

62. Question: Are you looking for POE+ or UPOE on the access layer switching?
    UNL's RESPONSE: Option for both would be preferable.

63. Question: Do you want to consider an EA for the licensing that would accompany any hardware?
    UNL's RESPONSE: The University would consider an EA if it provided additional value over renewing licensing through the master contract established from this bid.

64. Question: What is the current Routing Protocols that are being used and where are they being used?
    UNL's RESPONSE: OSPF and BGP are currently being used in Campus Backbones. Data Centers currently do not utilize routing protocols. Access/Unified Edge devices do not utilize routing protocols.

65. Question: Is MGig preferred over 1g port speed with regards to Wireless AP uplink connectivity?
    UNL's RESPONSE: No, but the University believes that WiFi 6/ax could benefit from MGig in high density locations.

66. Question: What is estimated latency between DC's?

UNL's RESPONSE: The estimated RTT latency between Data Centers is less than 1-2ms under normal operating conditions. If there is a requirement for anything under 5ms, please make note of it in the bid.

67. Question: What is the estimated Latency between the campus sites?
    UNL's RESPONSE: The estimated latency between UNK and UNO is 5ms under normal operating conditions. The estimated latency between Curtis and UNO under normal conditions is 7ms under normal conditions.

68. Question: On RFP document University of Nebraska eBid # 3131-19 -432 Page 4 litem c- stats a total 57k wireless clients, but on page 5 – item E states support more than 40k at or near peak? – Which of client counts is correct?
    UNL's RESPONSE: 57,500 is the correct number.

69. Question: What is current wired client / device count per for access switching per each campus?
    UNL's RESPONSE: See Question 28.

70. Question: Are there considerations regarding firewall and IPS deploying with regards to network?
    UNL's RESPONSE: Firewall and IPS appliances are not in scope for this project. The University is currently using Palo Alto firewalls to secure the network and any changes would be the result of a future bid.

71. Question: What are the current routing protocols that are being used currently, and where are used (internal, campus, between campuses)?
    UNL's RESPONSE: See Question 64.

72. Question: Are there any Point to Point outdoor Wireless bridge devices imbedded into the network?
    UNL's RESPONSE: Yes, the university has several outdoor Point-to-Point wireless bridges in use today where fiber optic connections that were cost or time-prohibitive. Approximately 20 are in use today. Additional PtP bridges are anticipated over the life of the contract.

73. Question: Has a Wireless site survey been conducted with regards to any outdoor Wireless network needs?
    UNL's RESPONSE: No.

74. Question: Does the Wireless network need to have the ability of providing redundancy for the (LAN) Network?
    UNL's RESPONSE: No.

75. Question: What type of clients or endpoints does the BYOD environment support? Are they any Compliance or Policy requirements that the Authentication platform need to match up against?
    UNL's RESPONSE: The University expects that any and all types of BYOD devices may be brought onto the campus from students, faculty, and staff. NAC is not in use at this time and policies are not currently set. A preference towards integration with RADIUS and/or Shibboleth to allow clients to use their common University username and password are preferable.

76. Question: Does the university already have a pre-configured or automated action for remediation when a client device is inspected and determined to be out of compliance of any role-based authentication platform?
    UNL's RESPONSE: No, NAC is not in use at the University today.

77. Question: Does the university need to have an appliance or software application that will predetermine bandwidth allocations for any consumer media or IoT devices?
    UNL's RESPONSE: The University does not have any such appliance or software application at this time but would be open to it being included as part of the response if it added value to the network.

78. Question: Can you explain or elaborate on how the University leverages the AWS cloud in terms integration with existing Datacenter environment?

UNL's RESPONSE: The University runs select services within the AWS cloud and has site-to-site VPNs setup between the AWS cloud and University data centers.

79. Question: Can you elaborate on the any or all Cloud solutions that university is currently leveraging?
UNL's RESPONSE: At this time, the University's Infrastructure as a Service footprint in the cloud is with AWS and Azure. Many Software as a Service products are also in use.

80. Question: With the regards to the Datacenter aspect of the RFP, are there any specific Applications that the solution needs to support?
UNL's RESPONSE: VMware vSphere, SAP, and PeopleSoft Campus Solutions.

81. Question: Unified Edge: As per the Scope of Work document - objectives - Replace existing edge switches, supplier understands that it is expected to replace 1388 edge switches. However as per the Attachment A, Unified Edge Inventory List the total number of edge switches are 1369. Kindly validate and share the inventory for the missing edge switches as well.
UNL's RESPONSE: Please see Question and Answer #115.

82. Question: Unified Edge: In continuation to the above information, supplier also performed the end of support analysis of the existing Unified Edge inventory and figured out that the following number of edge switches have reached EOS and should be replaced year on year. 469 in 2019 (275 Cisco & 194 Enterasys); 111 in 2020 (111 Cisco); 225 in 2021 (Cisco); 9 in 2024 (Enterasys); 7 in 2025 (Cisco). And a total of 548 switches (Cisco, Enterasys & Extreme) have not been declared EOS by the OEM yet. However, As per the objectives in the Scope of Work document we are expected to replace 1388 edge switches. So does the University of Nebraska wants the supplier to replace the entire wired inventory even if they are not yet declared EOS by the OEM? OR it expects to perform the replacement of switches in a phased manner - year on year and leverages the ones which are not yet declared EOS by the OEM.
UNL's RESPONSE: Yes, the University intends to migrate to a standardized network deployment across all campuses in a phased approach, year on year, until complete regardless of EOS date by the OEM.

83. Question: Unified Edge: Similarly for Wireless Edge devices, As per the supplier's analysis for the End of Support devices. 425 in 2019 (Cisco); 547 in 2020 (Aruba); 1004 in 2021 (Cisco); 178 in 2022 (2 Aruba, 4 Cisco, 172 Xirrus); 766 in 2023 (67 Aruba & 699 Cisco); 1399 in 2024 (13 Aruba & 1386 Cisco); and 2736 have not been declared EOS by the OEM yet. However, As per the objectives in the Scope of Work document supplier is expected to replace the entire wireless edge infrastructure. So does the University of Nebraska wants the supplier to replace the entire wireless inventory even if they are not yet declared EOS by the OEM? OR it expects to perform the replacement of Wireless devices (WAP and WLC) in a phased manner - year on year and leverages the ones which are not yet declared EOS bythe OEM.
UNL's RESPONSE: We anticipate this to be a phased deployment across locations over several years.

84. Question: General Network: Share what all Network Tools are deployed in the existing state for the various tasks listed: Network Management and Reporting tool for Wired and Wireless Edge devices; Network Performance Monitoring; Network Reporting of wired and wireless devices; Network Capacity management; Network Automation tool; Network Configuration management; ITSM Tool; MoM layer tool if any.
UNL's RESPONSE: Prime (Cisco), Airwave (Aruba), Netsight (Extreme), Voyance (Nyansa), Solarwinds (Monitoring), AKIPS (Monitoring), BMC Footprints (ITSM Tool), Splunk (Logging)

85. Question: General Network: How are the DNS and DHCP services deployed in the current state, please share the details. How is the IP managemnet done in the existing deployment of DC and remote LAN. Also, please share the number of DNS queries in your current environment along with DHCP lease, number of IP address, VLANs in your current state.
UNL's RESPONSE: DNS/DHCP services are hosted in each campus at an LCR (see question #). Management appliances for the DNS/DHCP service are hosted in a centralized datacenter and push DNS/DHCP data to individual campuses. IP management varies at the current moment. DHCP queries typically peak at 50/s for the UNL campus and less for other campuses. DNS queries peak at around

1700/s for the UNL campus and less for other campuses. IP addresses in-use at the UNL campus are estimated to be around 74k, and the number of VLANs at around 800. For UNO we estimate those metrics are around 50% and UNK around 25%.

86. Question: General Network: The Supplier understand that a Unified University of Nebraska Information Technology Services team supports all four University campuses. How is this team located, is it placed in a single location or divided amongst the 4 different university campuses?
    UNL's RESPONSE: Divided amongst locations in Lincoln, Omaha, and Kearney with all staff supporting all locations jointly.

87. Question: General Network: Share the Site wise incident, change and Problem data for network data equipment for the past 6 months - 1 year along with categorization.
    UNL's RESPONSE: This information is not available to be shared at this time.

88. Question: General Network: How is the current hardware maintenance provided - is it through OEM support or spares or both? Is there a local hardware break-fix provider contracted for each region or is the support handled by Customer resources located onsite?
    UNL's RESPONSE: Both OEM support and spares.

89. Question: General Network: Supplier wants to know if there is any asset refresh policy for network equipment. If yes Please share the asset lifecycle and details for the same. How are these End of Support devices currently supported. Please specify?
    UNL's RESPONSE: Core network services are kept under support and maintenance and are refreshed/retired at or before the end of support date. This includes Campus Backbone, Data Center, and Wireless controllers. It is the University's desire to replace/retire Access Switch and Wireless APs prior to their end-of-support date, however financial restrictions can mean these devices are used past their end-of-support dates in some cases. For longer-lived devices, longer support periods are desirable.

90. Question: General Network: Supplier wants to know if there any in-flight projects that would affect the design of our proposed solution for this RFP? If yes, please share the details.
    UNL's RESPONSE: For the purposes of RFP responses, there are no in-flight projects that would affect the design of the proposed solution.

91. Question: Data Centre LAN: Supplier understands that the existing Data Centres have a mixture of network equipment for Data center routing and switching at different sites. Cisco: 6506E (VSS), Nexus 5548 (vPC) w/FEX 2248, Nexus 93180 (vPC). Arista: 7504E (MC-LAG), 7150, 7050, 7010 devices. The supplier is expected to provide the future state based on Leaf and Spine Architecture. Kindly validate. Also, please share the existing inventory details for the supplier to analyze and check if some of the equipment can be leveraged / reused. For ex - Nexus 93180 - the count of these switches, if spare, can the supplier leverage them be used as TOR Leaf switch for the new architecture?
    UNL's RESPONSE:
    For the purposes of evaluating Data Center proposals we are assuming that no hardware will be re-used in the evaluation of bids. Due to the complexity of the existing networks, we intend to build a new environment and migrate existing services into the new environment.

    For the purposes of evaluating Campus Backbone proposals, re-using of existing equipment will be handled on a case-by-case basis after the RFP process. To simplify evaluation of bids we are ignoring existing core equipment.

    The University is seeking to build a new Datacenter environment and migrate existing workloads into the new environment. The complexity and timeline of this migration has not been evaluated yet and as such the bidder should not assume that existing equipment can be used in the new build.

92. Question: Data Centre LAN: Supplier understands that every TOR leaf switch is expected to have 48 hosts per leaf mostly 10G/1G. Is the supplier expected to provide some spare ports for each Top of Rack switch?

UNL's RESPONSE: Each TOR leaf switch is expected to deliver 48x 10G/1G ports to hosts in total. The 48 count has spare/empty ports built-in.

93. Question: Data Centre LAN: Kindly share the high-level architecture diagram of the Data Centre locations for supplier to better understand the design of the existing state.
UNL's RESPONSE: The design of the current Data Center is not in scope of this proposal. The University is requesting proposals for building new DC networks. The University will explore potential integration or migration of old and new DC environments at a future time.

94. Question: Data Centre LAN: Supplier wants to know that how is University of Nebraska planning to migrate from the existing to the new architecture for their respective DC locations as in the future state both the DC are expected to run active - active. Is it going to be a Big bang approach or a phased approach of migration?
UNL's RESPONSE: The decision will depend on the service impact and cost. Implementation will include a greenfield data center facility and the University is open to considering big bang and phased approaches at this time.

95. Question: Campus Backbone: Supplier understands that The University's existing campus backbones are built on a variety of hardware platforms including Extreme X670 (5 systems), Cisco Catalyst 6807-XL systems (12 systems), Alcatel-Lucent Enterprise OS6900-X72 (22 systems), and a variety of aggregation switches. Share the details of the inventory and existing architecture diagrams for all the campus backbone locations for the supplier to analyze the existing inventory and redesign the future state architecture.
UNL's RESPONSE: The university is seeking a clean slate proposal. Please see attachments B and C for details on available infrastructure.

96. Question: Campus Backbone: As per Attachment B _Service Specification by Campus - For Curtis Supplier should include a pair of routers such that each router will be serving to 16 downstream devices. Will these downstream devices connect directly to the router or will there be an intermediate switch as well? Please share the existing architecture diagram which will help us build a future state architecture.
UNL's RESPONSE: The 16 downstream devices will be access switch switches either in stack or chassis configuration. The access switches will connect directly to the routers.

97. Question: Campus Backbone: For Kearney, the supplier is expected to provide a pair of routers at 4 physical locations with 16 downstream devices each and pair of aggregation switches at each of 6 physical location with 12 downstream devices each. The number of physical locations vary for the router and the aggregation switches and is not very clear with respect to the fibre connectivity diagram for Kearney. Supplier requests for the existing high-level LAN/WAN connectivity diagram to better design the future state.
UNL's RESPONSE: Aggregation switches were specified to solve the problem of limited inter-building fiber optic plant and as such will be located in a downstream building. The fiber diagrams summarize the overall architecture.

98. Question: Campus Backbone: Supplier wants to know if aggregate switching is required for all the three sites - A, B & C for Lincoln location? If yes, then as per the requirement the aggregate switches are required for each of the 31 physical location. However as per the Attachment C, UNL fibre map there are more than 31 physical locations covering all the three sites of Lincoln. Please clarify and share the high-level LAN/WAN diagram for all this location as well.
UNL's RESPONSE: Many of the locations at UNL did not require aggregation switching. See question #130 for clarifications on when aggregation switches were requested.

99. Question: Campus Backbone: Share a high-level LAN/ WAN diagram for Omaha campus backbone network as well.
UNL's RESPONSE: WAN nodes are located in Region A building 14 and region B building 1. UNO buildings tend to have more and smaller access closets than other campuses. A detailed LAN diagram is unavailable at the moment.

100. Question: General Network: Share the service window which supplier needs to support for the Managed Network Services
UNL's RESPONSE: Managed services would typically be scheduled within the hours of 8:00am to 5:00pm, Monday through Friday. Rates for after-hours and weekend work are also desired.

101. Question: Steady State Support: Confirm if the operations support for the underlying Network architecture is also in scope for the service provider. If yes, Please share the required support window (24x7 or 16x5).
UNL's RESPONSE: No, the general operation of the network will be handled by University staff.

102. Question: Can you breakdown the port count and switch count per building?
UNL's RESPONSE: See Question 28.

103. Question: In a building does the fiber terminate to a central MDF? Then do the IDFs all have fiber to that single MDF? Could we get a count of MDF/IDF per building?
UNL's RESPONSE: IDF Fiber terminates to a central building MDF with typically 12 or more strands of single mode fiber. In some cases 62.5µ or 50µ fiber is used. For purposes of a comparable bid, assume that single-mode fiber is used. We are unable to provide an IDF count per building at this time.

104. Question: Is campus housing included in the RFP?
UNL's RESPONSE: Campus Housing for UNL, UNK, and Curtis is included in this RFP. Campus Housing for UNO is out-of-scope.

105. Question: What connectivity is the campus backbone providing? To clarify is it used to interconnect/route the campus sites from a user data perspective? Is it used for the Data Center interconnect between Omaha and Lincoln? Is it used for WAN connectivity/routing for the remote sites? Has consideration been provided to directly connect the campuses without a need for a IPN? Can the datacenter interconnect be directly connected fiber or ethernet handoff? Do the remote sites all terminate in Lincoln or is it going to other sites too? There is a potential to bypass the need of an elaborate backbone network if there is directly connected fiber and/or ethernet handoff between sites. This goes back to questions 1 and 2 above.
UNL's RESPONSE: The purpose of the campus backbone is to serve as aggregation for campus buildings (users) and regions within a campus (UNK, UNL,UNO). The backbone on each campus is also used for connecting to the University MPLS WAN (NU-WAN). The NU-WAN provides connectivity between NU campuses, to Internet, and to Data Centers including potentially DCI functions. The remote sites use leased circuits to connect to a statewide educational MPLS WAN (NN-WAN) which the University helps administrate. Traffic from the remote sites is aggregated and routed through the Lincoln campus today. In summary, the campus backbone is used for high speed connectivity and resiliency for users at each of the campuses.

106. Question: Which wired NAC use cases are deployed today and which ones are desired to be deployed for the University in the future?
UNL's RESPONSE: The University does not currently have a NAC solution in place and is open to considering any use cases that add value to the network or better mitigate our security and compliance risks.

107. Question: What network automation use cases does the University have in mind for the new campus deployment?
UNL's RESPONSE: Zero touch provisioning, VLAN assignment, port reconfiguration, firmware updates, and others that allow us to better utilize our staff's time.

108. Question: Does the University have a NetDevOps group or does it plan to build one or is consulting or professional services desired to automate network operations workflows?
UNL's RESPONSE: The University does not have a NetDevOps group today and intends to leverage existing staff, collaborations with peer institutions, and professional services to automate network operations workflows.

109. Question: Does the University use any type of Software Defined Controller or controllerless overlay technologies today?
UNL's RESPONSE: No.

110. Question: What VXLAN use cases does the University desire to implement?
UNL's RESPONSE: Regarding Data Center use cases – the university seeks Layer 2 and Layer 3 virtualization with scalability, reliability, and convergence characteristics of a routed underlay. In a majority of cases, Layer 2 and Layer 3 segments will be within a single datacenter. In a subset of cases, layer 2 and layer 3 segments may be connected through a DCI technology to provide IP mobility between datacenters.

111. Question: What are the Universities use cases and requirements for your industrial switches?
UNL's RESPONSE: Parking garages and outdoor deployment of connectivity where environmental control for the switch locations is not always possible.

112. Question: For the chassis switches shown in inventory can a configuration or utilization of the chassis be provided?
UNL's RESPONSE: See Question 115

113. Question: How many multi-rate ports on average do you believe will be needed per closet?
UNL's RESPONSE: See Question 48.

114. Question: Would it be acceptable to add a dedicated multi-rate switch or a pair of multi-rate switches (for HA) to a stack if there is a significant cost benefit vs using modules in each individual switch?
UNL's RESPONSE: Yes.

115. Question: In the SOW under background info UNL provided quantities of switches, closets, ports, POE ports etc… and the total number of switches comes to 1,485 and later states 1388 edge switches are to be replaced. When looking at attachment A the total number of switches come to 1,389 including the C65XXs and C45XXs without carding info. For bid proposal purposes when considering edge switching can we get a breakout with something like the number of 48port, 24port, 12 port switches you would like to see bid? Or can we get more details on the carding where modular chassis' exist and a confirmation of what should be included in for replacement in the edge portion of the proposal vs the backbone if both functions exist in the same chassis?
UNL's RESPONSE: All Unified Edge proposals should be based on information in Attachment A. The total number of switches and port counts for each switch should be based on existing switch footprint. The Catalyst 6500 & Catalyst 4500 switches should be considered edge only and not part of the backbone. For the Catalyst 4500, each switch has 192 ports (4x48 10/100/1000 PoE) and each Catalyst 6500 switch has 288 ports (6x48 10/100/1000 PoE).

116. Question: 2. Existing inventory includes industrial switching. Can an explanation be given to how and where they are used (environmental concerns, DC power needed, etc…)?
UNL's RESPONSE: See Question 111. AC power is available at all locations. Industrial switching is typically located in an environmentally sealed location (such as a NEMA enclousure), but are not environmentally controlled and in some cases may not be ventillated.

117. Question: How many N-Base-T, 802.3bz capable ports need to be on each switch.
UNL's RESPONSE: See Question 48.

118. Question: What are the POE requirements? Is it only 802.3at or do you have 802.3bt requirements?
UNL's RESPONSE: See Question 62.

119. Question: Will you accept 802.11ac wave 2 access points or only WiFi 6 capable Aps?
UNL's RESPONSE: See Question 4.

120. Question: Do you have a network equipment inventory per building and per closet?

UNL's RESPONSE: No.

121. Question: Do you have an AP inventory per building?
UNL's RESPONSE: Information can be provided for implementation planning after award but is not currently compiled on a per building basis.

122. Question: (Attribute) Questions 27, 1228, 1229, 1230 Talk about capabilities and risk mitigation of installing but there doesn't seem to be install asked for. Can you clarify what information exactly you are looking to gather?
UNL's RESPONSE: The University is seeking technical risk mitigations to hardware/software/utility failure. Faults in networking equipment can have a cascading effect on otherwise healthy networking components. We're seeking information on how a technology used in a proposal can help identify or isolate networking faults such as gray

123. Question: What network automation use cases does the University have in mind for the new campus deployment?
UNL's RESPONSE: See Question 107.

124. Question: Does the University have a NetDevOps group or does it plan to build one or is consulting or professional services desired to automate network operations workflows?
UNL's RESPONSE: See Question 108.

125. Question: What are the Universities use cases and requirements for your industrial switches?
UNL's RESPONSE: See Question 111.

126. Question: For the chassis switches (Cat4500, Cat6500) shown in inventory can a configuration or utilization of the chassis be provided?
UNL's RESPONSE: See Question 115.

127. Question: There are a few VXLAN questions in the Campus Attributes questions, is VxLAN design a requirement for Campus LAN, what is the driver for VxLAN in the campus LAN if so?
UNL's RESPONSE: VxLAN is not a requirement for edge proposal.

128. Question: Are optics for building out the Campus LAN proposal in scope for the RFP response?
UNL's RESPONSE: No

129. Question: There are total downstream optics counts on the Campus backbone routers specified. For example, for Kerney 128 x 10GBase-LR are specified. Is this required per router?
UNL's RESPONSE: This is the total number of LR optics required for a campus/region as a whole. Please refer to the number of "downstream devices" per router when reviewing Attachment B. For example, UNK specifies 16 downstream devices per-router, this means that each router would need to support 16x connections to access/aggregation switches. Each aggregation/access switch or switch pair would need an uplink into two unique routers to form an MC-LAG.

130. Question: Why are 10G used between aggregation switches and the Campus core routing layer? Can this be moved to 40 or 100G to save real estate on the Campus routers? If so please update the 10G counts to reflect the higher speed. 100G is preferred between aggregation switching and Campus routing.
UNL's RESPONSE: 40G or 100G may be used between the Campus Core Routing and aggregation switches. Regarding the UNL Campus Backbone, aggregation switch pairs were specified when the closet switch count in a single building exceeded 4 switches. Regarding the UNK Campus Backbone, aggregation switch pairs were specified when fiber pair counts in the existing fiber plant were limited to access switches. The bidder may provide a design that uses aggregation switches hosted in fiber hubs serving multiple buildings or in a building. It's the University's desire that the failure of any single building, fiber cable, or other piece of equipment does not disproportionately jeopardize services to other University buildings where possible.

131. Question: Do the Palo Alto DC firewalls provide segmentation for east to west traffic in the DC? Are there any micro-segmentation technologies being used or considered in the DC?
UNL's RESPONSE: Yes, the Palo Alto firewalls provide east-west segmentation today. No micro-segmentation technologies are currently being used but VMware NSX is being considered.

132. Question: Are proposals for DAC cables to the server in scope for the RFP? If so, please provide the quantity, lengths and speeds needed for the DC leafs.
UNL's RESPONSE: No. Cables are not in scope for any section of the RFP

133. Question: Are optics for building the DC fabric in scope for the RFP response?
UNL's RESPONSE: Yes. The optics should be included, but not any cabling.

134. Question: Can the University share information on what the current compute and orchestration stack looks like today and for the proposed DC enhancement?
UNL's RESPONSE: The current computer/orchestration stack is fragmented and limited at the moment, but is composed of several VMware vSphere instances. The ultimate goal is to consolidate those vSphere instances to a smaller number once a unified DC environment is established.

135. Question: The RFP states that the University is looking to deploy NSX in the DC. Would a competing solution be of interest for the University?
UNL's RESPONSE: Yes.

136. Question: How does the University provide connectivity to their AWS VPC's today? Is automating connectivity and security for Multicloud connectivity considered as part of this RFP? If so can the scale of the AWS deployment be shared? (How many VPCs and compute instances)
UNL's RESPONSE: AWS connectivity today is via site-to-site VPN's. No, the automation of connectivity and security for multi-cloud is outside the scope of this RFP.

137. Question: In Attachment A, it states "In addition, a network access and control policy management solution must be included." Are you requesting a NAC deployment for the wireless, wired or both?
UNL's RESPONSE: Options for both.

138. Question: If wireless, please tell us the peak number of devices connected at a given time. Please break this out between UNL/UNK/UNO campuses.
UNL's RESPONSE: Most recent data: UNL – 28,300, UNO – 8,200, UNK – 5,400.

139. Question: If wired, please tell us the peak number of wired devices connected at a given time. Please break this out between UNL/UNK/UNO campuses.
UNL's RESPONSE: UNL – 27,500 , UNO – 12,500 , UNK – 5,500

140. Question: Do you require posture health assessments for any devices connected to your wireless network? If so, please tell us how many devices need to be postured.
UNL's RESPONSE: There is no requirement for posturing devices currently. But anticipate the need to utilize posturing/end point profiling for wired and wireless devices.

141. Question: Do you require posture health assessments for any devices connected to your wired network? If so, please tell us how many devices need to be postured.
UNL's RESPONSE: See Question 140

142. Question: Do you require posture health assessments for any devices connected to your wired network? If so, please tell us how many devices need to be postured.
UNL's RESPONSE: See Question 140.

143. Question: Section a.ii.1.d: Should we assume speeds above 10Gbps do not mean bundling of multiple 10Gbps links?
UNL's RESPONSE: Yes.

144. Question: Sections a.ii.2.a and a.ii.2.c are at odds with each other. Are we to expect one-to-one replacement, or fill coverage gaps on campus and/or increase density of deployment? Does it make sense to do this after or during initial deployment? Will wireless surveys be allowed prior to initial deployment? WiFi calling (Section a.ii.1.b requirement) will require the ability to deliver S/N of -67dBM.
UNL's RESPONSE: This is understood by the University, objective is –67dBM. Since WiFi surveys have not been completed 1:1 replacement is the best estimate for cost comparison between proposals. Wireless surveys will be allowed prior to initial deployment with the objective of designing spaces to meet that requirement.

145. Question: Section a.ii.2.c: are there controller-less technologies we can consider?
UNL's RESPONSE: Yes.

146. Question: Section a.iii.3: Does this imply OTV for overlay configuration ability to control BUM traffic storms?
UNL's RESPONSE: No.

147. Question: Section a.iii.4: Programmability features using open automation tools? Can those tools be specified?
UNL's RESPONSE: Ansible is primarily used today but knowledge of all supported open tools would be preferred.

148. Question: Section a.iii.5: Is Splunk for log aggregation or is there more integration being requested?
UNL's RESPONSE: Log aggregation.

149. Question: Section a.iii.5: Is Netflow the implied standard for exporting network flows, or is SFlow preferred?
UNL's RESPONSE: The University is accepting proposals that include either or both flow technologies. SFlow is not preferred.

150. Question: Section a.iii.5: What modules of Solarwinds are currently in place?
UNL's RESPONSE: NCM, NPM, SAM

151. Question: Section a.iii.5: What monitoring tools are owned and used today, can you provide a full list of tools and their associated modules e.g. SolarWinds' Network Performance Monitor (NPM)
UNL's RESPONSE: University-wide: SolarWinds NPM (see question 150), AKIPs, Splunk.

Campus-specific tools may include: Net-Insight, NetMRI, Nagios Core, and ELK Stack.

152. Question: Section a.iii.5: Are you looking for services to set up the tools to monitor the proposed hardware solution. Should these services include the setup of the correct alerts, reports and dashboards within the SolarWinds and Splunk toolset?
UNL's RESPONSE: No.

153. Question: Section a.iii.5: Is an Application Performance Monitoring (APM) solution required as part of the proposed solution?
UNL's RESPONSE: No.

154. Question: Section a.iii.5: Would you like Splunk dashboards or visualizations built?
UNL's RESPONSE: Open to seeing pricing to do so as an optional line item.

155. Question: Section a.iii.5: There is a comment in the RFP – "There is also an expectation to have integration with Splunk for logging and analysis". Is the network solution looking for the capability for integration of network events into Splunk or looking for actual integration of networking events into Splunk?
UNL's RESPONSE: See Question 148.

156. Question: Could an on-site session to have a HL architectural discussion of current state be arranged prior submission of proposal?
UNL's RESPONSE: Due to timeline constraints, we will not be able to have on-site discussions prior to submission proposal.

157. Question: Building /MDF-IDF questions: Lincoln: Estimate an average on how many closets per building?
UNL's RESPONSE: 2

158. Question: Estimate a lowest closet count per building?
UNL's RESPONSE: 1

159. Question: Estimate a highest closet count per building?
UNL's RESPONSE: 6

160. Question: Estimate how many are SM fiber and how many are MM fiber?
UNL's RESPONSE: We have standardized on SM fiber within buildings in Lincoln

161. Question: Is it MM fiber OM3 or OM4?
UNL's RESPONSE: No MM MDF-IDF fiber in use

162. Question: Estimate in the longest length MM fiber from a closet to MDF-IDF?
UNL's RESPONSE: No MM MDF-IDF fiber in use

163. Question: Estimate in the longest length SM fiber from a closet to MDF-IDF?
UNL's RESPONSE: 200 meters

164. Question: Building /MDF-IDF questions: Omaha: Estimate an average on how many closets per building?
UNL's RESPONSE: UNO Typically has 4-5 closets per building.

165. Question: Estimate a lowest closet count per building?
UNL's RESPONSE: 1

166. Question: Estimate a highest closet count per building?
UNL's RESPONSE: 9 closets in a single building is the highest count.

167. Question: Estimate how many are SM fiber and how many are MM fiber?
UNL's RESPONSE: UNO typically has SM fiber from a building MDF to each IDF. Assume 12 strands for the purposes of a comparable proposal

168. Question: Is it MM fiber OM3 or OM4?
UNL's RESPONSE: The small install base of MM fiber varies in standard. For purposes of a comparable proposal, assume SMF.

169. Question: Estimate in the longest length MM fiber from a closet to MDF-IDF?
UNL's RESPONSE: N/A

170. Question: Estimate in the longest length SM fiber from a closet to MDF-IDF?
UNL's RESPONSE: 300 meters

Question:
171. Question: Building /MDF-IDF questions: Kearney: Estimate an average on how many closets per building?
UNL's RESPONSE: 2

172. Question: Estimate a lowest closet count per building?
UNL's RESPONSE: 1

173. Question: Estimate a highest closet count per building?
UNL's RESPONSE: 3

174. Question: Estimate how many are SM fiber and how many are MM fiber?
UNL's RESPONSE: All MDF-IDF are SM fiber

175. Question: Is it MM fiber OM3 or OM4?
UNL's RESPONSE: No MM fiber in use

176. Question: Estimate in the longest length MM fiber from a closet to MDF-IDF?
UNL's RESPONSE: No MM fiber in use

177. Question: Estimate in the longest length SM fiber from a closet to MDF-IDF?
UNL's RESPONSE: 200 meters

178. Question: Out-State locations: Estimate how many connections How these connections are brought in (MPLS, L2 Services, VPLS, EVPL, Internet/VPN, etc)
UNL's RESPONSE: Approximately 32 sites are currently connected via leased L2 circuits into University managed MPLS network.

179. Question: Campus Access: Is it an underlay (as asked for the DC; VXLAN underlay) is required and/or preferred?
UNL's RESPONSE: An underlay or something with similar characteristics is preferred for Campus Backbone and Data Center

180. Question: If underlay is required/desired, an estimate in how many overlays would need to be supported.
UNL's RESPONSE: At this time we do not have an estimate for the total number of overlays.

181. Question: Same as is desired not to share controller between campuses in the Wireless solution, is it OK to assumed that each campus will be its own underlay with unique overlays or is it expected to all campus be part of the same underlay.
UNL's RESPONSE: Connectivity and authentication for users are the primary concerns related to local campus resources, ensuring a campus can function with loss of connectivity to University data centers. Management, monitoring, and other services can, and likely will overlay the entire network across locations.

182. Question: Is it multicast a requirement?
UNL's RESPONSE: Depending on what section of the RFP this is referring to

183. Question: Is it IPv6 a requirement and/or preferred?
UNL's RESPONSE: Support for IPv6 is required.

184. Question: Existing secured wired access to the network? All ports or provide a percentage estimate of the total ports listed.
UNL's RESPONSE: See Questions 138-140

185. Question: If secured wired access is in place, what solution is been used?
UNL's RESPONSE: See Questions 138-140

186. Question: Percentage estimate of expected supported mGig technology out of the total ports listed.
UNL's RESPONSE: See Question 48.

187. Question: Wireless Is it Wi-Fi 6 required for outdoor Aps?

UNL's RESPONSE: Yes, once those are available in the marketplace.

188. Question: Out of the initial 8 SSIDs Are all of them expected in all campus or different SSIDs per campus? How many WPA2-Enterprise? Is it centralizing traffic back to controller a mandatory business/technical requirement?
UNL's RESPONSE: The majority of the SSIDs will be broadcast at all locations. A few will be location specific, only deployed within specific areas or buildings. With a few exceptions, the University tunnels all wireless traffic back to a controller. Solutions that do not tunnel traffic would be considered if they add significant value to the network. At least one WPA2-Enterprise SSID will be provided at all locations.

189. Question: Datacenter Is it AC power? Type of power outlet in cabinets/PDUs ?
UNL's RESPONSE: All Data Centers and MDF/IDF closets have AC power, typically 110/220V available within the cabinets with a preference towards 220V. No preference to outlet types at this time.

190. Question: Is it the Lincoln datacenter (Nebraska Hall) located in one of the fiber hub regions as described in Attachment C – Campus fiber map. Case not, is it the datacenter out of one of the buildings? Which fiber hub region servers this building?
UNL's RESPONSE: Nebraska Hall is located near one of the fiber hubs as described in Attachment C. The Data Center environment will be treated as a site off the WAN independent of the campus network and will have its own connectivity into the University WAN. Any traffic between the UNL campus and the Data Center environment will transit the WAN hardware. This maintains design parity between sites and allows for Data Center high availability to be designed independent of any campus backbone.

191. Question: General use leaves Most of the interfaces are listed to be 1Gig and/or 10Gig. Out of the 768 listed ports.
UNL's RESPONSE: This does not appear to be a question.

192. Question: Estimate percentage in 1Gig copper connections?
UNL's RESPONSE: We estimate 50% of active connections may operate at 1Gbps. All server-facing connections in the Data Center environment should support 10Gbps or better.

193. Question: Estimate percentage in 10Gig copper connections?
UNL's RESPONSE: We do not anticipate any 10GBase-T connections in the Data Center environments. If any are present, it is preferable to use 10GBase-T SFP+ transceivers or equivalent.

194. Question: Estimate percentage in 10Gig fiber connections? Is it OK to assume MM fiber for these connections?
UNL's RESPONSE: We estimate 50% of the active connections will operate at 10Gbps.

195. Question: Is it IPv6 multicast required or only IPv4 multicast?
UNL's RESPONSE: IPv6 Multicast routing is not in use today, however it preferable to have multicast routing parity between IPv4 and IPv6. If IPv6 multicast routing is not a current capability, but is on the road-map, please list it as "Variance" to any RFP attributes specifying it as such and describe the estimated implementation timeline.

196. Question: Duplicate VLAN tags on the overlay or underlay?
UNL's RESPONSE: Duplicate VLAN may be required in the overlay. For example: two unique ethernet services may exist that get delivered to two different tenants using the same 802.1Q VLAN tag. Although this does not exist today, it may be possible that those two tenants are connected to the same backbone routers but on different ports. Primarily it is important for the RFP committee to understand whether VLAN tags must be unique globally, unique to a router, or unique to a service delivery point / service access point.

197. Question: Campus Backbone Existing VRFs in place are all VRF-lite
UNL's RESPONSE: All existing VRFs within the campus backbone are implemented as VRF-Lite.

198. Question: Is it MPLS LDP/MPLS SR to expand VRF-life deployment a requirement
UNL's RESPONSE: MPLS LDP/RSVP/SR transport on the Campus Backbone would meet the requirement, however MPLS is not a specific requirement. Other technologies such as VXLAN-EVPN may be considered if they fulfil the requirements (IE: deliver virtualized layer 3 services and virtualized layer 2 services).

199. Question: Is it 1Gig and 10Gig services required at the campus backbone layer
UNL's RESPONSE: The backbone is expected to deliver 10Gig services to aggregation and access layer devices and we are targeting a 100Gbps capacity between backbone routers.

200. Question: What's the campus → Aggregation/Access layer speed requirement
UNL's RESPONSE: Aggregation devices are expected to deliver 10Gig or better service to access layer devices. Access layer devices are expected to deliver 1Gbps to client devices and wireless APs. See Question and Answer #48

201. Question: UNL – Campus Is it expected a backbone core per region (as described in Attachment C – Campus fiber map)
UNL's RESPONSE: At UNL it expected that there will be at least 2 backbone nodes per region able to provide connectivity to each building. For regions A and C, Campus Backbone routers would be located in physically separate buildings (fiber hub 1 and 2) to maintain service in the event of a complete power blackout in one of the fiber hubs. Region B has a single fiber hub at present, so two Campus Backbone routers would be deployed in the same fiber hub. More than one router may be used to provide service from a single hub if needed for port capacity reasons, however the solution must be able to deliver the same Layer 3 subnet to access devices connected to different Backbone Routers.

202. Question: Attachment B – Campus Backbone It mentions 6 spare units is required for each model of hardware listed on this section. Is it accurate to have 6 spare units for campus backbone equipment? Or is it spare units required only for equipment on the access campus.
UNL's RESPONSE: For a comparable proposal, please include 6 spare units for each model, including campus backbone equipment.

203. Question: Equipment list section: Wired Inventory, Chassis based equipment, They dual supervisor engine? Are all line cards/ports copper?
UNL's RESPONSE: Access switches do not have dual supervisors. All line cards are copper with the exception of a line card (typically the supervisors) for SFP/SFP+ uplinks.

204. Question: Standalone switches, Could an estimate be provided of an average on how stackable switches are stack?
UNL's RESPONSE: Existing switch stacks typically fall in the 3-5 count per-stack.

205. Question: Could an estimate be provided of the lowest members per stack?
UNL's RESPONSE: The lowest number of switches per stack is 1.

206. Question: Could an estimate be provided of the highest members per stack?
UNL's RESPONSE: The highest number per-stack is 9. It's worth noting that in some closets have a maximum available port count of 720 ports, so multiple stacks may be required if stackable switches are used.

207. Question: Can University of Nebraska approve an extension on this RFP?
UNL's RESPONSE: That will be evaluated by Procurement and will be communicated to all bidders through the system.

208. Question: Can our company utilize the existing agreed on MSA attached above instead of signing the Master Agreement included in the RFP?
UNL's RESPONSE: No, the size of this agreement will require a new MSA.

209. Question: The RFP suggested providing free training options. Is the University of Nebraska interested in pricing for training options?
UNL's RESPONSE: Yes.

210. Question: Section ii : 1 – The University makes reference to a 5 year deployment plan – Over the course of the 5 years, would the University accept a co-terminus support agreement, allowing all equipment support ending at the same time, or would the university prefer a 5 year support agreement on each phase?
UNL's RESPONSE: The University would prefer that all subscriptions and support be co-termed to a common end date across multiple purchases that will occur on the contract, either from a phased installation or general expansion over time.

211. Question: The University makes several references to network – Is the University looking for network connectivity in this RFP? If so, what are the requirements?
UNL's RESPONSE: The University is not seeking any additional external network connectivity or bandwidth as part of this RFP.

212. Question: The University makes several references to scalability of the Network – Can the University provide current bandwidth (1G, 10G etc.) to date and expectations for growth?
UNL's RESPONSE: Approximate Peak WAN utilization Curtis is 200Mbps, UNK 2Gbps, UNL is 10Gbps, UNO is 2Gbps. We expect 20% growth per year for most usage. Re-architecting the Data Center environments will likely increase that utilization, however it is difficult to estimate due to the current architecture of Data Center environments. Delivery of a Science DMZ over the campus backbone over a VRF instead of through dedicated dark fiber could affect utilization.

213. Question: Power Requirements were not referenced: Describe power requirement for edge devices (AC or DC). Describe power requirements de the Data Centers (AC or DC).
UNL's RESPONSE: See Question 189.

214. Question: Section D, Page 11 – Refers to trade in of the current infrastructure. This can only be provided with a complete inventory of the University's hardware. Can the University provide said inventory of the devices the University would like to trade in?
UNL's RESPONSE: This is provided in attachment A for Unified Edge. A complete inventory of Campus Backbone and Datacenter will not be provided.

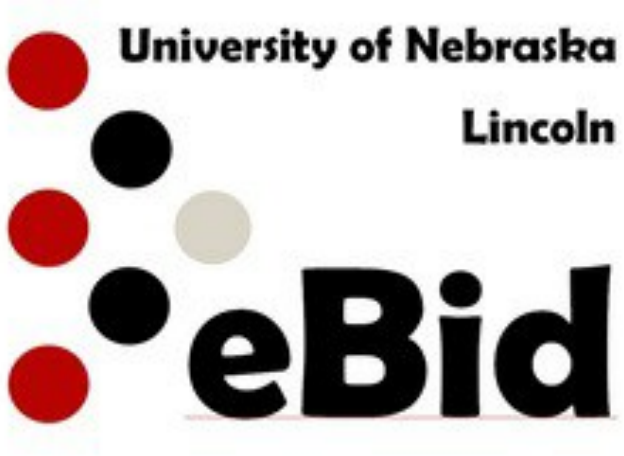
215. Question: Does the RFP allow for third party vendors to meet some of the stated requirements?
UNL's RESPONSE: Yes, as long as requirements are met.

216. Question: Does the RFP allow for a third-party network access control and/or role-based access control integrated solutions? If so, is there an existing or preferred third party network access control and/or role-based access control vendor today?
UNL's RESPONSE: Yes. No existing NAC solution applying enforcement is in place today.

217. Question: Are you doing only or more? If so, what capacity?
UNL's RESPONSE: Question is not clear.

218. Question: May a bidder submit more than one proposal?
UNL's RESPONSE: Yes, a bidder may submit more than one proposal. Each proposal must be easily identifiable for evaluation purposes. Alternate line-items can be submitted by clicking on "add alternate"

219. Question: Since the responses were extended a day, will the submission deadline be extended
UNL's RESPONSE: Yes, the deadline will be extended to Oct 7th at 1pm US/Central time.



3131-19-4321 Addendum 3
GovConnection, Inc.
Supplier Response

Event Information

Number: 3131-19-4321 Addendum 3
Title: Network Hardware Solutions
Type: RFP - Request for Proposal
Issue Date: 8/30/2019
Deadline: 10/7/2019 01:00 PM (CT)
Notes: In order to participate in this bid you must submit your responses electr onically through this eBid system. Bidders must be registered in eBid t o review more details regarding this opportunity. Please review all tab s in the bid to obtain the specific information before submitting a bid re sponse. No paper bids will be accepted.

This is a very complex project, allow plenty of time to complete you response.

The University of Nebraska is requesting proposals from firms offering 1) Unified Edge Solutions, 2) Data Center Network Solutions, and 3) Campus Backbone Solutions for campuses in Lincoln, Omaha, Kearn ey, and Curtis. The intent of this Request for Proposal (RFP) and the e nsuing process is to provide companies with the information, requirem ents, and specifications necessary for the preparation of a profession al and comprehensive proposal.

Addendum 2 - University response to questions received is in the atta

chments tab.
Addendum 3 - Bid Close Date moved to Monday October 7, 2019 at 1 :00 p.m. (CST)

Contact Information

Contact: Claudette Biskup
Address: 1700 Y Street
Lincoln, NE 68588-0645
Phone: 1 (402) 472-2126
Fax: 1 (402) 472-2246
Email: ebid@unl.edu

GovConnection, Inc. Information

Contact: Rob Pica
Address: 732 Milford Road
Merrimack, NH 03054
Phone: (800) 800-0019 x33324
Fax: (603) 683-0260
Toll Free: (800) 800-0019
Email: rpica@govconnection.com

By submitting your response, you certify that you are authorized to represent and bind your company.

Robert Marconi, VP SLED Sales
Signature

sledcontracts@connection.com
Email

Submitted at 10/7/2019 11:49:07 AM

Supplier Note

Connection has been partnering with the University of Nebraska for over 15 years under the account managem ent of Rob Pica for the entire period, and Steve Siebersma for the past 6 years. During this partnership the Con nection team has developed an invaluable and unique understanding of the University's IT environment. Connec tion has successfully supported all of the campuses within the university system on a multitude of IT projects ove r the years. We take pride in matching the university directives with the solutions Connection is able to offer in IT hardware, software, and services. It is also a privilege for Connection to support the university in the variety of s ymposiums, events, and conferences held on the campuses. Our holistic, multi-layered approach in support of t he university system has led to a strengthening of the relationships with the manufacturers used on the campuse s as well, including Cisco. We are anxious to continue listening, understanding, guiding, consulting, assisting an d supporting university initiatives to improve student outcomes and user satisfaction. We are driven to go the ex tra mile whenever and however needed and will continue to seek creative ways to assist, improve, and to help y ou realize your strategic vision. Connection has enjoyed building a long and successful working relationship wit h the university of Nebraska; we look forward to continuing that course and to working together with you on this project.

Requested Attachments

Key Personnel/Engagement Team — Key Personnel Engagement Team Organizational Chart - Connection.pdf

Provide an outline of your proposed engagement team, which shall include the following: Organizational chart of the e ntire engagement team, including titles, number of people in each position, etc.

Master Price Agreement — Univ_Nebraska_Master_Price_Agreement.xlsx

Include: Part Number, Description, Manufacturer List Price, Percentage % Discount, Discount Price

Service Level Agreement — 3131-19-4321 Attachment - Service Level Agreement.docx

See attribute 985. Provide your Service Level Agreement (SLA). Upload a copy of your SLA to the Attachments sectio n of this RFP.

Attachment A Unified Edge — Univ_Nebraska_Unified Edge.xlsx

Proposal for Attachment A

Attachment B Campus Backbone — Univ_Nebraska_Camp_Backbone.xls

Attachment B – Campus Backbone Pricing Proposal

Attachment D Data Center Univ_Nebraska_DataCenter.xlsx

Attachment D – Data Center Pricing Proposal

Response Attachments

3131-19-4321 Appendix_A_Technology_Agreement - signed by GovC.pdf

Signed Technology Agreement

Univ_Nebraska_Learning Credits.xlsx

Line item # 4 - Cisco Learning Credits for Training

IBOS Install-Base-Optimization-Service Overview.pdf

Attribute 28 - No cost Value Add

Cover Letter w signature.pdf

Connection Cover Letter

Attributes with Expanded Answers v3.docx

Attributes with answers larger than characters allowed, or with hot links.

UofNebraska Prelim Solution Design Document Final- 10-7-19 (003).pdf

Solution Design Document

Bid Attributes

1	**Bidder Requirements** I acknowledge reading and understanding the UNL Bidder Requirements attachment. **All bids must be received by the system *before* the bid deadline. It is the responsibility of the bidder to allow adequate time for reviewing and submitting their proposal *before* the deadline to ensure all required responses have been completed. The "Submission Button" in the University's eBid system will be inoperable when the deadline for submission for eBids has ended. Incomplete bids will be rejected by the system.** Bidder Requirements Attachment
2	**Bid Terms and Conditions** I acknowledge reading and understanding the Bid Terms and Conditions attachment. Bid Terms and Conditions Attachment
3	**Site Terms & Conditions** Bidder acknowledges to having read and understand eBid Terms and Conditions of Access and Use. Site Terms & Conditions

4 Public Information

Bids submitted to the University are presumed to be public records. If bids contain trade secrets, academic or scient ific research work in progress and unpublished, or other proprietary or commercial information which if released wo uld give advantage to business competitors and serve no public purpose, it is the responsibility of the bidder to desi gnate such content as confidential. When bids are opened to determine a successful bidder, all bids will be availabl e for public inspection. Portions of bids designated by the bidder as confidential will be withheld from public inspecti on. Any reasonably segregable portion of the bid that is not designated as confidential shall be provided for public i nspection after deletion of the portion or portions of the bid which may be withheld. Price terms appearing in bids or proposals, invoices, purchase orders or other documents calling for the expenditure of public funds may not be desi gnated as confidential or withheld from public inspection.

A bidder shall be solely responsible for providing the defense to any challenge to a decision to withhold information contained in a proposal, based upon bidder's identification of the information as confidential.
A bidder must submit any confidential material, as defined above, as a "separate" and "redacted" attach ment with their response in the UNL eBid system. This attachment must be clearly marked/identified as " Confidential".

Public Information

5 Scope of Work

I have carefully examined the Scope of Work attachment and I fully understand the type and quality of the product(s) and/or service(s) sought by UNL and hereby propose to supply such at the prices stated and in accordance with th is bid.

Scope of Work Attachment

6 Bid Responses

Unless a response specifically requests an attachment I shall make every effort to provide answers in the spaces av ailable within each bid tab. Furthermore I understand that by not doing so this may disqualify my proposal as submit ted.

Bid Responses

7 Company Profile

Describe your company (a brief history may be appropriate), its size and locations, and number of employees.

Company Profile
Connection is a Fortune 1000 Global Solutions Provider that connects people with technology to enhance growth, elevate productivity, and empower innovation.

The Connection brand includes Connection® Business Solutions, Connection® Enterprise Solutions, and Connecti on® Public Sector Solutions, which provide customer-centric IT solutions and services for small- to medium-sized b usinesses, enterprises, and public sector markets, respectively.

Our Story
When Patricia Gallup and David Hall founded this company 37 years ago, the personal computer was a revolution ary idea they knew would change the world. They were right.

Since that day back in 1982, technology has advanced in leaps and bounds. And we've been there all along, helpi ng people connect with innovative technologies—from the PC to the latest cloud services—in new and exciting way s

Establishing a reputation as a pioneer in the industry early on, our experts set the standard for the levels of servic e and support customers expect in the marketplace today. We became known as an innovator and service leader by introducing toll-free technical support before, during, and after the sale. Our team was constantly on the lookou t for services that would differentiate the company from the competition and offer customers a higher level of comf ort and convenience. Today, we are a Fortune 1000 company with annual revenues topping $2.7 billion. We've co me a long way— and we haven't stopped yet.
A Trusted Technology Advisor

Twice recognized by Forbes as one of “America's Most Trustworthy Companies,” our mission is to provide customers with the expert guidance, state-of-the-art tools, and exceptional service to solve their technology challenges. Today, we serve our customers through our staff of highly trained Account Managers, our team of on-staff experts, and our efficient procurement websites. A collaborative approach to the design, deployment, and support of technology has fueled Connection's growth and earned us the reputation of trusted advisor to our customers

Company Profile (Cont’d)
Technical Expertise
Offering nationwide service coverage, access to more than 300,000 products, and in-house teams of certified technical experts, project managers, and engineers, Connection continues to expand its capabilities to meet evolving customer needs. From virtualization and cloud computing to mobility and security solutions, the Company pushes the boundaries of information technology to provide the performance, value, and efficiency customers need to achieve better business outcomes.
Connection delivers custom-configured computer systems from an ISO 9001:2015 certified technical configuration lab at our Technology Integration and Distribution Center in Wilmington, Ohio. In addition, the Company maintains more than 2,500 technical certifications to ensure that we can solve the most complex issues of our customer.

Who is Connection?

? We are a financially stable, Fortune 1000 company.

? We offer complete solutions and services designed to improve operations and increase the value of IT.

? We employ the most highly trained, experienced IT professionals in the industry.

? We are dedicated to exceptional
customer service

? We offer global procurement in 174 countries with over 500 suppliers, allowing us to provide IT service management that’s unmatched in our industry.

Company Fast Facts

? Founded: 1982

? President, Connection Public Sector Solutions, Robert Howard

? Corporate headquarters: Merrimack, NH

? Locations: Keene and Portsmouth, NH; Shelton, CT; Boca Raton, FL; Schaumburg, IL; Wilmington, OH; Marlborough, MA;
Rockville, MD; Exton, PA;
and Dakota Dunes, SD

? Annual revenue: $2.7 billion (2018)

? NASDAQ listing: CNXN

8 **Audited Financial Statements**

The bidder shall, upon request, provide UNL with audited financial statements and that of any parent or holding company for the three most recent fiscal years. Demonstrated financial ability and stability to ensure performance under any contract awarded is of extreme importance to the evaluation process. Without stating specific reasons, the University may reject or refuse to further evaluate any proposal based on the exercise of its judgment in its sole discretion that the financial position presented in a proposal lacks the qualities that UNL deems necessary to the success of the project. Entities unable to meet the requirements set forth in this paragraph may provide other information or guaranties, which in the discretion of UNL, meet its concerns regarding financial stability. Can you provide, if requested, three years of audited financial statements as described above?

Yes

9 **Litigation or Claims**

Identify any litigation or claim brought against your company within the last seven years, which might reflect adversely on your company's professional image or ability in relation to providing the goods or services sought under this bid.

From time to time, GovConnection, Inc. is party, as plaintiff or defendant, to various types of legal proceedings, audits and claims, which arise in the ordinary course of business. Publicly available information on material matters, if any, is as reported in our SEC filings located at https://ir.connection.com.

10 **Company Sale or Acquisition**

Is your company currently for sale or involved in any transaction to expand or to become acquired by or merged with another organization? If so, please explain. Has your company been involved in any reorganization, acquisition or merger within the last two years? If so, please explain.

no

11 **Reference #1**

Provide a client reference (including length and nature of service relationship, name of the contact person, title, phone number, email, and address) with whom you have or have had a comparable business relationship. Other educational institutions would be most valuable. Do NOT reference University of Nebraska or it's employees.

Massachusetts Institute of Technology (MIT)
MIT has been a flagship account of Connection and Cisco for over 20 years. Every component of MIT’s connectivity infrastructure including wired, wireless, core, network backbone, distribution, and software management are supported by Cisco via Connection.
Mark Silis
VP of Information Systems & Technology
77 Massachusetts Ave
Cambridge, MA 02139
mark@mit.edu
617.253.3292

12 **Reference #2**

Provide a client reference (including length and nature of service relationship, name of the contact person, title, phone number, email, and address) with whom you have or have had a comparable business relationship. Other educational institutions would be most valuable. Do NOT reference University of Nebraska or it's employees.

Auburn University:
Auburn has been working with Connection on networking solutions for 7+ years. Connection supports the university with Cisco network backbone hardware and software and providing wireless access across the campus.
Richard Dale - Campus Network Administrator
Auburn University Office of Information Technology
300 Lem Morrison Drive | Auburn, AL 36849-5429
daleric@auburn.edu
(334) 844-9366

13	**Reference #3** Provide a client reference (including length and nature of service relationship, name of the contact person, title, phone number, email, and address) with whom you have or have had a comparable business relationship. Other educational institutions would be most valuable. Do NOT reference University of Nebraska or it's employees. Colorado State: Connection supports the connectivity of stakeholders at Colorado State in several ways with a few different solutions, and has been doing so for 8 years. Connection has outfitted the gear for CSU with Cisco Core and switches. We have also provided wireless access points in university housing and the new football stadium and just about everything in between. Nic Garrison Academic Computing & Networking Services Colorado State University, Campus Delivery 1018 Fort Collins, CO 80523 (970)491-2434, Nicholas.Garrison@colostate.edu
14	**Reference #4** Provide a client reference (including length and nature of service relationship, name of the contact person, title, phone number, email, and address) with whom you have or have had a comparable business relationship. Other educational institutions of 20,000 students or greater within the United States using the proposed equipment in a similar manner to the University of Nebraska would be most valuable. Do NOT reference University of Nebraska or it's employees. UNC-Charlotte: UNC-Charlotte has had a 15+ year relationship with Connection. The networking business we do with the university involves a wide range of Cisco products including wired & wireless components of their network as well as Data Center and network backbone hardware and software. Jesse Beaumann, M.S. – Assistant Vice Chancellor for Enterprise Infrastructure 704-687-1242 jbeauman@uncc.edu 9201 University City Blvd Kennedy 320B Charlotte, NC 28223 9201 University City Blvd Charlotte, NC 28223
15	**Reference #5** Provide a client reference (including length and nature of service relationship, name of the contact person, title, phone number, email, and address) with whom you have or have had a comparable business relationship. Other educational institutions of 20,000 students or greater within the United States using the proposed equipment in a similar manner to the University of Nebraska would be most valuable. Do NOT reference University of Nebraska or it's employees. Tennessee State University: TSU has been doing business with Connection for 10+ years. The nature of their networking and security business with Connection includes core, edge, wireless, and firewall. John Dodd – Network Manager Tennessee State University 3500 John A. Merritt Blvd Nashville, TN 37209 (615) 963-7651 ext 2925 jdodd@tnstate.edu

16 **Warranty**

I warrant that all equipment and supplies offered will conform to the design, specifications, samples, or other descrip tions contained in this bid, will be free from defects in workmanship and material and to the extent that I know, or hav e reason to know of the purpose for which the supplies are intended, will be fit and sufficient for such purpose as de emed applicable. The warranty required here under must provide all parts, equipment, transportation, technical assi stance, labor and supervision necessary to correct any deficiency resulting from manufacturing defects without char ge for a period of one (1) year after the date of final acceptance of all materials, equipment, and services furnished by successful bidder. Thereafter the manufacturer's standard warranty will apply.

Warranty

17 **University System Participation**

I acknowledge that in some instances, other University campuses or state agencies may wish to explore the possibili ty of sharing in the benefits of this bid and its resultant contract.

Univ System Participation

18 **Non-Collusive Bid**

I acknowledge that any bid responses submitted are not the result of collusion with other eligible bidders, with any e mployee of the State or University, and no effort has been made to preclude UNL from obtaining the most advantag eous response possible to this bid.

Noncollusive Bid

19 **University Employee**

I affirm that if I am an employee of the University of Nebraska, I have notified the buyer of my status as such and tha t this contract must be completed in accordance with Board of Regents Policy 6.2.1.12, Purchases Involving Univers ity Personnel.

N/A

20 **Deviations/Exceptions/Bid Compliance**

If you do not comply or partially comply with any terms, conditions, specifications, processes, etc. of this bid, we ask that you indicate those sections and your counter term, condition, explanation here. Failure to provide such informa tion here indicates that you are in complete compliance with those terms, conditions, specifications as stated in this bid. Attachments can be included in your bid response, but you must indicate here that an attachment is provided. Please include any deviations/exceptions/bid compliance counter terms.

no exceptions

21 **Contractor's Certificate of Insurance**

I acknowledge and understand that prior to the commencement of any work, successful bidder is required to furnish a certificate of insurance with coverage’s to bodily injury/personal injury/liability coverage, property damage liability coverage, and workman's compensation coverage. This certificate must be on file in the Procurement Services offic e prior to any commencement of work. It is absolutely necessary that "The Board of Regents of the University of Ne braska as an additional insured” be added to the face of the certificate for all coverage except worker's compensati on. The above statement must be worded in this manner. It is also absolutely necessary that a “Completed Operatio ns Coverage” must be included as part of the vendor’s General Liability. In addition to standard insurance coverage ’s the vendor will be required to carry minimum: $1 million per claim & $3 million per occurrence for liability and prop erty damage.

Contractors Cert of Ins will be provided

22 **Line Item Award**

I acknowledge and understand that this is a line by line bid, with the possibility of each line being awarded to a differ ent Bidder and it is possible not all items will be awarded.

Line Item Award

23	**Technical Support** It is strongly desired that, at a minimum, edge switching be accompanied by a lifetime warranty, with support and sof tware upgrades, by the manufacturer. If this is not the case, the selected Bidder must provide technical support fro m the equipment manufacturer on the proposed switching hardware for a period of **five (5)** years. Any hardware or software not covered under a lifetime warranty should include **five (5) years (60 months)** of support, including soft ware updates and next-business day parts replacement. Any support must include online access to software upgrades, online access to the manufacturer's knowledge base , online initiation of technical support cases, phone-based initiation of technical support cases, and initial response f rom a technical support engineer within two hours of initiating a technical support case, and next-business-day repl acement of failed hardware. Yes, I can
24	**Equipment Delivery** Equipment must be delivered within four weeks of order placement unless an estimated delivery schedule is provide d within the first week after order placement. Software, virtual appliances, and/or licenses should arrive as soon as possible after order placement Yes, I can
25	**Key Personnel/Engagement Team** Key Personnel/Engagement Team - Describe in detail as specified on the "Response Attachments" tab. Rob Pica, Sr. Executive Account Manager 800-800-0019 ext. 33324 rob.pica@connection.com; Steve Siebersma, Business Development Manager 800-800-0019 ext. 77830 steve.siebersma@connection.com; Brian Kelly, Sr. Solu tions Architect 800-800-0014 ext. 74597 – brian.d.kelly@connection.com. Full org chart is attached.
26	**Company Contact Information** Identify the person within your organization to whom questions regarding this proposal should be addressed, includi ng name, title, address, and phone number. It is preferable that the contact be the lead engineer. Brian D. Kelly, Sr. Solution Architect, Technology Solution Group, Mobile 331-213-0759, Brian.d.kelly@connection. com, GovConnection, Inc., 800 Stevens Port Drive, Suite 900, Dakota Dunes, SD 57049
27	**Mitigation of Risk** With a vast and complex networking environment, the participant should describe how risk and downtime would be a voided in changing the entire switching and wireless environment across the enterprise Risk mitigation will be outlined in an SOW upon award.
28	**Value Add** Describe any additional services that you would like to include at no cost to the University We will include at no cost to the University Connection's Install Based Optimization service (IBOS). IBOS utilizes Cis co's Smart Net Total Care virtual collector and web-based portal as a primary tool to manage your Smart Net contr acts and inventory. You will have visibility to device level details and access to reports with product and security ale rts. A dedicated team will assist with onboarding, analysis and maintenance of these reports, customized to fit your needs. IBOS focuses on data reconciliation and renewal preparation. We also provide scheduled reviews for proac tive planning and support. Please see IBOS attachment.
29	**Travel Policy** The University of Nebraska has strict guidelines related to the reimbursement of travel. Our travel policy can be fou nd at: http://travel.unl.edu/. I acknowledge that I have read and understand the University's travel policy and any reimbursable travel expenses will adhere to these policies. Furthermore I acknowledge that in accordance with Bidder's Requirements Section 8.2, prior to an award, contract, or purchase order by the University any travel incurred is considered non-reimbursable. Travel Policy

30	**Attachments** Any response attachments must be 100MB or smaller in size per file. Please indicate whether or not you will be sup plying attachments with your bid response. YES
31	**Unified Edge Solutions Required Features – Switching** Proposed solutions must offer components which support the following list of features. Please simply affirm or deny that your proposed solution meets the following requirements by notating each item with "**accept**", "**deny**", or "**vari ance**." Please explain any variances in your product. The Bidder cannot answer "accept" if the feature is not curre ntly available in the proposed hardware running current general availability (production) release software. If a featu re is not in production software at the time of the RFP submission, the Bidder must choose "deny" or "variance." If a feature not in production software is described under a "variance," it must be noted the feature is not currently avail able
32	**Layer 2 protocols and functions**
33	**Support IEEE 802.1D bridging** Proposed switches must fully support IEEE 802.1D bridging, including features originally defined as 802.1w (Rapid Spanning Tree Protocol). RSTP is currently used on some campus's current switches. Accept
34	**Variance to support IEEE 802.1D bridging** Support IEEE 802.1D bridging *No response*
35	**Configure a port as an edge-port** Layer 2 protocols and functions: Proposed switches must support a feature to configure a port as an edge-port, su ch that spanning-tree will transition more quickly/immediately to a forwarding mode and not generate topology-chan ge-notifications (TCNs Accept
36	**Variance Configure a port as an edge-port** Variance Configure a port as an edge-port *No response*
37	**Support a loop protection feature** Layer 2 protocols and functions: Proposed switches must support a loop protection feature, independent of STP, to disable a port where a loop has been detected on a down-stream switch. Accept
38	**Variance to support a loop protection feature** Support a loop protection feature *No response*
39	**Support a per-port feature to ignore STP BPDUs** Layer 2 protocols and functions: Proposed switches must support a per-port feature to ignore STP BPDUs (i.e. bpd u-filter), allowing the port to remain in a forwarding state. Accept

40	**Variance to support a per-port feature to ignore STP BPDUs** Support a per-port feature to ignore STP BPDUs *No response*
41	**Switches must support a per-port feature to block** Layer 2 protocols and functions: Proposed switches must support a per-port feature to block a port that receives a BPDU (i.e. bpdu-protect), applicable to ports configured as edge-ports Accept
42	**Variance to switches must support a per-port feature to block** Switches must support a per-port feature to block a port that receives a BPDU *No response*
43	**Support switches must fully support IEEE 802.1Q VLAN tagging on layer 2 interfaces.** Proposed switches must fully support IEEE 802.1Q VLAN tagging on layer 2 interfaces. Accept
44	**Variance to switches must support IEEE 802.1Q VLAN** Switches must support IEEE 802.1Q VLAN tagging on layer 2 interfaces. *No response*
45	**Support switches must support jumbo frame sizes of 9,192+ bytes** Proposed switches must support jumbo frame sizes of 9,192+ bytes on all routed physical and virtual interfaces and ports operating as L2-only bridging ports. Accept
46	**Variance to support jumbo frame sizes of 9,192+ bytes** Support jumbo frame sizes of 9,192+ bytes on all routed physical and virtual interfaces and ports operating as L2-only bridging ports. *No response*
47	**Support switches must be non-blocking** All switch ports on a switch must be non-blocking, capable of simultaneous forwarding of traffic at line rate, between ports on the same switch or card and, for chassis-based switches, between ports on different cards. Variance
48	**Variance to switch must be non-blocking** Variance to switch being non-blocking The Cisco Catalyst 9400 Series Switches support the mentioned features contingent on line card configuration. See the referenced link: Reference: https://www.cisco.com/c/en/us/products/collateral/switches/catalyst-9400-series-switches/datasheet-c78-739055.html Accept. Catalyst 9300 and 9500 Series Switches support the mentioned features.
49	**Support a form of multi-chassis link aggregation** Proposed switches must support form of multi-chassis link aggregation (i.e. MLAG or MC-LAG), between at least two switches. Allowing for members of a downstream link-aggregate to terminate at least one member on each aggregated switch. Accept

50 **Variance to a form of multi-chassis link aggregation**

Variance to a form of multi-chassis link aggregation.

No response

51 **Support the option for virtual chassis**

Proposed switches must support the option for virtual chassis or, if non-chassis, stacking such that connected switc hes are manageable as a single switch.

Accept

52 **Variance to switches must support the option for virtual chassis**

Variance to support the option for virtual chassis.

No response

53 **Support 802.3ad compliant LACP link aggregates**

Proposed switches must support 802.3ad compliant LACP link aggregates.

Accept

54 **Variance to 802.3ad compliant LACP link aggregates**

Variance to 802.3ad compliant LACP link aggregates.

No response

55 **Support virtual chassis or stacking**

Is virtual chassis or stacking is supported, members of an LACP aggregate must be able to terminate individually on the same switch or across different switches.

Accept

56 **Variance to virtual chassis or stacking**

Variance to virtual chassis or stacking.

No response

57 **Support chassis-based switches IEEE 802.3ad link**

Chassis-based switches, proposed line cards must support IEEE 802.3ad link aggregation with aggregate member ports on the same, or different, line cards.

Accept

58 **Variance to chassis-based switches support IEEE 802.3ad l**

Variance to chassis-based switches, proposed line cards must support IEEE 802.3ad link aggregation with aggregat e member ports on the same, or different, line cards.

No response

59 **Switches in the stack must support IEEE 802.3ad link**

Fixed configuration switches supporting stacking or virtual-chassis are proposed, all switches in the stack must supp ort IEEE 802.3ad link aggregation with ports on the same or different, switches in the stack.

Accept

60 **Variance to switches in the stack must support IEEE 802.3ad link**

Variance to switches in the stack must support IEEE 802.3ad link

No response

61 **Switches must be full-featured switches**

Proposed switches must be full-featured switches and not port extenders.

Accept

62 **Variance to switches must be full-featured switches**

Variance to switches being full-featured switches.

No response

63 **Switches must support static MAC assignment**

Proposed switches must support static MAC assignment, allowing for the mapping of a MAC address to a port or ser ies of ports.

Accept

64 **Variance to support static MAC assignment**

Variance to support static MAC assignment, allowing for the mapping of a MAC address to a port or series of ports.

No response

65 **Following Attributes pertain to IPv4/IPv6 Layer3 protocols and functions**

66 **Switches must support basic L3 functionality and protocols**

Proposed switches must support basic L3 functionality and protocols, with a minimum of L3 forwarding via default-g ateway or IPv4/IPv6 static routes.

Accept

67 **Variance to support**

Variance to support basic L3 functionality and protocols, with a minimum of L3 forwarding via default-gateway or IPv 4/IPv6 static routes.

No response

68 **Switches must support IPv4 and IPv6 addressing**

Proposed switches must support IPv4 and IPv6 addressing, of VLAN interfaces via static or DHCP assignment, frequ ently used to verify DHCP and/or gateway reach-ability.

Accept

69 **Variance to support IPv4 and IPv6 addressing**

Variance to support IPv4 and IPv6 addressing

No response

70 **Switches must support Internet Group Management Protocol version 3 (IGMPv3)**

Proposed switches must support Internet Group Management Protocol version 3 (IGMPv3) as described by RFC 33 76 on routed and non-routed physical and virtual interfaces.

Accept

71 **Variance to support Internet Group Management Protocol version 3 (IGMPv3)**

Variance to support Internet Group Management Protocol version 3 (IGMPv3) as described by RFC 3376 on routed and non-routed physical and virtual interfaces.

No response

72 **Switches must support a ping utility to source ICMP**

Proposed switches must support a ping utility to source ICMP echo requests for both IPv4 and IPv6.

Accept

73 **Variance to support a ping utility to source ICMP**

Variance to support a ping utility to source ICMP echo requests for both IPv4 and IPv6.

No response

74 **Switches must support a ping utility allowing specification**

Proposed switches must support a ping utility that allows specification of the source address as any locally defined IPv4 or IPv6 interface on the device.

Accept

75 **Variance to support a ping allowing specification**

Variance to support a ping utility that allows specification of the source address as any locally defined IPv4 or IPv6 interface on the device.

No response

76 **Switches must support a trace-route utility for both IPv4 and IPv6**

Proposed switches must support a trace-route utility for both IPv4 and IPv6.

Accept

77 **Variance to support a trace-route**

Variance to support a trace-route utility for both IPv4 and IPv6.

No response

78 **Switches must support a trace-route utility allowing specification**

Proposed switches must support a trace-route utility that allows specification of the source address as any locally defined IPv4 or IPv6 interface on the device.

Accept

79 **Variance to support a trace-route utility allowing specification**

Variance to support a trace-route utility that allows specification of the source address as any locally defined IPv4 or IPv6 interface on the device.

No response

80 **Following attributes pertain to Security and AAA**

81 **Switches must support the ability to mirror traffic**

Proposed switches must support the ability to mirror traffic from a set of source ports to single destination port in hardware.

Accept

82	**Variance to support the ability to mirror traffic from a set of source ports to single destination port in hardware.** Variance to support the ability to mirror traffic from a set of source ports to single destination port in hardware. *No response*
83	**Switches must support the ability to mirror traffic from a higher bandwidth port to a 1 Gb port** Proposed switches must support the ability to mirror traffic from a higher bandwidth port to a 1 Gb port with the und erstanding that the destination port would be oversubscribed by some ratio. Accept
84	**Variance to support the ability to mirror traffic from a higher bandwidth port to a 1 Gb port** Variance to support the ability to mirror traffic from a higher bandwidth port to a 1 Gb port. *No response*
85	**Switches must be able to apply an IPv4 or IPv6 ACL** Proposed switches must be able to apply an IPv4 or IPv6 ACL in hardware to both inbound and outbound traffic for all routed and non-routed physical interfaces and VLANs (including loopbacks). Accept
86	**Variance to support the ability to apply an IPv4 or IPv6 ACL** Variance to support the ability to apply an IPv4 or IPv6 ACL in hardware to both inbound and outbound traffic for all routed and non-routed physical interfaces and VLANs (including loopbacks). *No response*
87	**Switches must be able to apply layer2 MAC based ACLs** Proposed switches must be able to apply layer2 MAC based ACLs in hardware to both inbound and outbound traffi c for all routed and non-routed physical interfaces and VLANs. Accept
88	**Variance to support the ability to apply layer2 MAC based ACLs** Variance to support the ability to apply layer2 MAC based ACLs in hardware to both inbound and outbound traffic fo r all routed and non-routed physical interfaces and VLANs. *No response*
89	**Switches must support an RFC 3176 compliant version of** Proposed switches must support an RFC 3176 compliant version of sFlow, RFC 3954 compliant version of Netflow, or RFC 5101 compliant version of IPFIX with support for IPv4 and IPv6. Accept
90	**Variance to support an RFC 3176 compliant version of** Variance to support an RFC 3176 compliant version of sFlow, RFC 3954 compliant version of Netflow, or RFC 5101 compliant version of IPFIX with support for IPv4 and IPv6. *No response*
91	**Switches must support some type of ARP protection mechanism** Proposed switches must support some type of ARP protection mechanism, to avoid spoofing, and it is strongly prefe rred that the feature also operates when the switch is in Layer2 mode only. Accept

92 **Variance to support some type of ARP protection mechanism**

Variance to support some type of ARP protection mechanism, to avoid spoofing, and it is strongly preferred that the feature also operates when the switch is in Layer2 mode only.

No response

93 **Switches must support enabling 802.1x user-authentication via RADIUS**

Proposed switches must support enabling 802.1x user-authentication via RADIUS, or other methods, on a per-port basis, allowing for the exclusion of some ports from authentication.

Accept

94 **Variance to support enabling 802.1x user-authentication via RADIUS**

Variance to support enabling 802.1x user-authentication via RADIUS

No response

95 **Switches must support 802.1x using EAP-PEAP and EAP-TLS**

Proposed switches must support 802.1x using EAP-PEAP and EAP-TLS.

Accept

96 **Variance to support 802.1x using EAP-PEAP and EAP-TLS**

Variance to support 802.1x using EAP-PEAP and EAP-TLS.

No response

97 **Switches must support MAC-authentication-bypass**

Proposed switches must support MAC-authentication-bypass, allowing for fail-thru MAC based authentication, for th ose clients that do not support 802.1x supplicants.

Accept

98 **Variance to support MAC-authentication-bypass**

Variance to support MAC-authentication-bypass, allowing for fail-thru MAC based authentication, for those clients th at do not support 802.1x supplicants.

No response

99 **Switches must support fall-through placement**

For those clients that are unable to perform 802.1x authentication and fail MAC authentication, all switches must su pport fall-through placement on a preconfigured guest or unauthorized client VLAN to provide limited network acces s.

Accept

100 **Variance to support fall through placement**

Variance to support all switches must support fall-through placement on a preconfigured guest or unauthorized clien t VLAN to provide limited network access.

No response

101 **Switches must support caching of successful client authentications**

Proposed switches must support caching of successful client authentications for the purpose of re-authentication in the event of AAA server failure/unreachable.

Accept

102	**Variance to switches must support caching of successful client authentications** Variance to switches must support caching of successful client authentications *No response*
103	**Switches must be able to authenticate multiple users** Proposed switches must be able to authenticate multiple users on a single switch port using both 802.1x and MAC a uthentication, to support the attachment of non-managed, end-user switches to authenticated ports. Accept
104	**Variance to must be able to authenticate multiple users** Variance to must be able to authenticate multiple users *No response*
105	**Switches must support change-of-authority (CoA)** Proposed switches must support change-of-authority (CoA) such that a user, who has been moved into a new role (i .e. Quarantine) on the AAA server, can be more swiftly transitioned to their new role status. Accept
106	**Variance to must support change-of-authority (CoA)** Variance to must support change-of-authority (CoA) *No response*
107	**Switches must support a monitor only mode** Proposed switches must support a monitor only mode, where authentication features can be enabled, but regardles s of the result, users will be placed in a definable VLAN or network state. This is needed to validate whether port/us er-authentication will work or not on a particular switch or switch-port. Accept
108	**Variance to support a monitor only mode** Variance to support a monitor only mode *No response*
109	**Switches must support the dynamic VLAN assignments per-client from the AAA/NAC server** Proposed switches must support the dynamic VLAN assignments per-client from the AAA/NAC server. Accept
110	**Variance to support the dynamic VLAN assignments per-client from the AAA/NAC server** Variance to support the dynamic VLAN assignments per-client from the AAA/NAC server. *No response*
111	**Switches must support a method, such as, MAC-based VLAN assignment** Proposed switches must support a method, such as MAC-based VLAN assignment, to support individual VLAN acce ss by multiple users connected to end-user switches connected to authenticated edge ports. Accept

112	**Variance to support a method, such as, MAC-based VLAN assignment** Variance to support a method, such as, MAC-based VLAN assignment, to support individual VLAN access by multiple users connected to end-user switches connected to authenticated edge ports. *No response*
113	**Switches must support the application of per-client dynamic ACLs delivered from the AAA/NAC server** Proposed switches must support the application of per-client dynamic ACLs delivered from the AAA/NAC server. Accept
114	**Variance to support the application of per-client dynamic ACLs delivered from the AAA/NAC server** Variance to support the application of per-client dynamic ACLs delivered from the AAA/NAC server. *No response*
115	**Switches must support locally configured named ACLs that can be applied via RADIUS** Proposed switches must support locally configured named ACLs that can be applied via RADIUS. Accept
116	**Variance to support locally configured named ACLs that can be applied via RADIUS** Variance to support locally configured named ACLs that can be applied via RADIUS. *No response*
117	**Switches must support locally configured named roles** Proposed switches must support locally configured named roles, callable via RADIUS, that include options for assignment of security policy or ACL and VLAN. Accept
118	**Variance to support locally configured named roles** Variance to support locally configured named roles *No response*
119	**Switches must support locally downloadable roles and ACLs** Proposed switches must support locally downloadable roles and ACLs, so they can be centrally managed and distributed from a centralized RADIUS/NAC server. Accept
120	**Variance to support locally downloadable roles and ACLs** Variance to support locally downloadable roles and ACLs *No response*
121	**Switches must support SNMP traps for link status change** Proposed switches must support SNMP traps for link status change. Accept
122	**Variance to support SNMP traps for link status change** Variance to support SNMP traps for link status change. *No response*

123 **Switches must support be able to apply an IPv4 access control list (ACL)**

Proposed switches must be able to apply an IPv4 access control list (ACL) in hardware to both inbound and outbound traffic for all routed and non-routed interfaces and VLANs (including loopbacks).

Accept

124 **Variance to be able to apply an IPv4 access control list (ACL)**

Variance to be able to apply an IPv4 access control list (ACL)

No response

125 **Switches must support be able to apply an IPv6 access control list (ACL)**

Proposed switches must be able to apply an IPv6 access control list (ACL) in hardware to both inbound and outbound traffic for all routed and non-routed interfaces and VLANs (including loopbacks).

Accept

126 **Variance to be able to apply an IPv6 access control list (ACL)**

Variance to be able to apply an IPv6 access control list (ACL)

No response

127 **Switches must support a method of DHCP snooping for IPv4 and IPv6**

Proposed switches must support a method of DHCP snooping for IPv4 and IPv6, where ports not identified as trusted will not accept DHCP-OFFERs from clients.

Accept

128 **Variance to support a method of DHCP snooping for IPv4 and IPv6**

Variance to support a method of DHCP snooping for IPv4 and IPv6, where ports not identified as trusted will not accept DHCP-OFFERs from clients.

No response

129 **Switches must support an IPv6 RA guard feature**

Proposed switches must support an IPv6 RA guard feature to prevent clients connected to untrusted ports from originating IPv6 router-advertisements.

Accept

130 **Variance to support an IPv6 RA guard feature**

Variance to support an IPv6 RA guard feature to prevent clients connected to untrusted ports from originating IPv6 router-advertisements.

No response

131 **Switches must support the concept of a private VLAN**

Proposed switches must support the concept of a private VLAN, where all clients in the broadcast domain can learn the MAC address of the gateway but are not able to discover other hosts on the same VLAN/broadcast domain.

Accept

132 **Variance to support the concept of a private VLAN**

Variance to support the concept of a private VLAN, where all clients in the broadcast domain can learn the MAC address of the gateway but are not able to discover other hosts on the same VLAN/broadcast domain.

No response

133	**Following attributes pertain to Mangement**
134	**Switches must support SNMPv2c and SNMPv3** Proposed switches must support SNMPv2c and SNMPv3. Accept
135	**Variance to support SNMPv2c and SNMPv3** Variance to support SNMPv2c and SNMPv3. *No response*
136	**Switches must support remote access** Proposed switches must support remote access to the command line interface (CLI) via SSHv2. Accept
137	**Variance to support remote access** Variance to support remote access to the command line interface (CLI) via SSHv2. *No response*
138	**Switches must support restricting access to SSH** Proposed switches must support restricting access to SSH by an ACL or equivalent protection. Accept
139	**Variance to support restricting access to SSH** Variance to support restricting access to SSH by an ACL or equivalent protection. *No response*
140	**Switches must support access to the CLI** Proposed switches must support access to the CLI via a serial console port, or some other method to communicate via direct physical connection. Accept
141	**Variance to support access to the CLI** Variance to support access to the CLI via a serial console port, or some other method to communicate via direct phy sical connection. *No response*
142	**Switches must support RADIUS authentication for SSH** Proposed switches must support RADIUS authentication for SSH and serial console users. Accept
143	**Variance to support RADIUS authentication for SSH** Variance to support RADIUS authentication for SSH and serial console users. *No response*

144 **Switches must support failover**

Proposed switches must support failover to a user account locally defined on the device, if the RADIUS server is unreachable.

Accept

145 **Variance to support failover**

Variance to support failover to a user account locally defined on the device, if the RADIUS server is unreachable.

No response

146 **Switches must support encryption of the RADIUS**

Proposed switches must support encryption of the RADIUS shared secret stored in the configuration file.

Accept

147 **Variance to support encryption of the RADIUS**

Variance to support encryption of the RADIUS shared secret stored in the configuration file.

No response

148 **Switches must support encryption of local user passwords**

Proposed switches must support encryption of local user passwords stored in the configuration file.

Accept

149 **Variance to support encryption of local user passwords**

Variance to support encryption of local user passwords stored in the configuration file.

No response

150 **Switches must be able to represent its configuration**

Proposed switches must be able to represent its configuration (such as a text file) that can be uploaded to restore a configuration.

Accept

151 **Variance to be able to represent its configuration**

Variance to be able to represent its configuration (such as a text file) that can be uploaded to restore a configuration

No response

152 **Switches must support logging to a syslog server**

Proposed switches must support logging to a syslog server on a configurable port other than default syslog (udp/514).

Accept

153 **Variance to support logging to a syslog server**

Variance to support logging to a syslog server on a configurable port other than default syslog (udp/514).

No response

154 **Switches must preferably support NTP**

Proposed switches must preferably support NTP as described in RFC 5905, or at minimum, SNTP as described by RFC 4330.

Accept

155	**Variance to preferably support NTP** Variance to preferably support NTP as described in RFC 5905, or at minimum, SNTP as described by RFC 4330. *No response*
156	**Switches must support IEEE 802.1ab Link-Layer Discovery Protocol (LLDP).** Proposed switches must support IEEE 802.1ab Link-Layer Discovery Protocol (LLDP). Accept
157	**Variance to support IEEE 802.1ab Link-Layer Discovery Protocol (LLDP).** Variance to support IEEE 802.1ab Link-Layer Discovery Protocol (LLDP). *No response*
158	**Switches must support some form of traffic limiting/policing** Proposed switches must support some form of traffic limiting/policing or storm-control per port. Accept
159	**Variance to support some form of traffic limiting/policing** Variance to support some form of traffic limiting/policing or storm-control per port. *No response*
160	**Switches must support secure encrypted file transfer** Proposed switches must support secure encrypted file transfer for uploading/downloading code or configuration files. Accept
161	**Variance to support secure encrypted file transfer** Variance to support secure encrypted file transfer for uploading/downloading code or configuration files. *No response*
162	**Switches must support naming of individual interfaces** Proposed switches must support naming of individual interfaces within the configuration and this information must be retrievable via CLI "show" commands and SNMP. Accept
163	**Variance to support naming of individual interfaces** Variance to support naming of individual interfaces within the configuration and this information must be retrievable via CLI "show" commands and SNMP. *No response*
164	**Following attributes pertain to Physical & Power Characteristics**
165	**Switches must support an option for multi-rate ports supporting speeds greater than 1Gbps** Proposed switches must support an option for multi-rate ports (802.3bz/NBase-T and 10GBASE-T) supporting speeds greater than 1Gbps. Accept

166

Variance to support an option for multi-rate ports supporting speeds greater than 1Gbps

Variance to support an option for multi-rate ports (802.3bz/NBase-T and 10GBASE-T) supporting speeds greater th an 1Gbps.

No response

167

Switches must be mountable

Proposed switches must be mountable in both a standard two-rail 19" communication rack (preferred) and a standa rd 19" four-post server rack.

Accept

168

Variance to be mountable

Variance to be mountable in both a standard two-rail 19" communication rack (preferred) and a standard 19" four-p ost server rack.

No response

169

Switches must support 120 and 208 VAC

Proposed switches must support 120 and 208 VAC capable power supplies.

Accept

170

Variance to support 120 and 208 VAC

Variance to support 120 and 208 VAC capable power supplies.

No response

171

Switches must contain N+1 power redundancy

Proposed switches must contain N+1 power redundancy, such that if any individual power supply were to fail or lose power, the switch would continue to function without any impairment. For example, if a switch requires three power s upplies to function, the switch must support four power supplies such that any individual power supply could fail and the switch would continue to function without impairment, to include the delivery of PoE/PoE+ power.

Accept

172

Variance for switch to contain N+1 power redundancy

Variance for switches must contain N+1 power redundancy, such that if any individual power supply were to fail or lo se power, the switch would continue to function without any impairment.

No response

173

Switches must have hot swappable power

Proposed switches must have hot swappable power supplies.

Accept

174

Variance to have hot swappable power supplies

Variance to have hot swappable power supplies.

No response

175

Fans are individually replaceable, all switches must have N+1 redundant fan trays

If fans are individually replaceable, all switches must have N+1 redundant fan trays, or fans, such that any individua l fan tray can fail without impairing the switch's function or requiring the switch to shut down.

Accept

176	**Variance to fans are individually replaceable** Variance to fans are individually replaceable, all switches must have N+1 redundant fan trays, or fans, such that any individual fan tray can fail without impairing the switch's function or requiring the switch to shut d *No response*
177	**Switches must support both 802.3af (PoE) and 802.3at (PoE+)** Proposed switches must support both 802.3af (PoE) and 802.3at (PoE+) power. Accept
178	**Variance to support both 802.3af (PoE) and 802.3at (PoE+)** Variance to switches must support both 802.3af (PoE) and 802.3at (PoE+) power. *No response*
179	**Switches must support hot swapping of line cards** Proposed switches must support hot swapping of line cards, without adversely affecting other cards in operation. Accept
180	**Variance to support hot swapping of line cards** Variance to switches support hot swapping of line cards, without adversely affecting other cards in operation. *No response*
181	**Stackable switches, a switch stack must allow for the failure of any one switch** For stackable switches, a switch stack must allow for the failure of any one switch, without disabling the stack or deg rading the operation of the remaining stack members. Accept
182	**Variance to stackable switches failure** Variance to stackable switches, a switch stack must allow for the failure of any one switch, without disabling the stac k or degrading the operation of the remaining stack members. *No response*
183	**Stackable switches, any switch in a stack must be replaceable** For stackable switches, any switch in a stack must be replaceable without disabling the stack nor degrading the ope ration of the remaining stack members. Accept
184	**Variance to stackable switches replacement** Variance to stackable switches, any switch in a stack must be replaceable without disabling the stack nor degrading the operation of the remaining stack member *No response*
185	**Strongly Desired Features – Switching** The following list of features are highly desirable in a proposed solution. Please simply affirm or deny that your pro posed solution meets the following requirements by notating each item with "**accept**", "**deny**", or "**variance**." Pleas e explain any variances in your product. The Bidder cannot answer "accept" if the feature is not currently available in the proposed hardware running current general availability (production) release software. If a feature is not in pr oduction software at the time of the RFP submission, the Bidder must choose "deny" or "variance." If a feature not i n production software is described under a "variance," it must be noted the feature is not currently available.

186	**The following attributes pertain to Layer 2/3 protocols and functions**
187	**Switches should support concurrent use of VLANs 1-4096** Proposed switches should support concurrent use of VLANs 1-4096. Accept
188	**Variance to switches support concurrent use of VLANs 1-4096** Variance to switches should support concurrent use of VLANs 1-4096. *No response*
189	**Switches should support hardware forwarding** Proposed switches should support hardware forwarding for a minimum of 60,000 hosts (MAC table entries) via layer 2 bridging functions, please indicate the maximum. Variance
190	**Variance to switches should support hardware forwarding** Variance to switches should support hardware forwarding. Catalyst 9200 and 9300 switches support up to 32K MAC entries. Catalyst 9400 supports up to 64K MAC entries. Catalyst 9500 switches support up to 64K MAC entries. Catalyst 9600 switches support up to 64K and 82K MAC a ddresses (depending on I/O Module)
191	**Switches should support minimum of 4,096 hosts** Proposed switches should support a minimum of 4,096 hosts, or MAC entries, in a single layer 2 VLAN**.** Accept
192	**Variance to switches should support a minimum of 4,096 hosts** Variance to switches should support a minimum of 4,096 hosts, or MAC entries, in a single layer 2 VLAN. *No response*
193	**Switches should support support broadcast storm control** Proposed switches should support broadcast storm control and multicast storm control for all ports operating as L2-only bridging ports. Accept
194	**Variance to switches should support broadcast storm control** Variance to switches should support broadcast storm control and multicast storm control for all ports operating as L 2-only bridging ports. *No response*
195	**Switches should support IPv4 static ARP entries** Proposed switches should support IPv4 static ARP entries. Accept
196	**Variance to switches should support IPv4 static ARP entries** Variance to switches should support IPv4 static ARP entries. *No response*

197	**Switches should support IPv6 static neighbor-table entries** Proposed switches should support IPv6 static neighbor-table entries. Accept
198	**Variance to switches should support IPv6 static neighbor-table entries** Variance to switches should support IPv6 static neighbor-table entries. *No response*
199	**The following attributes pertain to Security**
200	**Switches should support a client redirect to a third-party captive portal** Proposed switches should support a client redirect to a third-party captive portal for authentication; i.e. a captive-portal hosted on a NAC platform for web-based authentication or acceptable-use acceptance by guests. Accept
201	**Variance to switches should support a client redirect to a third-party captive portal** Variance to switches should support a client redirect to a third-party captive portal for authentication; i.e. a captive-portal hosted on a NAC platform for web-based authentication or acceptable-use acceptance by guests. *No response*
202	**Switches should support a minimum of two traffic-mirroring sessions** Proposed switches should support a minimum of two traffic-mirroring sessions. Accept
203	**Variance to switches should support a minimum of two traffic-mirroring sessions** Variance to switches should support a minimum of two traffic-mirroring sessions. *No response*
204	**The following attributes pertain to Management**
205	**Switches should support an out-of-band management port** Proposed switches should support an out-of-band management port. Accept
206	**Variance to switches should an out-of-band management port** Variance to switches support an out-of-band management port. *No response*
207	**Switches should should run the same operating system** Proposed switches should run the same operating system. Accept
208	**Variance to switches should run the same operating system** Variance to switches should run the same operating system. *No response*

209

Switches should support restricting SNMP access

Proposed switches should support restricting SNMP access by an access control list or equivalent protection.

Accept

210

Variance to switches support restricting SNMP access

Variance to switches support restricting SNMP access by an access control list or equivalent protection.

No response

211

Switches should support restricting SNMP access

Proposed switches should represent the following information as objects that can be queried via SNMP:
Status of physical devices (chassis, fan trays, power supplies, line cards, and etc.).
Status of resources (CPU, memory, and etc.).
Status and statistics of internal processes.
Status of physical interfaces, sub-interfaces, and physical and virtual interfaces.
Traffic and error counters for physical interfaces, sub-interfaces, and physical and virtual interfaces

Accept

212

Variance to switches represent the information as objects that can be queried via SNMP

Variance to switches support represent the information as objects that can be queried via SNMP

No response

213

Switches should represent the following information as objects that can be queried via SNMP

Proposed switches should represent the following information as objects that can be queried via SNMP.
Transmit and receive light levels on optical transceivers.
Serial number and slot position of every field replaceable part.

Accept

214

Variance to switches represent the information as objects that can be queried via SNMP

Variance to switches support represent the following information as objects that can be queried via SNMP

No response

215

Switches should support SNMP traps identifying MAC address changes on a switch port

Proposed switches should support SNMP traps identifying MAC address changes on a switch port.

Accept

216

Variance to switches support SNMP traps identifying MAC address changes on a switch port

Variance to switches support SNMP traps identifying MAC address changes on a switch port.

No response

217

Switches should report via the CLI per-interface

Proposed switches should report via the CLI per-interface and/or per-VLAN traffic counters for L2-only interfaces.

Accept

218

Variance to switches should report via the CLI per-interface

Variance to switches should report via the CLI per-interface and/or per-VLAN traffic counters for L2-only interfaces.

No response

219 **Switches should support manual assignment of syslog facilities local0 - local7.**

Proposed switches should support manual assignment of syslog facilities local0 - local7.

Accept

220 **Variance to switches should support manual assignment of syslog facilities local0 - local7.**

Variance to switches should support manual assignment of syslog facilities local0 - local7.

No response

221 **Switches should support syslog over TCP.**

Proposed switches should support syslog over TCP.

Accept

222 **Variance to switches should support syslog over TCP.**

Variance to switches should support syslog over TCP.

No response

223 **Switches optical transceivers should report transmit and receive light levels**

Proposed all optical transceivers should report transmit and receive light levels.

Accept

224 **Variance to optical transceivers**

Variance to optical transceivers should report transmit and receive light levels.

No response

225 **Switches switches should support high frequency updates**

Proposed switches should support high frequency updates for interface counters (1-5 seconds preferred).

Accept

226 **Variance to switches should support high frequency updates**

Variance to switches should support high frequency updates for interface counters (1-5 seconds preferred).

No response

227 **Switches switches should support programmatic management**

Proposed switches should support programmatic management using one or more API protocols such as NETCONF or REST for example. Please specify, support of these, or other, protocols and/or provide user documentation.

Accept

228 **Variance to switches should programmatic management**

Variance to switches should support programmatic management using one or more API protocols such as NETCONF or REST for example.

No response

229 **Switches switches should support CLI reporting**

Proposed switches should support CLI reporting of the serial number and slot position of every field replaceable part.

Accept

230

Variance to switches should support CLI reporting

Variance to switches should support CLI reporting of the serial number and slot position of every field replaceable part.

No response

231

Switches switches should log usernames of authorized users

Proposed switches should log usernames of authorized users to the syslog server at the time of login.

Accept

232

Variance to switches should log usernames of authorized users

Variance to switches should log usernames of authorized users to the syslog server at the time of login.

No response

233

Switches switches log the username

Proposed switches should log the username associated with configuration changes to the syslog server at the time changes are committed.

Accept

234

Variance to switches should log the username

Variance tp switches should log the username associated with configuration changes to the syslog server at the time changes are committed.

No response

235

Switches switches support in-service software upgrade (ISSU)

Proposed switches should support in-service software upgrade (ISSU).

Accept

236

Variance to switches should support in-service software upgrade (ISSU)

Variance to switches should support in-service software upgrade (ISSU).

No response

237

Switches switches support third-party optics and transceivers

Proposed switches should support third-party optics and transceivers.

Variance

238

Variance to switches should support third-party optics and transceivers

Variance to switches should support third-party optics and transceivers.

Third-party optics will function in the Catalyst 9000 switches, but will not be supported under maintenance contracts.

239

Switches switches should support configuration management

Proposed switches should support configuration management that includes the ability to archive, rollback and delta with running configurations on the switches themselves.

Accept

240

Variance to switches should support configuration management

Variance to switches should support configuration management.

No response

241 **Switches switches support control plane protection**

Proposed switches should support control plane protection. Traffic forwarding, switch adjacencies, and CLI management of the device over the serial console and out-of-band management ports should continue to function with high volumes of traffic. This includes, but is not limited to ARP storms, broadcast storms, DHCP relay forwarding, and handling traffic with IP options set.

Accept

242 **Variance to switches should support control plane protection**

Variance to switches should support control plane protection.

No response

243 **Switches switches support assigning role based administrative access**

Proposed switches should support assigning role based administrative access by using a returned RADIUS attribute such that the switches restrict the execution of CLI commands based on the returned role code.

Accept

244 **Variance to switches should support assigning role based administrative access**

Variance to switches should support assigning role based administrative access.

No response

245 **Switches switches support zero-touch-provisioning**

Proposed switches should support some form of zero-touch-provisioning.

Accept

246 **Variance to switches should support zero-touch-provisioning**

Variance to switches should support some form of zero-touch-provisioning.

No response

247 **The following attributes pertain to Hardware – Fixed and Modular chassis**

248 **Switches switches support N+1 redundant supervisors or management modules**

Proposed switches should support N+1 redundant supervisors or management modules.

Accept

249 **Variance to switches support N+1 redundant supervisors or management modules**

Variance to switches should support N+1 redundant supervisors or management modules.

No response

250 **Switches that contain N+1 supervisor modules**

Proposed switches that contain N+1 supervisor modules should support hot swapping the non-active supervisor (i.e., supervisor removal without powering down the chassis) without degrading the function of the device.

Accept

251 **Variance to switches that contain N+1 supervisor modules**

Variance to switches that contain N+1 supervisor modules

No response

252 **Hardware supporting N+1 supervisor/management modules**

Hardware supporting N+1 supervisor/management modules, switches should support "non-stop" forwarding followin g the failure of the primary supervisor when a redundant supervisor is installed. Failure of the primary supervisor sh ould not result in interruption of service, which includes traffic forwarding and maintaining routing information such t hat no re-convergence is required by running routing protocols.

Accept

253 **Variance to hardware supporting N+1 supervisor/management modules**

Variance to hardware supporting N+1 supervisor/management modules.

No response

254 **Modular switches should support individual upgrades of supervisor cards**

All modular switches should support individual upgrades of supervisor cards so that data forwarding is not affected by the upgrade process. In-service-software-upgrade is also acceptable.

Accept

255 **Variance to modular switches should support individual upgrades of supervisor cards**

Variance to modular switches should support individual upgrades of supervisor cards.

No response

256 **The following attributes pertain to Physical & Power Characteristics**

257 **Switches should should support 802.3bt PoE type 3 or 802.3bt PoE type 4 power**

Proposed switches should support 802.3bt PoE type 3 or 802.3bt PoE type 4 power.

Accept

258 **Variance to switches should support 802.3bt PoE type 3 or 802.3bt PoE type 4 power**

Variance to switches should support 802.3bt PoE type 3 or 802.3bt PoE type 4 power.

No response

259 **The following attributes pertain to Questions and Clarifications – Switching**

Bidder must answer the following set of questions designed to help identify basic metrics, scaling issues, and suitabi lity. If more than one type of switch is proposed, the values for each type must be specified.

260 **Layer 2/3 VXLAN features**

If supported, are VXLAN features and forwarding supported in hardware or software?

The Catalyst 9000 switch supports VXLAN in hardware.

261 **Layer 2/3 VXLAN forwarding**

If supported, does the VXLAN forwarding implementation use unicast, multicast or both/other?

The Catalyst 9000, as part of an SD-Access Fabric that is a Locator/ID Separation Protocol (LISP)-Based control p lane with VXLAN encapsulation in the data plane, supports Multicast and Unicast Traffic.

262 **Layer 2/3 support VRF functionality**

Does the proposed switching hardware support VRF functionality?

The Catalyst 9000 Series Switches support VRF instances.

263

Layer 2/3 indicate maximum supported IPv4 multicast IGMP groups

Indicate the maximum supported IPv4 multicast IGMP groups.

The Catalyst 9200 Series Switches supports up to 1,000 Multicast Groups.
The Catalyst 9300 Series Switches supports up to 8,000 Multicast Groups.
The Catalyst 9400 Series Switches supports up to 16,000 Multicast Groups.
The Catalyst 9500 Series Switches supports up to 16,000 Multicast Groups.

264

Layer 2/3 indicate maximum supported IPv6 multicast MLD groups

Indicate the maximum supported IPv6 multicast MLD groups.

The Catalyst 9400 Series Switches support the following Multicast Request for Comment (RFC) standards:
- RFC 2710 Multicast Listener Discovery (MLD) for IPv6
- RFC 3590 Source Address Selection for the MLD Protocol
- RFC 3810 MLD Version 2 (MLDv2) for IPv6
- RFC 4601 Protocol Independent Multicast-Sparse Mode (PIM-SM): Protocol Specification
- RFC 4610 Anycast-RP Using Protocol Independent Multicast (PIM)
- RFC 6085 Address Mapping of IPv6 Multicast Packets on Ethernet
- RFC 5059 Bootstrap Router (BSR) Mechanism for Protocol Independent Multicast (PIM)
- RFC 4604 Using Internet Group Management Protocol (IGMP) Version 3 (IGMPv3) and MLDv2 for Source-Specific Multicast
- RFC 4601 Protocol Independent Multicast-Sparse Mode (PIM-SM): Protocol Specification (Revised)
- RFC 3973 Protocol Independent Multicast-Dense Mode (PIM-DM): Protocol Specification (Revised)
- RFC 3956 Embedding the Rendezvous Point (RP) Address in an IPv6 Multicast Address
- RFC 3810 MLDv2 for IPv6.

265

Layer 2/3 indicate the Ethernet forwarding modes

Indicate the Ethernet forwarding modes available and which is default.

The Catalyst 9000 supports store-and-forward in hardware switching.

266

Layer 2/3 indicate if the support is for the entire VLAN

If private VLANs are supported, please indicate if the support is for the entire VLAN or can be configured per-port?

The Cisco Catalyst 9000 switch supports Private VLAN. Each port can be configured in the primary, community, or isolated VLAN.

267

Layer 2/3 briefly describe layer 3 functions

Briefly describe any layer 3 functions and protocols supported by the proposed solution.

The Cisco Catalyst 9000 Series Switches support Open Shortest Path First (OSPF), Routing Information Protocol (RIP), Enhanced Interior Gateway Routing Protocol (EIGRP), Intermediate System to Intermediate System (IS-IS) and Border Gateway Protocol (BGP).

268

Layer 2/3 if routing is supported maximum number of unicast routes supported

If routing is supported, specify the maximum number of unicast routes supported.

The Catalyst 9400 Series Switches, with Supervisor Engine installed, support up to 112,000 IPv4 routes.
The Catalyst 9300 Series Switches support up to 32,000 IPv4 routes.
The Catalyst 9200 Series Switches support up to 14,000 IPv4 routes.
The Catalyst 9500 Series Switches, with Supervisor Engine installed, support up to 212,000 IPv4 routes.
The Catalyst 9600 Series Switches, with Supervisor Engine installed, support up to 212,000 IPv4 routes.

269

Layer 2/3 if routing is supported maximum number of multicast routes supported

If routing is supported, specify the maximum number of multicast routes supported.

The Catalyst 9400 Series Switches, with Supervisor Engine installed, support up to 16,000 Multicast routes.
The Catalyst 9300 Series Switches support up to 8,000 Multicast routes.
The Catalyst 9500 Series Switches support up to 32,000 Multicast routes.
The Catalyst 9600 Series Switches, with Supervisor Engine installed, support up to 32,000 Multicast routes.
The Catalyst 9200 Series Switches support up to 1,000 Multicast routes.

270

Layer 2/3 explain the ARP protection mechanism

Explain the ARP protection mechanism, and whether it operates in L2 and/or L3. If ARP protection is available in L2 mode, briefly indicate the operation and requirements (i.e. DHCP snooping, manual IP to MAC assignments, and etc .).

The Cisco Catalyst 9000 switch supports Dynamic Address Resolution Protocol (ARP) Inspection (DAI).
DAI uses the binding information that is built by DHCP snooping to enforce the advertisement of bindings to prevent man-in-the-middle attacks. These attacks can occur when an attacker intercepts and selectively modifies communicated data to masquerade as one or more of the entries in a communication association. DAI adds an extra layer of security to ARP inspection by verifying that the ARP packet's MAC address and IP address match an existing DHCP snooping binding in the same VLAN. The basic functionality and packet flow of ARP inspection remains unchanged except for the addition of checks to ensure that a DHCP binding exists.

271

Layer 2/3 proposed switches support a non-spanning-tree loop protection mechanism

If the proposed switches support a non-spanning-tree loop protection mechanism, does that mechanism function in tandem with MAC-based VLAN assignment and multiple authenticated users on a single switch port?

The Catalyst 9000 supports Spanning-Tree Loop protection mechanisms.

272

Layer 2/3 behavior of spanning-tree

What is the behavior of spanning-tree when an 802.1x authenticated port has multiple authenticated users on a downstream unmanaged switch and each of those users are in a different VLAN (MAC-based VLAN assignment)?

The Catalyst 9000 supports BPDU Filter/Guard and Portfast to allow for connection to the hub without causing spanning tree instability. Also see the documentation on the operation of IEEE 802.1x Multi-auth Per User VLAN assignment.

273

Layer 2/3 proposed solution allows for tunneling of wired user traffic

If the proposed solution allows for tunneling of wired user traffic, please briefly detail this feature and any requirements.

Our solution does not require use of tunnels.

274

The following attributes pertain to Hardware and Architecture

275

Hardware and architecture control plane protection

Briefly describe the hardware architecture of each proposed switching solution, including a description of control plane mechanisms, port/ASIC grouping, and client traffic forwarding. Please also include any relevant documents explaining the architecture that can be shared for review.

The Catalyst 9000 switch platform supports control plane policing.
Hardware architecture and packet walk-through of all Catalyst models can be found here:
Reference: https://www.ciscolive.com/c/dam/r/ciscolive/emea/docs/2019/pdf/BRKARC-3863.pdf
Reference: https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/BRKARC-3010.pdf

276

Hardware and architecture TCAM size

Describe in detail the control plane protection mechanisms available in each proposed device, especially those related to multicast or broadcast traffic.

The Catalyst 9000 switch platform supports control plane policing.

277

Hardware and architecture size of the port buffers

Specify the TCAM size.

The Catalyst 9400 uses UADP 2.0 ASICs as well as Static Random-Access Memory (SRAM) for storage. The UADP 2.0 ASICs have 54K Ternary Content-Addressable Memory (TCAM) per ASIC and current supervisors for the C9400 have three ASICs onboard. The Catalyst 9400 with Supervisor 1XL also supports flexible tables so that available TCAM/SRAM may be reconfigured to support the specific use case of the customer.

278

Port buffers

Specify the size of the port buffers and whether they are shared or per-port.

The Cisco Catalyst 9400 Series Switches support 96 MB of packet buffer.
The Cisco Catalyst 9600 Series Switches support up to 108 MB of packet buffer.
The Catalyst 9300 Series Switches have 16 MB buffer for 24- or 48-port Gigabit Ethernet models, and 32 MB buffer for 24 and 48-port Multigigabit. Sharing is within the ASIC.
The Catalyst 9500 Series Switches have up to 128MB Buffer with 36 MB of unified buffer per ASIC.
The Catalyst 9200 Series Switches have 6 MB buffer for 24- or 48-port Gigabit Ethernet models. Sharing is within the ASIC.

279

Traffic queues

Specify the traffic queues per port and their size.

Merrimack

280

Memory Layout

Specify the overall memory layout of the switch.

The Catalyst 9300 switch has 8GB memory, and 16 GB of flash and external Universal Serial Bus (USB) 3.0 SSD pluggable storage slot (delivering 120GB of storage with an option SSD drive) to host containers.
The Catalyst 9400 C9400-SUP-1 Supervisor has 16GB memory and 10GB of flash memory with up to 960 GB of SATA SSD local storage for container-based application hosting.
The Catalyst 9500 switch has 16GB memory and 16GB of flash memory.
The Catalyst 9300 switch has 4GB memory, and 4 GB of flash.
The Catalyst 9400 C9400-SUP-1 Supervisor has 16GB memory and 16GB of flash memory with up to 960 GB of SATA SSD local storage for container-based application hosting.

281

Maximum MAC addresses supported

Specify the maximum number of MAC addresses supported.

The Catalyst 9400 Series Switches, with Supervisor Engine installed, support up to 64,000 MAC Addresses.
The Catalyst 9300 Series Switches support up to 32,000 MAC Addresses.
The Catalyst 9500 Series Switches support up to 82,000 MAC Addresses.
The Catalyst 9200 Series Switches support up to 32,000 MAC Addresses.
The Catalyst 9600 Series Switches with Supervisor Engine installed, support up to 82,000 MAC Addresses.

282

Per-port MAC address limitations

Specify any per-port MAC address limitations.

The Catalyst 9000 has no per port MAC address restrictions.

283

Non-hardware traffic forwarding

Specify all known conditions that result in non-hardware traffic forwarding.

All traffic, whether Layer 2, Layer 3, or multicast, is hardware switched, but some of the lookups for a few features l ike ETA and Application Visibility and Control (AVC) are done in software.

284

Maximum ethernet frame size

Specify the maximum Ethernet frame size supported. If it is not consistent across all interface types, specify the maxi mum frame size per interface type.

The Catalyst 9000 switches all support consistent Jumbo frame sizes across all platforms.

285

Per-slot maximum bandwidth

For any proposed modular switches, specify the per-slot maximum and available bandwidth.

The Cisco Catalyst 9400 Series Switch line cards have 48 ports maximum (1G). The chassis has a passive backpl ane that will support up to 480G per slot for future growth. The proposed SUP-1 provides 720G total bandwidth wit h 80 Gpbs per slot.

The 9600 chassis has a passive backplane that will support up to 6.4Tb per slot for future growth. The proposed S UP-1 provides 9.6Tb total bandwidth with 2.4Tb Gpbs per slot.

286

Backplane bandwidth capacity

For any proposed switches, describe the switch maximum and available backplane or switch fabric bandwidth capaci ty.

The Cisco Catalyst 9400 Series Switch modular chassis has a passive backplane that provides future proofing by supporting bandwidth up to 480G per slot for future growth.
The Cisco Catalyst 9400 Series Switch modular chassis has a passive backplane that provides future proofing by supporting bandwidth up to 6.4Tb per slot for future growth.

287

Limitations to utilizing full bandwidth

Describe any limitations to utilizing the full bandwidth per-slot or along the backplane, are there limitations introduce d by management or switching cards, or other components?

Cisco Catalyst 9400 has a maximum bandwidth scalability per line-card slot up to 480 Gbps on all slots. With curre ntly available line cards, that is 80 Gbps per line-card slot when used with C9400-SUP-1 and 120 Gbps per line-ca rd slot when used with C9400-SUP-1XL. Depending on the card and supervisor used, there could be oversubscript ion, in some cases 3:1 or 2:1, 3.3:1 or 2.2:1. The supervisor itself has two nonblocking 40 Gigabit Ethernet uplinks .

288

Forwarding architecture

In a chassis-based switch, is bandwidth distributed across the backplane or centralized through a switching or mana gement card?

Cisco Catalyst 9400 Series is a centralized architecture that is designed to provide dedicated wire-speed bandwidt h to each line card slot within the chassis. Each line card has a dedicated bandwidth to the supervisor engine for p acket processing. All network data that flows into the Cisco Catalyst 9400 Series through the various line cards go es through the supervisor engine for processing, even in single-slot port-to-port communications.

289

Oversubscription rate

For any proposed modular switches, specify the oversubscription rate, if any, for all line cards and/or port groups in the proposed switching platform(s).

Cisco Catalyst 9400 chassis has the following oversubscription ratios based on supervisor and line cards used:
Line card: Multigigabit line card with C9400-SUP-1: 3.3:1
Line card: UPOE 48p line card with C9400-SUP-1: 1:1
Line card: PoE+ 48p 1G line card with C9400-SUP-1: 1:1Line card: Data 48p 1G line card with C9400-SUP-1: 1:1
Line card: SFP+ 24p line card with C9400-SUP-1: 3:1
Line card: Data SFP 48p line card with C9400-SUP-1: 1:1
Line card: Data SFP 24p line card with C9400-SUP-1: 1:1.

290

ASIC Arrangement

Describe the ASIC arrangement for each proposed line card or switch chassis type.

Catalyst 9300:
- 24 Port 9300 - 1 Application-Specific Integrated Circuit (ASIC)/2 Cores
- 48 Port 9300 - 1 ASIC/2 Cores
- 24 Port mGig 9300 - 2 ASIC/4 Cores
- 48 Port mGig 9300 - 2 ASIC/4 Cores.

Catalyst 9400-SUP-1:
- Unified Access Data Plane (UADP) 3 2.0XL ASIC/4 Cores
- UADP #1 7-Slot
- Slot 2 and 7
- UADP #1 10-Slot
- Slot 1, 9, and 10
- UADP #2 7-Slot
- Slot 1 and 5
- UADP #2 10-Slot
- Slot 2, 3 and 4
- UADP #3 7-Slot
- Slot 6 and Uplinks
- UADP #3 10-Slot
- Slot 7, 8, and Uplinks.

Catalyst 9500:
- 2 ASIC/4 Cores.

Catalyst 9200 Series non-mgig switches use one UADP 2.0 mini, whereas the mGig models have two.

291

ASIC Description

Describe the ASIC/processor used for traffic forwarding.

Response requires more characters than available. Please see complete answer on “Attributes with Expanded Answers” doc.

292

Software feature licensing

Indicate whether all software features are enabled by default on the proposed switches or if additional licenses would be needed for activation. Please indicate available licenses and reference costs.

Cisco Catalyst 9000 has two license levels, Network Essentials and Network Advantage, in addition to three subscription levels associated with these licenses (DNA Essentials and DNA Advantage, and Cisco ONE Advantage). Cisco ONE Advantage is the highest level that provides you with access to all the features this platform can offer.
There are no additional feature-based licenses (for example, to enable Multiprotocol Label Switching (MPLS) on top of Advantage feature set) on Cisco Catalyst C9400 switches.

293

Port licensing

Indicate whether all ports are enabled by default on the proposed switches or if additional licenses would be needed for activation. Please indicate available licenses and reference costs.

There are no additional licenses needed to enable ports on Cisco Catalyst 9000 switches.

294 **NBase-T bandwidth options in stackable switches**

For those switches or cards that support NBase-T/802.3bz service, please indicate the supported bandwidth option s (i.e. 10M, 100M, 1G, 2.5G, 5G, and 10G).

Cisco Catalyst 9000 Series supports MultiGigabit Ethernet ports with speeds of 100/1000 Mbps, 2.5/5 Gbps, and 10GBASE-T on the Multigigabit ports.

295 **NBase-T bandwidth options in chassis or modular switches**

For those switches supporting NBase-T/802.3bz, how many ports per fixed chassis, or for modular chassis, per line-card, support 1, 2.5, 5, and 10G?

Catalyst C9300 (C9300-48UXM-A)
48 Multigigabit Ethernet Ports (36 X 2.5G + 12 X 10G).
Catalyst 9400
Cisco Catalyst 9400 Series 48Port UPOE w/24p mGig 24p RJ-45 (C9400-LC-48UX)
24x 10/100/1000 + 24x 100/1G/2.5G/5G/10G.

296 **NBase-T and POE support**

For those switches or cards that support NBase-T/802.3bz service, are the ports able to support PoE/PoE+/PoE Type 3/PoE Type 4?

Yes

297 **NBase-T standards**

For any ports that > 1Gbs and < 10Gbs, please list the supported standard (i.e. NBase-T or 802.3bz).

Cisco Catalyst 9000 supports IEEE 802.3bz Multigigabit Ethernet standard on the Multigigabit ports.

298 **Supervisor or management card redundancy**

If proposed modular switches support modular supervisor cards, are N+1 supervisor-cards supported for redundancy?

Cisco Catalyst C9400 supports N+1 supervisor engine redundancy.

299

Control plane forwarding

Explain all layer2/layer3 protocols that are forwarded to the switch control plane for consideration.

Any packet that is destined to the switch IP address or MAC (and some broadcasts) will be passed to a higher laye r protocol which will engage the CPU.
Such packets include:
Control packets: Control packets are received for STP, Cisco Discovery Protocol (DP), VLAN Trunking Protocol (V TP), Hot Standby Router Protocol (HSRP), Port Aggregation Protocol (PAgP), Link Aggregation Control Protocol (L ACP), and UniDirectional Link Detection (UDLD)
Routing protocol updates: Examples of these protocols are RIP, EIGRP, BGP, and OSPF Protocol
SNMP traffic that is destined to the switch
Telnet and Secure Shell Protocol (SSH) traffic to the switch
ARP responses to ARP requests.
There are also special conditions that can trigger packets to be handles by the CPU. These conditions include, but are not limited to:
Packets with IP options, an expired Time to Live (TTL).
Packets with special handling, such as tunneling.
IP fragmentation.
Packets that require Internet Control Message Protocol (ICMP) messages from the RP.
Maximum Transmission Unit (MTU) check failure.
Packets with IP errors, which include IP checksum and length errors.
If the input packets return a bit error (such as the Single-Bit Error [SBE]), the packets are sent to the CPU for softw are processing and are corrected. The system allocates a buffer for them and uses the CPU resource to correct it.
Packets that fail the Reverse Path Forwarding (RPF) check.
Glean/receive Glean refers to packets that require ARP resolution, and receive refers to packets that fall in the rec eive case.
Hardware resources full conditions. These resources include FIB, Content-Addressable Memory (CAM), and TCA M.

300

Control plane policing

Explain in detail any built-in policers and any other related protection mechanisms for the control plane.

Catalyst 9000 supports Control Plane Policing (CoPP). The CoPP feature improves security on your device by prot ecting the CPU from unnecessary traffic, or Denial of Service (DoS) traffic, and by prioritizing control plane and ma nagement traffic.
Your device is typically segmented into three planes of operation, each with its own objective:
The data plane, to forward data packets
The control plane, to route data correctly
The management plane, to manage network elements.
You can use CoPP to protect most of the CPU-bound traffic and ensure routing stability, reachability, and packet d elivery. Most importantly, you can use CoPP to protect the CPU from a DoS attack.
CoPP uses the Modular QoS Command-line interface (MQC) and CPU queues to achieve these objectives. Differe nt types of control plane traffic are grouped together based on certain criteria, and assigned to a CPU queue. You can manage these CPU queues by configuring dedicated policers in hardware. For example, you can modify the p olicer rate for certain CPU queues (traffic-type), or you can disable the policer for a certain type of traffic.
Although the policers are configured in hardware, CoPP does not affect CPU performance or the performance of t he data plane. But since it limits the number of packets going to CPU, the CPU load is controlled. This means that services waiting for packets from hardware may see a more controlled rate of incoming packets (the rate being us er-configurable).

301

Per-port multicast rate limiting

Can the switch rate limit multicast traffic per port?

Catalyst 9000 switches support Storm Control (or traffic suppression), which monitors packets passing from an interface to the switching bus and determines if the packet is unicast, multicast, or broadcast. The switch counts the number of packets of a specified type received within the 1-second time interval and compares the measurement with a predefined suppression-level threshold.
Storm control uses one of these methods to measure traffic activity:
Bandwidth as a percentage of the total available bandwidth of the port that can be used by the broadcast, multicast, or unicast traffic
Traffic rate in packets per second at which broadcast, multicast, or unicast packets are received
Traffic rate in bits per second at which broadcast, multicast, or unicast packets are received
Traffic rate in packets per second and for small frames. This feature is enabled globally. The threshold for small frames is configured for each interface.
With each method, the port blocks traffic when the rising threshold is reached. The port remains blocked until the traffic rate drops below the falling threshold (if one is specified) and then resumes normal forwarding. If the falling suppression level is not specified, the switch blocks all traffic until the traffic rate drops below the rising suppression level. In general, the higher the level, the less effective the protection against broadcast storms.

302

Per-port broadcast rate limiting

Can the switch rate limit broadcast traffic per port?

Catalyst 9000 switches support Storm Control (or traffic suppression), which monitors packets passing from an interface to the switching bus and determines if the packet is unicast, multicast, or broadcast. The switch counts the number of packets of a specified type received within the 1-second time interval and compares the measurement with a predefined suppression-level threshold.
Storm control uses one of these methods to measure traffic activity:
Bandwidth as a percentage of the total available bandwidth of the port that can be used by the broadcast, multicast, or unicast traffic.
Traffic rate in packets per second at which broadcast, multicast, or unicast packets are received.
Traffic rate in bits per second at which broadcast, multicast, or unicast packets are received.
Traffic rate in packets per second and for small frames. This feature is enabled globally. The threshold for small frames is configured for each interface.
With each method, the port blocks traffic when the rising threshold is reached. The port remains blocked until the traffic rate drops below the falling threshold (if one is specified) and then resumes normal forwarding. If the falling suppression level is not specified, the switch blocks all traffic until the traffic rate drops below the rising suppression level. In general, the higher the level, the less effective the protection against broadcast storms.

303

Per-port unknown-unicast rate limiting

Can the switch rate limit unknown-unicast traffic per port?

Catalyst 9000 switches support Storm Control (or traffic suppression), which monitors packets passing from an interface to the switching bus and determines if the packet is unicast, multicast, or broadcast. The switch counts the number of packets of a specified type received within the 1-second time interval and compares the measurement with a predefined suppression-level threshold.
Storm control uses one of these methods to measure traffic activity:
Bandwidth as a percentage of the total available bandwidth of the port that can be used by the broadcast, multicast, or unicast traffic
Traffic rate in packets per second at which broadcast, multicast, or unicast packets are received
Traffic rate in bits per second at which broadcast, multicast, or unicast packets are received
Traffic rate in packets per second and for small frames. This feature is enabled globally. The threshold for small frames is configured for each interface.
With each method, the port blocks traffic when the rising threshold is reached. The port remains blocked until the traffic rate drops below the falling threshold (if one is specified) and then resumes normal forwarding. If the falling suppression level is not specified, the switch blocks all traffic until the traffic rate drops below the rising suppression level. In general, the higher the level, the less effective the protection against broadcast storms.

304

Storm-control units

Can the storm-control settings be applied as a percentage of bandwidth value per port?

Catalyst 9000 switches support Storm Control (or traffic suppression), and one of the methods it uses is bandwidth as a percentage of the total available bandwidth of the port that can be used by the broadcast, multicast, or unicast traffic.

305

Stack cabling

For any proposed fixed configuration switches, please indicate the type and method of cabling supported to create the stack.

The Cisco Catalyst 9300 Series supports the industry's highest back-panel stacking bandwidth solution (480 Gbps) with StackWise-480. Up to eight switches can be configured in a Stackwise-480, with the special connector at the back of the switch using dedicated stack cables. Stacking cables are available in lengths of 50CM, 1M, and 3M. The Cisco Catalyst 9300 also include StackPower to provide redundancy of power supplies across the stack. The stack members work together as a unified system. Layer 2 and Layer 3 protocols present the entire switch stack as a single entity to the network. The Cisco Catalyst 9200 Series supports a back-panel stacking bandwidth solution (160 Gbps) with StackWise-160.

306

Maximum switches in a stack

For any proposed fixed configuration switches that are stackable, please indicate the maximum number of switches in a stack.

The Catalyst 9200 and 9300 supports up to eight switches in a stack.

307

Stacking bandwidth

For any proposed fixed configuration switches that are stackable, please indicate the cabling method and the bandwidth for the stacking connection.

The Cisco Catalyst 9300 Series is a stackable enterprise switching platform and provides 480 Gbps of StackWise technology. Up to eight switches can be configured in a StackWise-480 with the special connector at the back of the switch using dedicated stack cables. Stacking cables are available in lengths of 50CM, 1M, and 3M. The Cisco Catalyst 9300 also includes StackPower to provide redundancy of power supplies across the stack. The Cisco Catalyst 9500 supports Cisco StackWise Virtual for redundancy and load balancing on the port channel. The Cisco Catalyst 9200 Series provides 160 Gbps of StackWise technology.

308

Stacking master unit and failover

For any proposed configuration requiring stacking (i.e. fixed configuration switches), please indicate if there is a "master" switch and what happens if that switch fails.

All stack members are eligible to be the active switch or the standby switch. If the active switch becomes unavailable, the standby switch becomes the active switch.
An active switch retains its role unless one of these events occurs:
The switch stack is reset
The active switch is removed from the switch stack
The active switch is reset or powered off
The active switch fails.
The switch stack membership is increased by adding powered-on standalone switches or switch stacks.
Note: We recommend assigning the highest priority value to the switch that you prefer to be the active switch. This ensures that the switch is reelected as the active switch if a reelection occurs.
The active switch is elected or reelected based on one of these factors and in the order listed:
The switch that is currently the active switch
The switch with the highest stack member priority value
The switch with the shortest start-up time
The switch with the lowest MAC address.
After election, the new active switch becomes available after a few seconds. In the meantime, the switch stack uses the forwarding tables in memory to minimize network disruption. The physical interfaces on the other available stack members are not affected during a new active switch election and reset.
When the previous active switch becomes available, it does not resume its role as the active switch.

309

MAC learning with MLAG

Please describe the MAC learning between two switches using MLAG, when an LACP with two members, has one m ember terminating on each MLAG member switch.

Cisco Catalyst 9400/9500 series switches support StackWise Virtual, which synchronizes MAC address tables acro ss members. The StackWise Virtual link is clearly a vital part of the StackWise Virtual domain. It provides the signal ing path used for synchronizing the two switch control planes, as well as the data path for any user data traffic nee ding to pass between the two switches. Therefore, the StackWise Virtual link is bundled as an EtherChannel interf ace, allowing for redundant interfaces and higher bandwidth capacity.
The stack member with SSO active in the current role centrally manages all network control and management plan e protocols. The Layer 2 and Layer 3 protocol states are synchronized with the HOT_STANDBY stack member swit ch.

310

MAC learning with Virtual Chassis

Please describe the MAC learning between two switches using stacking/virtual-chassis, when an LACP with two me mbers, has one member terminating on each MLAG member switch.

Cisco Catalyst 9400/9500 switches support StackWise Virtual, which synchronizes MAC address tables across me mbers. The StackWise Virtual link is clearly a vital part of the StackWise Virtual domain. It provides the signaling p ath used for synchronizing the two switch control planes, as well as the data path for any user data traffic needing to pass between the two switches. Therefore, the StackWise Virtual link is bundled as an EtherChannel interface, allowing for redundant interfaces and higher bandwidth capacity.
The stack member with SSO active in the current role centrally manages all network control and management plan e protocols. The Layer 2 and Layer 3 protocol states are synchronized with the HOT_STANDBY stack member swit ch.

311

ARP learning with MLAG

Please describe the ARP learning between two switches using MLAG when an LACP with two members, has one me mber terminating on individual member switches.

Cisco Catalyst 9400/9500 switches support StackWise Virtual, which synchronizes MAC address tables across me mbers. The StackWise Virtual link is clearly a vital part of the StackWise Virtual domain. It provides the signaling p ath used for synchronizing the two

312

ARP learning with Virtual Chassis

Please describe the ARP learning between two switches using stacking/virtual when an LACP with two members, ha s one member terminating on individual member switches.

Cisco Catalyst 9400/9500 switches support StackWise Virtual, which synchronizes MAC address tables across me mbers. The StackWise Virtual link is clearly a vital part of the StackWise Virtual domain. It provides the signaling p ath used for synchronizing the two switch control planes, as well as the data path for any user data traffic needing to pass between the two switches. Therefore, the StackWise Virtual link is bundled as an EtherChannel interface, allowing for redundant interfaces and higher bandwidth capacity.
The stack member with SSO active in the current role centrally manages all network control and management plan e protocols. The Layer 2 and Layer 3 protocol states are synchronized with the HOT_STANDBY stack member swit ch.

313

MLAG Active-Active support

For LACP link members originating on switches using MLAG or stacking/virtual-chassis, are LACP members active-passive or active-active?

Active/Active by default.

314	**LAG packet hashing** Describe the packet hashing method(s) for traffic traversing LACP link-aggregate members, assuming all members are active-active. The Hashing algorithm is configurable on Catalyst 9000 Switches. However, by default we have 2 Tuple Hash (Source/Dest IP), and based on the above hash, the traffic flows will be load-balanced across all the active links of the port-channel.
315	**MLAG packet hashing** Describe the packet hashing method(s) for traffic traversing link-aggregate members, each terminating on an individual member of an MLAG or stacked/virtual-chassis pair. We follow the same hashing method as above where the traffic will be load balanced based on the default 2 Tuple Hash. It is configurable just like the above options.
316	**MLAG and Virtual-Chassis traffic forwarding limitations** For switches configured for MLAG or stacking/virtual-chassis, please describe any limitations to the switch operation or traffic forwarding. Switches configured in StackWise Virtual Link (SVL) mode are capable of forwarding traffic locally without traversing the StackWise Virtual link. For better performance, we support local forwarding in a way that we always forward traffic locally without sending the traffic to the neighbor via SVL link.
317	**Available line-cards for chassis based switches** For any proposed modular switches, please provide a list of available line cards for the purposes of seeing available port and bandwidth options. Multiple line card options listed here: https://www.cisco.com/c/en/us/products/collateral/switches/catalyst-9400-series-switches/nb-06-cat9600-series-line-data-sheet-cte-en.html
318	**Available models of fixed configuration switches** For any proposed fixed configuration switches, please provide a list of all models in the line for the purposes of seeing available port and bandwidth options. Cisco Catalyst 9300, 9400, 9500, 9600 Series Switches
319	**The following attributes pertain to physical, power and cooling characteristics**
320	**Physical dimensions** Specify the number of rack units for each type of modular chassis in the proposal. Dimensions (H x W x D) C9407R > 17.41 x 17.30 x 16.30 in. (44.22 x 43.94 x 41.40 cm) C9410R > 2.61 x 17.30 x 16.30 in. (57.43 x 43.94 x 41.40 cm)
321	**802.3bt type 3 and type 4 support** Please specify current or planned support for 802.3bt PoE supporting device Type 3 (60W) and Type 4 (90W). Edge switches in the proposal include the 9200 series switches with support PoE (15.4) and PoE+ (30W). The catalyst 9300 and 9400 series switches support PoE (15.4), PoE+ (30W) and UPoE (60W)
322	**Power requirements** Specify the power requirements of each proposed fixed or modular configuration switch when using AC power. PWR-C5-125WAC > 100 to 240 VAC, 50 to 60 Hz 1.6-0.7A PWR-C5-600WAC > 100 to 240 VAC, 50 to 60 Hz 7-2.8A PWR-C5-1KWAC > 100 to 240 VAC, 50 to 60 Hz 12-6A

323

BTU output

Specify the BTU output for each standalone switch or modular chassis model in the proposed configuration for 120 V AC, 208V AC (and -48V DC operation if applicable).

PWR-C5-125WAC > 426.5 BTU/hr,125W PWR-C5-600WAC > 2047.3 BTU/hr, 600W PWR-C5-1KWAC > 3412 BTU /hr, 1000W

324

Boot time

Specify the boot time in seconds for each proposed device configuration. This should be the time it takes for the de vice to reach a full forwarding state from a powered off state without taking into consideration convergence of routin g protocols.

The boot times for each switch platform are shown in Table 5.
Table 5. Cisco Catalyst 9000 Series Boot Time
Platform Boot Time (Sec) Boot FWD (Sec) Standby Hot (Sec)
9300 (Data/PoE/UPoE) 175 338 NA
9300 (Mgig) 197 332 NA
9300—8 Stack Members 197 332 598
9400—7-Slot Fully Loaded 252 510 553
9500 185 337 NA
Boot Time—Timer starts from "reload" to timer ends at "PRESS RETURN."
Boot FWD—The first interface comes up after the reload.
Standby Hot—Whole stack reload till standby-hot reaches SSO.

325

Airflow direction

Specify the airflow direction through each type of proposed switch and whether it can be modified.

The stackable switches airflow direction is always from front to rear. The chassis based switches are side to side ai rflow.

326

POE totals

Specify the maximum amount of PoE/PoE+/PoE Type 3/PoE Type 4 power that can be delivered at once per chassis slot or fixed configuration switch.

The Catalyst 9400 supports up to eight power supplies. The 9400 can be configured with 3200W power supplies. The PoE line cards take roughly 65W of power. Fully loaded, this is just under 1400W. Maxed out at 12800W minu s the 1400W leaves over 11,000W of power available to PoE power.
The Catalyst 9300 with dual 1100W power supplies has a 1560W available PoE power.

327

Maximum POE type 3/4 power delivery

Specify the maximum number of ports that can supply full PoE/PoE+/PoE Type 3/PoE Type 4 power at once, for any proposed chassis or fixed configuration switches, in the proposed configuration.

The Catalyst 9400 supports up to eight power supplies. The 9400 can be configured with 3200W power supplies. The PoE line cards take roughly 65W of power. Fully loaded, this is just under 1400W. Maxed out at 12800W minu s the 1400W leaves over 11,000W of power available to PoE power. In 802.3at power, that is enough power for ov er 700 interfaces.
The Catalyst 9300 with dual 1100W power supplies will support 48 PoE+ devices.

328

The following attributes pertain to management

329

Software upgrade process

Describe the switch software upgrade process and estimated time to complete.

The Cisco Catalyst 9400 supports ISSU with dual supervisors. The data plane continues to forward while the control plane of each respective supervisor is rebooted. The process would be to copy the image to the switch and start the ISSU process. Alternatively, if you look down the path of DNA Center Automation, software upgrades can be scheduled and pushed seamlessly via the DNA Center Console. The process here would be to use DNA Center as repository for the IOS-XE image. Push that image from one to as many switches as you want and perform an ISSU. This is known as the Software Image Management (SWIM) dashboard inside of the DNA Center Console.

330

MLAG / Virtual Chassis upgrade process

Describe the software upgrade process for the switches when configured as an MLAG or VC pair and indicate any downtime for one or both switches.

This is very similar to the previous response. The Cisco Catalyst 9400 supports ISSU. This can be done manually or through DNA Center Automation. The data plane continues to forward and there should not be any downtime during an upgrade.

331

APIs supported

Describe supported APIs and their capabilities, providing any documentation as relevant.

A modern network switch like the Cisco Catalyst 9000 Series supports a wide range of automation features and provides robust open APIs over NETCONF and RESTCONF using YANG data models for external tools, both off-the-shelf and custom-built, so you can automatically provision network resources.

332

XML/JSON configuration file support

Is there support for importing and/or exporting the switch configuration in XML or JSON format?

Cisco IOS XE (used on Catalyst 9000 switches) supports open YANG models across multiple ecosystems, with nearer-term focus on the OpenConfig, IETF, and CableLabs (DOCSIS) defined models. Because YANG is protocol independent, it can be converted into any encoding format, such as XML, JSON, Group-Based Policy (GBP), etc., that the network configuration protocol supports.

333

Libraries or related tools

Describe any vendor provided tools or programming libraries or Ansible roles, that benefit automation/orchestration.

Cisco Catalyst 9000 automation through Cisco DNA Center supports open and programmable interfaces for integration with third-party solutions. Support also includes NETCONF, RESTCONF, Python API, and iPXE. A modern network switch like the Cisco Catalyst 9000 Series supports a wide range of automation features and provides robust open APIs over NETCONF and RESTCONF using YANG data models for external tools, both off-the-shelf and custom-built, so you can automatically provision network resources.

334

Rollback

Indicate whether the software has a provision for a "rollback" feature allowing the return of the configuration to one or more historic revisions.

The configure replace command allows you to revert to a previous configuration state, effectively rolling back changes that were made since the previous configuration state was saved.

335

Pre-loading of software/configuration

Indicate whether the switches support the saving of or pre-positioning of software or configuration files in their onboard flash memory.

Cisco Catalyst 9000 supports Flash File System. The flash file system is a single-flash device on which you can store files (configurations and software images). It also provides several commands to help you manage software bundles and configuration files. The default flash file system on the device is named “flash.”

336

Multiple versions of software

Is it possible to store more than one version of the system software on the switch and choose which to boot?

You can have multiple versions on the switch and select which one to boot from.

337

Out of band management protocols

If the switches contain an out-of-band management port, please indicate what types of management traffic are sour ced from this port and can that traffic be directed to standard ports? (i.e. RADIUS, NTP, SNMP requests or sFlow/Ne tflow/IPFIX export?)

The out-of-band management port can be used for any management traffic/protocols. The management port is a Virtual Routing/Forwarding (VRF) Instance interface to which you can connect a PC. You can use the Ethernet ma nagement port instead of the device console port for network management. Traffic from this port is not normally for warded to other network ports (separate routing table).

338

Exclusive configuration

Is there an "edit exclusive" option when editing the configuration and prohibiting other users from doing the same si multaneously.

Cisco Catalyst 9000 switches support Configuration Lock as a feature of IOS XE. Exclusive Configuration Change Access (also called the "Configuration Lock" feature) allows you to have exclusive change access to the Cisco IOS XE running configuration, preventing multiple users from making concurrent configuration changes.

339

Zero-Touch-Provisioning

If zero-touch-provisioning is supported, please detail what is required and if there are supplemental management pl atforms provided for this.

When a device that supports Zero-Touch Provisioning boots up, and does not find the startup configuration (durin g initial installation), the device enters the Zero-Touch Provisioning mode. The device searches for a Dynamic Host Control Protocol (DHCP) server, bootstraps itself with its interface IP address, gateway, and Domain Name System (DNS) server IP address, and enables Guest Shell. The device then obtains the IP address or URL of an HTTP/TF TP server, and downloads the Python script from an HTTP/TFTP server to configure the device.

340

sFlow support

If the proposed switches support sFlow, what is the maximum sampling rate for a switch under heavy load? A sampli ng rate of 1:1 being ideal.

The Cisco Catalyst 9000 switches supports line-rate, hardware-based Full Flexible NetFlow (FNF), delivering flow c ollection of up to 64,000 flows.

341

NetFlow support

If the proposed switches support Netflow, what is the maximum sampling rate for a switch under heavy load? A sampl ing rate of 1:1 being ideal.

The Cisco Catalyst 9000 switches supports line-rate, hardware-based FNF, delivering flow collection of up to 64,00 0 flows.
1:1 and sampled are supported.

342

IPFIX support

If the proposed switches support IPFIX, what is the maximum sampling rate for a switch under a heavy load? A sampl ing rate of 1:1 being ideal.

The Cisco Catalyst 9000 switches supports line-rate, hardware-based Flexible NetFlow, delivering flow collection of up to 64,000 flows.
1:1 and sampled are supported.

343

OpenFlow support

If supported, what version of OpenFlow is used?

Cisco supports OpenFlow with FAUCET pipeline on the Catalyst 9000 Series switches. Faucet controls OpenFlow 1.3 hardware which delivers high forwarding performance.

344

OpenFlow hardware support

Describe the forwarding for OpenFlow, are flows managed in hardware or software?

Cisco supports OpenFlow with FAUCET pipeline on the Catalyst 9000 Series switches. Faucet controls OpenFlow 1.3 hardware which delivers high forwarding performance.

345

Security

346

802.1x functionality when authentication is unavailable

Please explain the expected operation of a switch configured for 802.1x or MAC authentication when the AAA/NAC server is unreachable and a new client connects, or an existing client's authentication times out.

The switch has the ability to operate in a fallback mode. This can be defined by the administrator. The 802.1x device can be configured in Open or Closed Mode. The administrator can also configure a fail open scenario when the NAC server is not reachable.

347

802.1x functionality with an unmanaged downstream switch

In the case where switch port is configured for 802.1x and an unmanaged switch is connected to the port, what are the expected limitations to serving various types of authenticating (or non-authenticating) clients on the downstream unmanaged switch; i.e. can they be placed on different VLANs, have different ACLs, etc.?

Multiple-authentication (multiauth) mode allows one client on the voice VLAN and multiple authenticated clients on the data VLAN. When a hub or access point is connected to an 802.1x-enabled port, multiple-authentication mode provides enhanced security over multiple-hosts mode by requiring authentication of each connected client. For non-802.1x devices, you can use MAC authentication bypass or web authentication as the fallback method for individual host authentications to authenticate different hosts through by different methods on a single port.
Multiple-authentication mode also supports Multidomain Authentication (MDA) functionality on the voice VLAN by assigning authenticated devices to either a data or voice VLAN, depending on the Vendor-Specific Attributes (VSAs) received from the authentication server.

348

Documentation related to port-based authentication

Please provide documentation related to the expected operation and configuration of port-based authentication options.

When 802.1x port-based auth is enabled and the client supports 802.1x-compliant client software, these events occur:
- If the client identity is valid and auth succeeds, the switch grants the client access to the network. If 802.1x auth times out while waiting for an EAPOL exchange and MAB is enabled, the switch can use the client MAC for auth.
- If the client MAC is valid and auth succeeds, the switch grants the client access to the network. If the client MAC is invalid and the auth fails, the switch assigns the client to a guest VLAN.
- If the switch gets an invalid identity from a client and a restricted VLAN is specified, the switch can assign the client to a restricted VLAN that provides limited services.
- If the RADIUS server is unavailable and inaccessible auth bypass is enabled, the switch grants the client access to the network by putting the port in the critical-authentication state in the RADIUS-configured or the user-specified access VLAN.

349	**Documentation related to port-based authentication with multiple users per port** Please provide documentation related to the expected operation and configuration of port-based authentication options when multiple users connect to the same port.
	Multiple-authentication (multiauth) mode allows one client on the voice VLAN and multiple authenticated clients on the data VLAN. When a hub or access point is connected to an 802.1x-enabled port, multiple-authentication mode provides enhanced security over multiple-hosts mode by requiring authentication of each connected client. For non-802.1x devices, you can use MAC authentication bypass or web authentication as the fallback method for individual host authentications to authenticate different hosts through by different methods on a single port.
350	**Maximum number of authenticated clients per switch port** Please indicate the maximum number of clients that can be authenticated on a single switch port when multiple users connect to the same port.
	This is limited by the port security table. Max range is 2000 dot1x, MAB or web-auth sessions on the 9200 switches
351	**Simultaneous authentication methods on a single port** Please describe the combinations of authentication methods that can be simultaneously enabled on a switch port. (i.e. 802.1x, MAC authorization, web authorization, others?)
	Accept. Cisco ISE can simultaneously provide the following authentication methods to wired switch ports: - 802.1x active authentication using several methods (e.g., Protected Extensible Authentication Protocol [PEAP], EAP- Transport Layer Security [TLS]) - MAC-based authentication - Centralized Web Portal authentication for both guests and other authorized users - Passive authorization through Active Directory integration.
352	**Dynamic Roles / ACLs** Please describe the necessary security relationship between the NAC/RADIUS server and the switch that would allow the NAC/RADIUS server to modify the switch configuration to provide downloadable roles and/or dynamic ACLs.
	802.1x Authentication with Downloadable ACLs and Redirect URLs You can download ACLs and redirect URLs from a RADIUS server to the switch during 802.1x authentication or MAC authentication bypass of the host. You can also download ACLs during web authentication.
353	**User-traffic tunneling** Please describe any features that would allow tunneling of user traffic for specific VLANs to a centralized switch or controller with access to a common layer3 interface, much like centralized forwarding for wireless APs. This feature would be of limited but broad use, allowing for guests, IoT and gaming systems (as examples) to share a common subnet or pool of subnets.
	It is recommended to place such items in a guest VLAN that would be in an isolated VRF.
354	**Encryption of local secrets** Please describe the encryption used for the storage of radius secrets and local user passwords in the configuration file.
	MD5 based alogorithm with one-way hash.
355	**Required Features – Wireless** Proposed solutions must offer components which support the following list of features. Please simply affirm or deny that your proposed solution meets the following requirements by notating each item with “accept”, “deny”, or “variance.” Please explain any variances in your product. The Bidder cannot answer “accept” if the feature is not currently available in the proposed hardware running current general availability (production) release software. If a feature is not in production software at the time of the RFP submission, the Bidder must choose “deny” or “variance.” If a feature not in production software is described under a “variance,” it must be noted the feature is not currently available.

356	**Required Features – Wireless - General Features**
357	**Maintenance** The proposed wireless controllers and access points must be eligible and covered for maintenance for 60-months from date of purchase. Accept
358	**Variance to maintenance** Variance to The proposed wireless controllers and access points must be eligible and covered for maintenance for 60-months from date of purchase. Cisco Smart net programs are designed to offer hardware and software warranty's are on term program, that offer coverage and support in 1, 3, 5, and 7 year option
359	**Wireless Access Point Auto-Provisioning** Wireless access points must support auto-provisioning via DHCP attributes or DNS queries, such that access points are adopted by wireless controllers and fully functional without manual configuration. Accept
360	**Variance to wireless Access Point Auto-Provisioning** Variance to auto-provisioning via DHCP attributes or DNS queries, such that access points are adopted by wireless controllers and fully functional without manual configuration. *No response*
361	**Controller Uplinks** The proposed stand-alone controllers or chassis must support at minimum, two 10 Gbps interfaces for network redundancy. If a chassis using a data backplane is proposed, each controller must have 10 Gbps of bandwidth available via the backplane/switch fabric. Accept
362	**Variance to controller Uplinks** Variance to at minimum, two 10 Gbps interfaces for network redundancy. If a chassis using a data backplane is proposed, each controller must have 10 Gbps of bandwidth available via the backplane/switch fabric. Accept
363	**Captive Portal** The proposed solution must include a captive portal that can be used to provide instructions on how to configure clients and the ability to download configuration software. The captive portal must allow the University to upload custom web pages, and it must allow unauthenticated clients to access IP-based resources by specifying a set of allowed IP addresses (via an access control list or equivalent strategy). Accept
364	**Variance to captive Portal** Variance to The proposed solution must include a captive portal that can be used to provide instructions on how to configure clients and the ability to download configuration software. The captive portal must allow the University to upload custom web pages, and it must allow unauthenticated clients to access IP-based resources by specifying a set of allowed IP addresses (via an access control list or equivalent strategy). *No response*

365

Wireless Access Point Uplink

Wireless access points must connect to the wired network via at a minimum of 1 Gbps/full-duplex Ethernet and also support multi-gig.

Accept

366

Variance to wireless Access Point Uplink

Variance to Wireless access points must connect to the wired network via at a minimum of 1 Gbps/full-duplex Ethernet and also support multi-gig.

No response

367

IGMP Snooping Support

The proposed system must support IGMP snooping.

Accept

368

Variance to iGMP Snooping Support

Variance to IGMP snooping.

No response

369

Layer 3 Roaming

The proposed solution must support IP (L3) roaming.

Accept

370

Variance to layer 3 Roaming

Variance to IP (L3) roaming.

No response

371

Dual-Stack feature parity

The University wireless service is currently a dual-stacked IPv4/IPv6 network. The features available for IPv4 must also be available for IPv6 (i.e., feature parity) in the proposed system, including reporting the IPv6 address of the client on the controller and wireless management application. Any functional differences between IPv4 and IPv6 support must be individually noted in the variance explanation.

Accept

372

Variance to dual-Stack feature parity

Variance to The University wireless service is currently a dual-stacked IPv4/IPv6 network. The features available for IPv4 must also be available for IPv6 (i.e., feature parity) in the proposed system, including reporting the IPv6 address of the client on the controller and wireless management application. Any functional differences between IPv4 and IPv6 support must be individually noted in the variance explanation.

No response

373

IPv6 RA Guard

The proposed system must support IPv6 RA guard, such that a wireless client cannot send IPv6 router advertisements that are received by other wireless clients.

Accept

374

Variance to iPv6 RA Guard

Variance to IPv6 RA guard, such that a wireless client cannot send IPv6 router advertisements that are received by other wireless clients.

No response

375

IPv6 SLAAC support

The proposed system must support IPv6 wireless clients using SLAAC addressing in a dual-stacked environment.

Accept

376

Variance to iPv6 SLAAC support

Variance to IPv6 wireless clients using SLAAC addressing in a dual-stacked environment.

No response

377

IPv6 DHCPv6 support

The proposed system must support IPv6 wireless clients using DHCPv6 addressing in a dual-stacked environment.

Accept

378

Variance to iPv6 DHCPv6 support

Variance to IPv6 wireless clients using DHCPv6 addressing in a dual-stacked environment.

No response

379

IPv6 multicast optimizations

The proposed system must support the same IPv6 multicast optimizations as are provided for IPv4.

Accept

380

Variance to iPv6 multicast optimizations

Variance to the same IPv6 multicast optimizations as are provided for IPv4.

No response

381

Disable LEDs

Access points must have the option of turning off all LED indicator lights.

Accept

382

Variance to disable LEDs

Variance to Access points must have the option of turning off all LED indicator lights.

No response

383

Zero-Configuration bridging

The proposed system must support bridging Bonjour, and other zero-configuration protocol advertisements betwee n SSIDs/VLANs, such that services on one SSID/VLAN can be discovered across SSIDs/VLANs by wireless clients (e .g., if an AppleTV is associated to SSID1 on VLAN1, a client associated with SSID2 on VLAN2 must be able to disco ver and use the AppleTV).

Accept

384

Variance to zero-Configuration bridging

Variance to bridging Bonjour, and other zero-configuration protocol advertisements between SSIDs/VLANs, such tha t services on one SSID/VLAN can be discovered across SSIDs/VLANs by wireless clients (e.g., if an AppleTV is asso ciated to SSID1 on VLAN1, a client associated with SSID2 on VLAN2 must be able to discover and use the AppleTV) .

No response

385

Selective Zero-configuration advertisements

The proposed system must have full-featured management of Bonjour and other zero-configuration protocols, such that service advertisements can be selectively sent between VLANs and clients based on location, logical group, or user attributes.

Accept

386

Variance to selective Zero-configuration advertisements

Variance to The proposed system must have full-featured management of Bonjour and other zero-configuration protocols, such that service advertisements can be selectively sent between VLANs and clients based on location, logical group, or user attributes.

No response

387

VLAN ID in RADIUS Attributes

Wireless controllers must support placing users into appropriate VLANs when returning a text-based VLAN ID in the RADIUS Tunnel-Private-Group-ID value (e.g., returning the value "faculty" rather than "801").

Accept

388

Variance to vLAN ID in RADIUS Attributes

Variance to placing users into appropriate VLANs when returning a text-based VLAN ID in the RADIUS Tunnel-Private-Group-ID value (e.g., returning the value "faculty" rather than "801").

No response

389

VLAN Name RADIUS Attribute

Wireless controllers must support naming/correlating a specific VLAN or VLAN pool to a descriptive text value that can be used in conjunction with RADIUS returned values (e.g., naming VLAN 801 "faculty", so that a RADIUS returned VLAN ID of "faculty" places the user in VLAN 801).

Accept

390

Variance to vLAN Name RADIUS Attribute

Variance to naming/correlating a specific VLAN or VLAN pool to a descriptive text value that can be used in conjunction with RADIUS returned values (e.g., naming VLAN 801 "faculty", so that a RADIUS returned VLAN ID of "faculty" places the user in VLAN 801).

No response

391

SSID VLAN Assignment

Wireless controllers must support the association of specific VLANs or VLAN pools to SSIDs (e.g., assign VLAN 101 to SSID1, VLAN 102 to SSID2, etc.).

Accept

392

Variance to sSID VLAN Assignment

Variance to the association of specific VLANs or VLAN pools to SSIDs (e.g., assign VLAN 101 to SSID1, VLAN 102 to SSID2, etc.).

No response

393

Hospitality Access Points

The proposed controllers must support a currently available small form-factor hospitality access point that can be installed in a typical wall outlet box.

Accept

394	**Variance to hospitality Access Points** Variance to currently available small form-factor hospitality access point that can be installed in a typical wall outlet box. *No response*
395	**Hospitality Access Point frequency support** Hospitality access-points must support both 2.4 GHz and 5 GHz radios, able to operate simultaneously, and wired Et hernet access with an option to centrally forward, or tunnel, Ethernet traffic. Accept
396	**Variance to hospitality Access Point frequency support** Variance to both 2.4 GHz and 5 GHz radios, able to operate simultaneously, and wired Ethernet access with an optio n to centrally forward, or tunnel, Ethernet traffic. *No response*
397	**Ceiling mounting options** Wireless APs must support wall and ceiling mounting options (excluding hospitality APs). Accept
398	**Variance to ceiling mounting options** Variance to wall and ceiling mounting options (excluding hospitality APs). *No response*
399	**Remote worker support** The proposed controllers and access-points must support a remote access option, where APs can be deployed indi vidually for remote workers. Accept
400	**Variance to remote worker support** Variance to remote access option, where APs can be deployed individually for remote workers. *No response*
401	**AP Tunneling behind NAT** APs must create a secure tunnel back to the controllers and provide enterprise wireless over the Internet, even whe n placed behind a NAT device such as a home broadband router. Variance
402	**Variance to aP Tunneling behind NAT** Variance to APs must create a secure tunnel back to the controllers and provide enterprise wireless over the Intern et, even when placed behind a NAT device such as a home broadband router. The 8540 can support Office Extend Access Points (OEAPs). Cisco OEAP provides secure communications from a Cisco WLC to a Cisco AP at a remote location, seamlessly extending the corporate WLAN over the Internet to an e mployee's residence. The user's experience at the home office is exactly the same as it would be at the corporate office. Datagram Transport Layer Security (DTLS) encryption between the access point and the controller ensures that all communications have the highest level of security.

403

AP Tunneling Ethernet

Remote access-points must have at least one Ethernet port capable of tunneling traffic back to controllers on camp us.

Accept

404

Variance to aP Tunneling Ethernet

Variance to Remote access-points must have at least one Ethernet port capable of tunneling traffic back to controlle rs on campus.

No response

405

AP Tunneling VLAN support

Remote access-points having Ethernet ports, must also support VLAN tagging and be able to tunnel traffic back to t he controllers on campus, per-VLAN.

Accept

406

Variance to aP Tunneling VLAN support

Variance to Remote access-points having Ethernet ports, must also support VLAN tagging and be able to tunnel traf fic back to the controllers on campus, per-VLAN.

No response

407

Controller Capacity specifications by Campus

Controller capacity between the campuses must not be shared. Lincoln controllers should only adopt Lincoln acces s points, Omaha controllers should only adopt Omaha access points, and Kearney controllers should only adopt Ke arney access points. Controllers need to support at least 35,000 concurrent users in Lincoln, 15,000 concurrent us ers in Omaha, and 7,000 concurrent users in Kearney.

Accept

408

Variance to controller Capacity specifications by Campus

Variance to Controller capacity between the campuses must not be shared. Lincoln controllers should only adopt Li ncoln access points, Omaha controllers should only adopt Omaha access points, and Kearney controllers should o nly adopt Kearney access points. Controllers need to support at least 35,000 concurrent users in Lincoln, 15,000 c oncurrent users in Omaha, and 7,000 concurrent users in Kearney.

No response

409

Controller Redundancy

The controllers must be proposed to support N+1 redundancy and must have 1+1 redundancy with physical diversit y.

Accept

410

Variance to controller Redundancy

Variance to The controllers must be proposed to support N+1 redundancy and must have 1+1 redundancy with phy sical diversity.

No response

411

Required Features – Wireless - Wireless Related

412

Wi-Fi Alliance 5 and 6 certification

All access points must be Wi-Fi Alliance certified for WiFi 5 & 6 for 2.4 GHz radios and 5 GHz radios.

Accept

413 **Variance to wi-Fi Alliance 5 and 6 certification**

Variance to All access points must be Wi-Fi Alliance certified for WiFi 5 & 6 for 2.4 GHz radios and 5 GHz radios.

No response

414 **Wi-Fi Alliance WPA2 Enterprise certification**

Access points and wireless controllers must be Wi-Fi Alliance certified for WPA2 Enterprise.

Accept

415 **Variance to wi-Fi Alliance WPA2 Enterprise certification**

Variance to Access points and wireless controllers must be Wi-Fi Alliance certified for WPA2 Enterprise.

No response

416 **Spatial Stream support**

All access points, with the exception of hospitality units, must fully support four 802.11ac spatial streams (4x4:4 MU-MIMO).

Accept

417 **Variance to spatial Stream support**

Variance to four 802.11ac spatial streams (4x4:4 MU-MIMO).

No response

418 **MU-MIMO wave 2 support**

All access points must support 802.11ac wave 2 Multi-user MIMO (MU-MIMO).

Accept

419 **Variance to mU-MIMO wave 2 support**

Variance to 802.11ac wave 2 Multi-user MIMO (MU-MIMO).

No response

420 **WMM certification**

All access points must be Wi-Fi Alliance WMM certified.

Variance

421 **Variance to wMM certification**

Variance to All access points must be Wi-Fi Alliance WMM certified.

The IEEE is currently scheduled to ratify the Wi-Fi 6 amendment in the last quarter of 2019. The Wi-Fi Alliance has a similar timeline for a Wi-Fi 6 certification. The latest official estimate for ratification is always available at the 802 I EEE website in the “RevCom and Standards Board Final or Continuous Process Approval” column.

422 **Dual-band support**

All access points must support dual-band, two-radio operation such that 2.4 GHz and 5 GHz operations are support ed concurrently.

Accept

423 **Variance to dual-band support**

Variance to dual-band, two-radio operation such that 2.4 GHz and 5 GHz operations are supported concurrently.

No response

424

802.11n channel bonding

All 5 GHz radios must support 802.11n channel bonding (40 MHz operation).

Accept

425

Variance to 802.11n channel bonding

Variance to 802.11n channel bonding (40 MHz operation).

No response

426

802.11ac channel bonding

All 5Ghz radios must support 802.11ac channel bonding (40, 80, 160MHz operation).

Accept

427

Variance to 802.11ac channel bonding

Variance to 802.11ac channel bonding (40, 80, 160MHz operation).

No response

428

DFS support

All access points must support 5 GHz DFS channels.

Accept

429

Variance to dFS support

Variance to 5 GHz DFS channels.

No response

430

BSSID uniqueness

All access points must advertise a unique BSSID per SSID.

Accept

431

Variance to bSSID uniqueness

Variance to All access points must advertise a unique BSSID per SSID.

No response

432

SSID count support

The proposed wireless access points must support advertising a minimum of eight SSIDs simultaneously.

Accept

433

Variance to sSID count support

Variance to advertising a minimum of eight SSIDs simultaneously.

No response

434

Auto-channel selection

The proposed solution must support auto-channel selection for all access point radios.

Accept

435

Variance to auto-channel selection

Variance to auto-channel selection for all access point radios.

No response

436

Channel-set selection for auto-assignment

The proposed solution must allow administratively defining the set of channels used for auto-assignment for both 2.4 GHz and 5 GHz operation.

Accept

437

Variance to channel-set selection for auto-assignment

Variance to The proposed solution must allow administratively defining the set of channels used for auto-assignment for both 2.4 GHz and 5 GHz operation.

No response

438

Channel restriction for auto-channel assignment

The proposed system must allow restricting the channels used for auto-channel assignment at both global and user-defined group levels.

Accept

439

Variance to channel restriction for auto-channel assignment

Variance to The proposed system must allow restricting the channels used for auto-channel assignment at both global and user-defined group levels.

No response

440

Auto-power selection

The proposed solution must support auto-power selection for all access point radios.

Accept

441

Variance to auto-power selection

Variance to auto-power selection for all access point radios.

No response

442

Basic and transmit rates

The proposed system must support the selection of basic and transmit rates for 2.4 and 5Ghz radios.

Accept

443

Variance to basic and transmit rates

Variance to the selection of basic and transmit rates for 2.4 and 5Ghz radios.

No response

444

Load balancing

The proposed solution must support load balancing wireless clients across multiple radios.

Accept

445

Variance to load balancing

Variance to load balancing wireless clients across multiple radios.

No response

446

Band steering

The proposed solution must support band steering, such that 5 GHz capable wireless clients have a much higher probability of associating to an available 5 GHz radio over an available 2.4 GHz radio.

Accept

447	**Variance to band steering** Variance to band steering, such that 5 GHz capable wireless clients have a much higher probability of associating to an available 5 GHz radio over an available 2.4 GHz radio. *No response*
448	**Guard interval** Access points must support 802.11n/ac short guard interval. Accept
449	**Variance to guard interval** Variance to 802.11n/ac short guard interval. *No response*
450	**IP Multicast transmit rate** The system must be able to specify the IP multicast transmit rate. Accept
451	**Variance to iP Multicast transmit rate** Variance to The system must be able to specify the IP multicast transmit rate. *No response*
452	**Device fingerprinting** The proposed solution must support device fingerprinting to identify the type of wireless client on the network by ge neral device type and operating system. Accept
453	**Variance to device fingerprinting** Variance to device fingerprinting to identify the type of wireless client on the network by general device type and op erating system. *No response*
454	**Client isolation** The proposed solution must have a feature to prohibit inter-user traffic when users are associated to the same SSI D, i.e. a guest network. Accept
455	**Variance to client isolation** Variance to The proposed solution must have a feature to prohibit inter-user traffic when users are associated to th e same SSID, i.e. a guest network. *No response*
456	**Required Features – Wireless - Management**
457	**Single point for configuration** The proposed system must provide a management interface or application that allows a single point of configuration for the entire solution or a single point of configuration per campus. Accept

458

Variance to single point for configuration

Variance to The proposed system must provide a management interface or application that allows a single point of c onfiguration for the entire solution or a single point of configuration per campus.

No response

459

Centralized data plane

The proposed solution must support a centralized data plane, such that user traffic is tunneled to wireless controller s.

Accept

460

Variance to centralized data plane

Variance to centralized data plane, such that user traffic is tunneled to wireless controllers.

No response

461

Bridging wireless clients to LAN

The proposed solution must support bridging wireless client traffic at the access point to the local LAN. This must be configurable per SSID, per logical group, and per access point.

Accept

462

Variance to bridging wireless clients to LAN

Variance to bridging wireless client traffic at the access point to the local LAN. This must be configurable per SSID, per logical group, and per access point.

No response

463

Multi-role support

The proposed wireless management application and all controllers must support multiple role-based permission lev els that can be set via returned RADIUS Attribute-Value Pairs.

Accept

464

Variance to multi-role support

Variance to multiple role-based permission levels that can be set via returned RADIUS Attribute-Value Pairs.

No response

465

Console port

All standalone controllers and chassis must support a console management interface.

Accept

466

Variance to console port

Variance to console management interface.

No response

467

Management and IP reachability

All controllers and chassis must support IP reachability to a management IP interface.

Accept

468

Variance to management and IP reachability

Variance to IP reachability to a management IP interface.

No response

469	**SNMP Support** All controllers and chassis must support SNMPv2c and SNMPv3. Accept
470	**Variance to sNMP Support** Variance to SNMPv2c and SNMPv3. *No response*
471	**Management access control** All controllers and chassis must support restricting management access via a locally defined access control list (or e quivalent protection). This must apply to all management protocols supported on the proposed wireless controllers and management application (HTTPS, SNMP, SSH, REST, SOAP, etc.). All controllers and the management applicati on must support the ability to restrict access by a combination of source IP and destination port. Accept
472	**Variance to management access control** Variance to restricting management access via a locally defined access control list (or equivalent protection). This m ust apply to all management protocols supported on the proposed wireless controllers and management application (HTTPS, SNMP, SSH, REST, SOAP, etc.). All controllers and the management application must support the ability to restrict access by a combination of source IP and destination port. *No response*
473	**RADIUS authentication** All controllers and chassis must support RADIUS-based authentication for HTTPS (GUI), SSH, and serial console us ers. Accept
474	**Variance to rADIUS authentication** Variance to RADIUS-based authentication for HTTPS (GUI), SSH, and serial console users. *No response*
475	**Local account failover** All wireless controllers must support failover to a locally defined user account, if the RADIUS server is unreachable f or management. Accept
476	**Variance to local account failover** Variance to failover to a locally defined user account, if the RADIUS server is unreachable for management. *No response*
477	**Controller SSID and User SNMP information** All wireless controllers must represent the following information as objects that can be queried via SNMP: 1) Wireles s client associations 2) The following information regarding 802.11 wireless clients: MAC address, IPv4 address, IPv 6 address, Channel, Transmit data rate, Receive data rate, 802.1X authentication status, Transmit and receive ban dwidth consumption, RSSI, and SSID. Accept

478

Variance to controller SSID and User SNMP information

Variance to All wireless controllers must represent the following information as objects that can be queried via SNMP : 1) Wireless client associations 2) The following information regarding 802.11 wireless clients: MAC address, IPv4 address, IPv6 address, Channel, Transmit data rate, Receive data rate, 802.1X authentication status, Transmit and receive bandwidth consumption, RSSI, and SSID.

No response

479

Access Point SNMP information

All wireless controllers must represent the following information as objects that can be queried via SNMP regarding access points (via the controller): Transmit and receive bandwidth consumption on the access point's wired uplink, Error counters per radio, Number of retransmits per radio, Number of users per radio, Channel the radio is currently operating on, IP address, Wireless radio base MAC address, BSSIDs, Wired Ethernet MAC address, Status of resources (CPU, memory, etc.), Status and statistics of internal processes, Status of all physical interfaces, and Traffic counters for controller physical interfaces.

Accept

480

Variance to access Point SNMP information

Variance to All wireless controllers must represent the following information as objects that can be queried via SNMP regarding access points (via the controller): Transmit and receive bandwidth consumption on the access point's wired uplink, Error counters per radio, Number of retransmits per radio, Number of users per radio, Channel the radio is currently operating on, IP address, Wireless radio base MAC address, BSSIDs, Wired Ethernet MAC address, Status of resources (CPU, memory, etc.), Status and statistics of internal processes, Status of all physical interfaces, and Traffic counters for controller physical interfaces.

No response

481

Encryption of RADIUS secrets

All wireless controllers must support encryption of RADIUS shared secrets stored in the configuration file.

Accept

482

Variance to encryption of RADIUS secrets

Variance to encryption of RADIUS shared secrets stored in the configuration file.

No response

483

Encryption of local user passwords

All wireless controllers must support encryption of local user passwords stored in the configuration file.

Accept

484

Variance to encryption of local user passwords

Variance to encryption of local user passwords stored in the configuration file.

No response

485

Configuration backup and restore

All wireless controllers must be able to represent its configuration in a text file that can be uploaded to restore the configuration.

Accept

486

Variance to configuration backup and restore

Variance to All wireless controllers must be able to represent its configuration in a text file that can be uploaded to restore the configuration.

No response

487	**Syslog support** All wireless controllers and the management application must support logging to a syslog server on a configurable port. Accept
488	**Variance to syslog support** Variance to logging to a syslog server on a configurable port. *No response*
489	**Logging of administrator logins** All wireless controllers and the management application must log usernames of authorized users to the syslog server at the time of login. Accept
490	**Variance to logging of administrator logins** Variance to All wireless controllers and the management application must log usernames of authorized users to the syslog server at the time of login. *No response*
491	**Logging of configuration changes** All wireless controllers and the management application must log the username associated with configuration changes to the syslog server at the time changes are committed. Accept
492	**Variance to logging of configuration changes** Variance to All wireless controllers and the management application must log the username associated with configuration changes to the syslog server at the time changes are committed. *No response*
493	**Reporting of client IPv4 and IPv6 addresses** The IPv4 and IPv6 addresses of wireless clients must be reported on the controller GUI and the wireless management application. Accept
494	**Variance to reporting of client IPv4 and IPv6 addresses** Variance to The IPv4 and IPv6 addresses of wireless clients must be reported on the controller GUI and the wireless management application. *No response*
495	**Controller fail-over** The proposed system must support controller failover to an online spare. Accept
496	**Variance to controller fail-over** Variance to controller failover to an online spare. *No response*

497	**MTU size for control channel** The control channel between the wireless controller and the access point must operate given an IP MTU smaller tha n 1500 bytes. Accept
498	**Variance to mTU size for control channel** Variance to The control channel between the wireless controller and the access point must operate given an IP MTU smaller than 1500 bytes. *No response*
499	**Per-SSID RADIUS server support** The controller must have the capability of specifying the RADIUS server used for wireless client authentication per S SID. For example, the following correlation must be possible: SSID1 <-> RADIUS-server1, SSID2 <-> RADIUS-server 2, SSID3 <-> RADIUS-server1. Accept
500	**Variance to per-SSID RADIUS server support** Variance to The controller must have the capability of specifying the RADIUS server used for wireless client authenti cation per SSID. For example, the following correlation must be possible: SSID1 <-> RADIUS-server1, SSID2 <-> RA DIUS-server2, SSID3 <-> RADIUS-server1. *No response*
501	**RADIUS fail-over** The controller must support multiple RADIUS servers (primary and backup) per SSID. Accept
502	**Variance to rADIUS fail-over** Variance to multiple RADIUS servers (primary and backup) per SSID. *No response*
503	**SSID in RADIUS Called-Station-ID** The controller must add the SSID value in the "Called-Station-ID" sent to a RADIUS server when authenticating wirel ess clients. For example, if a wireless client attempting to authenticate to the SSID "eduroam", then the Called-Statio n-ID might be represented as "10.1.2.3:eduroam". Accept
504	**Variance to sSID in RADIUS Called-Station-ID** Variance to The controller must add the SSID value in the "Called-Station-ID" sent to a RADIUS server when authent icating wireless clients. For example, if a wireless client attempting to authenticate to the SSID "eduroam", then the Called-Station-ID might be represented as "10.1.2.3:eduroam". *No response*
505	**Client MAC in RADIUS Calling-Station-ID** The controller must report wireless client MAC addresses in the "Calling-Station-ID" sent to a RADIUS server when a uthenticating wireless clients. Accept

506

Variance to client MAC in RADIUS Calling-Station-ID

Variance to The controller must report wireless client MAC addresses in the "Calling-Station-ID" sent to a RADIUS s erver when authenticating wireless clients.

No response

507

Controller administration by multiple admins

The controller GUI must support administrative access by multiple users simultaneously.

Accept

508

Variance to controller administration by multiple admins

Variance to administrative access by multiple users simultaneously.

No response

509

Management administration by multiple admins

The wireless management application must support administrative access by multiple users simultaneously.

Accept

510

Variance to management administration by multiple admins

Variance to administrative access by multiple users simultaneously.

No response

511

Definition of configuration groups

The proposed system must allow the definition of logical configuration groups. The University of Nebraska currently defines a logical group per building to allow for configuration differences, such as which SSIDs are bound to the acc ess points in a building.

Accept

512

Variance to definition of configuration groups

Variance to The proposed system must allow the definition of logical configuration groups. The University of Nebras ka currently defines a logical group per building to allow for configuration differences, such as which SSIDs are bou nd to the access points in a building.

No response

513

Licensing in a fail-over scenario

The failure of any one controller in a group of redundant controllers must not change the number of access points li censed for the group.

Accept

514

Variance to licensing in a fail-over scenario

Variance to The failure of any one controller in a group of redundant controllers must not change the number of acc ess points licensed for the group.

No response

515

Client tracking and searching

The wireless controller and management application must support finding wireless host information by MAC address , IP address, and username.

Accept

516 **Variance to client tracking and searching**

Variance to finding wireless host information by MAC address, IP address, and username.

No response

517 **SNTP support**

All wireless controllers and the wireless management application must support SNTP as the described by RFC 2030 .

Accept

518 **Variance to sNTP support**

Variance to SNTP as the described by RFC 2030.

No response

519 **Required Features – Wireless - Physical and power characteristics**

520 **POE minimums**

All access points must be function using 802.3af power-over-Ethernet (i.e., there must be minimal feature impairme nt or degradation).

Accept

521 **Variance to pOE minimums**

Variance to All access points must be function using 802.3af power-over-Ethernet (i.e., there must be minimal featur e impairment or degradation).

No response

522 **Controller service and power supply redundancy**

All standalone controllers and chassis must support redundant power supplies, such that if any individual power sup ply were to fail, the controller or chassis would continue to function without impairment or degradation of service.

Accept

523 **Variance to controller service and power supply redundancy**

Variance to redundant power supplies, such that if any individual power supply were to fail, the controller or chassis would continue to function without impairment or degradation of service.

No response

524 **Controller function and power supply redundancy**

Given two power sources, all standalone controllers and chassis must support a power supply configuration such th at losing one power source does not impair or degrade function.

Accept

525 **Variance to controller function and power supply redundancy**

Variance to power supply configuration such that losing one power source does not impair or degrade function.

No response

526 **Hot swappable power supplies**

All standalone controllers and chassis must have hot swappable power supplies, such that they are individually rem ovable without impairing or degrading function.

Accept

527 **Variance to hot swappable power supplies**

Variance to All standalone controllers and chassis must have hot swappable power supplies, such that they are individually removable without impairing or degrading function.

No response

528 **Strongly Desired Features – Wireless**

The following list of features are highly desirable in a proposed solution. Please simply affirm or deny that your proposed solution meets the following requirements by notating each item with “accept”, “deny”, or “variance.” Please explain any variances in your product. The Bidder cannot answer “accept” if the feature is not currently available in the proposed hardware running current general availability (production) release software. If a feature is not in production software at the time of the RFP submission, the Bidder must choose “deny” or “variance.” If a feature not in production software is described under a “variance,” it must be noted the feature is not currently available.

529 **Strongly Desired Features – Wireless - General Functions**

530 **VLAN pooling**

All controllers should support VLAN pooling to allow for optimized utilization of IP addresses.

Accept

531 **Variance to vLAN pooling**

Variance to VLAN pooling to allow for optimized utilization of IP addresses.

No response

532 **Fast AP migration during a controller failure**

Wireless access points should not have to reboot to move to a redundant wireless controller, following a controller failure.

Accept

533 **Variance to fast AP migration during a controller failure**

Variance to Wireless access points should not have to reboot to move to a redundant wireless controller, following a controller failure.

No response

534 **Control wireless access based on MAC address**

The proposed solution should support denying wireless clients based on MAC address using centralized strategy (i.e., RADIUS or an equivalent strategy).

Accept

535 **Variance to control wireless access based on MAC address**

Variance to denying wireless clients based on MAC address using centralized strategy (i.e., RADIUS or an equivalent strategy).

No response

536 **L3 Roaming**

The IP (L3) roaming strategy should allow reverse path forwarding enforcement on router interfaces (i.e., a roamed client will not have traffic discarded, because the wireless system forwards the client's traffic to a routed interface that is not configured for the wireless client's subnet).

Variance

537	**Variance to l3 Roaming** Variance to The IP (L3) roaming strategy should allow reverse path forwarding enforcement on router interfaces (i.e ., a roamed client will not have traffic discarded, because the wireless system forwards the client's traffic to a routed interface that is not configured for the wireless client's subnet). On the Cisco 8540 Wireless Controller, Layer 3 roaming is supported, but not in FlexConnect local-switching mode .
538	**DHCP enforcement** The proposed solution should allow a configurable option to enforce that all IPv4 addresses and IPv6 are assigned via DHCP. This option should be configurable per SSID. Accept
539	**Variance to dHCP enforcement** Variance to The proposed solution should allow a configurable option to enforce that all IPv4 addresses and IPv6 ar e assigned via DHCP. This option should be configurable per SSID. *No response*
540	**Remote packet capture** The proposed solution should support remote packet captures on access points and controllers and allow capture fi lters to filter which packets are captured. Accept
541	**Variance to remote packet capture** Variance to remote packet captures on access points and controllers and allow capture filters to filter which packets are captured. *No response*
542	**Distributed data plane support** The proposed system should support access points in a distributed data plane configuration, such that wireless clie nt traffic is bridged from the access point to the local switch. Setting access points into distributed mode should be a llowed based on user-defined groups. There are potential applications for this in some remote locations and for ma naging access points at smaller regional campuses. Accept
543	**Variance to distributed data plane support** Variance to access points in a distributed data plane configuration, such that wireless client traffic is bridged from th e access point to the local switch. Setting access points into distributed mode should be allowed based on user-defi ned groups. There are potential applications for this in some remote locations and for managing access points at s maller regional campuses. *No response*
544	**Strongly Desired Features – Wireless - Wireless Related**
545	**Over-the-air packet capture** Access points should support over-the-air packet captures while simultaneously serving wireless clients without imp airment or degradation. Accept

546

Variance to over-the-air packet capture

Variance to over-the-air packet captures while simultaneously serving wireless clients without impairment or degradation.

No response

547

Rogue access point detection

Access points should support rogue access point detection while simultaneously serving wireless clients without impairment or degradation.

Accept

548

Variance to rogue access point detection

Variance to rogue access point detection while simultaneously serving wireless clients without impairment or degradation.

No response

549

RF monitoring

The proposed solution should perform RF monitoring while simultaneously serving clients without impairment or degradation.

Accept

550

Variance to rF monitoring

Variance to The proposed solution should perform RF monitoring while simultaneously serving clients without impairment or degradation.

No response

551

Logging of channel modifications

The controller should have the capability to log access point channel modifications, including the new channel assignment, the previous channel assignment, and the reason for the change.

Accept

552

Variance to logging of channel modifications

Variance to The controller should have the capability to log access point channel modifications, including the new channel assignment, the previous channel assignment, and the reason for the change.

No response

553

Logging of power modifications

The controller should have the capability to log access point power modifications, which include the new power level, the previous power level, and the reason for the change.

Accept

554

Variance to logging of power modifications

Variance to The controller should have the capability to log access point power modifications, which include the new power level, the previous power level, and the reason for the change.

No response

555

Interference classification

The proposed solution should have the ability to classify types of interference observed during RF monitoring and generate alerts based on user specified criteria.

Accept

556 **Variance to interference classification**

Variance to The proposed solution should have the ability to classify types of interference observed during RF monitoring and generate alerts based on user specified criteria.

No response

557 **Ruggedized AP support**

The proposed controllers should support a ruggedized AP for outdoor coverage.

Accept

558 **Variance to ruggedized AP support**

Variance to ruggedized AP for outdoor coverage.

No response

559 **802.11u HotSpot support**

The proposed solution should provide support for 802.11u HotSpot features.

Accept

560 **Variance to 802.11u HotSpot support**

Variance to The proposed solution should provide support for 802.11u HotSpot features.

No response

561 **Strongly Desired Features – Wireless - Management**

562 **Access Point to Controller encryption**

All control communication between the access points and the controllers should be encrypted using industry-standard protocols.

Accept

563 **Variance to access Point to Controller encryption**

Variance to All control communication between the access points and the controllers should be encrypted using industry-standard protocols.

No response

564 **Hitless controller failover**

The proposed controllers should provide a hitless failover in case of controller failure.

Accept

565 **Variance to hitless controller failover**

Variance to The proposed controllers should provide a hitless failover in case of controller failure.

No response

566 **Logging of successful and unsuccessful client band-steering**

The proposed system should log or otherwise provide a mechanism to determine when a wireless client is successfully or unsuccessfully band steered.

Variance

567

Variance to logging of successful and unsuccessful client band-steering

Variance to The proposed system should log or otherwise provide a mechanism to determine when a wireless client is successfully or unsuccessfully band steered.

Working as expected, this does not generate log messages. In order to see this information, the administrator nee ds to debug. The Access Point and WLC can send debug messages to a log server for further analysis if desired. Band Selection and Load Balancing are able to be seen in the debugs of the Access Points.

568

Logging of successful and unsuccessful client load-balancing

The proposed system should log or otherwise provide a mechanism to determine when a wireless client is successf ully or unsuccessfully load balanced.

Variance

569

Variance to logging of successful and unsuccessful client load-balancing

Variance to The proposed system should log or otherwise provide a mechanism to determine when a wireless client is successfully or unsuccessfully load balanced.

Working as expected, this does not generate log messages. In order to see this information, the administrator nee ds to debug. The Access Point and WLC can send debug messages to a log server for further analysis if desired. Band Selection and Load Balancing are able to be seen in the debugs of the Access Points.

570

Controller redundancy across IP subnet boundaries

The proposed controllers should support redundancy across IP subnet boundaries (i.e., no requirement for L2 adja cency between the controllers).

Variance

571

Variance to controller redundancy across IP subnet boundaries

Variance to redundancy across IP subnet boundaries (i.e., no requirement for L2 adjacency between the controllers).

For SSO/HA configuration the controllers need to be connected together on the same Layer 2 segment. This is du e to the use of a Virtual IP and how the failover works. In an N+1 scenario, there is no requirement for the controlle rs to be connected in on the same Layer 2 segment.

572

Distinct RADIUS servers for MFA support

Wireless controllers and the wireless management application should support multi-factor authentication for GUI logi n using two successive RADIUS authentication queries to two different RADIUS servers. For example, a user should be authenticated with a username/password against one RADIUS server, and then the controller or management ap plication should require and process a one-time password token against a second distinct RADIUS server.

Deny

573

Variance to distinct RADIUS servers for MFA support

Variance to multi-factor authentication for GUI login using two successive RADIUS authentication queries to two diffe rent RADIUS servers. For example, a user should be authenticated with a username/password against one RADIUS server, and then the controller or management application should require and process a one-time password token a gainst a second distinct RADIUS server.

No response

574

Administrative GUI MFA support

In addition to 2-factor authentication using two RADIUS servers, it is strongly desired that any GUI access to the con trollers be able to integrate with multi-factor authentication.

Deny

575 **Variance to administrative GUI MFA support**

Variance to In addition to 2-factor authentication using two RADIUS servers, it is strongly desired that any GUI acces s to the controllers be able to integrate with multi-factor authentication.

No response

576 **Multiple software image support on controllers**

The wireless controller should support storing multiple software images.

Accept

577 **Variance to multiple software image support on controllers**

Variance to storing multiple software images.

No response

578 **Software version rollback support**

The wireless controller should support rolling back to a previous version of software following an upgrade.

Accept

579 **Variance to software version rollback support**

Variance to rolling back to a previous version of software following an upgrade.

No response

580 **Configuration rollback support**

The wireless controller should support rolling back to the previous configuration.

Accept

581 **Variance to configuration rollback support**

Variance to rolling back to the previous configuration.

No response

582 **Categorized debug log support**

The wireless controller should support categorized debug logging on a per technology basis (e.g., enable debuggin g for RADIUS or enable debugging for load), such that debugging does not need to be enabled globally for troubles hooting a specific problem.

Accept

583 **Variance to categorized debug log support**

Variance to categorized debug logging on a per technology basis (e.g., enable debugging for RADIUS or enable de bugging for load), such that debugging does not need to be enabled globally for troubleshooting a specific problem.

No response

584 **Multiple syslog destination support**

All controllers and the wireless management application should log to multiple syslog destinations.

Accept

585 **Variance to multiple syslog destination support**

Variance to All controllers and the wireless management application should log to multiple syslog destinations.

No response

586

Assignment of preferences to individual APs or AP groups

The proposed solution should allow assigning preferences to individual access points and user-defined groups of access points.

Accept

587

Variance to assignment of preferences to individual APs or AP groups

Variance to The proposed solution should allow assigning preferences to individual access points and user-defined groups of access points.

No response

588

Resource consumption monitoring

The proposed solution should allow visibility into resource consumption on the controllers and access points (bandwidth, CPU, memory, process information, and etc.).

Accept

589

Variance to resource consumption monitoring

Variance to The proposed solution should allow visibility into resource consumption on the controllers and access points (bandwidth, CPU, memory, process information, and etc.).

No response

590

Role-based access for delegation

The wireless management application should allow role-based access to user-defined groups of access points (e.g., we would like the ability to delegate view access to access points in the computer science group to the computer science department, but without delegating access to data for any other groups access points).

Variance

591

Variance to role-based access for delegation

Variance to The wireless management application should allow role-based access to user-defined groups of access points (e.g., we would like the ability to delegate view access to access points in the computer science group to the computer science department, but without delegating access to data for any other groups access points).

Cisco 9800 Wireless Controller Management and DNA Center support Role- Based Access Control with some predefined roles, but it is not allowed to create AP Groups related with some specific user or role to manage them.

592

Customization of default dashboard

The wireless management application should support customization of the default "dashboard."

Accept

593

Variance to customization of default dashboard

Variance to customization of the default "dashboard."

No response

594

Rate limiting based on SSID and RADIUS attributes

The wireless controller should have the ability to set rate limits on wireless hosts based on SSID and based on returned RADIUS attributes (or lack of attributes).

Accept

595

Variance to rate limiting based on SSID and RADIUS attributes

Variance to The wireless controller should have the ability to set rate limits on wireless hosts based on SSID and ba sed on returned RADIUS attributes (or lack of attributes).

No response

596

Flow monitoring support

Proposed controllers should support an RFC 3176 compliant version of sFlow, RFC 3954 compliant version of Netfl ow, or RFC 5101 compliant version of IPFIX records for both IPv4 and IPv6 traffic.

Accept

597

Variance to flow monitoring support

Variance to an RFC 3176 compliant version of sFlow, RFC 3954 compliant version of Netflow, or RFC 5101 complia nt version of IPFIX records for both IPv4 and IPv6 traffic.

No response

598

Out of band management protocols

The proposed controllers and chassis should support an out-of-band Ethernet management port.

Accept

599

Variance to out of band management protocols

Variance to an out-of-band Ethernet management port.

No response

600

Firewalling service

The proposed controllers should support firewall services with traffic information available in the controller's dashbo ard.

Variance

601

Variance to firewalling service

Variance to firewall services with traffic information available in the controller's dashboard.

Cisco 9800 Wireless Controller Management and DNA Center support Role- Based Access Control with some pred efined roles, but it is not allowed to create AP Groups related with some specific user or role to manage them.

602

Application level visibility

The proposed controllers should support a dashboard with application level visibility into user traffic.

Accept

603

Variance to application level visibility

Variance to dashboard with application level visibility into user traffic.

No response

604

Configuration backup transfer protocols

The proposed wireless controllers should be able to back up configurations via TFTP or SCP.

Accept

605

Variance to configuration backup transfer protocols

Variance to The proposed wireless controllers should be able to back up configurations via TFTP or SCP.

No response

606

Dual-stack feature parity

The proposed wireless management application should support the same feature set for IPv4 and IPv6 (i.e., feature parity). Any functional differences between IPv4 and IPv6 support must be individually noted in the variance explana tion.

Accept

607

Variance to dual-stack feature parity

Variance to the same feature set for IPv4 and IPv6 (i.e., feature parity). Any functional differences between IPv4 and IPv6 support must be individually noted in the variance explanation.

No response

608

Simulate client authentication

The wireless controller should be able to simulate a PEAP/MS-CHAPv2 wireless client authentication to verify RADIU S configuration and verify returned RADIUS attributes.

Accept

609

Variance to simulate client authentication

Variance to The wireless controller should be able to simulate a PEAP/MS-CHAPv2 wireless client authentication to verify RADIUS configuration and verify returned RADIUS attributes.

No response

610

Questions and Clarifications – Wireless

Participant must answer the following set of questions designed to help identify basic metrics, scaling issues, and su itability. If more than one type of switch is proposed, the values for each type must be specified.

611

Questions and Clarifications - Wireless - General

612

Architecture overview

Briefly describe the architecture of your wireless solution, including a description of control plane mechanisms and client traffic forwarding. Please include any hardware acceleration (encryption/decryption, packet forwarding, etc.) and the point of AES encryption/decryption (access point or controller).

The Cisco SD-Access for Wireless Enterprise Fabric provides end-to-end enterprise-wide segmentation, flexible subnet addressing, and controller-based networking with uniform enterprise-wide policy and mobility. It moves the enterprise network from current VLAN-centric architecture to a user group-based enterprise architecture, with flexible Layer 2 extensions within and across sites.

Enterprise fabric is a network topology where traffic is passed through inter-connected switches, while providing the abstraction of a single Layer 2 or Layer 3 device. This provides seamless connectivity, with policy application and enforcement at the edge of the fabric. Fabric uses IP overlay, which makes the network appear as a single virtual entity without using clustering technologies.

The following definitions are used for fabric nodes Enterprise Fabric: A network topology where traffic is passed through inter-connected switches, while providing the abstraction of a single Layer 2 or Layer 3 device.

Fabric Domain: An independent operation part of the network. It is administered independent of other fabric domains.

Endpoints: Hosts or devices that connect to the fabric edge node are known as endpoints. They directly connect to the fabric edge node or through a Layer 2 network.

The main components of a typical SD-Access Wireless are Fabric Border Nodes (BN), Fabric Edge Nodes (EN), WLC, Application Policy Infrastructure Controller - Enterprise Module (APIC-EM), and Host Tracking Database (HDB).

The sequence of bringing up an AP is given below:

Switch powers up the AP (POE or UPOE).

AP gets an IP address from the DHCP server.

Switch registers the IP address of the AP with the map server.

AP discovers Cisco WLC through CAPWAP discovery.

After the DTLS handshake, CAPWAP control tunnel is created between AP and Cisco WLC for control packets. CAPWAP data tunnel is created for IEEE 802.11 management frames. The AP image is downloaded and the configuration is pushed on AP from controller.

Cisco WLC queries the map server for the switch (Remote Logistics Operations Center [RLOC] IP) behind which the AP has been registered.

Cisco WLC registers a dummy MAC address with the map server.

Map server sends a dummy MAC address notification to the switch to create a VXLAN tunnel to AP.

AP is ready to accept clients.

613

Broadcast and multicast traffic management

Describe the proposed solution's broadcast traffic and multicast management capabilities.

If your network supports packet multicasting, you can configure the multicast method that the controller uses. The controller performs multicasting in two modes:
- Unicast mode—In this mode, the controller unicasts every multicast packet to every access point associated to th e controller. This mode is inefficient, but might be required on networks that do not support multicasting.
- Multicast mode—In this mode, the controller sends multicast packets to a CAPWAP multicast group. This method reduces overhead on the controller processor and shifts the work of packet replication to your network, which is m uch more efficient than the unicast method.

When you enable multicast mode and the controller receives a multicast packet from the wired LAN, the controller encapsulates the packet using CAPWAP and forwards the packet to the CAPWAP multicast group address. The co ntroller always uses the management interface for sending multicast packets. Access points in the multicast group receive the packet and forward it to all the BSSIDs mapped to the interface on which clients receive multicast traffic . From the access point perspective, the multicast appears to be a broadcast to all SSIDs.

The controller supports MLD v1 snooping for IPv6 multicast. This feature keeps track of and delivers IPv6 multicast flows to the clients that request them. To support IPv6 multicast, you must enable Global Multicast Mode.

IGMP snooping is available to better direct multicast packets. When this feature is enabled, the controller gathers I GMP reports from the clients, processes them, creates unique Multicast Group IDs (MGIDs) from the IGMP reports after selecting the Layer 3 multicast address and the VLAN number, and sends the IGMP reports to the infrastruct ure switch. The controller sends these reports with the source address as the interface address on which it receive d the reports from the clients. The controller then updates the access point MGID table on the access point with th e client MAC address.

When the controller receives multicast traffic for a particular multicast group, it forwards it to all the access points, but only those access points that have active clients listening or subscribed to that multicast group send multicast t raffic on that particular WLAN. IP packets are forwarded with an MGID that is unique for an ingress VLAN and the d estination multicast group. Layer 2 multicast packets are forwarded with an MGID that is unique for the ingress inte rface.

614

Rogue access point detection methods

Describe rogue access point detection methods and include any impact on wireless clients.

The controller continuously monitors all the nearby access points and automatically discovers and collects informa tion on rogue access points and clients. When the controller discovers a rogue access point, it uses the Rogue Lo cation Discovery Protocol (RLDP) and the rogue detector mode access point is connected to determine if the rogu e is attached to your network.

Controller initiates RLDP on rogue devices that have open authenticated and configured. If RLDP uses FlexConne ct or local mode access points, then clients are disconnected for that moment. After the RLDP cycle, the clients ar e reconnected to the access points. As and when rogue access points are seen (auto-configuration), the RLDP pr ocess is initiated.

You can configure the controller to use RLDP on all the access points or only on the access points configured for t he monitor (listen-only) mode. The latter option facilitates automated rogue access point detection in a crowded R adio Frequency (RF) space, allowing monitoring without creating unnecessary interference and without affecting th e regular data access point functionality. If you configure the controller to use RLDP on all the access points, the c ontroller always chooses the monitor access point for RLDP operation if a monitor access point and a local (data) access point are both nearby. If RLDP determines that the rogue is on your network, you can choose to contain th e detected rogue either manually or automatically.

615

L3 roaming strategy

Describe the IP (L3) roaming strategy in the proposed solution.

Layer 3 or Inter-subnet roaming is similar to inter-controller roaming in that the controllers exchange mobility messages on the client roam. However, instead of moving the client database entry to the new controller, the original controller marks the client with an “Anchor” entry in its own client database. The database entry is copied to the new controller client database and marked with a “Foreign” entry in the new controller. The roam remains transparent to the wireless client, and the client maintains its original IP address.
In inter-subnet roaming, WLANs on both anchor and foreign controllers need to have the same network access privileges and no source-based routing or source-based firewalls in place. Otherwise, the clients may have network connectivity issues after the handoff.
In a static anchor setup using controllers and RADIUS server, if AAA override is enabled to dynamically assign VLAN and QoS, the foreign controller updates the anchor controller with the right VLAN after a Layer 2 authentication (802.1x). For Layer 3 RADIUS authentication, the RADIUS requests for authentication are sent by the anchor controller.

616

Voice over Wi-Fi features

Describe any voice over Wi-Fi features in your product.

Creating a Wi-Fi Calling network using Cisco products is simple because it is made up of equipment that is cost-effective, easy-to-use, and packed with Cisco expertise and reliability. Cisco Aironet access points offer a purpose-built, innovative chipset with best-in-class RF architecture. The Cisco 802.11ac access points—like the Cisco Aironet products—offer not only greater range and reliability than offered by the competition, but also Cisco High Density Experience, which consists of a subset of features including Cisco ClientLink 3.0 and Cisco CleanAir. High Density Experience allows more users to connect, while providing a better user experience by reducing RF interference and optimizing signal quality and performance. Three parameters on the device affect voice and/or video quality:
Call Admission Control (CAC)
Expedited bandwidth requests
Unscheduled automatic power save delivery (UAPSD).
(CAC) and UAPSD are supported on Cisco Compatible Extensions (CX) v4 and v5; however, these parameters are also supported even without CX but on any device implementing WMM (that supports 802.1e). Expedited bandwidth requests are supported only on CX v5.
Traffic Stream Metrics (TSM) can be used to monitor and report issues with voice quality.

617

E911 options

Describe any E911 options available in the proposed solution.

Wi-Fi E911 can be provided via the Cisco-enabled partner, RedSky. See the datasheet at the referenced link:
Reference: https://marketplace.cisco.com/catalog/solution/90780?pid=94963

618

Client location services

Describe any wireless client location services available in the proposed solution.

Cisco DNA Spaces (optional) is a powerful, end-to-end, indoor location services cloud platform that provides wireless customers with rich location-based services, including location analytics, business insight, customer experience management, asset tracking, Bluetooth Low Energy (BLE) management, and cloud APIs.

It provides a single point of entry for all location technology and intelligence through a single dashboard interface. Cisco DNA Spaces delivers the industry's most scalable location-based marketing platform, all while being compatible across existing Cisco Aironet®, Cisco Catalyst®, and Cisco Meraki® infrastructure with flexible deployment.

619

Voice over Wi-Fi best practices

Describe best practices with your product regarding voice over Wi-Fi (including the minimum RSSI value for service coverage area).

Cisco Wireless solution WLANs support four levels of QoS:
Platinum/Voice
Gold/Video
Silver/Best Effort (default)
Bronze/Background
You can configure the voice traffic WLAN to use Platinum QoS, assign the low-bandwidth WLAN to use Bronze Qo S, and assign all other traffic between the remaining QoS levels.
For voice traffic, the access point uses a QoS-profile-specific UP to derive the IP Differentiated Services Code Poi nt (DSCP) value that is visible on the wired LAN:
Architecture for Voice, Video and Integrated Data (AVVID) IP DSCP: 46 (EF)
QoS Profile: Platinum
AVVID 802.1p: 5
IEEE 802.11e UP: 6.
Additionally, Cisco have some Voice over WLAN (VoWLAN) Design Recommendations like:
Antenna Considerations
Channel Utilization
Call Capacity
Dynamic Transmit Power Control
802.11r and 802.11k Features
Cell Edge: Cisco guidelines for deploying 802.11b/g/a VoWLAN handsets recommend a design where a minimum p ower of -67 dBm is present at the cell boundary and the 20 percent recommended overlap between cells.

620

Access point scale

Specify the maximum number of access points supported on the proposed controller model.

The Cisco 9800-80 Wireless Controller supports 6,000 APs.

621

Wireless client scale

Specify the maximum number of wireless hosts supported on the proposed controller model.

The Cisco 9800-80 Wireless Controller supports up to 64,000 clients. The number of supported clients will vary de pending on the RF deployment conditions.

622

Wireless client scale per AP

Specify the maximum and recommended number of simultaneous wireless clients supported for each type of radio i ncluded in the proposal, listed by access point model.

All Catalyst 9100 APs support up to 500 clients per AP

623

AP to controller communication - control channel

Describe the control channel between wireless access points and the wireless controller.

Cisco lightweight access points use the IETF standard CAPWAP to communicate with the controller and other light weight access points on the network.
In a CAPWAP environment, a lightweight access point discovers a controller by using CAPWAP discovery mechani sms and then sends the controller a CAPWAP join request. The controller sends the access point a CAPWAP join r esponse allowing the access point to join the controller. When the access point joins the controller, the controller m anages its configuration, firmware, control transactions, and data transactions.
Cisco WLCs enable you to encrypt CAPWAP control packets (and optionally, CAPWAP data packets) that are sent between the AP and the Cisco WLC using DTLS. DTLS is a standards-track IETF protocol based on TLS. CAPWA P control packets are management packets exchanged between a controller and an access point, while CAPWAP data packets encapsulate forwarded wireless frames. CAPWAP control and data packets are sent over separate U DP ports: 5246 (control) and 5247 (data). If an access point does not support DTLS data encryption, DTLS is ena bled only for the control plane, and a DTLS session for the data plane is not established.

624

Device fingerprinting

Describe the method used for device fingerprinting and the types of devices and operating systems that the proposed system can identify.

In Cisco WLAN Controller Monitor Dashboard, you can see the operating system running in the connected clients. This list is sorted according to the number of clients of each OS type.
In Cisco DNA Center, if your network uses Cisco ISE for user authentication, you can configure DNA Center Assurance for Cisco ISE integration. This will allow you to see more information about wired clients, such as the username and operating system, in DNA Center Assurance.
Cisco ISE uses network probes, a method used to collect an attribute or set of attributes from an endpoint on your network. The probe allows you to create or update endpoints with their matched profile in the Cisco ISE database.
Cisco ISE can profile devices using a number of network probes that analyze the behavior of devices on the network and determine the type of the device. Network probes help you to gain more network visibility:
IP Address and MAC Address Binding
NetFlow Probe
DHCP Probe
DHCP SPAN Probe
HTTP Probe
HTTP SPAN Probe
RADIUS Probe
Network Scan (NMAP) Probe
DNS Probe
SNMP Query Probe
SNMP Trap Probe
Active Directory Probe.

625

Throughput capacity

Describe the tested throughput capacity of your controller with respect to wireless client traffic and the method for determining the specified capacity.

Cisco 9800-80 Wireless Controller supports up to:
40-Gbps throughput
6,000 access points
64,000 clients.

626

Product lifecycle

Describe where the proposed wireless controllers and access points are in their product life cycle.

Cisco 9800 Wireless Controller and Cisco 9100 Access Point are both in "Orderable Status," with full sale, deployment, and support features.

627

AP plenum rating

List the controller supported access points that are plenum rated.

Cisco 9100 Access Point is compliant with UL 2043 standard, which is a plenum-rated standard.

628

Controller topology

Provide a diagram of the proposed controller topology. A network diagram of the current environment can be provid ed upon request for reference.

Cisco is recommending a distributed model with intersite redundancy. A distributed design model is recommended primarily for large-scale deployments. The benefits of this design include IP address management, simplified confi guration and troubleshooting, and roaming at scale. In this design model, the WLAN controller and APs are both lo cated within the same site. You can connect the WLAN controller to a data center services block, a separate servic es block off of the campus core, or a LAN distribution layer. Wireless traffic between WLAN clients and the LAN is t unneled by using the control and provisioning of wireless access points (CAPWAP) protocol between the controller and the AP.A distributed architecture (Figure 18) uses the nearest controller as a single point for managing Layer 2 security and wireless network policies. It also enables services to be applied to wired and wireless traffic in a con sistent and coordinated fashion.
In addition to providing the traditional benefits of a Cisco Unified Wireless Network approach, the distributed desig n model meets the following customer demands:
Seamless mobility—Enables fast roaming across the campus, so that users remain connected to their session eve n while walking between various floors or adjacent buildings with changing subnets
Ability to support rich media—Enhances robustness of voice with call admission control and multicast with Cisco Vi deoStream technology
Centralized policy—Enables intelligent inspection through the use of firewalls, as well as application inspection, net work access control, policy enforcement, and accurate traffic classification.

629

Questions and Clarifications - Wireless - Wireless Related

630

Maximum SSID count

Specify the number of SSIDs that can be simultaneously advertised on each proposed access point model.

The Cisco Aironet 9100 Series Access Point supports 16 BSSIDs per radio for a total of 16 WLANs per radio.

631

Band-steering method

Describe the method used to band-steer clients.

Cisco 8540 Wireless Controller supports Band Selection feature (aka Band-Steering) to enable client radios that a re capable of dual-band (2.4 and 5-GHz) operations to move to a less congested 5-GHz access point.
The band selection algorithm affects clients that use 2.4-GHz band. Initially, when a client sends a probe request t o an access point, the corresponding client probe's Active and Count values (as seen from the band select table) become one. The algorithm functions based on the following scenarios:
Scenario1—Client RSSI (as seen from the show cont d0/d1 | begin RSSI command output) is greater than both Mid RSSI and Acceptable Client RSSI:
Dual-band clients—No 2.4-GHz probe responses are seen at any time; 5-GHz probe responses are seen for all 5-GHz probe requests.
Single-band (2.4-GHz) clients—2.4-GHz probe responses are seen only after the probe suppression cycle.
After the client's probe count reaches the configured probe cycle count, the algorithm waits for the Age Out Suppr ession time and then marks the client probe's Active value as 0. Then, the algorithm is restarted.
Scenario2—Client RSSI (as seen from show cont d0/d1 | begin RSSI) lies between Mid-RSSI and Acceptable Client RSSI:
All 2.4-GHz and 5-GHz probe requests are responded to without any restrictions.
This scenario is similar to the band select disabled.

632 Load-balancing method

Describe the method used to load-balance clients across access points, including the method to determine which access points are included in the set of access points available for load balancing a client.

When a wireless client attempts to associate to a lightweight access point, association response packets are sent to the client with an 802.11 response packet, including status code 17. The code 17 indicates that the AP is busy. The AP does not respond with an association response bearing “success” if the AP threshold is not met. And with code 17 (AP busy), if the AP utilization threshold is exceeded, another less busy AP hears the client request.
For example, if the number of clients on AP1 is more than the number of clients on AP2 plus the load-balancing window, then AP1 is considered to be busier than AP2. When a client attempts to associate to AP1, it receives an 802.11 response packet with status code 17, indicating that the access point is busy, and the client attempts to associate to a different access point.
You can configure the controller to deny client associations up to 10 times (if a client attempted to associate 11 times, it would be allowed to associate on the 11th try). You can also enable or disable load balancing on a particular WLAN, which is useful if you want to disable load balancing for a select group of clients (such as time-sensitive voice clients).
Passive scanning clients will be able to associate to an AP irrespective of whether load balancing is enabled or not.
You can configure the controller to analyze the WAN interface utilization of neighboring APs and then load balance the clients across the lightly loaded APs. You can configure this by defining a load balancing threshold. By defining the threshold, you can measure the WAN interface utilization percentage. For example, a threshold value of 50 triggers the load balancing upon detecting utilization of 50 percent or more on an Access Point-Wide Area Network (AP-WAN) interface.

633 Auto-channel strategy

Describe the auto-channel assignment strategy.

Cisco WLAN Controllers and Access Points using RRM software embedded in the Cisco Wireless LAN Controller act as a built-in RF engineer to consistently provide real-time RF management of your wireless network. RRM enables Cisco WLCs to continually monitor their associated lightweight access points for the following information:
Traffic load—The total bandwidth used for transmitting and receiving traffic. It enables wireless LAN managers to track and plan network growth ahead of client demand.
Interference—The amount of traffic coming from other 802.11 sources.
Noise—The amount of non-802.11 traffic that is interfering with the currently assigned channel.
Coverage—The RSSI and Signal-to-Noise Ratio (SNR) for all connected clients.
Other—The number of nearby access points.
Using this information, RRM can periodically reconfigure the 802.11 RF network for best efficiency. To do this, RRM performs these functions:
Radio resource monitoring
Transmit power control to auto-power
Dynamic channel assignment to auto-channel
Coverage hole detection and correction.
You can specify the channels that the DCA algorithm considers when selecting the channels to be used for RRM scanning by using the Cisco WLC GUI.

634

Auto-power strategy

Describe the auto-power assignment strategy.

Cisco WLAN Controllers and Access Points using RRM software embedded in the Cisco Wireless LAN Controller act as a built-in RF engineer to consistently provide real-time RF management of your wireless network. RRM enables Cisco WLCs to continually monitor their associated lightweight access points for the following information:
Traffic load—The total bandwidth used for transmitting and receiving traffic. It enables wireless LAN managers to track and plan network growth ahead of client demand.
Interference—The amount of traffic coming from other 802.11 sources.
Noise—The amount of non-802.11 traffic that is interfering with the currently assigned channel.
Coverage—The RSSI and SNR for all connected clients.
Other—The number of nearby access points.
Using this information, RRM can periodically reconfigure the 802.11 RF network for best efficiency. To do this, RRM performs these functions:
Radio resource monitoring
Transmit power control to auto-power
Dynamic channel assignment to auto-channel
Coverage hole detection and correction.
You can specify the channels that the DCA algorithm considers when selecting the channels to be used for RRM scanning by using the Cisco WLC GUI.

635

Channels supported

Specify all the channels (including DFS channels) certified by the FCC for use with each proposed radios listed by access point model.

Refer to the section identifying Frequency band and 20-MHz operating channels on the following document: https://www.cisco.com/c/en/us/products/collateral/wireless/catalyst-9100ax-access-points/datasheet-c78-741988.html

636

Azimuth and Elevation charts

Provide Azimuth and Elevation charts for each radio in the proposed access point models using the proposed omni-directional antennas (integrated or external).

Please refer to figures 27-43 of the following document located here: https://www.cisco.com/c/en/us/products/collateral/wireless/catalyst-9100ax-access-points/deployment-guide-c07-741977.html

637

Point-to-point bridging support

Describe how bridging between access points (point-to-point) can be supported in the proposed solution.

Cisco WLAN Controller and Access Points support Mesh and Workgroup Bridge:
The wireless mesh terminates on two points on the wired network. The first location is where the Rooftop AP (RAP) attaches to the wired network, and where all bridged traffic connects to the wired network. The second location is where the CAPWAP controller connects to the wired network; this location is where the WLAN client traffic from the mesh network connects to the wired network. The WLAN client traffic from CAPWAP is tunneled at Layer 2, and matching WLANs should terminate on the same switch VLAN where the controllers are collocated. The security and network configuration for each of the WLANs on the mesh depend on the security capabilities of the network to which the controller is connected.
A WorkGroup Bridge (WGB) is a small standalone unit that can provide a wireless infrastructure connection for Ethernet-enabled devices. Devices that do not have a wireless client adapter to connect to the wireless network can be connected to the WGB through the Ethernet port. The WGB is associated with the root AP through the wireless interface, which means that wired clients get access to the wireless network.

638

Spectrum analysis features

Describe the spectrum analysis capabilities of your solution, including the types of interference that can be identified, and any impact on serving wireless clients (i.e., does the access point use time slices between serving clients and monitoring RF).

The Aironet 9100 Series Access Point supports CleanAir, which delivers proactive, high-speed spectrum intelligence across channels to combat performance problems due to wireless interference. Combined with the WLC and Cisco Prime Infrastructure, it will provide a self-healing system with superior quality of experience for any use in the network.

639

802.11ax support

Describe your roadmap plans for 802.11ax support including anticipated controller and/or architecture changes needed to support.

The Cisco Catalyst 9100 Access Points can be managed by all Cisco Catalyst 9800 Series Wireless Controllers. In addition, they are supported by the Cisco 3504, 5520, and 8540 Wireless Controllers.
The Cisco Catalyst 9100 Access Points are designed to work with Cisco DNA Center (Release 1.2.10 and later) for simplified network management and orchestration, with automation, assurance, and topology support. They can also be managed by Cisco Prime ® Infrastructure (Release 3.6 and later).

640

Wireless mesh capabilities

The University does not have immediate plans on implementing wireless mesh but would like to understand options for future implementation. Describe the wireless mesh capabilities of your products.

Cisco has several AP models that support MESH deployments, mainly for outdoor purposes. Basic deployment involves configuring one of the radios of the AP for the backhaul mesh mode, while the other radios are used for local access.

641

High density strategy

Describe your architectural strategy for supporting areas with a high density of users.

Cisco provides a complete design guideline for designing and implementing wireless networks for high-density areas in higher education scenarios like university and college campuses. The design is divided into five principles:
1. Establishing a valid per-connection bandwidth requirement.
2. Calculating the aggregate throughput required for a coverage area.
3. Choosing a high-minimum data rate to support efficiency, lower duty cycle, and reduce the effective size of the resulting cel.
4. Determining the channel plan that will be supported and how it will be administered.
5. Accounting for and managing all energy within the operating spectrum.
The complete guide, “Wireless LAN Design Guide for High Density Client Environments in Higher Education."

642

Questions and Clarifications - Wireless - Management

643

Controller fail-over

Describe the controller failover model.

The Cisco WLC 9800 failover process is called Stateful Switch Over (SSO). In this configuration, a 1:1 (Active- Standby-Hot) configuration is deployed with two controllers, meaning one controller is active and manages all the APs, and a standby controller is waiting in the event a problem with the main controller occurs.

644

AP behavior during a controller fail-over event

Describe how an access point moves from a primary to a backup controller after a controller fails including the time required for the process to complete.

One of the controllers assumes complete control of the active APs. When the primary controller presents a failure, the switch-over process begins, moving all active APs to the standby controller. If the main controller returns to its normal state, the complete environment can be configured to make the APs return to the main controller, or they can stay in the secondary controller if preferred. The time required for the complete databases of the active WLC to be copied on the standby WLC (once it is detected that failover has to be done) ranges between 15 to 20 minutes.

645

Controller upgrade process

Describe the controller upgrade process.

For the Cisco 9800 controller upgrade process, there are several steps required. These steps are detailed here: https://www.cisco.com/c/en/us/td/docs/wireless/controller/9800/config-guide/b_wl_16_10_cg/software-maintenance-upgrade.html

646

Largest recommended subnet size

Please indicate the largest recommended subnet size for client traffic when utilizing centralized forwarding.

Best practice recommendation is /21 to /23, see Table 6.
Table 6. Subnet Size
Prefix size Network mask Usable hosts per subnet
/20 255.255.240.0 4,094
/21 255.255.248.0 2,046
/22 255.255.252.0 1,022
/23 255.255.254.0 510

647

Questions and Clarifications - Wireless - Physical, power, and cooling characteristics

648

Recommended AP mounting position

Specify the recommended/optimal mounting position (wall, ceiling, in-wall outlet) for each proposed access point mo del.

The Cisco Aironet 9100 Access Points support both ceiling and wall-mount configurations. Either of these deploym ents can be good implementations, as long as there are no major obstacles for the wireless signal. If this AP is cho sen for a wall configuration, external antennae model would be recommended.

649

Mounting bracket

Provide a diagram for the mounting brackets for each proposed access points.

Please refer to figure 10-25 for various mounting options of the document located here: https://www.cisco.com/c/en /us/products/collateral/wireless/catalyst-9100ax-access-points/deployment-guide-c07-741977.html#_Toc3418526

650

Supported AP mounting position

Specify all supported mounting positions (wall, ceiling, in-wall outlet) for each proposed access point model and the considerations for mounting an access point not in the recommended position.

The Cisco Aironet 9100 AP has different mounting options; it can be mounted directly to a ceiling on the gridwork or to a wall. It also supports third party mounting options from Oberon wireless.

651

Controller size

Specify the height in number of rack units for each proposed standalone-controller or chassis system.

9800-80 WLC
2RU
Physical dimensions
Dimension Value
Width: 17.3 inches (43.94 cm)
Depth: 20.5 inches (52.07 cm)
Height: 3.47 inches (8.81 cm)
Weight: 31.5 lb (14.29 kg)

652

Controllers supported in a chassis

If proposing a chassis-based system, specify the number of controllers supported in a single chassis.

Not applicable. Cisco 9800 WLC is not a chassis-based controller.

653

120v power requirements

Specify the power requirements of each proposed controller or chassis configuration when using 120V AC power.

The Cisco 9800-80 WLC supports two 1100W AC or 950W self-ranging power supply, going from 85 up to 264VAC for input.

654

208v power requirements

Specify the power requirements of each proposed controller or chassis configuration when using 208V AC power.

The Cisco 9800-80 WLC supports two 1100W AC or 950W self-ranging power supply, going from 85 up to 264VAC for input.

655

48v power requirements

Specify the power requirements of each proposed controller or chassis configuration when using -48V DC power.

The Cisco 9800-80 WLC supports two 1100W AC or 950W self-ranging power supply, going from 85 up to 264VAC for input.

656

Thermal output

Specify the BTU output for each standalone controller or chassis model in the proposed configuration for 120V AC and 208V AC operation.

The Cisco 9800-80 WLC has a heat dissipation: 2047 BTU/hr

657

Maximum power consumption

Specify the maximum power consumption of each proposed standalone controller or chassis model.

The Cisco 9800-80 WLC has a maximum power consumption of 600W.

658

Maximum thermal output

Specify the maximum BTU output for each proposed standalone controller or chassis model.

The Cisco 9800-80 WLC has a heat dissipation: 2047 BTU/hr

659

AP power needs for future access points

Please provide your assessment of future power needs for access points.

For the foreseeable future, all proposed indoor APs will draw less than 30W of power each.

660

Required Features – Software Platforms

Proposed solutions must offer components which support the following list of features. Please simply affirm or deny t hat your proposed solution meets the following requirements by notating each item with “accept”, “deny”, or “varianc e.” Please explain any variances in your product. The Bidder cannot answer “accept” if the feature is not currently a vailable in the proposed hardware running current general availability (production) release software. If a feature is n ot in production software at the time of the RFP submission, the Bidder must choose “deny” or “variance.” If a featur e not in production software is described under a “variance,” it must be noted the feature is not currently available.

661

Required Features – Software Platforms - General

662

Automated backups

Proposed software systems must support a mechanism for automated backups to a secondary storage server using a secure protocol.

Accept

663

Variance to automated backups

Variance to mechanism for automated backups to a secondary storage server using a secure protocol.

No response

664

Restore from backup

The backup for any proposed software systems must be loadable such that the system is fully functional after a restore of an archived configuration.

Accept

665

Variance to restore from backup

Variance to The backup for any proposed software systems must be loadable such that the system is fully functional after a restore of an archived configuration.

No response

666

Two factor support

The proposed software platforms must allow for 2-factor authentication.

Accept

667

Variance to two factor support

Variance to The proposed software platforms must allow for 2-factor authentication.

No response

668

Required Features – Software Platforms - Network Access Control

669

NAC deployable as a discreet system

The network access control platform, or NAC, providing RADIUS and policy enforcement must be a discreet software system, separate from other software systems or components.

Accept

670

Variance to NAC deployable as a discreet system

Variance to The network access control platform, or NAC, providing RADIUS and policy enforcement must be a discreet software system, separate from other software systems or components.

No response

671

NAC platform scale

The proposed NAC platform must be scalable to expand support for wired and wireless authentication as the environment grows.

Accept

672

Variance to nAC platform scale

Variance to The proposed NAC platform must be scalable to expand support for wired and wireless authentication as the environment grows.

No response

673

NAC deployable in a geographically redundant manner

The proposed NAC platform must be deployable in a geographically redundant manner such that two separate data centers could house components of the NAC and the loss of any one data center would not degrade the ability to authenticate clients.

Accept

674 **Variance to NAC deployable in a geographically redundant manner**

Variance to The proposed NAC platform must be deployable in a geographically redundant manner such that two separate data centers could house components of the NAC and the loss of any one data center would not degrade the ability to authenticate clients.

No response

675 **NAC support for 802.1x authentication**

The proposed NAC platform must allow for the support of 802.1x EAP-PEAP and EAP-TLS authentication.

Accept

676 **Variance to nAC support for 802.1x authentication**

Variance to The proposed NAC platform must allow for the support of 802.1x EAP-PEAP and EAP-TLS authentication.

No response

677 **NAC support for MAC authentication**

The proposed NAC platform must support MAC address authentication with a web-based method for end-users to register MAC addresses for authentication.

Accept

678 **Variance to nAC support for MAC authentication**

Variance to MAC address authentication with a web-based method for end-users to register MAC addresses for authentication.

No response

679 **NAC support for captive portal authentication**

The proposed NAC platform must support a captive-portal feature to authenticate users via a web page in the absence of all other authentication options; i.e. guest access via provided credentials or acceptance of acceptable-use policy.

Accept

680 **Variance to nAC support for captive portal authentication**

Variance to captive-portal feature to authenticate users via a web page in the absence of all other authentication options; i.e. guest access via provided credentials or acceptance of acceptable-use policy.

No response

681 **NAC support for RADIUS attributes**

The proposed NAC platform must support standard RADIUS attributes and be able to assign policies based on received attributes.

Accept

682 **Variance to nAC support for RADIUS attributes**

Variance to standard RADIUS attributes and be able to assign policies based on received attributes.

No response

683 **NAC information regarding authentication attempts**

The proposed NAC platform must provide all relevant information related to an authentication attempt, per attempt, within the NAC interface.

Accept

684	**Variance to nAC information regarding authentication attempts** Variance to The proposed NAC platform must provide all relevant information related to an authentication attempt, per attempt, within the NAC interface. *No response*
685	**NAC RBAC** The proposed NAC platform must allow role-based access to allow groups such as end-user support, to view authentication attempts for troubleshooting purposes. Accept
686	**Variance to nAC RBAC** Variance to The proposed NAC platform must allow role-based access to allow groups such as end-user support, to view authentication attempts for troubleshooting purposes. *No response*
687	**NAC profiling capabilities** The proposed NAC must offer profiling capabilities to identify, as best as possible, the type of device connecting and the OS in use. Accept
688	**Variance to nAC profiling capabilities** Variance to The proposed NAC must offer profiling capabilities to identify, as best as possible, the type of device connecting and the OS in use. *No response*
689	**NAC management of zero-configuration devices** The proposed NAC (or other component) must provide management capabilities for zero-configuration devices (i.e. Apple TVs, Google Chromecast, Amazon Fire, and etc.) allowing users to register the devices and then to enact limitations on the visibility and access of those devices via the wired and/or wireless networks. Accept
690	**Variance to nAC management of zero-configuration devices** Variance to The proposed NAC (or other component) must provide management capabilities for zero-configuration devices (i.e. Apple TVs, Google Chromecast, Amazon Fire, and etc.) allowing users to register the devices and then to enact limitations on the visibility and access of those devices via the wired and/or wireless networks. *No response*
691	**NAC integration with directory services** The NAC must allow for integration with active-directory, LDAP services and other RADIUS servers via RADIUS proxy as authentication sources. Accept
692	**Variance to nAC integration with directory services** Variance to The NAC must allow for integration with active-directory, LDAP services and other RADIUS servers via RADIUS proxy as authentication sources. *No response*

693

NAC delivery of dynamic policies

The NAC must allow delivery of dynamic policies and ACLs to wired switches and wireless controllers, allowing for ce ntralization of client authorization components.

Accept

694

Variance to nAC delivery of dynamic policies

Variance to The NAC must allow delivery of dynamic policies and ACLs to wired switches and wireless controllers, all owing for centralization of client authorization components.

No response

695

NAC redundancy

The NAC solution must be sized to allow redundant components to be installed within the data centers in Lincoln an d Omaha for geographic redundancy.

Accept

696

Variance to nAC redundancy

Variance to The NAC solution must be sized to allow redundant components to be installed within the data centers i n Lincoln and Omaha for geographic redundancy.

No response

697

Required Features – Software Platforms - Monitoring & Analytics

698

Monitoring of component groups

Proposed software monitoring platforms must allow for the grouping of individual monitored hardware components; i .e. group all components within a specific building or location.

Accept

699

Variance to monitoring of component groups

Variance to Proposed software monitoring platforms must allow for the grouping of individual monitored hardware co mponents; i.e. group all components within a specific building or location.

No response

700

RBAC into monitoring solution

Proposed monitoring solutions must allow for role-based access, with limitations on the information that can be acce ssed and the scope, to allow for some interaction by front-line support personnel.

Accept

701

Variance to rBAC into monitoring solution

Variance to Proposed monitoring solutions must allow for role-based access, with limitations on the information that can be accessed and the scope, to allow for some interaction by front-line support personnel.

No response

702

Monitoring - AP information

Proposed monitoring platforms must provide the following minimum information related to wireless access-points: AP Name, Type of hardware, Connected users, LAN MAC, Individual radio information: channel, BSSID(s), SSID(s)powe r, number of clients and bandwidth usage, Serial number, IP Address, and Relevant information related to physical E thernet interfaces on the AP.

Accept

703

Variance to monitoring - AP information

Variance to Proposed monitoring platforms must provide the following minimum information related to wireless acces s-points: AP Name, Type of hardware, Connected users, LAN MAC, Individual radio information: channel, BSSID(s), SSID(s)power, number of clients and bandwidth usage, Serial number, IP Address, and Relevant information related to physical Ethernet interfaces on the AP.

No response

704

Monitoring - Client information

Proposed monitoring platforms must provide the following minimum information related to wireless clients: Username , Assigned IPv4/IPv6 address(es), Associated SSID, MAC Address, Assigned VLAN, Associated AP, and OS and De vice information.

Accept

705

Variance to monitoring - Client information

Variance to Proposed monitoring platforms must provide the following minimum information related to wireless client s: Username, Assigned IPv4/IPv6 address(es), Associated SSID, MAC Address, Assigned VLAN, Associated AP, and OS and Device information.

No response

706

Monitoring - Switch information

Proposed monitoring platforms must provide the following minimum information related to switches: Switch name, IP Address, Per-port attached MAC Addresses, Per-port number of connected users, LLDP information, and Per-port bandwidth information.

Accept

707

Variance to monitoring - Switch information

Variance to Proposed monitoring platforms must provide the following minimum information related to switches: Swit ch name, IP Address, Per-port attached MAC Addresses, Per-port number of connected users, LLDP information, a nd Per-port bandwidth information.

No response

708

Monitoring - multiple clients on a single port

Proposed monitoring platforms must provide the following minimum information related to authenticated wired clients . If multiple clients authenticate to an individual port, information for all clients must be shown. 1) Username 2) MAC Address 3) Assigned VLAN

Accept

709

Variance to monitoring - multiple clients on a single port

Variance to Proposed monitoring platforms must provide the following minimum information related to authenticated wired clients. If multiple clients authenticate to an individual port, information for all clients must be shown. 1) Userna me 2) MAC Address 3) Assigned VLAN

No response

710

Strongly Desired Features – Software Platforms

The following list of features are highly desirable in a proposed solution. Please simply affirm or deny that your prop osed solution meets the following requirements by notating each item with “accept”, “deny”, or “variance.” Please ex plain any variances in your product. The Bidder cannot answer “accept” if the feature is not currently available in th e proposed hardware running current general availability (production) release software. If a feature is not in product ion software at the time of the RFP submission, the Bidder must choose “deny” or “variance.” If a feature not in prod uction software is described under a “variance,” it must be noted the feature is not currently available.

711 **Strongly Desired Features – Software Platforms - General**

712 **Management software deployable in a geographically redundant manner**

All software management platforms should have the ability to be deployed in a geographically redundant, manner. T he University has two data centers where components of a redundant solution would reside; layer2 extension is avai lable if needed for connectivity. Depending upon the service, activate/passive deployment is acceptable.

Accept

713 **Variance to management software deployable in a geographically redundant manner**

Variance to All software management platforms should have the ability to be deployed in a geographically redundan t, manner. The University has two data centers where components of a redundant solution would reside; layer2 exte nsion is available if needed for connectivity. Depending upon the service, activate/passive deployment is acceptable .

No response

714 **Management software integration with DUO two factor**

All software should preferably integrate with the DUO security product or leverage a secondary RADIUS server for c hained authentication. Other methods may be acceptable as long as 2-factor authentication can be accommodated.

Accept

715 **Variance to management software integration with DUO two factor**

Variance to All software should preferably integrate with the DUO security product or leverage a secondary RADIUS server for chained authentication. Other methods may be acceptable as long as 2-factor authentication can be acc ommodated.

No response

716 **Questions and Clarifications – Software Platforms**

Participant must answer the following set of questions designed to help identify basic metrics, scaling issues, and su itability. If more than one type of switch is proposed, the values for each type must be specified.

717 **Questions and Clarifications – Software Platforms - General**

718 **Software scaling figures**

Please indicate scaling numbers for all proposed software components, to include number of devices and clients th at can be authenticated, monitored and managed per server instance.

As of today, DNA Center can support 5,000 devices and 100,000 concurrent endpoints

719 **Software Open APIs**

Please indicate any open API’s that are available, and if user profile data is accessible.

Cisco APIs for all platforms can be found at developer.cisco.com

720 **DATA CENTER NETWORK SOLUTIONS**

721	**Required Features – Data Center** Proposed solutions must offer components which support the following list of features. Please simply affirm or deny that your proposed solution meets the following requirements by notating each item with “accept”, “deny”, or “variance.” Please explain any variances in your product. The Bidder cannot answer “accept” if the feature is not currently available in the proposed hardware running current general availability (production) release software. If a feature is not in production software at the time of the RFP submission, the Bidder must choose “deny” or “variance.” If a feature not in production software is described under a “variance,” it must be noted the feature is not currently available.
722	**Required Features – Data Center - General Requirements**
723	**Data rate support** Proposed solutions must have support for 1Gbps, 10Gbps, 25Gbs and 100Gbps interfaces for leaf switch. Accept
724	**Variance to data rate support** Variance to Proposed solutions must have support for 1Gbps, 10Gbps, 25Gbs and 100Gbps interfaces for leaf switch. *No response*
725	**Leaf 100Gbps support** Proposed solutions must support a minimum of four 100Gbs interfaces for each leaf switch. Accept
726	**Variance to leaf 100Gbps support** Variance to minimum of four 100Gbs interfaces for each leaf switch. *No response*
727	**Spine 100Gbps support** Proposed solutions must support 100Gbs for spine switches. Accept
728	**Variance to spine 100Gbps support** Variance to 100Gbs for spine switches. *No response*
729	**Required Features – Data Center - Ethernet Bridging protocols and functions**
730	**Spanning tree support** Proposed routers and switches must fully support IEEE 802.1D bridging, including features originally defined as 802.1w (Rapid Spanning Tree Protocol). Accept
731	**Variance to spanning tree support** Variance to IEEE 802.1D bridging, including features originally defined as 802.1w (Rapid Spanning Tree Protocol). *No response*

732 **Spanning tree edge-port support**

Proposed routers and switches must support a feature to configure a port as an edge-port, such that spanning-tree will transition more quickly/immediately to a forwarding mode and not generate topology-change-notifications (TCNs).

Accept

733 **Variance to spanning tree edge-port support**

Variance to feature to configure a port as an edge-port, such that spanning-tree will transition more quickly/immedia tely to a forwarding mode and not generate topology-change-notifications (TCNs).

No response

734 **Spanning tree bdpu-filter support**

Proposed routers and switches must support a per-port feature to ignore STP BPDUs (i.e. bpdu-filter), allowing the port to remain in a forwarding state.

Accept

735 **Variance to spanning tree bdpu-filter support**

Variance to per-port feature to ignore STP BPDUs (i.e. bpdu-filter), allowing the port to remain in a forwarding state.

No response

736 **Spanning tree bdpu-protect support**

Proposed routers/switches must support a per-port feature to block a port that receives a BPDU (i.e. bpdu-protect), applicable to ports configured as edge-ports.

Accept

737 **Variance to spanning tree bdpu-protect support**

Variance to per-port feature to block a port that receives a BPDU (i.e. bpdu-protect), applicable to ports configured as edge-ports.

No response

738 **802.1Q VLAN tagging support**

Proposed routers and switches must fully support IEEE 802.1Q VLAN tagging on layer 2 and layer 3 interfaces.

Accept

739 **Variance to 802.1Q VLAN tagging support**

Variance to IEEE 802.1Q VLAN tagging on layer 2 and layer 3 interfaces.

No response

740 **Jumbo frame support**

Proposed routers and switches must support jumbo frame sizes of 9,192+ bytes on all routed physical and virtual int erfaces and ports operating as L2-only bridging ports.

Accept

741 **Variance to jumbo frame support**

Variance to jumbo frame sizes of 9,192+ bytes on all routed physical and virtual interfaces and ports operating as L 2-only bridging ports.

No response

742

MLAG support

Proposed switches must support a form of multi-chassis link aggregation (i.e. MLAG or MC-LAG), between at least t wo switches, with control plane separation intact. Allowing for members of a downstream link-aggregate to terminate at least one member on each aggregated switch.

Accept

743

Variance to mLAG support

Variance to form of multi-chassis link aggregation (i.e. MLAG or MC-LAG), between at least two switches, with contr ol plane separation intact. Allowing for members of a downstream link-aggregate to terminate at least one member o n each aggregated switch.

No response

744

MLAG LACP support

Proposed switches must support 802.3ad compliant LACP link aggregates, including when multi-chassis link aggreg ation is used.

Accept

745

Variance to mLAG LACP support

Variance to 802.3ad compliant LACP link aggregates, including when multi-chassis link aggregation is used.

No response

746

LACP support

Members of an LACP aggregate must be able to terminate individually on the same router/switch or across different routers/switches.

Accept

747

Variance to lACP support

Variance to Members of an LACP aggregate must be able to terminate individually on the same router/switch or acr oss different routers/switches.

No response

748

Cross line-card LACP support

For chassis-based switches, proposed line cards must support IEEE 802.3ad link aggregation with aggregate memb er ports on the same, or different, line cards.

Accept

749

Variance to cross line-card LACP support

Variance to IEEE 802.3ad link aggregation with aggregate member ports on the same, or different, line cards.

No response

750

Cross stack LAG support

If fixed configuration routers/switches supporting stacking or virtual-chassis are proposed, all routers/switches in the stack must support IEEE 802.3ad link aggregation with ports on the same or different, routers/switches in the stack.

Accept

751

Variance to cross stack LAG support

Variance to IEEE 802.3ad link aggregation with ports on the same or different, routers/switches in the stack.

No response

752 **No port extenders**

Proposed routers and switches must be full-featured switches and not port extenders.

Accept

753 **Variance to no port extenders**

Variance to Proposed routers and switches must be full-featured switches and not port extenders.

No response

754 **Static MAC assignment**

Proposed routers and switches must support static MAC assignment, allowing for the mapping of a MAC address to a port or series of ports.

Accept

755 **Variance to static MAC assignment**

Variance to static MAC assignment, allowing for the mapping of a MAC address to a port or series of ports.

No response

756 **Scalable layer 2 virtualization**

Proposed routers and switches must support scalable Layer 2 virtualization over a routed core (IE: over IPv4, IPv6, or MPLS)

Accept

757 **Variance to scalable layer 2 virtualization**

Variance to scalable Layer 2 virtualization over a routed core (IE: over IPv4, IPv6, or MPLS)

No response

758 **Required Features – Data Center - IPv4 / IPv6 Protocols and Functions**

759 **Routing support**

Proposed routers must support IPv4 and IPv6 unicast and multicast routing.

Accept

760 **Variance to routing support**

Variance to IPv4 and IPv6 unicast and multicast routing.

No response

761 **Unicast routing support**

Proposed switches must support OSPFv2, OSPFv3, and BGP.

Accept

762 **Variance to unicast routing support**

Variance to OSPFv2, OSPFv3, and BGP.

No response

763

Static routing support

Proposed routers must support static routes.

Accept

764

Variance to static routing support

Variance to static routes.

No response

765

VRF support

Proposed routers must support VRFs (virtual routing and forwarding).

Accept

766

Variance to vRF support

Variance to VRFs (virtual routing and forwarding).

No response

767

Virtualization overlay support

Proposed routers must support IPv4 and IPv6 virtualized routing through an overlay (IE: MPLS-L3VPN, VXLAN-EVPN, MPLS-EVPN, or other overlay technologies).

Accept

768

Variance to virtualization overlay support

Variance to IPv4 and IPv6 virtualized routing through an overlay (IE: MPLS-L3VPN, VXLAN-EVPN, MPLS-EVPN, or other overlay technologies).

No response

769

Anti-spoofing features

Proposed routers must support address anti-spoofing for edge services. (IE: When a router is acting as a default gateway for an IPv4/IPv6 network)

Accept

770

Variance to anti-spoofing features

Variance to address anti-spoofing for edge services. (IE: When a router is acting as a default gateway for an IPv4/IPv6 network)

No response

771

Required Features – Data Center - Management Functions

772

SNMP support

Proposed routers and switches must support SNMPv2c and SNMPv3.

Accept

773

Variance to sNMP support

Variance to SNMPv2c and SNMPv3.

No response

774 **SSH management access**

Proposed routers and switches must support remote access to the command line interface (CLI) via SSHv2.

Accept

775 **Variance to sSH management access**

Variance to remote access to the command line interface (CLI) via SSHv2.

No response

776 **SSH access control**

Proposed routers and switches must support restricting access to SSH by an ACL or equivalent protection.

Accept

777 **Variance to sSH access control**

Variance to restricting access to SSH by an ACL or equivalent protection.

No response

778 **Serial console support**

Proposed routers and switches must support access to the CLI via a serial console port, or some other method to communicate via direct physical connection.

Accept

779 **Variance to serial console support**

Variance to access to the CLI via a serial console port, or some other method to communicate via direct physical connection.

No response

780 **RADIUS or TACACS+ support**

Proposed routers and switches must support RADIUS or TACACS+ authentication for SSH and serial console users.

Accept

781 **Variance to rADIUS or TACACS+ support**

Variance to RADIUS or TACACS+ authentication for SSH and serial console users.

No response

782 **Local account failover**

Proposed routers and switches must support failover to a user account locally defined on the device, if the RADIUS or TACACS+ server is unreachable.

Accept

783 **Variance to local account failover**

Variance to failover to a user account locally defined on the device, if the RADIUS or TACACS+ server is unreachable.

No response

784 **Encryption of RADIUS or TACACS+ secrets**

Proposed routers and switches must support encryption of the RADIUS and TACACS+ shared secret stored in the configuration file.

Accept

785

Variance to encryption of RADIUS or TACACS+ secrets

Variance to encryption of the RADIUS and TACACS+ shared secret stored in the configuration file.

No response

786

Local password encryption

Proposed routers and switches must support encryption of local user passwords stored in the configuration file.

Accept

787

Variance to local password encryption

Variance to encryption of local user passwords stored in the configuration file.

No response

788

Configuration backup

Proposed routers and switches must be able to represent its configuration (such as a text file) that can be uploaded to restore a configuration.

Accept

789

Variance to configuration backup

Variance to Proposed routers and switches must be able to represent its configuration (such as a text file) that can be uploaded to restore a configuration.

No response

790

Syslog support

Proposed routers and switches must support logging to a syslog server on a configurable port other than default sy slog (udp/514).

Accept

791

Variance to syslog support

Variance to logging to a syslog server on a configurable port other than default syslog (udp/514).

No response

792

SNTP support

Proposed routers and switches must preferably support NTP as described in RFC 5905, or at minimum, SNTP as de scribed by RFC 4330.

Accept

793

Variance to sNTP support

Variance to Proposed routers and switches must preferably support NTP as described in RFC 5905, or at minimum, SNTP as described by RFC 4330.

No response

794

LLDP support

Proposed routers and switches must support IEEE 802.1ab Link-Layer Discovery Protocol (LLDP).

Accept

795

Variance to lLDP support

Variance to IEEE 802.1ab Link-Layer Discovery Protocol (LLDP).

No response

796

Storm control

Proposed routers and switches must support some form of traffic limiting/policing or storm-control per port.

Accept

797

Variance to storm control

Variance to some form of traffic limiting/policing or storm-control per port.

No response

798

Interface naming

Proposed switches must support naming of individual interfaces within the configuration and this information must b e retrievable via CLI "show" commands and SNMP.

Accept

799

Variance to interface naming

Variance to naming of individual interfaces within the configuration and this information must be retrievable via CLI " show" commands and SNMP.

No response

800

Encrypted file transfer

Proposed routers and switches must support secure encrypted file transfer for uploading/downloading code or confi guration files.

Accept

801

Variance to encrypted file transfer

Variance to secure encrypted file transfer for uploading/downloading code or configuration files.

No response

802

Required Features – Data Center - Physical & Power Characteristics

803

Equipment dimensions

Proposed routers and switches must be mountable in both a standard two-rail 19" communication rack (preferred) a nd a standard 19" four-post server rack.

Accept

804

Variance to equipment dimensions

Variance to Proposed routers and switches must be mountable in both a standard two-rail 19" communication rack (preferred) and a standard 19" four-post server rack.

No response

805

input voltage

Proposed routers and switches must support 120 and 208 VAC capable power supplies.

Accept

806

Variance to input voltage

Variance to 120 and 208 VAC capable power supplies.

No response

807 **Power supply redundancy**

Proposed routers and switches must contain N+1 power redundancy, such that if any individual power supply were t o fail or lose power, the device would continue to function without any impairment. For example, if a device requires three power supplies to function, the switch must support four power supplies such that any individual power supply could fail and the device would continue to function without impairment.

Accept

808 **Variance to power supply redundancy**

Variance to four power supplies such that any individual power supply could fail and the device would continue to fu nction without impairment.

No response

809 **Hot swappable power supplies**

Proposed routers and switches must have hot swappable power supplies.

Accept

810 **Variance to hot swappable power supplies**

Variance to Proposed routers and switches must have hot swappable power supplies.

No response

811 **Hot swappable line cards**

All modular switches must support hot swapping of line cards, without adversely affecting other cards in operation.

Accept

812 **Variance to hot swappable line cards**

Variance to hot swapping of line cards, without adversely affecting other cards in operation.

No response

813 **Resiliency of a stack during individual unit failure**

For stackable routers and switches, a switch stack must allow for the failure of any one switch, without disabling the stack or degrading the operation of the remaining stack members.

Variance

814 **Variance to resiliency of a stack during individual unit failure**

Variance to For stackable routers and switches, a switch stack must allow for the failure of any one switch, without di sabling the stack or degrading the operation of the remaining stack members.

Stackable switches are not proposed for the DataCenter switching of this RFP

815 **Strongly Desired Features – Data Center**

The following list of features are highly desirable in a proposed solution. Please simply affirm or deny that your prop osed solution meets the following requirements by notating each item with “accept”, “deny”, or “variance.” Please ex plain any variances in your product. The Bidder cannot answer “accept” if the feature is not currently available in th e proposed hardware running current general availability (production) release software. If a feature is not in product ion software at the time of the RFP submission, the Bidder must choose “deny” or “variance.” If a feature not in prod uction software is described under a “variance,” it must be noted the feature is not currently available.

816 **Strongly Desired Features – Data Center - General**

817

Third party optics and transceivers

Proposed routers and switches should support third-party optics and transceivers.

Variance

818

Variance to third party optics and transceivers

Variance to third-party optics and transceivers.

Third-party optics will function in the Nexus 9000 switches, but will not be supported under maintenance contracts.

819

Strongly Desired Features – Data Center - Ethernet Bridging Protocols and Functions

820

802.1q VLAN tag re-use

Proposed routers and switches should support the re-use of an 802.1q VLAN tag in different bridging domains for d ownstream devices.

Accept

821

Variance to 802.1q VLAN tag re-use

Variance to the re-use of an 802.1q VLAN tag in different bridging domains for downstream devices.

No response

822

MAC table size

Proposed routers and switches should support hardware forwarding for a minimum of 60,000 hosts (MAC table entri es) via layer 2 bridging functions, please indicate the maximum.

Accept

823

Variance to mAC table size

Variance to hardware forwarding for a minimum of 60,000 hosts (MAC table entries) via layer 2 bridging functions, pl ease indicate the maximum.

No response

824

Supported MAC entries per VLAN

Proposed routers and switches should support a minimum of 4,096 hosts, or MAC entries, in a single layer 2 VLAN. Please indicate the maximum.

Accept

825

Variance to supported MAC entries per VLAN

Variance to minimum of 4,096 hosts, or MAC entries, in a single layer 2 VLAN. Please indicate the maximum.

No response

826

Broadcast storm control

Proposed routers and switches should support broadcast storm control and multicast storm control for all ports oper ating as L2-only bridging ports.

Accept

827

Variance to broadcast storm control

Variance to broadcast storm control and multicast storm control for all ports operating as L2-only bridging ports.

No response

828	**Strongly Desired Features – Data Center - IPv4 / IPv6 Protocols and Functions**

829	**Static ARP Support** Proposed routers and switches should support IPv4 static ARP entries. Accept

830	**Variance to static ARP Support** Variance to IPv4 static ARP entries. *No response*

831	**Static IPv6 ND support** Proposed routers and switches should support IPv6 static neighbor-table entries. Accept

832	**Variance to static IPv6 ND support** Variance to IPv6 static neighbor-table entries. *No response*

833	**IPv4 and IPv6 feature parity in forwarding** Proposed routers and switches should have feature parity between IPv4 and IPv6 forwarding. Accept

834	**Variance to iPv4 and IPv6 feature parity in forwarding** Variance to Proposed routers and switches should have feature parity between IPv4 and IPv6 forwarding. *No response*

835	**IPv4 and IPv6 feature parity in management** Proposed routers and switches should have feature parity between IPv4 and IPv6 management functionality. Accept

836	**Variance to iPv4 and IPv6 feature parity in management** Variance to Proposed routers and switches should have feature parity between IPv4 and IPv6 management function ality. *No response*

837	**Routing between virtualized ethernet networks** Routing between two different virtualized Ethernet networks should be supported (IE: Routing between two different VXLAN VNIs) Accept

838	**Variance to routing between virtualized ethernet networks** Variance to Routing between two different virtualized Ethernet networks should be supported (IE: Routing between t wo different VXLAN VNIs) *No response*

839

ARP/ND suppression in overlay

Routers should support ARP/ND suppression across any overlay network.

Accept

840

Variance to aRP/ND suppression in overlay

Variance to ARP/ND suppression across any overlay network.

No response

841

Strongly Desired Features – Data Center - Management Functions

842

Zero-touch provisioning

Proposed routers and switches should support some form of zero-touch-provisioning.

Accept

843

Variance to zero-touch provisioning

Variance to some form of zero-touch-provisioning.

No response

844

Out-of-Band management

Proposed routers and switches should support an out-of-band management port.

Accept

845

Variance to out-of-Band management

Variance to an out-of-band management port.

No response

846

Control-plane-protection

Proposed routers and switches should support control plane protection. Traffic forwarding, switch adjacencies, and CLI management of the device over the serial console and out-of-band management ports should continue to functi on with high volumes of traffic. This includes, but is not limited to ARP storms, broadcast storms, DHCP relay forwar ding, and handling traffic with IP options set.

Accept

847

Variance to control-plane-protection

Variance to control plane protection. Traffic forwarding, switch adjacencies, and CLI management of the device over the serial console and out-of-band management ports should continue to function with high volumes of traffic. This i ncludes, but is not limited to ARP storms, broadcast storms, DHCP relay forwarding, and handling traffic with IP opti ons set.

No response

848

Selectable syslog facility

Proposed routers and switches should support manual assignment of syslog facilities local0 - local7.

Accept

849

Variance to selectable syslog facility

Variance to manual assignment of syslog facilities local0 - local7.

No response

850

Syslog over TCP

Proposed routers and switches should support syslog over TCP.

Variance

851

Variance to syslog over TCP

Variance to syslog over TCP.

NX-OS supports RFC 3164 compliant syslog which uses the UDP as its underlying transport layer mechanism.

852

Logging of administrative logins

Proposed routers and switches should log usernames of authorized users to the syslog server at the time of login.

Accept

853

Variance to logging of administrative logins

Variance to Proposed routers and switches should log usernames of authorized users to the syslog server at the tim e of login.

No response

854

Logging of configuration changes

Proposed routers and switches should log the username associated with configuration changes to the syslog server at the time changes are committed.

Accept

855

Variance to logging of configuration changes

Variance to Proposed routers and switches should log the username associated with configuration changes to the s yslog server at the time changes are committed.

No response

856

Syslog documentation

Syslog documentation should be provided for all syslog messages encountered during normal operation.

Accept

857

Variance to syslog documentation

Variance to Syslog documentation should be provided for all syslog messages encountered during normal operatio n.

No response

858

SNMP access control

Proposed routers and switches should support restricting SNMP access by an access control list or equivalent prote ction.

Accept

859

Variance to sNMP access control

Variance to restricting SNMP access by an access control list or equivalent protection.

No response

860

SNMP interface attributes

Proposed routers and switches should represent the following information as objects that can be queried via SNMP: 1) Status of physical devices (chassis, fan trays, power supplies, line cards, and etc.). 2) Status of resources (CPU, memory, and etc.). 3) Status and statistics of internal processes. 4) Status of physical interfaces, sub-interfaces, an d physical and virtual interfaces. 5) Traffic and error counters for physical interfaces, sub-interfaces, and physical a nd virtual interfaces.

Accept

861

Variance to sNMP interface attributes

Variance to Proposed routers and switches should represent the following information as objects that can be querie d via SNMP: 1) Status of physical devices (chassis, fan trays, power supplies, line cards, and etc.). 2) Status of reso urces (CPU, memory, and etc.). 3) Status and statistics of internal processes. 4) Status of physical interfaces, sub-i nterfaces, and physical and virtual interfaces. 5) Traffic and error counters for physical interfaces, sub-interfaces, a nd physical and virtual interfaces.

No response

862

SNMP inventory and optic light levels

Proposed routers and switches should represent the following information as objects that can be queried via SNMP. 1) Transmit and receive light levels on optical transceivers. 2) Serial number and slot position of every field replace able part.

Accept

863

Variance to sNMP inventory and optic light levels

Variance to Proposed routers and switches should represent the following information as objects that can be querie d via SNMP. 1) Transmit and receive light levels on optical transceivers. 2) Serial number and slot position of every f ield replaceable part.

No response

864

Optical power monitoring

All optical transceivers should report transmit and receive light levels.

Accept

865

Variance to optical power monitoring

Variance to All optical transceivers should report transmit and receive light levels.

No response

866

Interface counter update frequency

Proposed routers and switches should support high frequency updates for interface counters (1-5 seconds preferre d).

Accept

867

Variance to interface counter update frequency

Variance to high frequency updates for interface counters (1-5 seconds preferred).

No response

868

Role-based access based on RADIUS attribute

Proposed routers and switches should support assigning role based administrative access by using a returned RAD IUS attribute such that the router/switch restrict the execution of CLI commands based on the returned role code.

Accept

869

Variance to role-based access based on RADIUS attribute

Variance to assigning role based administrative access by using a returned RADIUS attribute such that the router/switch restrict the execution of CLI commands based on the returned role code.

No response

870

Strongly Desired Features – Data Center - Physical & Power Characteristics

871

Hot swappable fans

Any replaceable fans should be hot-swappable.

Accept

872

Variance to hot swappable fans

Variance to Any replaceable fans should be hot-swappable.

No response

873

Questions and Clarifications - Datacenter

Participant must answer the following set of questions designed to help identify basic metrics, scaling issues, and suitability. If more than one type of router or switch is proposed, the values for each type must be specified

874

Questions and Clarifications - Datacenter - Architecture

875

Block architecture diagram

Describe the architecture and provide a block diagram of that includes major components such as ASICs (Application Specific Integrated Circuit), Memory, CPU, network Modules, stack interface, etc.

Block diagrams of Cisco Nexus 9000 models are illustrated in the Nexus 9000 Architecture document found here: https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/BRKARC-3222.pdf

876

Architecture - layer 2 decisions

Describe where in the architecture layer 2 decisions are made.

Block diagrams and packet walks of Cisco Nexus 9000 models are illustrated in the Nexus 9000 Architecture document found here: https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/BRKARC-3222.pdf

877

Architecture - layer 3 decisions

Describe where in the architecture layer 3 decisions are made.

Block diagrams and packet walks of Cisco Nexus 9000 models are illustrated in the Nexus 9000 Architecture document found here: https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/BRKARC-3222.pdf

878

Architecture - ACL decisions

Describe where in the architecture ACLs (Access Control Lists) (V4 and V6) are made

Block diagrams and packet walks of Cisco Nexus 9000 models are illustrated in the Nexus 9000 Architecture document found here: https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/BRKARC-3222.pdf

879

CPU Memory

How much memory is available for the CPU?

N9K-C93180YC-FX
24GB
N9K-C9336-FX2
24GB
N9K-C9364C
32GB
N9K-C9332C
16GB

880

Buffer location and buffer sharing

Describe where buffer is located in the architecture and how it is shared.

Cloud Scale platforms implement shared-memory egress buffered architecture
Each ASIC slice has dedicated buffer – only ports on that slice can use that buffer
Dynamic Buffer Protection adjusts max thresholds based on class and buffer occupancy
Intelligent buffer options maximize buffer efficiency

881

Ports served by a single ASIC

Describe how many ports are serviced from a single ASIC

LSE ASIC
• 1.8T chip – 2 slices of 9 x 100G each
• X9700-EX modular linecards; 9300-EX TORs
LS1800FX ASIC
• 1.8T chip – 1 slice of 18 x 100G with MACSEC
• X9700-FX modular linecards; 9300-FX TORs
S6400 ASIC
• 6.4T chip – 4 slices of 16 x 100G each
• 9364C/9332C TORs; E2 fabric modules
LS3600FX2 ASIC
• 3.6T chip – 2 slices of 18 x 100G with MACSEC
+ CloudSec
• 9300-FX2 TORs

882

Packet walk within a single ASIC

Describe a packet walk through for data entering and exiting on the same ASIC.

Packet walks are illustrated in Cisco Live documentation titled Nexus 9000 Architecture. A presentation can be vie wed here: https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/BRKARC-3222.pdf

883

Packet walk within a single switch

Describe a packet walk through for data entering and exiting from a different ASIC on the same switch.

Packet walks are illustrated in Cisco Live documentation titled Nexus 9000 Architecture. A presentation can be vie wed here: https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/BRKARC-3222.pdf

884

Packet walk through different units in a stack

Describe a packet walk through for data entering and exiting via another switch on the stack.

Stackable switches are not proposed in the DataCenter section of this RFP

885

Architecture - overbooked components

Describe where the architecture is overbooked.

All Cisco Nexus switches proposed in this solution are non-blocking.
The Nexus 9364C switch supports Layer 2 and 3 non-blocking with aggregate 12.84 Tbps of bandwidth across 64 fixed 40/100G QSFP28 ports and 2 fixed 1/10G SFP+ ports.
The Nexus 9332C switch supports Layer 2 and 3 non-blocking with aggregate 6.4 Tbps of bandwidth across 32 fix ed 40/100G QSFP28 ports and 2 fixed 1/10G SFP+ ports.
The Nexus 93180YC-FX switch supports Layer 2 and 3 non-blocking with aggregate 3.6 Tbps of bandwidth across 6 fixed 40/100G QSFP28 ports and 48 fixed 1/10/25G SFP+ ports.
The Nexus 9336C-FX2 switch supports Layer 2 and 3 non-blocking with aggregate 7.2 Tbps of bandwidth across 3 6 fixed 1/10/25/40/100G ports

886 **Architecture -other features**

Describe any other architectural features that were not asked about that are important.

Network OS - NX-OS Stable and Programmable
Real process separation since Day-1 - including routing protocols, for true isolation, stability and restartability.
Clean VRF implementation, for high VRF scale and stability. OSPF and BGP are completely VRF-aware for all features.
Enhanced ISSU: unique NX-OS container-based upgrade, bringing a sub-6 sec industry-leading control-plane downtime upon upgrade.
Modern object-based architecture with DME, exposed via NX-API REST.
Industry-leading Ansible support with 70+ NX-OS modules, and unparalleled performance and simplicity.
Complete YANG solution: auto-generated YANG APIs with YDK.
Solid virtualization version with N9Kv including full support for VXLAN EVPN, including VXLAN routing, multi-site, and TRM.

Fabric with VXLAN EVPN
Scalable and Extensible Fabric Design and DCI with Multi-Site
Distributed and VRF-Aware Multicast Routing with Tenant Routed Multicast (TRM); single copy of Multicast packet within and between Sites
vPC without Peer Link as a consistent, more scalable, better converging MLAG architecture
Optimized Forwarding and redirection for Network Functions & L4-L7 Services (virtual or physical Network Functions); VXLAN EVPN-aware PBR, ESR, Multipathing
Private VLAN integration with VXLAN
IPv6 VTEP and Underlay for VXLAN – VXLANv6
VXLAN Ping, Traceroute and Pathtrace with VXLAN OAM; within and between Sites
High Scale of VRFs (900/0) and Networks (2000/4000)
Unicast- and Multicast-based Underlay for better scalability
Seamless Integration into MPLS and SR (L3VPN)

Day-1 Automation Advantage with DCNM
Simple, GUI-based workflows including VXLAN EVPN, multi-site and TRM.
Integration for Public Cloud Connectivity using CSR1kv
Native switch role awareness (leaf, spine, border leaf, etc).
Topology and link awareness for provisioning.
Resource management and visibility (point-to-point IPs, VLANs, VNIs, etc).
Real brownfield import including resources.
Easy rollback.
Endpoint and VMM support for deep compute visibility.
VXLAN OAM for deep VXLAN visibility.

Day-2 Ops and Telemetry Advantage with NIR
Deep Hardware Visibility, Anomalies and Root Cause Identification
Industry-leading hardware-based telemetry: ASIC-level flow visibility, flow drop reason, flow latency, interface statistics, and buffer usage.
Combined with NX-OS software telemetry: NX-OS configuration, environmentals, routing, and more - for total visibility.
Anomaly detection: define baseline trends, and raise errors automatically.
Root cause of anomalies are automatically identified via diagnosis and correlation.

887 **Built in redundancy**

Describe any built-in redundancy for a single switch.

In the nexus 9000 series switches the cooling fans and power supplies are redundant.

888 **Additional redundancy**

Describe any additional redundancy gained by these switches.

When using a CLOS, spine and leaf, architecture you enable node redundancy throughout the fabric.

889

On-Board memory

Describe the quantity and type of onboard memory (DRAM/Flash/disk/etc.).

Nexus 9336C-FX2
System memory: 24GB
SSD: 128GB
Nexus 93180YC-FX
System memory: 24GB
SSD: 128GB
Nexus 9364C
System memory: 32GB
SSD: 128GB
Nexus 9332C
System memory: 16GB
SSD: 128GB

890

Available hardware upgrades

Describe any hardware upgrades that may be purchased for the switch aside from 'network modules'.

Fans and powersupplies with front to back and back to front airflow can be changed to accomindate airflow require ments.

891

Questions and Clarifications - Datacenter - Interface Requirements

892

Spine 100Gbps port densities

What are the 100 Gig port densities for the spine node?

N9K-C9364C
64 ports
N9K-C9332C
32 ports

893

Types of 10G optics

What 10 Gig optics are available, how many strands of SPF+, QSFP+ fiber are required, and what are their rated di stances?

PID	Form Factor	Reach	Media	Connector Type	Transceiver Type
SFP-10G-SR	SFP+	300m (OM3)	MMF	LC	Optic
SFP-10G-SR	SFP+	400m (OM4)	MMF	LC	Optic
SFP-10G-SR	SFP+	300m (OM3)	MMF	LC	Optic
SFP-10G-SR-S	SFP+	300m (OM3)	MMF	LC	Optic
SFP-10G-SR-S	SFP+	400m (OM4)	MMF	LC	Optic
SFP-10G-SR-S	SFP+	300m (OM3)	MMF	LC	Optic
SFP-10G-LR	SFP+	10km	SMF	LC	Optic
SFP-10G-LR	SFP+	10km	SMF	LC	Optic
SFP-10G-LR-S	SFP+	10km	SMF	LC	Optic
SFP-10G-LR-S	SFP+	10km	SMF	LC	Optic
SFP-10G-ER	SFP+	40km	SMF	LC	Optic
SFP-10G-ER	SFP+	40km	SMF	LC	Optic
SFP-10G-ER-S	SFP+	40km	SMF	LC	Optic
SFP-10G-ER-S	SFP+	40km	SMF	LC	Optic
SFP-H10GB-CU1M	SFP+	1m	DAC	N/A	Cable
SFP-H10GB-CU1M	SFP+	1m	DAC	N/A	Cable
SFP-H10GB-CU3M	SFP+	3m	DAC	N/A	Cable
SFP-H10GB-CU3M	SFP+	3m	DAC	N/A	Cable
SFP-H10GB-CU5M	SFP+	5m	DAC	N/A	Cable
SFP-H10GB-CU5M	SFP+	5m	DAC	N/A	Cable
SFP-H10GB-ACU7M	SFP+	7m	DAC	N/A	Cable
SFP-H10GB-ACU7M	SFP+	7m	DAC	N/A	Cable
SFP-H10GB-ACU10M	SFP+	10m	DAC	N/A	Cable
SFP-H10GB-ACU10M	SFP+	10m	DAC	N/A	Cable
SFP-10G-AOC1M	SFP+	1m	AOC	N/A	Cable
SFP-10G-AOC1M	SFP+	1m	AOC	N/A	Cable
SFP-10G-AOC2M	SFP+	2m	AOC	N/A	Cable
SFP-10G-AOC2M	SFP+	2m	AOC	N/A	Cable
SFP-10G-AOC3M	SFP+	3m	AOC	N/A	Cable
SFP-10G-AOC3M	SFP+	3m	AOC	N/A	Cable
SFP-10G-AOC5M	SFP+	5m	AOC	N/A	Cable
SFP-10G-AOC5M	SFP+	5m	AOC	N/A	Cable
SFP-10G-AOC7M	SFP+	7m	AOC	N/A	Cable
SFP-10G-AOC7M	SFP+	7m	AOC	N/A	Cable
SFP-10G-AOC10M	SFP+	10m	AOC	N/A	Cable
SFP-10G-AOC10M	SFP+	10m	AOC	N/A	Cable

894

Types of 100G optics

What 100 Gig optics are available, how many strands of QSFP28 fiber are required, and what are their rated distances?

PID Form Factor Reach Cable Type Media Connector Type Transceiver Type
QSFP-100G-SR4-S QSFP28 100m (OM4) Ribbon Fiber MMF MPO-12 Optic
QSFP-100G-SR4-S QSFP28 100m (OM4) Ribbon Fiber MMF MPO-12 Optic
QSFP-100G-CWDM4-S QSFP28 2km Duplex Fiber SMF LC Optic
QSFP-100G-CWDM4-S QSFP28 2km Duplex Fiber SMF LC Optic
QSFP-100G-PSM4-S QSFP28 500m Ribbon Fiber SMF MPO-12 Optic
QSFP-100G-PSM4-S QSFP28 500m Ribbon Fiber SMF MPO-12 Optic
QSFP-100G-LR4-S QSFP28 10km Duplex Fiber SMF LC Optic
QSFP-100G-LR4-S QSFP28 10km Duplex Fiber SMF LC Optic
QSFP-100G-SM-SR QSFP28 2km Duplex Fiber SMF LC Optic
QSFP-100G-SM-SR QSFP28 2km Duplex Fiber SMF LC Optic
QSFP-100G-ER4L-S QSFP28 40km Duplex Fiber SMF LC Optic
QSFP-100G-ER4L-S QSFP28 40km Duplex Fiber SMF LC Optic
QSFP-40/100-SRBD QSFP28 100m (OM4) Duplex Fiber MMF LC Optic
QSFP-40/100-SRBD QSFP28 70m (OM3) Duplex Fiber MMF LC Optic
QSFP-40/100-SRBD QSFP28 100m (OM4) Duplex Fiber MMF LC Optic
QSFP-100G-CU1M QSFP28 1m N/A (Incl AOC and DAC) DAC N/A Cable
QSFP-100G-CU1M QSFP28 1m N/A (Incl AOC and DAC) DAC N/A Cable
QSFP-100G-CU2M QSFP28 2m N/A (Incl AOC and DAC) DAC N/A Cable
QSFP-100G-CU2M QSFP28 2m N/A (Incl AOC and DAC) DAC N/A Cable
QSFP-100G-CU3M QSFP28 3m N/A (Incl AOC and DAC) DAC N/A Cable
QSFP-100G-CU3M QSFP28 3m N/A (Incl AOC and DAC) DAC N/A Cable
QSFP-100G-CU5M QSFP28 5m N/A (Incl AOC and DAC) DAC N/A Cable
QSFP-100G-CU5M QSFP28 5m N/A (Incl AOC and DAC) DAC N/A Cable

895

Spine and leaf port buffers

What is the size of the port buffers on spine and leaf nodes?

All Cisco Nexus Switches proposed in this solution contains 40MB buffers

896

Leaf interface options and speeds

What are the leaf switch interface options and what speeds do they support?

10/100Mbps 1/10/25/40/100Gbps Copper, SFP,SFP+,QSFP+

897

Spine oversubscription

Are the interfaces oversubscribed on the Spine?

No.
The Nexus 9364C switch supports Layer 2 and 3 non-blocking with aggregate 12.84 Tbps of bandwidth across 64 fixed 40/100G QSFP28 ports and 2 fixed 1/10G SFP+ ports.
The Nexus 9332C switch supports Layer 2 and 3 non-blocking with aggregate 6.4 Tbps of bandwidth across 32 fixed 40/100G QSFP28 ports and 2 fixed 1/10G SFP+ ports.

898

Leaf oversubscription

Are the interfaces oversubscribed on the Leaf/Top of Rack? If so, describe.

No.
The Nexus 93180YC-FX switch supports Layer 2 and 3 non-blocking with aggregate 3.6 Tbps of bandwidth across 6 fixed 40/100G QSFP28 ports and 48 fixed 1/10/25G SFP+ ports.
The Nexus 9336C-FX2 switch supports Layer 2 and 3 non-blocking with aggregate 7.2 Tbps of bandwidth across 36 fixed 1/10/25/40/100G ports

899

SFP+ support for 1Gbps

On your leaf switch, do your 10 Gig SFP+ ports support 1Gig and 10 Gig transceivers?

Yes. The Nexus 93180YC-FX supports SFP ports to accomindate 10/100/1000 copper and 1Gbps fiber connections.

900

Modules available

Describe what modules/interface cards are available for each switch/chassis.

No chassis based switches proposed for the DataCenter switching section of this RFP.

901

Hot swapping of modules

Are modules hot swappable?

Power supplies and fan modules are hot swappable.

902

Questions and Clarifications - Datacenter - Resource Limits

903

FIB size

What is your max count for FIB (Forwarding Information Base) for the solution?

Nexus 9336C-FX2
Maximum number of Longest Prefix Match (LPM) routes: 896,000
Maximum number of IP host entries: 896,000
Maximum number of MAC address entries: 256,000
Nexus 93180YC-FX
Maximum number of Longest Prefix Match (LPM) routes: 1,792,000
Maximum number of IP host entries: 1,792,000
Maximum number of MAC address entries: 512,000
Nexus 9364C and 9332C
Maximum number of Longest Prefix Match (LPM) routes: 262,000
Maximum number of IP host entries: 262,000
Maximum number of MAC address entries: 92,000

904

Route table size

Describe the maximum route table size of proposed routers & switches?

FX Series switches maximum number of Longest Prefix Match (LPM) routes: 1,792,000
FX2 Series switches maximum number of Longest Prefix Match (LPM) routes: 896,000
Spine C Series switches maximum number of Longest Prefix Match (LPM) routes: 262,000

905

Switching and routing performance

Describe the switching and routing performance, packets per second, etc.

Nexus 93180YC-FX switch supports 3.6 Tbps of bandwidth and 1.2 bpps.
Nexus 9336C-FX2 switch supports 7.2 Tbps of bandwidth and over 2.8 bpps.
Nexus 9332C spine switch supports 6.4 Tbps of bandwidth and 2.3 bpps
Nexus 9364C spine switch supports 12.84 Tbps of bandwidth and 4.3 bpps.

906

Memory available on spine and leaf nodes

How much storage and memory is available on the Spine and Leaf nodes?

Nexus 93180YC-FX
24GB system memory 128GB SSD drive
Nexus 9336C-FX2
24GB system memory 128GB SSD drive
Nexus 9332C
16GB system memory 128GB SSD drive
Nexus 9364C
32GB system memory 128GB SSD drive

907

VRF scale

How many VRFs (virtual routing and forwarding) does the solution support?

Nexus 93180YC-FX
1000 with hardware limit up to 16,000
Nexus 9336C-FX2
1000 with hardware limit up to 16,000
Nexus 9332C
1000
Nexus 9364C
1000

908

VRF scale licensing costs

Does the solution require any licensing to use VRFs? If so, provide details including quantity and costs, if any.

VRF support is included in the Essentials licensing tier. There is no charge per VRF instance.

909

VNI Scaling

For VXLAN, how many VNIs do you support?

1000 VXLAN Layer 2 VNIs and 500 VXLAN Layer 3 VNIs/VRFs

910

Spine scaling

What is the maximum number of Spine nodes?

For an ACI solution the maximum spines per pod is 6 for a total of 24 spines per fabric.

911

Max distance between spines

What is the maximum distance between Spine nodes?

It is recommended that the spines be located on the same campus. There are solutions to support remote, extend ed and multisite designs to accomindate for additional latency between sites.

912

Questions and Clarifications - Datacenter - Protocol Support

913

VXLAN Layer 2 terminations

Does the solution support VXLAN Layer 2 termination? If so, how many?

VXLAN BGP eVPN
2000/4000 VXLAN Layer 2 VNIs and 900 VXLAN Layer 3 VNIs/VRFs
VXLAN BGP eVPN Ingress Replication
2000 VXLAN Layer 2 VNIs and 900 VXLAN Layer 3 VNIs/VRFs
Tenant Route Mcast L3 mode with VXLAN BGP eVPN
1000 VXLAN Layer 2 VNIs and 500 VXLAN Layer 3 VNIs/VRFs
VXLAN Flood and Learn
2000 VXLAN Layer 2 VNIs

914

VXLAN Layer 3 terminations

Does the solution support VXLAN Layer 3 termination? If so how many?

VXLAN BGP eVPN
2000/4000 VXLAN Layer 2 VNIs and 900 VXLAN Layer 3 VNIs/VRFs
VXLAN BGP eVPN Ingress Replication
2000 VXLAN Layer 2 VNIs and 900 VXLAN Layer 3 VNIs/VRFs
Tenant Route Mcast L3 mode with VXLAN BGP eVPN
1000 VXLAN Layer 2 VNIs and 500 VXLAN Layer 3 VNIs/VRFs
VXLAN Flood and Learn
2000 VXLAN Layer 2 VNIs

915

IGMP snooping

Does the solution support IGMP (internet group management protocol)?

Yes

916

VXLAN Layer 2 and Layer 3 termination

Can you terminate VXLAN Layer 2 and Layer 3 on the same device? If not when will it on this hardware?

Yes

917

MPLS support

Does the solution support MPLS (multiprotocol label switching) protocol?

Yes. Interconnecting the two sites can be done over an MPLS network as proposed in this solution. Although the N exus can serve as a fully featured MPLS node, in the proposed solutions it will be using VXLAN for the overlay enc apsulation and a routing protocol for interconnecting the underlay nodes.

918

LDP support

Does the solution support LDP (label distribution protocol) protocol?

Yes. As mentioned in the previous question, interconnecting the two sites can be done over an MPLS network as p roposed in this solution. Although the Nexus can serve as a fully featured MPLS node, in the proposed solutions it will be using VXLAN for the overlay encapsulation and a routing protocol for interconnecting the underlay nodes. When configuring the interface to connect to the MPLS network you will also enable it to use LDP on that specific i nterface.

919

Questions and Clarifications - Datacenter - Software Features

920

Leaf Layer 3 VXLAN

Do the leaf nodes support layer 3 VXLAN routing locally on the node?

Yes. Cisco Nexus 93180YC-FX supports VXLAN, and Cisco Nexus 9000 switches are designed for hardware-based VXLAN function.
https://www.cisco.com/c/en/us/td/docs/switches/datacenter/nexus9000/sw/93x/vxlan/configuration/guide/b-cisco-nex us-9000-series-nx-os-vxlan-configuration-guide-93x.html

921

Inter-VLAN routing

Where in the solution does inter-VLAN/network and Inter-vlan/VRF routing occur within the data center?

The anycast gateway feature is supported for both ACI and EVPN/VXLAN solutions, thus routing and policy enforc ement can occur at the leaf nodes.

922 **Leaf local switching**

On the top of rack switch, when two servers are on the same switch and VLAN/network communicate, does it switch locally?

Yes. All switches proposed in these solutions provide local switching.

923 **TOR local switching**

On the leaf switch, when two servers are on the same switch and VLAN/network communicate, does it switch locally?

Yes. All switches proposed in these solutions provide local switching.

924 **Leaf local routing**

On the leaf switch when two servers on the same switch but on different VLAN/network, does it switch/route locally?

Yes. As mentioned in a previous question the anycast gateway feature is supported, thus allowing for local routing and policy enforcement on the leaf nodes.

925 **Questions and Clarifications - Datacenter - Management Access and Authentication**

926 **Configuration method**

How do you configure your solution (CLI, GUI, API, etc.)?

ACI is configured from the APIC GUI interface but does allow for visiblity via CLI if needed. VXLAN-EVPN can be done via CLI and/or automation via the DCNM management platform. Also extensive amounts of APIs are available for using outside tools for automation.

927 **GUI management**

Describe if GUI management application is available for configuration of Spine Leaf network along with its features.

APIC GUI is available for ACI configuration. DCNM GUI is available for VXLAN-EVPN configuration.

928 **Supported operating systems**

If the solution uses a management application (GUI), what client operating systems are supported?

Various browsers and versions are supported.

929 **CLI and GUI feature parity**

Describe feature parity between CLI and GUI management application.

Everything that is done through the GUI on the APIC and/or DCNM can be manually performed via CLI. The CLI does offer more flexibility to do local programmability on the individual nodes.

930 **SSH command and interactive support**

Does the SSH access support remote command as well as interactive access?

Yes. All Nexus devices support SSH and you can also gain shell access for direct scripting and/or programmatic access to the device's command-line interface (CLI) to perform various tasks and Power On Auto Provisioning (POAP) or Embedded Event Manager (EEM) actions. Please reference the NX-OS Programmability Guide located here: https://www.cisco.com/c/en/us/td/docs/switches/datacenter/nexus9000/sw/92x/programmability/guide/b-cisco-nexus-9000-series-nx-os-programmability-guide-92x.html

931 **Telnet support**

Can you access the CLI via Telnet?

Yes, telnet can be enabled but it is not recommended as it is not secure.

932 **Disabling of telnet**

Can Telnet be disabled?

Yes, telnet can and should be disabled.

933 **API support**

Can the solution be managed by an API? Describe APIs

Yes, both EVPN/VXLAN and ACI solutions can be managed via APIs. Please refer to the following documents for API references: https://developer.cisco.com/site/cisco-nexus-nx-api-references/ https://developer.cisco.com/docs/aci/#!introduction/aci-programmability https://www.cisco.com/c/en/us/td/docs/switches/datacenter/sw/11_2_1/rest_api/rest_api_11_2_1.html

934 **Two-factor support**

Describe your system's support for two-factor authentication using SAML 2.0

SAML is supported on the Cisco APIC HTTP management interface. DCNM supports local, radius, TACACS, switch and LDAP based authentication

935 **SAML support**

Do you support two-factor authentication using SAML 2.0 for the CLI or HTTP management interface?

SAML is supported on the Cisco APIC HTTP management interface. DCNM supports local, radius, TACACS, switch and LDAP based authentication

936 **Questions and Clarifications - Datacenter - Troubleshooting**

937 **Packet capture support**

Does the solution support packet capture? Describe what devices and how it works.

There are several tools in addition to spanning traffic (SPAN, ERSPAN) to capture packets. These tools are Ethanalyzer, Embedded Logic Analyzer Module (ELAM) and Packet Tracer. More details on these tools are provided here: https://www.ciscolive.com/c/dam/r/ciscolive/emea/docs/2019/pdf/BRKARC-2011.pdf

938 **VXLAN troubleshooting**

What troubleshooting tools are available for VXLAN?

Use of VXLAN Ping, Traceroute and Pathtrace with VXLAN OAM; within and between sites along with VXLAN OAM for deep VXLAN visibility are tools that can be used for troubleshooting. More information on VXLAN OAM can be found here:

939 **Dropped packet troubleshooting**

What tools and counters are available to show why packets are dropped on an interface?

Packets could be dropped for the following reasons:
Software-switched packets could be dropped because of Control Plane Policing (CoPP).
Hardware-switched packets could be dropped by the hardware because of a bandwidth limitation.
There are two show commands that can be performed on a Nexus switch to show if either of this packet drops are occuring and what module they are occuring on.

940 **Local log sizes**

How many log entries can be stored locally on each model specified in the solution?

The default file size is 10485760. The file size can be configured from 4096 to 4194304 bytes.

941 **Questions and Clarifications - Datacenter - Power and Physical**

942 **Supported types of power**

What are the power types and quantity for the top of rack, spine, and leaf switches?

2 power supplies per Nexus 9300 switch
Power Supplies options on Nexus 9300 series
NXA-PAC-1100W-PI2 Nexus 9000 1100W AC PS, Port-side Intake
NXA-PAC-1100W-PE2 Nexus 9000 1100W AC PS, Port-side Exhaust
NXA-PDC-1100W-PI Nexus 9000 1100W DC PS, Port-side Intake
NXA-PDC-1100W-PE Nexus 9000 1100W DC PS, Port-side Exhaust
NXA-PHV-1100W-PI Nexus 1100W Platinum HV-AC-DC PS, Port-side Intake
NXA-PHV-1100W-PE Nexus 1100W Platinum HV-AC-DC PS, Port-side Exhaust
NXA-PAC-1200W-PE Cisco Nexus 1200W AC PS, Port-side Exhaust
NXA-PAC-1200W-PI Cisco Nexus 1200W AC PS, Port-side Intake
N9K-PUV-1200W Cisco Nexus 1200W, 200-277AC,240-380DC, dual airflow PSU
NXA-PDC-930W-PI Cisco Nexus 930W DC PS, Port-side Intake
NXA-PDC-930W-PE Cisco Nexus 930W DC PS, Port-side Exhaust

943 **AC and DC support**

Are both AC and DC power supply options available?

Yes there are both AC and DC power supplies for Cisco Nexus switches.

944 **Power supply efficiencies**

What are the power efficiencies of the power supplies?

Platinum rated power supplies are Climate Savers Platinum Efficiency (80Plus Platinum certified)

945 **Redundant power supplies**

Does all of the hardware support redundant power supplies?

Yes, all switches proposed for this solution include redundant power supplies.

946 **Air filters**

Are there any air filters for the equipment?

No, with the proposed switches there are no air filters.

947 **Hot swappable power supplies**

Are the power supplies hot swappable?

Yes, the power supplies are hot swappable.

948 **Front-to-back cooling**

Do the items in the solution support front to back cooling?

Yes, both front to back and back to front are supported.

949 **Questions and Clarifications - Datacenter - Warranty and Paid Support**

950

Hardware and software warranty

Describe the system warranty for hardware and software.

The Cisco Nexus series switches have a 1-year limited hardware warranty. The warranty includes hardware replacement with a 10-day turnaround from receipt of a Return Materials Authorization (RMA).
Hardware warranty duration: 1 year
Software warranty duration: 1 year
Hardware replacement: Cisco or its service center will use commercially reasonable efforts to ship a replacement part for delivery within 10 working days after receipt of the defective product at Cisco's site. Actual delivery times of replacement products might vary depending on customer location.
Both hardware and software warranties commence from the date of shipment to customer (and in case of resale by a Cisco reseller, commencing not more than 90 days after original shipment by Cisco).
Warranty allows guest access only to Cisco.com.
Software is provided "as is," and in no event does Cisco warrant that the software is error free or that customer will be able to operate the software without problems or interruptions. Warranty does not include software updates.
Paid Cisco Product Support: Support service is available globally 24 hours a day, 7 days a week, for Cisco software and hardware products and technologies associated with Cisco Nexus 9000 Series Switches. Enhanced support options delivered by Cisco also include solution support for Cisco ACI, Cisco SMARTnet™ Service, and Cisco Smart Net Total Care™* service.

951

Hardware warranty and duration

How long does the hardware warranty last?

The Cisco Nexus series switches have a 1-year limited hardware warranty. The warranty includes hardware replacement with a 10-day turnaround from receipt of a Return Materials Authorization (RMA).
Hardware warranty duration: 1 year
Software warranty duration: 1 year
Hardware replacement: Cisco or its service center will use commercially reasonable efforts to ship a replacement part for delivery within 10 working days after receipt of the defective product at Cisco's site. Actual delivery times of replacement products might vary depending on customer location.
Both hardware and software warranties commence from the date of shipment to customer (and in case of resale by a Cisco reseller, commencing not more than 90 days after original shipment by Cisco).
Warranty allows guest access only to Cisco.com.
Software is provided "as is," and in no event does Cisco warrant that the software is error free or that customer will be able to operate the software without problems or interruptions. Warranty does not include software updates.
Paid Cisco Product Support: Support service is available globally 24 hours a day, 7 days a week, for Cisco software and hardware products and technologies associated with Cisco Nexus 9000 Series Switches. Enhanced support options delivered by Cisco also include solution support for Cisco ACI, Cisco SMARTnet™ Service, and Cisco Smart Net Total Care™* service.

952

Software warranty and duration

How long does the software warranty last?

The Cisco Nexus series switches have a 1-year limited hardware warranty. The warranty includes hardware replacement with a 10-day turnaround from receipt of a Return Materials Authorization (RMA).
Hardware warranty duration: 1 year
Software warranty duration: 1 year
Hardware replacement: Cisco or its service center will use commercially reasonable efforts to ship a replacement part for delivery within 10 working days after receipt of the defective product at Cisco's site. Actual delivery times of replacement products might vary depending on customer location.
Both hardware and software warranties commence from the date of shipment to customer (and in case of resale by a Cisco reseller, commencing not more than 90 days after original shipment by Cisco).
Warranty allows guest access only to Cisco.com.
Software is provided "as is," and in no event does Cisco warrant that the software is error free or that customer will be able to operate the software without problems or interruptions. Warranty does not include software updates.
Paid Cisco Product Support: Support service is available globally 24 hours a day, 7 days a week, for Cisco software and hardware products and technologies associated with Cisco Nexus 9000 Series Switches. Enhanced support options delivered by Cisco also include solution support for Cisco ACI, Cisco SMARTnet™ Service, and Cisco Smart Net Total Care™* service.

953 **Warranty start time**

When do the warranties start?

Hardware warranty commences from the date of shipment to customer (and in case of resale by a Cisco reseller, not more than 90 days after original shipment by Cisco). Warranty allows guest access only to Cisco.com. Warranty duration: As long as the original end user continues to own or use the product.

954 **Paid support**

Is paid support required for support (hardware replacement, TAC, software upgrades, etc.) after the warranty expires?

Warranty allows guest access only to Cisco.com.
Paid Cisco Product Support: Support service is available globally 24 hours a day, 7 days a week, for Cisco software and hardware products and technologies associated with Cisco Nexus 9000 Series Switches. Enhanced support options delivered by Cisco also include solution support for Cisco ACI, Cisco SMARTnet™ Service, and Cisco Smart Net Total Care™* service.

955 **Support options**

List the available options for hardware and software support and their associated costs

PARTNER TO PROVIDE OPTIONS - The client and/or customer has the option to choose the level of support on each of the identified Hardware and/or software technologies. The support options are something that Connection will always recommend, based upon the best practices of the current projects, and the needs of the University. https://www.cisco.com/c/en/us/products/collateral/cloud-systems-management/smart-net-total-care/datasheet-c78-735459.html

956 **Hardware replacement without paid support**

What options do you have for hardware replacement without paid support and no warranty?

In order to RMA a device after the warranty has expired with no active service contract, you would need to recertify the device and obtain an active service contract to RMA the device. More info can be found here on the recertification process: https://www.cisco.com/c/en/us/products/hw-sw-relicensing-program.html#~tab-faq

957 **RMA process**

Describe your RMA process. Must we return hardware before a replacement is shipped?

Our new RMA Creation process consists of four steps:
Part Information
Site Information
Delivery Details
Review & Submit
Our Logistics and Technical Support teams now have the option to start creating the RMA by completing Step 1: Part information and verifying entitlement. Once the part information is added they will handoff the RMA to you (Acknowledgement CCO ID). You will receive an email with a link to the RMA online and from there you can Complete Step 2: Site Information, Step 3: Delivery Details and Step 4: Review & Submit.

958 **Questions and Clarifications - Datacenter - Shipping**

959 **Demo and education**

Will you ship us an agreed upon small selection of hardware for configuration development and education once we select you?

Cisco will provide appropriate credits that can be used for lab gear.

960 **Questions and Clarifications - Datacenter - General Solution Requirements**

961

Multi-tenancy

Describe how your system can support multiple tenancy for system administration.

In an ACI mutisite deployment, administration and orchestration is handled through the multi-site orchestration ma nager. Cisco ACI Multi-Site Orchestrator: This component is the intersite policy manager. It provides single-pane m anagement, enabling you to monitor the health score state for all the interconnected sites. It also allows you to defi ne, in a centralized place, all the intersite policies that can then be pushed to the different APIC domains for rende ring them on the physical switches building those fabrics. It thus provides a high degree of control over when and where to push those policies, hence allowing the tenant change domain separation that uniquely characterizes the Cisco ACI Multi-Site architecture.

962

Splunk integration

Does the solution integrate with Splunk?

Yes, there is direct integration with Cisco ACI and Splunk. Also the Cisco Networks App for Splunk Enterprise inclu des dashboards, data models and logic for analyzing data from Cisco IOS, IOS XE, IOS XR and NX-OS devices usi ng Splunk® Enterprise.

963

Options for DCI

With two separate data centers, what are the options for data center interconnect?

DCI for connecting two datacenters can be facilitated via L3 and L2 connectivity between sites. The solutions provi ded in this RFP facilitate the DCI via the MPLS WAN managed by the University System.

964

Flow monitoring support

Does the solution have sFlow/Netflow support? If so, what sample rate do you support 1:1 1:2, etc.?

Netflow is supported.

965

Flow versions supported

What versions of sFlow/Netflow does the solution support?

Both sFlow and Netflow are supported on the Nexus 9K switches. Netflow version 9 export format is supported and sFlow is supported in accordance with RFC 3176.

966

Questions and Clarifications - Datacenter - Software Licensing

967

Software licensing requirements

Does the solution require licensing of software features?

Yes. In the EVPN/VXLAN design each Nexus node will have a NX-OS advantage license along with a DCNM license . In the ACI solution each Nexus node will have an ACI Advantage License.

968

Licensing model

Describe how the solution and the individual items are licensed.

In the EVPN/VXLAN design each Nexus node will have a NX-OS advantage license along with a DCNM license. In t he ACI solution each Nexus node will have an ACI Advantage License.

969

Questions and Clarifications - Datacenter - General Security

970

CPU rate limiting

Describe any support you have for limiting CPU cycles to out of control processes.

Hardware rate-limiters protect the supervisor CPU from excessive inbound traffic. The traffic rate allowed by the hardware rate-limiters is configured globally and applied to each individual I/O module. The resulting allowed rate depends on the number of I/O modules in the system. CoPP provides more granular supervisor CPU protection by utilizing the modular quality-of-service CLI (MQC).

971

Stateful ACL support

Describe your on-switch capabilities for stateful access lists.

In a Cisco ACI solution, the Distributed Firewall is part of Cisco Application Virtual Switch (AVS) at the hypervisor k ernel level and works in conjunction with the Cisco Application Centric Infrastructure (ACI) hardware for policy enfo rcement. The Distributed Firewall keeps track of the state of the network connection, traversing across it, and disti nguishes legitimate packets for different types of TCP connection.

972

Hardware processing of ACLs

Are access lists processed in hardware, on the switch's CPU or both? Describe when each would be used.

Cisco Nexus 9300 switches supports IP ACL for IPv4 and IPv6 in hardware and these ACLs can be applied to both ingress and egress traffic. VLAN ACL is also supported. Refer to Cisco Nexus 9000 Series NX-OS Security Configu ration Guide. https://www.cisco.com/c/en/us/td/docs/switches/datacenter/nexus9000/sw/92x/security/configuration/g uide/b-cisco-nexus-9000-nx-os-security-configuration-guide-92x.html

973

Other security features

Describe any additional security features that are important in your solution.

Cisco data center security solutions contain:
Threat control and defense with intrusion prevention system (IPS)
Application and content security
Virtualization security (virtual firewall)
Highly secure access
Further details can be referenced here: https://www.cisco.com/c/dam/en/us/solutions/collateral/enterprise-networks /secure-data-center-solution/sales-tool-c96-740102.pdf?oid=aagsc008937

974

Questions and Clarifications - Datacenter - Roadmap and System Lifetime

975

Product lifecycle

Where in the product lifecycle is your current system, both hardware and software?

All hardware components and software are both in "Orderable Status," with full sale, deployment, and support feat ures.
Nexus 9336C-FX2 Release Date: 18-DEC-2017
Nexus 93180YC-FX Release Date?: ?22-MAR-2017
Nexus 9364C Release Date?: ?24-JUN-2017
Nexus 9332C Release Date: 12-FEB-2019

976

First date of production

What was the first date of production of your devices?

All hardware components and software are both in "Orderable Status," with full sale, deployment, and support feat ures.
Nexus 9336C-FX2 Release Date: 18-DEC-2017
Nexus 93180YC-FX Release Date?: ?22-MAR-2017
Nexus 9364C Release Date?: ?24-JUN-2017
Nexus 9332C Release Date: 12-FEB-2019

977

System age

How long has the system been sold?

All hardware components and software are both in "Orderable Status," with full sale, deployment, and support features.
Nexus 9336C-FX2 Release Date: 18-DEC-2017
Nexus 93180YC-FX Release Date?: ?22-MAR-2017
Nexus 9364C Release Date?: ?24-JUN-2017
Nexus 9332C Release Date: 12-FEB-2019

978

Estimated end-of-sale

What is the estimated earliest end-of sales date for your devices?

All hardware components and software proposed in this RFP are both in "Orderable Status," with full sale, deployment, and support features.
Cisco's End of Life Policy can be referenced here:
https://www.cisco.com/c/en/us/products/eos-eol-policy.html

979

Estimated end-of-support for software

What is the estimated earliest end-of-software support date?

All hardware components and software proposed in this RFP are both in "Orderable Status," with full sale, deployment, and support features.
Cisco's End of Life Policy can be referenced here:
https://www.cisco.com/c/en/us/products/eos-eol-policy.html

980

Estimated end-of-support for hardware

What is your estimated earliest end-of-hardware support date for your devices?

All hardware components and software proposed in this RFP are both in "Orderable Status," with full sale, deployment, and support features.
Cisco's End of Life Policy can be referenced here:
https://www.cisco.com/c/en/us/products/eos-eol-policy.html

981

Estimated end-of-support for security and vulnerability patching

What is your estimated earliest end of security and vulnerability support date?

All hardware components and software proposed in this RFP are both in "Orderable Status," with full sale, deployment, and support features.
Cisco's End of Life Policy can be referenced here:
https://www.cisco.com/c/en/us/products/eos-eol-policy.html

982

Estimated end-of-support for application

What is your estimated end of application support date (if an application used is considered separate from the standard operating system for the system)?

All hardware components and software proposed in this RFP are both in "Orderable Status," with full sale, deployment, and support features.
Cisco's End of Life Policy can be referenced here:
https://www.cisco.com/c/en/us/products/eos-eol-policy.html

983

Feature roadmap

Detail your new features/functionality over the next 12 months for your devices and software.

There are many exciting innovations planned for DataCenter Switching that we need to ensure are kept under wraps until fully ready! Once a current non-disclosure agreement is signed we will be happy to share the anticipated roadmap with the University of Nebraska team.

984 **Questions and Clarifications - Datacenter - TAC/Support**

985 **Service Level Agreement**

Provide your Service Level Agreement (SLA). Upload a copy of your SLA to the Attachments section of this RFP.

SLA for support is dependent upon the level of support (SmartNet) that is associated with the devices in the solution. Please refer to this document for description of the service levels: https://www.cisco.com/c/en/us/products/collateral/cloud-systems-management/smart-net-total-care/datasheet-c78-735459.html

986 **Technical Assistance Method**

How is your Technical Assistance Center contacted?

Cisco TAC can be contacted via phone or email. Support cases can be opened via phone, email, and/or cisco.com. Please refer to this document for contact methods: https://www.cisco.com/c/en/us/support/web/tsd-cisco-worldwide-contacts.html

987 **Questions and Clarifications - Datacenter - Training**

988 **Install training**

What training is required for staff whose role is to primarily install the systems and performs minimal configuration?

There are various training courses offered from Cisco and Cisco authorized training partners. Cisco will provide CLCs (Cisco Learning Credits) that can be used for onsite, offsite, virtual and/or self pased training. Cisco will work with the University of Nebraska team to identify the correct training for their staff.

989 **Configuration training**

What training is required for staff whose role is to primarily configure this system?

There are various training courses offered from Cisco and Cisco authorized training partners. Cisco will provide CLCs (Cisco Learning Credits) that can be used for onsite, offsite, virtual and/or self pased training. Cisco will work with the University of Nebraska team to identify the correct training for their staff.

990 **Training location**

Where is your training offered? On-site, online, etc.

Onsite, virtual and self paced training is available.

991 **Online training**

Is there an online training lab available? Is it at no cost to us?

There is Cisco online training available. It can be purchased with learning credits priced out in Line Item #4.

992 **Third party training**

Is there third-party approved training that we could utilize? Provide information of some.

There are various training courses offered from Cisco and Cisco authorized training partners. Cisco will provide CLCs (Cisco Learning Credits) that can be used for onsite, offsite, virtual and/or self paced training. Cisco will work with the University of Nebraska team to identify the correct training and training partners for their staff.

993 **Questions and Clarifications - Datacenter - Automation and Orchestration**

994

Network automation and orchestration support

Describe what network automation and orchestration software packages the switches work with.

Cisco DNA/SDA focused devices that can be integrated with Cisco NSO,(Network Services Orchestrator), also an automation tool. Cisco's Catalyst 9k series switches offer various software packages in this architecture

995

Multi-tenancy support

Describe your support for multi-tenancy with your automation and orchestration solution.

Our solution includes DNA-C. It’s architecture has been created with multi-tenancy in mind. The current release is still under development and rigorous testing will be completed prior to general release in future updates. Cisco has an extensive roadmap planned for DNA.

996

Multi-tenancy access control

With your multi-tenancy solution, can we limit which ports a user can modify? For example, user A can modify ports 1,3, 5 and user B can modify ports 2, 4 and 32 and user C can modify all the remaining ports?

With Cisco DNA-C, users are assigned user roles that specify the functions that they are permitted to perform. The users roles include the following:
• Administrator (SUPER-ADMIN-ROLE)—Users with this role have full access to all of the Cisco DNA Center functions. They can create other user profiles with various roles, including those with the SUPER-ADMIN-ROLE.
• Network Administrator (NETWORK-ADMIN-ROLE)—Users with this role have full access to all of the network-related Cisco DNA Center functions. They do not have access to system-related functions, such as App Management, Users (except for changing their own passwords), and Backup and Restore.
• Observer (OBSERVER-ROLE)—Users with this role have view-only access to the Cisco DNA Center functions. Users with an observer role cannot access any functions that configure or control Cisco DNA Center or the devices it manages.

997

Super-user support

Does your multi-tenancy solution have a concept of a super-user who can modify configuration anywhere? If yes, describe.

It is understood for DNA-C, from the future roadmap that this capability will be available.

998

API support

What APIs do you support for automation and orchestration?

Our solution integrates with open REST APIs and can be used to integrate data with third party analytics applications. API integration with other domains such as security, DC, and cloud is supported. Intent-based APIs enable business and IT applications to deliver intent to the network and to procure network analytics and insights for IT and business innovation. This integration allows IT and network systems to streamline IT operations and processes including automation and orchestration.

999

On-board scripting

Do you support onboard scripting? If so, what 'languages' do you support?

All Nexus devices support SSH and you can also gain shell access for direct scripting and/or programmatic access to the device's command-line interface (CLI) to perform various tasks and Power On Auto Provisioning (POAP) or Embedded Event Manager (EEM) actions. Please reference the NX-OS Programmability Guide located here: https://www.cisco.com/c/en/us/td/docs/switches/datacenter/nexus9000/sw/92x/programmability/guide/b-cisco-nexus-9000-series-nx-os-programmability-guide-92x.html

1000

Misc. information

What other information should we know about your automation and orchestration implementation that would be helpful?

Connection has this Technology is use internally at our Corporate HQ and was one of Cisco's premier partners to be selected in a national customer focused Marketing program. Connection has several post-sales engineers who deployed this technology in several different scenarios.

1001	**CAMPUS BACKBONE SOLUTIONS**

1002	**Required Features – Campus Backbone** Proposed solutions must offer components which support the following list of features. Please simply affirm or deny t hat your proposed solution meets the following requirements by notating each item with “accept”, “deny”, or “varianc e.” Please explain any variances in your product. The Bidder cannot answer “accept” if the feature is not currently a vailable in the proposed hardware running current general availability (production) release software. If a feature is n ot in production software at the time of the RFP submission, the Bidder must choose “deny” or “variance.” If a featur e not in production software is described under a “variance,” it must be noted the feature is not currently available.

1003	**Required Features – Campus Backbone - General Requirements**

1004	**Downstream device data rate support** Proposed solutions must include support for 1Gbps, 10Gbps service to downstream devices (IE: access switches). Accept

1005	**Variance to downstream device data rate support** Variance to Proposed solutions must include support for 1Gbps, 10Gbps service to downstream devices (IE: access switches). *No response*

1006	**Backbone data rate support** Proposed solutions must include support for 10Gbps and 100Gbps backbone connectivity. Accept

1007	**Variance to backbone data rate support** Variance to Proposed solutions must include support for 10Gbps and 100Gbps backbone connectivity. *No response*

1008	**Required Features – Campus Backbone - Ethernet Bridging protocols and functions**

1009	**Spanning tree support** Proposed routers and switches must fully support IEEE 802.1D bridging, including features originally defined as 802 .1w (Rapid Spanning Tree Protocol). RSTP is used on some campus’s current switches. Accept

1010	**Variance to spanning tree support** Variance to IEEE 802.1D bridging, including features originally defined as 802.1w (Rapid Spanning Tree Protocol). RSTP is used on some campus’s current switches. *No response*

1011 **Spanning tree edge-port support**

Proposed routers and switches must support a feature to configure a port as an edge-port, such that spanning-tree will transition more quickly/immediately to a forwarding mode and not generate topology-change-notifications (TCNs).

Accept

1012 **Variance to spanning tree edge-port support**

Variance to feature to configure a port as an edge-port, such that spanning-tree will transition more quickly/immedia tely to a forwarding mode and not generate topology-change-notifications (TCNs).

No response

1013 **Spanning tree bpdu-filter support**

Proposed routers and switches must support a per-port feature to ignore STP BPDUs (i.e. bpdu-filter), allowing the port to remain in a forwarding state.

Accept

1014 **Variance to spanning tree bpdu-filter support**

Variance to per-port feature to ignore STP BPDUs (i.e. bpdu-filter), allowing the port to remain in a forwarding state.

No response

1015 **Spanning tree bpdu-protect support**

Proposed routers/switches must support a per-port feature to block a port that receives a BPDU (i.e. bpdu-protect), applicable to ports configured as edge-ports.

Accept

1016 **Variance to spanning tree bpdu-protect support**

Variance to per-port feature to block a port that receives a BPDU (i.e. bpdu-protect), applicable to ports configured as edge-ports.

No response

1017 **IEEE 802.1Q VLAN tagging support**

Proposed routers and switches must fully support IEEE 802.1Q VLAN tagging on layer 2 and layer 3 interfaces.

Accept

1018 **Variance to iEEE 802.1Q VLAN tagging support**

Variance to IEEE 802.1Q VLAN tagging on layer 2 and layer 3 interfaces.

No response

1019 **Jumbo frame support**

Proposed routers and switches must support jumbo frame sizes of 9,192+ bytes on all routed physical and virtual int erfaces and ports operating as L2-only bridging ports.

Accept

1020 **Variance to jumbo frame support**

Variance to jumbo frame sizes of 9,192+ bytes on all routed physical and virtual interfaces and ports operating as L 2-only bridging ports.

No response

1021	**MLAG support** Proposed switches must support a form of multi-chassis link aggregation (i.e. MLAG or MC-LAG), between at least t wo switches, with control plane separation intact. Allowing for members of a downstream link-aggregate to terminate at least one member on each aggregated switch. Accept
1022	**Variance to mLAG support** Variance to form of multi-chassis link aggregation (i.e. MLAG or MC-LAG), between at least two switches, with contr ol plane separation intact. Allowing for members of a downstream link-aggregate to terminate at least one member o n each aggregated switch. *No response*
1023	**LACP support** Proposed switches must support 802.3ad compliant LACP link aggregates, including when multi-chassis link aggreg ation is used. Accept
1024	**Variance to lACP support** Variance to 802.3ad compliant LACP link aggregates, including when multi-chassis link aggregation is used. *No response*
1025	**Support for LAG across line cards** For chassis-based switches, proposed line cards must support IEEE 802.3ad link aggregation with aggregate memb er ports on the same, or different line cards. Accept
1026	**Variance to support for LAG across line cards** Variance to IEEE 802.3ad link aggregation with aggregate member ports on the same, or different line cards. *No response*
1027	**Support for LAG across stack** If fixed configuration routers/switches supporting stacking or virtual-chassis are proposed, all routers/switches in the stack must support IEEE 802.3ad link aggregation with ports on the same or different routers/switches in the stack. Accept
1028	**Variance to support for LAG across stack** Variance to IEEE 802.3ad link aggregation with ports on the same or different routers/switches in the stack. *No response*
1029	**Not port extenders** Proposed routers and switches must be full-featured switches and not port extenders. Accept
1030	**Variance to not port extenders** Variance to Proposed routers and switches must be full-featured switches and not port extenders. *No response*

1031

Static MAC assignment

Proposed routers and switches must support static MAC assignment, allowing for the mapping of a MAC address to a port or series of ports.

Accept

1032

Variance to static MAC assignment

Variance to static MAC assignment, allowing for the mapping of a MAC address to a port or series of ports.

No response

1033

Layer 2 virtualization over routed core

Proposed routers and switches must support scalable Layer 2 virtualization over a routed core (IE: over IPv4, IPv6, or MPLS)

Accept

1034

Variance to layer 2 virtualization over routed core

Variance to scalable Layer 2 virtualization over a routed core (IE: over IPv4, IPv6, or MPLS)

No response

1035

Storm control

Proposed routers and switches must support some form of traffic limiting/policing or storm-control per port.

Accept

1036

Variance to storm control

Variance to some form of traffic limiting/policing or storm-control per port.

No response

1037

Required Features – Campus Backbone - IPv4 / IPv6 Protocols and Functions

1038

IPv4 and IPv6 routing

Proposed routers must support IPv4 and IPv6 routing.

Accept

1039

Variance to iPv4 and IPv6 routing

Variance to IPv4 and IPv6 routing.

No response

1040

Unicast and multicast routing

Proposed routers must support unicast and multicast routing.

Accept

1041

Variance to unicast and multicast routing

Variance to unicast and multicast routing.

No response

1042 **Routing protocol support**

Proposed routers must support OSPFv2, OSPFv3, and BGP.

Accept

1043 **Variance to routing protocol support**

Variance to OSPFv2, OSPFv3, and BGP.

No response

1044 **Static route support**

Proposed routers must support static routes.

Accept

1045 **Variance to static route support**

Variance to static routes.

No response

1046 **VRF support**

Proposed routers must support VRFs (virtual routing and forwarding).

Accept

1047 **Variance to vRF support**

Variance to VRFs (virtual routing and forwarding).

No response

1048 **Virtualized Layer 3 support**

Proposed routers must support IPv4 and IPv6 virtualized routing through an overlay (IE: MPLS-L3VPN, VXLAN-EVPN, MPLS-EVPN, or other overlay technologies).

Accept

1049 **Variance to virtualized Layer 3 support**

Variance to IPv4 and IPv6 virtualized routing through an overlay (IE: MPLS-L3VPN, VXLAN-EVPN, MPLS-EVPN, or other overlay technologies).

No response

1050 **Edge provisioning of Layer 2 and Layer 3 services**

Proposed routers must support edge-provisioned virtualized Layer 2 and Layer 3 services.

Accept

1051 **Variance to edge provisioning of Layer 2 and Layer 3 services**

Variance to edge-provisioned virtualized Layer 2 and Layer 3 services.

No response

1052 **Anti-spoofing features**

Proposed routers must support address anti-spoofing for edge services (IE: For used when a router is acting as a default gateway for an IPv4/IPv6 network).

Accept

1053 **Variance to anti-spoofing features**

Variance to address anti-spoofing for edge services (IE: For used when a router is acting as a default gateway for a n IPv4/IPv6 network).

No response

1054 **Required Features – Campus Backbone - Management Functions**

1055 **SNMP support**

Proposed routers and switches must support SNMPv2c and SNMPv3.

Accept

1056 **Variance to sNMP support**

Variance to SNMPv2c and SNMPv3.

No response

1057 **SSH support**

Proposed routers and switches must support remote access to the command line interface (CLI) via SSHv2.

Accept

1058 **Variance to sSH support**

Variance to remote access to the command line interface (CLI) via SSHv2.

No response

1059 **SSH access control**

Proposed routers and switches must support restricting access to SSH by an ACL or equivalent protection.

Accept

1060 **Variance to sSH access control**

Variance to restricting access to SSH by an ACL or equivalent protection.

No response

1061 **SNMP access control**

Proposed routers and switches must support restricting SNMP access by an access control list or equivalent protect ion.

Accept

1062 **Variance to sNMP access control**

Variance to restricting SNMP access by an access control list or equivalent protection.

No response

1063 **Serial console support**

Proposed routers and switches must support access to the CLI via a serial console port, or some other method via direct physical connection.

Accept

1064

Variance to serial console support

Variance to access to the CLI via a serial console port, or some other method via direct physical connection.

No response

1065

RADIUS or TACACS+ support

Proposed routers and switches must support RADIUS or TACACS+ authentication for SSH and serial console administrators.

Accept

1066

Variance to rADIUS or TACACS+ support

Variance to RADIUS or TACACS+ authentication for SSH and serial console administrators.

No response

1067

Local account failover

Proposed routers and switches must support failover to a user account locally defined on the device, if the RADIUS or TACACS+ server is unreachable.

Accept

1068

Variance to local account failover

Variance to failover to a user account locally defined on the device, if the RADIUS or TACACS+ server is unreachable.

No response

1069

Encryption of RADIUS or TACACS+ secrets

Proposed routers and switches must support encryption of the RADIUS and TACACS+ shared secret stored in the configuration file.

Accept

1070

Variance to encryption of RADIUS or TACACS+ secrets

Variance to encryption of the RADIUS and TACACS+ shared secret stored in the configuration file.

No response

1071

Encryption of local user passwords

Proposed routers and switches must support encryption of local user passwords stored in the configuration file.

Accept

1072

Variance to encryption of local user passwords

Variance to encryption of local user passwords stored in the configuration file.

No response

1073

Configuration backup

Proposed routers and switches must be able to represent its configuration (such as a text file) that can be uploaded to restore a configuration.

Accept

1074 **Variance to configuration backup**

Variance to Proposed routers and switches must be able to represent its configuration (such as a text file) that can be uploaded to restore a configuration.

No response

1075 **Syslog support**

Proposed routers and switches must support logging to a syslog server on a configurable port other than default sy slog (udp/514).

Accept

1076 **Variance to syslog support**

Variance to logging to a syslog server on a configurable port other than default syslog (udp/514).

No response

1077 **NTP support**

Proposed routers and switches must support NTP as described in RFC 5905 or SNTP as described by RFC 4330.

Accept

1078 **Variance to nTP support**

Variance to NTP as described in RFC 5905 or SNTP as described by RFC 4330.

No response

1079 **LLDP support**

Proposed routers and switches must support IEEE 802.1ab Link-Layer Discovery Protocol (LLDP).

Accept

1080 **Variance to lLDP support**

Variance to IEEE 802.1ab Link-Layer Discovery Protocol (LLDP).

No response

1081 **Naming of interfaces**

Proposed switches must support naming of individual interfaces within the configuration and this information must b e retrievable via CLI "show" commands and SNMP.

Accept

1082 **Variance to naming of interfaces**

Variance to naming of individual interfaces within the configuration and this information must be retrievable via CLI " show" commands and SNMP.

No response

1083 **Encrypted file transfer**

Proposed routers and switches must support encrypted file transfer for uploading/download code or configuration fil es.

Accept

1084 **Variance to encrypted file transfer**

Variance to encrypted file transfer for uploading/download code or configuration files.

No response

1085 **Required Features – Campus Backbone - Physical & Power Characteristics**

1086 **Physical router and switch dimensions**

Proposed routers and switches must be mountable in both a standard two-rail 19" communication rack and a standa rd 19" four-post server rack.

Accept

1087 **Variance to physical router and switch dimensions**

Variance to Proposed routers and switches must be mountable in both a standard two-rail 19" communication rack a nd a standard 19" four-post server rack.

No response

1088 **Input voltage**

Proposed routers and switches must support 120 and 208 VAC capable power supplies.

Accept

1089 **Variance to input voltage**

Variance to 120 and 208 VAC capable power supplies.

No response

1090 **Power supply redundancy**

Proposed routers and switches must contain N+1 power redundancy, such that if any individual power supply were t o fail or lose power, the device would continue to function without any impairment. For example, if a device requires three power supplies to function, the switch must support four power supplies such that any individual power supply could fail and the device would continue to function without impairment.

Accept

1091 **Variance to power supply redundancy**

Variance to four power supplies such that any individual power supply could fail and the device would continue to fu nction without impairment.

No response

1092 **Hot swappable power supplies**

Proposed routers and switches must have hot swappable power supplies.

Accept

1093 **Variance to hot swappable power supplies**

Variance to Proposed routers and switches must have hot swappable power supplies.

No response

1094 **Hot swappable modules**

Proposed modular routers and switches must support hot swapping of modules, without adversely affecting other m odules in operation.

Accept

1095

Variance to hot swappable modules

Variance to hot swapping of modules, without adversely affecting other modules in operation.

No response

1096

Stack behavior during individual member failure

Proposed stackable routers and switches must allow for the failure of any one router/switch, without disabling the st ack or degrading the operation of the remaining stack members.

Accept

1097

Variance to stack behavior during individual member failure

Variance to Proposed stackable routers and switches must allow for the failure of any one router/switch, without disa bling the stack or degrading the operation of the remaining stack members.

No response

1098

Replacement of stack members

Proposed stackable routers and switches must be replaceable without disabling the stack nor degrading the operati on of the remaining stack members.

Accept

1099

Variance to replacement of stack members

Variance to Proposed stackable routers and switches must be replaceable without disabling the stack nor degrading the operation of the remaining stack members.

No response

1100

Hot swappable fans

Replaceable fans must be hot-swappable.

Accept

1101

Variance to hot swappable fans

Variance to Replaceable fans must be hot-swappable.

No response

1102

Strongly Desired Features – Campus Backbone

The following list of features are highly desirable in a proposed solution. Please simply affirm or deny that your prop osed solution meets the following requirements by notating each item with “accept”, “deny”, or “variance.” Please ex plain any variances in your product. The Bidder cannot answer “accept” if the feature is not currently available in th e proposed hardware running current general availability (production) release software. If a feature is not in product ion software at the time of the RFP submission, the Bidder must choose “deny” or “variance.” If a feature not in prod uction software is described under a “variance,” it must be noted the feature is not currently available.

1103

Strongly Desired Features – Campus Backbone - General

1104

Third party optics and transceivers

Proposed routers and switches should support third-party optics and transceivers.

Variance

1105

Variance to third party optics and transceivers

Variance to third-party optics and transceivers.

Third-party optics will function in the Catalyst 9000 switches, but will not be supported under maintenance contracts.

1106

Strongly Desired Features – Campus Backbone - Ethernet Bridging Protocols and Functions

1107

802.1q VLAN tag re-use

Proposed routers and switches should support the re-use of an 802.1q VLAN tag in different bridging domains for downstream devices.

Accept

1108

Variance to 802.1q VLAN tag re-use

Variance to the re-use of an 802.1q VLAN tag in different bridging domains for downstream devices.

No response

1109

Loop protection features

Proposed routers/switches should support a loop protection feature, independent of STP, to disable a port where a loop has been detected on a down-stream switch.

Accept

1110

Variance to loop protection features

Variance to loop protection feature, independent of STP, to disable a port where a loop has been detected on a down-stream switch.

No response

1111

MAC table size

Proposed routers and switches should support hardware forwarding for a minimum of 60,000 hosts (MAC table entries) via layer 2 bridging functions, please indicate the maximum.

Accept

1112

Variance to mAC table size

Variance to hardware forwarding for a minimum of 60,000 hosts (MAC table entries) via layer 2 bridging functions, please indicate the maximum.

No response

1113

MAC table size per VLAN

Proposed routers and switches should support a minimum of 4,096 hosts, or MAC entries, in a single layer 2 VLAN. Please indicate the maximum.

Accept

1114

Variance to mAC table size per VLAN

Variance to minimum of 4,096 hosts, or MAC entries, in a single layer 2 VLAN. Please indicate the maximum.

No response

1115	**Broadcast storm control** Proposed routers and switches should support broadcast storm control and multicast storm control for all ports operating as L2-only bridging ports. Accept
1116	**Variance to broadcast storm control** Variance to broadcast storm control and multicast storm control for all ports operating as L2-only bridging ports. *No response*
1117	**Strongly Desired Features – Campus Backbone - IPv4 / IPv6 Protocols and Functions**
1118	**Static ARP** Proposed routers and switches should support IPv4 static ARP entries. Accept
1119	**Variance to static ARP** Variance to IPv4 static ARP entries. *No response*
1120	**Static IPv6 ND** Proposed routers and switches should support IPv6 static neighbor-table entries. Accept
1121	**Variance to static IPv6 ND** Variance to IPv6 static neighbor-table entries. *No response*
1122	**IPv4 and IPv6 feature parity in forwarding** Proposed routers and switches should have feature parity between IPv4 and IPv6 forwarding. Accept
1123	**Variance to iPv4 and IPv6 feature parity in forwarding** Variance to Proposed routers and switches should have feature parity between IPv4 and IPv6 forwarding. *No response*
1124	**IPv4 and IPv6 feature parity in forwarding** Proposed routers and switches should have feature parity between IPv4 and IPv6 management functionality. Accept
1125	**Variance to iPv4 and IPv6 feature parity in forwarding** Variance to Proposed routers and switches should have feature parity between IPv4 and IPv6 management functionality. *No response*

1126	**Routing between virtualized ethernet networks** Routing between two different virtualized Ethernet networks should be supported (IE: Routing between two different VLANs or VXLAN VNIs) Accept
1127	**Variance to routing between virtualized ethernet networks** Variance to Routing between two different virtualized Ethernet networks should be supported (IE: Routing between t wo different VLANs or VXLAN VNIs) *No response*
1128	**ARP/ND suppression in overlay** Routers should support ARP/ND suppression across supported overlay networks. Accept
1129	**Variance to aRP/ND suppression in overlay** Variance to ARP/ND suppression across supported overlay networks. *No response*
1130	**Strongly Desired Features – Campus Backbone - Management Functions**
1131	**Zero-Touch-Provisioning** Proposed routers and switches should support some form of zero-touch-provisioning. Accept
1132	**Variance to zero-Touch-Provisioning** Variance to some form of zero-touch-provisioning. *No response*
1133	**Out-of-Band management** Proposed routers and switches should support an out-of-band management port. Accept
1134	**Variance to out-of-Band management** Variance to an out-of-band management port. *No response*
1135	**Control-plane-protection** Proposed routers and switches should support control plane protection. Traffic forwarding, switch adjacencies, and CLI management of the device over the serial console and out-of-band management ports should continue to functi on with high volumes of traffic. This includes, but is not limited to ARP storms, broadcast storms, DHCP relay forwar ding, and handling traffic with IP options set. Accept

1136

Variance to control-plane-protection

Variance to control plane protection. Traffic forwarding, switch adjacencies, and CLI management of the device over the serial console and out-of-band management ports should continue to function with high volumes of traffic. This i ncludes, but is not limited to ARP storms, broadcast storms, DHCP relay forwarding, and handling traffic with IP opti ons set.

No response

1137

Software upgrade process

Describe the switch software upgrade process and estimated time to complete and return to operation.

Accept

1138

Variance to software upgrade process

Variance to Describe the switch software upgrade process and estimated time to complete and return to operation.

No response

1139

Syslog facilities

Proposed routers and switches should support manual assignment of syslog facilities local0 - local7.

Accept

1140

Variance to syslog facilities

Variance to manual assignment of syslog facilities local0 - local7.

No response

1141

Syslog over TCP

Proposed routers and switches should support syslog over TCP.

Accept

1142

Variance to syslog over TCP

Variance to syslog over TCP.

No response

1143

Logging of administrative logins

Proposed routers and switches should log usernames of authorized users to the syslog server at the time of login.

Accept

1144

Variance to logging of administrative logins

Variance to Proposed routers and switches should log usernames of authorized users to the syslog server at the tim e of login.

No response

1145

Logging of configuration changes

Proposed routers and switches should log the username associated with configuration changes to the syslog server at the time changes are committed.

Accept

1146

Variance to logging of configuration changes

Variance to Proposed routers and switches should log the username associated with configuration changes to the syslog server at the time changes are committed.

No response

1147

Syslog documentation

Syslog documentation should be available for all syslog messages encountered during normal operation.

Accept

1148

Variance to syslog documentation

Variance to Syslog documentation should be available for all syslog messages encountered during normal operation.

No response

1149

SNMP MIB support

Proposed routers and switches should represent the following information as objects that can be queried via SNMP: 1) Status of physical devices (chassis, fan trays, power supplies, line cards, and etc.). 2) Status of resources (CPU, memory, and etc.). 3) Status and statistics of internal processes. 4) Status of physical interfaces, sub-interfaces, and physical and virtual interfaces. 5) Traffic and error counters for physical interfaces, sub-interfaces, and physical and virtual interfaces.

Accept

1150

Variance to sNMP MIB support

Variance to Proposed routers and switches should represent the following information as objects that can be queried via SNMP: 1) Status of physical devices (chassis, fan trays, power supplies, line cards, and etc.). 2) Status of resources (CPU, memory, and etc.). 3) Status and statistics of internal processes. 4) Status of physical interfaces, sub-interfaces, and physical and virtual interfaces. 5) Traffic and error counters for physical interfaces, sub-interfaces, and physical and virtual interfaces.

No response

1151

Optical power monitoring

All optical transceivers should report transmit and receive light levels.

Accept

1152

Variance to optical power monitoring

Variance to All optical transceivers should report transmit and receive light levels.

No response

1153

SNMP MIB support

Proposed routers and switches should represent the following information as objects that can be queried via SNMP. 1) Transmit and receive light levels on optical transceivers. 2) Serial number and slot position of every field replaceable part.

Accept

1154

Variance to sNMP MIB support

Variance to Proposed routers and switches should represent the following information as objects that can be queried via SNMP. 1) Transmit and receive light levels on optical transceivers. 2) Serial number and slot position of every field replaceable part.

No response

1155	**Interface counter update frequency** Proposed routers and switches should support high frequency updates for interface counters (1-5 seconds preferred). Accept
1156	**Variance to interface counter update frequency** Variance to high frequency updates for interface counters (1-5 seconds preferred). *No response*
1157	**Role-based access based on RADIUS attribute** Proposed routers and switches should support assigning role based administrative access by using a returned RADIUS or TACACS+ attribute such that the router/switch restrict the execution of CLI commands based on the returned role code. Accept
1158	**Variance to role-based access based on RADIUS attribute** Variance to assigning role based administrative access by using a returned RADIUS or TACACS+ attribute such that the router/switch restrict the execution of CLI commands based on the returned role code. *No response*
1159	**Strongly Desired Features – Campus Backbone - Physical & Power Characteristics**
1160	**Airflow options** Proposed routers and switches should include airflow options for both port-side exhaust or port-side intake. Can airflow direction be modified? Variance
1161	**Variance to airflow options** Variance to Proposed routers and switches should include airflow options for both port-side exhaust or port-side intake. Can airflow direction be modified? The stackable switches airflow direction is always from front to rear. The chassis based switches are side to side airflow.
1162	**Questions and Clarifications – Campus Backbone** Participant must answer the following set of questions designed to help identify basic metrics, scaling issues, and suitability. If more than one type of router or switch is proposed, the values for each type must be specified.
1163	**Questions and Clarifications – Campus Backbone - General**
1164	**Downstream device rate support** Describe any support for 25Gbps, 40Gbps, or 100Gbps services to downstream devices (access/aggregation switching). 25Gbps, 40Gbps, or 100Gbps are supported on Catalyst 9500 and 9600 switching models.

1165

Backbone link rate support

Describe any support for backbone speeds higher than 100Gbps.

Currently speeds over 100Gbps are not yet supported on the Catalyst switching line. 400Gbps interfaces are supported on select Nexus switching models.

1166

Blocking within a chassis

Describe any situation in a chassis where traffic forwarding may be blocking.

Cisco Catalyst 9600 Series Chassis
Hardware ready to support up to 25.6 Tbps in wired switching capacity, with up to 6.4 Tbps bandwidth per slot.
Up to 9.6 Tbps in wired switching capacity, with 3 Bpps of forwarding performance with the Cisco Catalyst 9600 Series Supervisor Engine 1.
Up to 48 nonblocking 100 Gigabit Ethernet QSPF28 ports with the Cisco Catalyst 9600 Series Supervisor Engine 1.
Up to 96 nonblocking 40 Gigabit Ethernet QSFP+ ports with the Cisco Catalyst 9600 Series Supervisor Engine 1.
Up to 192 nonblocking 25 Gigabit/10 Gigabit Ethernet SFP28/SFP+ ports with the Cisco Catalyst 9600 Series Supervisor Engine 1.
Catalyst 9500 Series Switches
Up to 6.4-Tbps switching capacity with up to 2 Bpps of forwarding performance
Up to 32 nonblocking 100 Gigabit Ethernet QSFP28 ports
Up to 32 nonblocking 40 Gigabit Ethernet QSFP+ ports
Up to 48 nonblocking 25 Gigabit Ethernet SFP28 ports
Up to 48 nonblocking 10 Gigabit Ethernet SFP+ ports

1167

Software development location

In what country is the proposed equipment's software developed and maintained?

Cisco has a global supply chain and materials are identified by country of origin, pursuant to the substantial transformation standard of the United States and World Customs Organization.

1168

Hardware development location

In what country is the proposed equipment's hardware developed?

Cisco has a global supply chain and materials are identified by country of origin, pursuant to the substantial transformation standard of the United States and World Customs Organization.

1169

Hardware manufacture location

In what country is the proposed equipment's hardware manufactured and assembled?

Cisco has a global supply chain and materials are identified by country of origin, pursuant to the substantial transformation standard of the United States and World Customs Organization.

1170

Questions and Clarifications – Campus Backbone - Ethernet Bridging Protocols and Functions

1171

MAC scaling characteristics

What is the maximum number of MAC address forwarding entries that can exist on a system?

The Catalyst 9500 Series Switches support up to 82,000 MAC Addresses.
The Catalyst 9600 Series Switches with Supervisor Engine installed, support up to 82,000 MAC Addresses.

1172

Ethernet virtualization limitations

Describe any scaling limitations of Layer 2 (Ethernet) virtualization supported, including any limitations when virtualized in a routed overlay.

The scale of a virtualizing L2 within a fabric of an SD Access solution is only dependent upon the scalability of the fabric size. The SD Access design proposed meets the current scale and anticipated scale presented in the RFP.

1173

MAC control-plane interaction

In a virtualized layer 2 service, are MAC forwarding information shared with other routers through a control-plane mechanism? If so, describe the mechanism.

In a SD Access solution conversational learning is used. Conversational learning is the process of populating forwarding tables with only endpoints that are communicating through the node.

1174

Other system limitations

Describe any other system limitations that may exist.

N/A

1175

Questions and Clarifications – Campus Backbone - IPv4 / IPv6 Protocols and Functions

1176

FIB scale

What is the maximum number of FIB (Forwarding Information Base) entries that exist?

FIB scale is per ASIC
UADP 3.0 v4 FIB Scale supports a maximum of 412,000 and v4 and v6 scale is the same.
UADP 2.0 v4 FIB Scale supports a maximum of 228,000 and v4 and v6 scale is reduced by half.

1177

FIB sharing

Is the FIB table shared between protocols (IE: IPv4 prefix routes, IPv4 host routes, IPv6 prefix routes, IPv6 host routes, and Ethernet bridging)? If so, do any types of entries consume more FIB space than another type of entry?

The Flexible lookup tables are shared acoss cores within an ASIC. These Flexible tables consists of different types of TCAM & SRAM. Allocation to these tables can be changed using this command 'hardware access-list tcam region.'

1178

FIB allocation method

If the FIB table is shared, can this allocation be changed? Is a system reboot required to change the allocation?

The Flexible lookup tables are shared acoss cores within an ASIC. These Flexible tables consists of different types of TCAM & SRAM. Allocation to these tables can be changed using this command 'hardware access-list tcam region.'

1179

RIB scale

Describe the maximum route table size.

Catalyst 9500
212,00
Catalyst 9600
212,000

1180

Routing and switching performance

Describe the switching and routing performance in bytes per second, packets per second, etc.

Catalyst 9500
Up to 6.4-Tbps switching capacity with up to 2 Bpps of forwarding performance
Catalyst 9600
Up to 9.6 Tbps in wired switching capacity, with 3 Bpps of forwarding performance with the Cisco Catalyst 9600 Series Supervisor Engine 1.

1181

VRF scale

Describe the number of VRF (virtual routing and forwarding) instances supported by proposed routers and any licensing required.

The maximum number of VRFs that you can configure on the Cisco Catalyst 9300, 9400, 9500 is 256. For Cisco Catalyst 9600 Series switches the maximum is 1K VRF's. In a SD Access design there is currently support for 64 Virtual Networks per fabric site.

1182

Anycast gateway support

Describe anycast gateway support. (IE: When multihoming a service, can either router in an MC-LAG act as the default gateway?)

In a SD Access design it does provide an Anycast L3 Gateway for the connected endpoints (same IP address on all Edge nodes). The same Switch Virtual Interface (SVI) is present on EVERY Edge with the SAME Virtual IP and MAC. When a Host moves from Edge 1 to Edge 2, it does not need to change it's Default Gateway

1183

ARP/ND control-plane interaction

Describe if and how ARP/ND information is shared with other routers.

Endpoint registration—Each edge node has a LISP control-plane session to all control plane nodes. After an endpoint is
detected by the fabric edge, it is added to a local host tracking database called the EID-table. The edge device also issues
a LISP map-register message to inform the control plane node of the endpoint detected so that it can populate the HTDB

1184

Layer 3 virtualization scaling limitations

Describe any scaling limitations of Layer3 (IPv4 and IPv6) virtualization.

Scaling within a SD Access design is based upon various metics to include but not limited to: Number of DNAC appliances, total endpoints, number of devices (Switch/Route/WLC), number of APs, number of sites, number of ports et. al. The SD Access design proposed in this RFP meets current requirements and anticipated scale requirements identified in the RFP.

1185

NSR support

Describe which routing protocols support NSR (Non Stop Routing).

Cisco Catalyst 9000 switches support non stop forwarding. NSFis supported by BGP, Enhanced Interior Gateway RoutingProtocol (EIGRP), and OSPFrouting protocols and also by Cisco ExpressForwarding for forwarding. These routing protocols have been enhanced with NSF-capability and awareness, which means that devices running these protocols can detect a switchover and take necessary actions to continue forwarding network traffic and to recover route information from peer devices.
In a SD Access fabric design with dual Border, control and intermediate nodes you can perform maintenance (switch upgrade) on Border, Control and intermediate nodes without disruption of networking services.

1186

Symmetric and Asymmetric VXLAN routing

If VXLAN routing is supported, is symmetric and asymmetric VXLAN routing supported?

Symmetric Routing is supported.

1187

VTEP and VNI scale

If VXLAN is supported, indicate the maximum number of VTEPs and VNIs supported.

Scale in the SD Access solution is dependant upon the scale of the DNA Center appliance domains. Currently it scales up to 600 IP Pools per site and 256 Virtual Networks per site.

1188	**BUM traffic replication in a single site deployment** If EVPN or a similar technology is supported, describe how BUM (Broadcast, Unknown unicast, Multicast) traffic is replicated in a single-site deployment. (IE: Is Head-End-Replication utilized, or multicast in an underlay deployment?)
	SD-Access have the option to use underlay multicast capabilities with many of the platforms, either configured manually or by using LAN automation, for more efficient delivery of traffic to interested edge switches using multicast replication capabilities built into the fabric devices versus burdening the border with extra processing for headend replication. The multicast is encapsulated to interested fabric edge switches, which de-encapsulate the multicast and replicate it to all the interested receivers on the switch. If the receiver is a wireless endpoint, the multicast (just like unicast) is encapsulated by the fabric edge toward the AP associated with the multicast receiver. In addition to communication efficiency, configuring multicast in the underlay network enables overlay networks with a Layer 2 flooding option. The SD-Access Layer-2 flooding option replicates ARP frames, broadcast frames, and link-local multicast frames to all endpoints in an overlay network, using source-specific multicast in the underlay. When enabled, Layer 2 flooding accommodates mDNS and similar services, and addresses connectivity needs for some silent host endpoints requiring receipt of specific non-unicast traffic prior to activating communication.
1189	**BUM traffic replication in a multi-site deployment** If EVPN or a similar technology is supported, describe how BUM (Broadcast, Unknown unicast, Multicast) traffic is replicated in a multi-site deployment. (IE: Is a designated forwarder used when multiple sites exist?)
	SD-Access have the option to use underlay multicast capabilities with many of the platforms, either configured manually or by using LAN automation, for more efficient delivery of traffic to interested edge switches using multicast replication capabilities built into the fabric devices versus burdening the border with extra processing for headend replication. The multicast is encapsulated to interested fabric edge switches, which de-encapsulate the multicast and replicate it to all the interested receivers on the switch. If the receiver is a wireless endpoint, the multicast (just like unicast) is encapsulated by the fabric edge toward the AP associated with the multicast receiver. In addition to communication efficiency, configuring multicast in the underlay network enables overlay networks with a Layer 2 flooding option. The SD-Access Layer-2 flooding option replicates ARP frames, broadcast frames, and link-local multicast frames to all endpoints in an overlay network, using source-specific multicast in the underlay. When enabled, Layer 2 flooding accommodates mDNS and similar services, and addresses connectivity needs for some silent host endpoints requiring receipt of specific non-unicast traffic prior to activating communication.
1190	**Questions and Clarifications – Campus Backbone - Management Functions**
1191	**Software upgrade process** Describe the switch software upgrade process including the ISSU or hitless upgrade process if any and estimated time to complete. Please also include any restrictions or caveats to these processes.
	The Cisco Catalyst 9400 supports ISSU with dual supervisors. The data plane continues to forward while the control plane of each respective supervisor is rebooted. The process would be to copy the image to the switch and start the ISSU process. Alternatively, if you look down the path of DNA Center Automation, software upgrades can be scheduled and pushed seamlessly via the DNA Center Console. The process here would be to use DNA Center as repository for the IOS-XE image. Push that image from one to as many switches as you want and perform an ISSU. This is known as the Software Image Management (SWIM) dashboard inside of the DNA Center Console.
1192	**Software upgrade process with MC-LAG or Virtual Chassis** Describe the software upgrade process for the routers and switches when configured as an MC-LAG or Virtual Chassis pair and indicate any downtime for one or both switches.
	This is very similar to the previous response. The Cisco Catalyst 9400 supports ISSU. This can be done manually or through DNA Center Automation. The data plane continues to forward and there should not be any downtime during an upgrade.

1193

API support

Describe supported APIs and their capabilities, providing any documentation as relevant.

A modern network switch like the Cisco Catalyst 9000 Series supports a wide range of automation features and pr ovides robust open APIs over NETCONF and RESTCONF using YANG data models for external tools, both off-the-shelf and custom-built, so you can automatically provision network resources.

1194

Configuration backup format

Is there support for importing and/or exporting the switch configuration in XML or JSON format?

Cisco IOS XE (used on Catalyst 9000 switches) supports open YANG models across multiple ecosystems, with nea rer-term focus on the OpenConfig, IETF, and CableLabs (DOCSIS) defined models. Because YANG is protocol ind ependent, it can be converted into any encoding format, such as XML, JSON, Group-Based Policy (GBP), etc., that the network configuration protocol supports.

1195

Other automation support

Describe any vendor provided tools, programming libraries, or Ansible roles that benefit automation/orchestration.

A modern network switch like the Cisco Catalyst 9000 Series supports a wide range of automation features and pr ovides robust open APIs over NETCONF and RESTCONF using YANG data models for external tools, both off-the-shelf and custom-built, so you can automatically provision network resources.With the use of DNA-Center applianc e you can automate initial turn up of a new factory-defaulted switch, deploy device templates, in an SD-Access des ign the configuration can be fully automated, and automation of device upgrades.

1196

Configuration rollback support

Indicate whether the software has a provision for a "rollback" feature allowing the return of the configuration to one or more historic revisions.

The configure replace command allows you to revert to a previous configuration state, effectively rolling back chan ges that were made since the previous configuration state was saved.

1197

Software staging

Indicate whether the routers and switches support the saving of or pre-positioning of software or configuration files i n their onboard flash memory.

Cisco Catalyst 9000 supports Flash File System. The flash file system is a single-flash device on which you can st ore files (configurations and software images). It also provides several commands to help you manage software bu ndles and configuration files. The default flash file system on the device is named “flash.”

1198

Multiple software versions

Is it possible to store more than one version of the system software on routers and switches and choose which to bo ot?

You can have multiple versions on the switch and select which one to boot from.

1199

Out-of-Band management

If the routers and switches contain an out-of-band management port, please indicate what types of management tra ffic are sourced from this port and can that traffic be directed to standard ports? (i.e. RADIUS, NTP, SNMP requests or sFlow/Netflow/IPFIX export?)

The out-of-band management port can be used for any management traffic/protocols. The management port is a Virtual Routing/Forwarding (VRF) Instance interface to which you can connect a PC. You can use the Ethernet ma nagement port instead of the device console port for network management. Traffic from this port is not normally for warded to other network ports (separate routing table).

1200	**Exclusive configuration mode** Is there an "edit exclusive" or similar option when editing the configuration and prohibiting other users from doing the same simultaneously. Cisco Catalyst 9000 switches support Configuration Lock as a feature of IOS XE. Exclusive Configuration Change Access (also called the "Configuration Lock" feature) allows you to have exclusive change access to the Cisco IOS XE running configuration, preventing multiple users from making concurrent configuration changes.
1201	**Zero-Touch-Provisioning** If zero-touch-provisioning is supported, please detail what is required and if there are supplemental management platforms provided for this. When a device that supports Zero-Touch Provisioning boots up, and does not find the startup configuration (during initial installation), the device enters the Zero-Touch Provisioning mode. The device searches for a Dynamic Host Control Protocol (DHCP) server, bootstraps itself with its interface IP address, gateway, and Domain Name System (DNS) server IP address, and enables Guest Shell. The device then obtains the IP address or URL of an HTTP/TFTP server, and downloads the Python script from an HTTP/TFTP server to configure the device.
1202	**sFlow support** If the proposed routers and switches support sFlow, what is the maximum sampling rate for a router under heavy load? The Cisco Catalyst 9000 switches supports line-rate, hardware-based Full Flexible NetFlow (FNF).
1203	**NetFlow support** If the proposed routers and switches support Netflow, what is the maximum sampling rate for a router under heavy load? A sampling rate of 1:1 being ideal. Catalyst 9500 Up to 512,000 Flexible NetFlow (FNF) entries in hardware 1:1 and sampled are supported. Catalyst 9600 Line-rate, hardware-based Flexible NetFlow (FNF) delivers flow collection for up to 294,000 flows. 1:1 and sampled are supported.
1204	**IPFIX support** If the proposed routers and switches support IPFIX, what is the maximum sampling rate for a router under heavy load? A sampling rate of 1:1 being ideal. The Cisco Catalyst 9000 switches supports line-rate, hardware-based Full Flexible NetFlow (FNF).
1205	**Questions and Clarifications – Campus Backbone - Physical & Power Characteristics**

1206

Physical dimensions

Describe the dimensions of any proposed router/switch. Use industry standard “rack units” where applicable.

H x W x D
Catalyst 9500
C9500-32C
1.73 x 17.5 x 21.2 in
C9500-32QC C9500-48YC C9500-24YC
1.73 x 17.5 x 18.0 in
C9500-12Q C9500-24Q C9500-40X C9500-16X
1.73 x 17.5 x 21.52 in

Catalyst 9600
35.43 x 44.2 x 40.9 cm
13.95 x 17.4 x 16.1 in.

1207

Power requirements

Specify the power requirements of each proposed fixed or modular switch when using AC power.

Catalyst 9500
PWR-C4-950WAC-R > AC 90 to 264 VAC, 47 to 63 Hz AC 10A at 115VAC, 5 A at 230VAC
PWR-C4-950WDC-R > -36Vdc~ -72Vdc 22.6A @ 48Vin, 950W
C9K-PWR-650WAC-R > AC 90VAC to 264VAC, 47 to 63 Hz AC 6.8A Max at 115VAC, 3.4 A Max at 230VAC (when f ull loading)
C9K-PWR-930WDC-R > DC -40VDC to -72VDC DC 23A max at -48VDC (when full loading)
C9K-PWR-1600WAC-R > AC 90VAC to 140VAC and 180VAC to 264VAC 47 to 63 Hz AC 10.5A Max at 115VAC (10 50W), 7.8 A Max at 230VAC (1600W)
C9K-PWR-1600WDC-R > DC -40VDC to -72VDC DC 40A max at -48VDC (when full loading)

Catalyst 9600
C9600-PWR-2KWAC > 90VAC to 140VAC and 180VAC to 264VAC
47 to 63 Hz AC 10.5A max at 115VAC (1050W) 7.8 A max at 230VAC (2000W)
C9600-PWR-2KWDC > -40VDC to -72VDC DC 40A max at -48VDC (when full PSU loading)

1208

Thermal output

Specify the BTU output for each standalone switch or modular chassis model in the proposed configuration for 120 V AC, 208V AC (and -48V DC operation if applicable).

Catalyst 9500
PWR-C4-950WAC-R > 1064
PWR-C4-950WDC-R > 1087
C9K-PWR-650WAC-R > 426-532 depending on switch model
C9K-PWR-930WDC-R > 435-544 depending on switch model
C9K-PWR-1600WAC-R > 904-2900 depending on switch model
C9K-PWR-1600WDC-R > 930-2976 depending on switch model

Catalyst 9600
C9606R + C9606-FAN = 1621 (max) This is the absolute maximum. Typically, the power would be 70% of absolute maximum

1209

Estimated boot time

Specify the boot time in seconds for each proposed device configuration. This should be the time it takes for the device to reach a full forwarding state from a powered off state without taking into consideration convergence of routing protocols.

The boot times for each switch platform are shown in Table 5.
Table 5. Cisco Catalyst 9000 Series Boot Time
Platform Boot Time (Sec) Boot FWD (Sec) Standby Hot (Sec)
9300 (Data/PoE/UPoE) 175 338 NA
9300 (Mgig) 197 332 NA
9300—8 Stack Members 197 332 598
94/600—7-Slot Fully Loaded 252 510 553
9500 185 337 NA
Boot Time—Timer starts from "reload" to timer ends at "PRESS RETURN."
Boot FWD—The first interface comes up after the reload.
Standby Hot—Whole stack reload till standby-hot reaches SSO.

1210

Power supply efficiency

What are the power efficiencies of power supplies?

Catalyst 9500
PWR-C4-950WAC-R > 94%
PWR-C4-950WDC-R > 91% at 48Vin, 50% load
C9K-PWR-650WAC-R > 94% (Typ)
C9K-PWR-930WDC-R > 92% (Typ)
C9K-PWR-1600WAC-R > 94% (Typ)
C9K-PWR-1600WDC-R > 92% (Typ)

Catalyst 9600
C9600-PWR-2KWAC > 94% (typical)
C9600-PWR-2KWDC > 92% (typical)

1211

Environmental tolerances

What are the environmental tolerances for temperature, humidity, and altitude?

Catalyst 9500
- Normal operating temperature range: 5C to 40C (up to 1829 meters (6000 ft)
- Short term operating temperature range: -5C to 55C
- Normal Relative Humidity range: 5% to 85%
- Short term Relative Humidity range: 5% to 93%
- Operating Altitude: up to 1829 m (6000 ft) at 55C

Catalyst 9600
- Normal operating temperature range: -5C to 40C (up to 10000 ft)
- Normal Relative Humidity: 10% to 95%, noncondensing
- Operating Altitude: -60 to 3000 m (-197 to 9843 feet)

1212

Questions and Clarifications – Campus Backbone - Switch and Router Architecture

1213

Hardware architecture

Describe the architecture of the router and provide a block diagram of the architecture that includes major components such as ASIC, Memory, CPU, network modules, stack interface, etc.

For the Catalyst 9500 block diagrams refer to pages 130-133. For the Catalyst 9600 block diagrams refer to pages 160-161, 164-165. Reference document: https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/5eU6DfQV/TECARC-2900.pdf

1214	**ASIC** Describe the model of ASIC used on any proposed router or switch. UADP 3.0 ASIC is utilized in both the Catalyst 9500 and 9600 series switches. The UADP 3.0 ASIC contains dual c ores, total bandwidth up to 1.6T, 54K TCAM entries and 36MB of buffers. More detailed information can be found h ere: https://community.cisco.com/t5/networking-blogs/uadp-the-powerhouse-of-catalyst-9000-family/ba-p/3764605
1215	**ASIC - pipeline description** Describe the forwarding pipeline on any proposed router or switch. UADP ASICs support a flexible and programable pipeline. The ingress and egress programmable stages are illustr ated on slide 199 located here: https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/BRKARC-2035.pdf Al so reference slides 82-85 of this reference: https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2016/pdf/BRKARC-3467.pdf
1216	**Memory available to CPU** Describe how much memory is available to the CPU? Catalyst 9500 and 9600 series switches contain 16G DDR4 memory along with 16 GB of internal storage. In additi on you can also utilize up to 960 GB of SATA SSD storage for container-based application hosting
1217	**System buffering** Describe where packet buffers are located in the architecture and how they are shared. Catalyst 9500 Series Switches have up to 128 MB Buffer with 36 MB of unified buffer per ASIC. Catalyst 9600 Series Switches have up to 108 MB Buffer with 36 MB of unified buffer per ASIC.
1218	**Packet walk within a single ASIC** Provide a packet walk-through for data entering and exiting on the same ASIC. Unicast forwarding within ASIC (ingress and egress) Step 1: Packet arrives at ingress port, PHY converts the signal and serializes the bits, and then it sends to network interface ports. Step 2: Network interface passes packet to ingress MACsec engine. Step 3: MACsec engine decrypts the packet if needed and passes unencrypted packet to ingress FIFO. Step 4: IFC snoops packet between FIFO and PBC. Step 5: IFC returns lookup result (frame descriptor) to PBC. Step 6: PBC uses the frame descriptor to determine the egress port. Egress on same ASIC, so result to moved to EQS. Step 7. EQS – replication, scheduling, and queue management. Step 8: PBC sends packet with new frame descriptor and enqueues the frame. Step 9. EFC snoops packet between PBC and rewrite engine. Step 10. EFC performs egress lookup functions to learn SRC MAC, egress SPAN, etc. and sends results to rewrite engine. Step 11. Rewrite engine rewrites packets and sends through the egress FIFO. Step 12. MACsec engine encrypts packet prior to placing it on NIF.

1219

Packet walk within a single router

Provide a packet walk-through for data entering and exiting from a different ASIC line card of on the same router.

Unicast forwarding across ASIC (ingress and egress)
Step 1: Packet arrives at ingress port, PHY converts the signal and serializes the bits, and then it sends to network interface ports
Step 2: Network interface passes packet to ingress MACsec engine.
Step 3: MACsec engine decrypts the packet if needed and passes unencrypted packet to ingress FIFO.
Step 4: IFC snoops packet between FIFO and PBC.
Step 5: IFC returns lookup result (frame descriptor) to PBC.
Step 6: PBC uses the frame descriptor to determine the egress port. Egress port across ASIC enqueues result to I QS.
Step 7: IQS provides queuing and scheduling functions for packet to be enqueued to Inter-ASIC connection.
Step 8: PBC sends packet with new frame descriptor and enqueues the frame to Inter-ASIC connection.
Step 9. Packet arrives from inter-ASIC connection, PBC parses header and sends to EQS.
Step 10. EQS performs replication, scheduling, and queue management and sends header to PBC.
Step 11. EFC snoops packet between PBC and rewrite engine.
Step 12. EFC performs egress lookup functions to learn SRC MAC, egress SPAN, etc. and sends results to rewrite engine.
Step 13. Rewrite engine rewrites packets and sends through the egress FIFO.
Step 14. MACsec engine encrypts packet prior to placing it on NIF.

1220

Other aspects

Describe any other architectural features that you feel are important.

- Next-Generation Network Based Application Recognition (NBAR2): NBAR2 enables advanced application classific ation techniques, accuracy with up to 1400 predefined and well-known application signatures and up to 150 encry pted applications on the Cisco Catalyst 9000 Series.
- On-box Python scripting, streaming telemetry, container-based application hosting
- Up to 960 GB of SATA SSD storage for container-based application hosting
- Optimized telemetry a visibility ERSPAN, AVC (NBAR2), App Hosting (in Containers/VMs), Wireshark
- Encrypted Traffic Analytics (ETA): You benefit from the power of machine learning to identify and take actions tow ard threats or anomalies in your network, including malware detection in encrypted traffic and distributed anomaly detection. Additionally, ETA is able to detect vulnerable implementations in encrypted traffic
- Support for AES-256 with the powerful MACsec 256-bit encryption algorithm available on all models
- Trustworthy solutions: Secure Unique Device Identification (SUDI) support for Plug and Play, enabling tamper-pro of device identity capability, which secures zero-touch provisioning by allowing your device to show a certificate to t he server to be able to get onto your network

1221

System upgrades

Describe any hardware upgrades that may be purchased for the router aside from network modules. For example, Memory, Flash, Processors, etc.

Up to 960 GB of SATA SSD storage for container-based application hosting

1222

Control plane redundancy

Describe any control plane redundancy do you have?

In an SD Access environment the control plane can be split between multiple nodes (typically 2). When using VSL (Virtual Stack Link) the control is split between two nodes. Also when using dual supervisors in a Catalyst 9400 and 9600 chassis the control plane is mirrored across the two supervisors.

1223

Master Price List

Bidder must propose a Master Pricing Agreement for hardware and related pricing, which meets the objective and c riteria of this RFP. Include at a minimum the following columns for each equipment, software, maintenance, support, or services available under the agreement: Part Number, Description, Manufacturer List Price, Percentage % Disco unt, Discount Price

Yes, I have uploaded Master Price

12224	**Attachment A Unified Edge** Inventory list below indicates the inventory that is currently installed across the NU system. We are requesting bids for models that are suitable replacements for these models meeting the specifications listed in the RFP. Utilizing as few AP models and controllers as possible. In addition, a network access and control policy management solution m ust be included. Yes, I can provide
12225	**Attachment B Campus Backbone** University of Nebraska has four campus networks located in Curtis, Kearney, Lincoln, and Omaha. Each campus net work will be interconnected with the University operated Wide Area Network in 2 distinct physical locations, with the exception of the Curtis campus. The operation of the campus network should not be dependent on the equipment in any single interconnections. Attachment B to create a comparative pricing proposal for Campus Backbone networking. Pricing for the Campus B ackbone proposals should include any licenses necessary to support features listed as required in this RFP. Yes, I can provide
12226	**Attachment D Data Center Network** University of Nebraska has two main Data Centers (DC), one in Lincoln (Nebraska Hall – NH) and one in Omaha (Ti erpoint). The University owns and operates a 100G capable WAN/MPLS network and DWDM transport between the se sites. The DC's connect into the WAN routers for inter-DC, campus and external connectivity. Attachment D to create a comparative pricing proposal for Data Center networking. Pricing for Data Center (DC) pr oposals should include any necessary licenses needed to support required features. This includes any graphical so ftware tools available for configuration and support of the DC network. Yes, I can provide
12227	**Attachment C** University of Nebraska has provided Logical Campus Fiber Optic Maps. Yes, I understand

1228

Company's capability

Provide point-by-point responses in Section 1, describing in detail your company's capability of meeting the stated objectives and needs, while meeting the technical requirements as described.

Refresh unified edge infrastructure

• Replace existing edge switches
o Connection has extensive experience in deploying network edge equipment. We fully understand the importance of working with the IT Team and building a plan that minimizes risk to the transition to the new equipment.

• Ensure adequate security at the edge
o Security at the edge is paramount for modern institutions to counter the multitude of external and internal threats to a network that has expanding edge and access for users. We recommend the expanded implementation of the NAC solution (Cisco Identity Services Engine) to meet the future demands of securing the network on the wired and wireless edge.

Refresh of existing wireless infrastructure

• Improve performance in areas of high wireless client density and continue to provide stable service
o The critical component will be to conduct site surveys to insure the areas that are covered by the deployed APs meet the coverage and density requirements. The placement of AP will also take into account how to insure stable services is provided by the mesh or overlay of AP deployment.

• Improve wireless system management
o This will be a critical component of the design. The Connection recommended design includes an "Assurance" feature of the controller using the Cisco Digital Network Architecture (Cisco DNA-C). Connection has provided additional information and narrative on that solution in other submissions for the university to reference.

• Leverage unifying software for authentication, monitoring, and analytics Authenticate and authorize all clients

o The Cisco Digital Network Architecture (Cisco DNA) includes authentication capability by using Cisco Identity Services Engine (ISE). Connection has provided additional information and narrative on that solution in other submissions for the university to reference.

Refresh campus backbone core/distribution network infrastructure
• Build capacity and simplify delivery of new services
o Connection recommends a platform that provides future options for centralized management.
• Utilize existing fiber optic cabling plant
o Connection will use all options to evaluate the existing fiber plant and leverage it for the design of the data center network.

Refresh data center network infrastructure

• Build new networking infrastructure for Data Centers at multiple sites
o The design for the data center network will evaluate throughput requirement to avoid oversubscription issues.

• Be scalable, high performance, supporting current trends and industry standards
o The design will leverage a leaf spine architecture that will allow for scale and stability of the data center network.

• Achieve higher operational efficiency through automation and orchestration
o There are options for the University to consider in the data center network design for operational model. Cisco has support for Cisco Network Services Orchestrator (NSO). NSO provides comprehensive lifecycle service automation to enable IT staff to design and deliver high-quality services faster and more easily.
o In addition Cisco has Cisco Application Centric Infrastructure (ACI) that also provide policy based security for the environment. Also, there are options for adopting solutions such as Ansible which are supported by Cisco's UCS solutions and allow for tighter API integration of systems.

1229 **Company's networking deployments**

Describe in detail similar networking deployments your company has executed in the past three to five years.

Connection supports a broad range of clients which allows our technical staff to understand the diverse needs of t he verticals we support. This ranges from education, Federal Government, Healthcare, Retail and Manufacturing v erticals. Of note Connection implemented a large scale medical facility network refresh that resulted in a near zero defect implementation. The healthcare facility was faced with changing clinical care requirements that pressed the need for an upgrade to the network core infrastructure. The healthcare facility had12 Sites (campus & Branch) tha t required a nimble plan to upgrade the network infrastructure. Some of the critical drivers for this initiative were:
• End of Live (EoL) product
• Business Risk due to need to integrate with new clinical care platforms
• A lack of scale with the existing platforms (Network edge and core)
• A need to integrate IoT solutions.

The network solution was delivered by Connection staff that encompassed security and full network campus updat e. We consider a key success component to this was our continuity in our delivery process using our Program Man agement Office (PMO) for project management oversight. Connection also included other services such as our Cu stomer Experience (CX) and asset management assistance leveraging Cisco Total Care using our own Install Base Optimization Service (IBOS) offering.

The core of our effort was align network infrastructure to the client's commitment to "improve what we do, every da y, to provide a superior patient experience…. To provide exceptional healthcare services in a safe and trustful envi ronment through the expertise, commitment and compassion of their family of caregivers"

The charter of the project was to create a modern, high throughput wired & wireless LAN that is flexible, expandabl e, secure, and easily managed for the client.

The project began with a thorough assessment of the environment:
• Wireless Assessment (combination of RF/onsite & predictive surveys)
• Spectrum analysis of the site
• Measure throughput of network under stress
• A review of currently deployed wireless networks
• How much area the client wants covered by the wireless system
• Planned wireless device locations to determine mounting and power requirements
• Equipment selection to meet the customer's requirements
• Correct antenna choices and mounting to optimize performance
• Combination of RF/onsite + predictive analysis

Important to this phase was a Readiness/Enablement review for future proofing the solution that was deployed. Im portant elements in this requirement were the following:
• Asset Management/Tracking via Location Services
• Added Capacity in anticipation of new IT services and connected devices
• Large increase in tablet usage
• Voltage need for deployed and new phones
• Enterprise Video Services
• Attracting & retaining talent
• Secure mobility/remote access

Deployment Phase:
• Implement new WLAN Control Footprint
• Replace critical WLAN Access Points
• Replace critical edge switches at campus and remote locations
• Update to latest Firewall & IPS Technology
• Deploy new network management platform
• Add WLAN Control Capacity to Support all Sites
• Replace firewalls at campus and remote locations
• Deploy Advanced Mobility Services for Location
• Relegate existing high availability to distribution layer
• Increase performance of distribution layer a key campus locations
• Deploy Advanced Mobility Services for IPS
• Create Identity Services Network Access Control (NAC) footprint

The result of this services were to improve the following:
• Modern network management platform
• New documentation standards
• Network operating system consistency
• Standard blueprint for network operations

1230 Company's networking deployments with United States

Describe in detail similar networking deployments your company has executed in the past three to five years for an institution of higher education within the United States.

Since our founding in 1982, Connection has set the standard for customer service in the IT industry. We strive to create a foundation for long-lasting and rewarding partnerships. We offer expert guidance, exceptional service, and innovative strategies to empower you to make informed IT investment decisions. A collaborative approach to the design, deployment, and support of technology has fueled Connection's growth and earned us the reputation of trusted advisor to our customers.

Connection has broad experience working with High Education and K12 institutions. We have education institutions that we presently and in the past have provided extensive IT consulting and infrastructure services. As an example we support the Lovington Independent School District in New Mexico maintaining all of their IT services. The support has ranged from updating their entire campus and remote sites to a standard solution that has vastly reduced the operational complexity and provided reliable services to their data users and stakeholders.

Connection has leverages its broad experience with Lovington and other similar learning institutions to
Collaborate on the best solution to create a friction-less learning environment.

Connection has qualified experts with experience building the right networking solutions for thousands of customers. Let our in-house experts help you build a complete IT infrastructure with a solid foundation. Our services address network efficiencies, collaboration requirements, increased speed, and greater productivity. In-depth assessment, documentation, consultation, design, planning, installation,
And management services are available for all networking solutions.

Network Architecture
A secure, reliable and resilient network is crucial for any entity operating in today's technology driven world. Our Network Practice can help you develop a clear understanding of the capabilities and shortcomings of your existing infrastructure and chart a plan for remediation. Engagement goals include:
• Understand existing network infrastructure
• Find new ways to expand capabilities
• Leverage current investments

Rapid network expansion, newly acquired or merged networks, may leave you with uncertainty about your overall environment. We can dig deep into your infrastructure with a comprehensive discovery of your IT network, document its current state, and conduct a performance analysis for each appliance for a holistic view. We help identify the equipment that should be upgraded and review performance issues,
such as bottlenecks. Once issues are uncovered or known issues are identified, we provide remediation plans to fix the problems, optimize your network's performance, and increase your network capabilities. Let our experts' help you define the right network architecture for your organization, implement it according to proven practices, and tune it for the applications and traffic patterns that exist in your environment.

Network Access
Network access can be simplified and secured with one network, one policy, and one management architecture. Our experts will take a holistic approach to design a network that provides wireless access that performs like wired, and effectively supports the policies that enable BYOD (Bring Your Own Device). Our Networking Practice works closely with our Security Practice to create policy-driven, on-demand access solutions with built-in security layers and will help you not only optimize your environment and resolve capacity issues but also include security measures across all domains.

1
2
3
1

Company's methodology

Describe your methodology for providing requested services, how you organize your team and the University team, and how you ensure you deliver a quality product that meets expectations.

The development of the enterprise architecture based systems will follow a Connection-developed best practices. Our proven three-step process aligns Client needs with the right technologies. Our engineering and architect staff work with clients to:
• Discern where you are today, your IT context, and what requirements are defining the boundaries
• Design an enterprise architecture that fits our clients unique environment
• Deliver the right technologies, guidance, and support to seamlessly deploy and manage the IT infrastructure

Connection works with client organization at all levels to discern, design, and deliver the best IT solutions for the or ganization. There is no one-size-fits-all version of IT technology. We combine unbiased expertise and best-of-bree d technology vendors. As a technology company with more than 35 years of experience, we leverage our deep par tnerships with industry veterans to deliver the right solution.
As Connection engages with our clients we include these elements as tenants of moving an organization forward in its digitization journey.
• Identifying and validating technology requirements
• Planning for infrastructure changes and resource requirements
• Developing a sound design aligned with technical requirements and business goals
• Delivering a successful integration
• Improving the efficiency of IT services and of the staff supporting IT
• Always maintaining a focus on core Security requirements
• Reducing operating expenses by improving the efficiency of operational processes and tools

Discern
The design process will begin with discovery and information gathering. The initial phase is to organize resources t hat collect the organizational requirements, developing an IT strategy, and proposing a conceptual architecture ide ntifying technologies that can best support the architecture.
These four elements are the key top level elements that begin the findings phase of collecting top domain require ments that feed into the succeeding steps.

Design
The preliminary requirements that were developed in the Discern phase drive the activities of the design specialist s. The design specification collected is a comprehensive detailed data set that drives to meets current business an d technical requirements, and incorporates specifications to support availability, reliability, security, scalability, and performance. The design phase is the basis for the delivery activities.

Deliver
During the Deliver Phase, hardware and software is integrated into the environment per the plan established durin g the Discern and Design phases.

Project Management
All Services engagements include professional project management to include the following:
• Service Provider will appoint a Project Manager (PM) as a single point of contact
• Project Manager shall maintain a project schedule, coordinate activities related to the implementation
o Coordinate and facilitate kick-off, status, deliverable review and closeout meetings
o Establish and manage the service schedule, communications and status reporting
o Identify, monitor and manage project risk, issues and escalations
o Facilitate change management as needed
o Confirm the Services delivered are in accordance with the SOW
o Coordinate deliverable and project completion acceptance from Client
o Monitor the project budget and invoices
o Manage the Client relationship
o Track and status progress against milestones
• The PM shall maintain all project documentation relevant to the infrastructure implementation

1232	**Recycling or Reuse** Supplier should clarify any services to aid in recycling or reuse (recovery) of packaging materials. Connection will work with University of Nebraska to champion the recycling and reuse of packaging materials. Con nection can leverage our state of the art Wilmington Ohio Configuration Center to centralize packaging recycling a nd reduce the impact on the environment. Connection has been an advocate for limiting packaging and its impacts on the ecology of the planet. In addition our disposal services can extend to end of life equipment. Our extensive program offerings provide opti ons for every aspect of asset management, from recycling and trade-in to environmentally friendly disposal. All yo u have to do is show us where the equipment is, and we will take care of the rest.

1233	**Cost Breakdown by campus** Addendum 2 request cost breakdown by campus. Bidder(s) can attach a document in the Response Attachments t ab of this RFP.

Bid Lines

1	Pricing for proposed equipment as outlined in Attachment A for Unified Edge equipment. [redacted]

2	Pricing for proposed equipment as outlined in Attachment B for Campus Backbone equipment. Quantity: 1 UOM: EA Unit Price: $3,285,251.52 Total: $3,285,251.52 Item Notes: Provide detailed listing of equipment and percentage of discount off list. Proposals for Campus Backbo ne equipment be broken down for each campus location. Reference Addendum 2. All pricing must be FOB destination and include shipping cost.

3	Pricing for proposed equipment as outlined in Attachment D for Data Center equipment. Quantity: 1 UOM: EA Unit Price: $2,250,006.40 Total: $2,250,006.40 Item Notes: Provide detailed listing of equipment and percentage of discount off list. Proposals for Campus Backbo ne equipment must be broken down for each campus location. Reference Addendum 2. All pricing must be FOB destination and include shipping cost.

4	Provide training to twenty (20) University personnel on the proposed products in a facility within 30 miles of the Li ncoln or Omaha campuses. **Price per person.** Quantity: 20 UOM: Per Person Unit Price: $1,250.00 Total: $25,000.00 Item Notes: Bidder must provide training to twenty (20) University personnel on the proposed products in a facili ty within 30 miles of the Lincoln or Omaha campuses. The training may be held onsite at the Univer sity. This training shall include instruction on the operating system, configuration, and troubleshooti ng of equipment which is pertinent to the University's intended use. In order to preserve business c ontinuity, two training sessions must be provided. Due to the scope of the project, training is a critic al component to ensure the engineering staff are able to effectively expand and support the environ ment. Supplier Notes: These are actually Cisco learning credits priced out with as a quantity of 50 x $500 each for a $25 000 total. The 50 credits is a liberal estimate for 2 sessions of onsite training for the 20 personnel. Please see the attached quote.
5	Certifications pertaining to the equipment being purchased and their supporting systems should be listed as an o ptional cost Price: $0.00 Total: $0.00 Supplier Notes: Certifications are not $0. Certification trainings can be purchased with learning credits such as ab out in line #4.

Response Total: $16,376,836.48

Connection™
PUBLIC SECTOR SOLUTIONS
we solve IT™

Request for Proposal

PREPARED FOR:
University of Nebraska-Lincoln

PROJECT:
eBid 3131-19-4321
Network Hardware Solutions

DUE:
October 7, 2019 at 2:00 PM ET

PREPARED BY:
Rob Pica
Sr. Executive Account Manager
Connection® Public Sector Solutions

and

Steve Siebersma
Business Development Manager 2
Connection® Public Sector Solutions

October 3, 2019

University of Nebraska-Lincoln
Procurement Services
1700 Y Street
Lincoln, NE 68588-0645

RE: eBid 3131-19-4321
Network Hardware Solutions

Attn: Claudette Biskup

Submitted: ebid@unl.edu

Thank you for inviting GovConnection, Inc. d/b/a Connection® Public Sector Solutions to participate in your Request for Proposal. To fully satisfy the requirements and specifications outlined in your RFP # 3114-19-4321, we are pleased to offer the enclosed solution for your review and consideration.

Connection® Public Sector Solutions, a trusted, single-source IT solutions provider from design through deployment, is dedicated to fulfilling the specialized IT needs of the public sector—including state and local government, K–12, and higher education institutions.

Connection is a financially stable, Fortune 1000 company you can count on. You can depend on our team to deliver expertise, solutions, and integrity, consistently.

We employ the most highly-trained, experienced IT professionals in the industry and celebrate its most tenured sales force. The depth of our expertise enables us to create smart, customer-centered solutions that match your needs and budget.

Thank you for the opportunity to offer this proposal. If selected, we'll partner as an extension of your team and remain committed to your success and ongoing satisfaction.

For additional information, or to discuss this response to your IFB, please feel free to contact your Account Manager, Rob Pica, at 800.800.0019 ext. 33324 or robert.pica@connection.com.

Sincerely,

Robert Marconi
Vice President SLED Sales
GovConnection, Inc. d/b/a Connection®
Public Sector Solutions

732 Milford Road, Merrimack, NH 03054 ▪ www.connection.com/ps

Attribute Response Narratives

 # 33 Support IEEE 802.1D bridging
Accept. The Cisco Catalyst 9000 Series Switches support IEEE 802.1D Spanning Tree Protocol (STP) and IEEE 802.1w Rapid Reconfiguration of Spanning Tree.

See Table 10, "Standards" at the referenced link:
Reference: https://www.cisco.com/c/en/us/products/collateral/switches/catalyst-9400-series-switches/datasheet-c78-739055.html

See Table 17, "Management and standards support" at the referenced link:
Reference: https://www.cisco.com/c/en/us/products/collateral/switches/catalyst-9500-series-switches/data_sheet-c78-738978.html

See Table 12, "Management and Standards Support" at the referenced link:
Reference: https://www.cisco.com/c/en/us/products/collateral/switches/catalyst-9300-series-switches/data_sheet-c78-738977.html

 # 35 Configure a port as an edge-port
Accept. The Cisco Catalyst 9000 Series Switches support Port Fast and is part of the IEEE 802.1w Rapid Reconfiguration of Spanning Tree.

 # 37 Support a loop protection feature
Accept. The Cisco Catalyst 9000 Series Switches support STP extensions. Cisco has added extensions to the STP that make convergence more efficient. In some cases, even though similar functionality may be incorporated into the IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) standard, we recommend using these extensions. All these extensions can be used with both RPVST+ and Multiple Spanning Tree (MST).

The available extensions are spanning-tree port types, Bridge Assurance, Bridge Protocol Data Unit (BPDU) Guard, BPDU Filtering, Loop Guard, and Root Guard. Many of these features can be applied either globally or on specified interfaces.

 # 39 Support a per-port feature to ignore STP BPDUs
Accept. The Cisco Catalyst 9300, 9400, and 9500 Series Switches support user-configurable STP features.

Catalyst 9000 allows the user to configure several different features as a part of the IEEE 802.1D implementation. These include Extended System ID, STP Port Priority, STP Port Cost, and Bridge Priority of a VLAN.

See "BPDU Guard" at the referenced link:
Reference:https://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst9400/software/release/169/configuration_guide/lyr2/b_169_lyr2_9400_cg/configuring_optional___spanning_tree_features.html

 # 41 Switches must support a per-port feature to block
Accept. The Cisco Catalyst 9300, 9400, and 9500 Series Switches support BPDU Guard and Root Guard.

See "Root GuardS" and "BPDU Guard" at the referenced link:
Reference:
https://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst9400/software/release/169/configuration_guide/lyr2/b_169_lyr2_9400_cg/configuring_optional___spanning_tree_features.html

 # 43 Support switches must fully support IEEE 802.1Q VLAN tagging on layer 2 interfaces.
Accept. The Cisco Catalyst 9200, 9300, 9400, and 9500 Series Switches support IEEE 802.1Q VLAN.

See "Management and Standards Support" table at the referenced link:
Reference: https://www.cisco.com/c/en/us/products/collateral/switches/catalyst-9400-series-switches/datasheet-c78-739055.html

 # 45 Support switches must support jumbo frame sizes of 9,192+ bytes
Accept. The Cisco Catalyst 9200, 9300, 9400, and 9500 Series Switches support Jumbo frame of 9198 bytes.

See "Cisco Catalyst 9400 Supervisor Engine-1 performance and scalability features" table at the referenced link:
Reference: https://www.cisco.com/c/en/us/products/collateral/switches/catalyst-9400-series-switches/datasheet-c78-739055.html

 # 49 Support a form of multi-chassis link aggregation
Accept. The Cisco Catalyst 9000 Series Switches support Multi-Chassis link aggregation. There are no external controllers needed for the Multi-Chassis link aggregation.

See "Configuring EtherChannels" at the referenced link:
Reference:
https://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst9400/software/release/16-9/configuration_guide/lyr2/b_169_lyr2_9400_cg/configuring___etherchannels.html

 # 89 Switches must support an RFC 3176 compliant version of sFlow, RFC 3954 compliant version of Netflow, or RFC 5101 compliant version of IPFIX with support for IPv4 and IPv6.
Accept. Cisco Catalyst Switches support Flexible NetFlow and IPFIX.

 # 99 Switches must support some type of ARP protection mechanism, to avoid spoofing, and it is strongly preferred that the feature also operates when the switch is in Layer2 mode only.
Accept. The Cisco Catalyst 9000 switch supports Dynamic Address Resolution Protocol (ARP) Inspection (DAI).

DAI uses the binding information that is built by DHCP snooping to enforce the advertisement of bindings to prevent man-in-the-middle attacks. These attacks can occur when an attacker intercepts and selectively modifies communicated data to masquerade as one or more of the entries in a communication association. DAI adds an extra layer of security to ARP inspection by verifying that the ARP packet's MAC address and IP address match an existing DHCP snooping binding in the same VLAN. The basic functionality and packet flow of ARP inspection remains unchanged except for the addition of checks to ensure that a DHCP binding exists.

 # 200 Switches should support a client redirect to a third-party captive portal for authentication; i.e. a captive-portal hosted on a NAC platform for web-based authentication or acceptable-use acceptance by guests.
Accept. The Cisco Identity Services Engine (ISE), which handles the authentication request for both wired and wireless, has the ability either to redirect to an external Captive Portal or to host the captive portal itself.

 # 207 Switches should run the same operating system.
Accept. All Catalyst 9K switches run the IOS-XE Operating System.

 # 211 Switches should support restricting SNMP access.
Accept. All Catalyst 9000 switches SNMP Object Identifiers (OIDs) can be queried as requested in this RFP.

 # 213 Switches should represent the following information as objects that can be queried via SNMP
Accept. The Cisco Catalyst 9400 Series Switches with installed Supervisor Engine - 1 support SNMP Traps. The list of supported notification types will be in line with those available on the Catalyst 4500E OS version 3.7.

Please see Table 65-3 at the referenced link:

Reference: http://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst4500/XE3-7-0E/15-23E/configuration/guide/xe-370-configuration/snmp.html#33294
http://www.cisco.com/c/en/us/products/collateral/switches/catalyst-9400-series-switches/datasheet-c78-739055.html

 # 215 Switches should support SNMP traps identifying MAC address changes on a switch port

Accept. The Cisco Catalyst 9400 Series Switches with installed Supervisor Engine - 1 support SNMP Traps. The list of supported notification types will be in line with those available on the Catalyst 4500E OS version 3.7.

Please see Table 65-3 at the referenced link:
Reference: http://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst4500/XE3-7-0E/15-23E/configuration/guide/xe-370-configuration/snmp.html#33294
http://www.cisco.com/c/en/us/products/collateral/switches/catalyst-9400-series-switches/datasheet-c78-739055.html

 # 227 Switches should support programmatic management

Accept. Cisco Catalyst 9000 switches open a completely new paradigm in network configuration, operation, and monitoring through network automation. The Cisco automation solution is open, standards-based, and extensible across the entire network lifecycle of a network device:

- Device provisioning: Through Plug-and-Play (PnP), Zero-Touch Provisioning (ZTP), and Preboot Execution (PXE)
- Configuration: Model-driven operation through open APIs over NETCONF, Python Scripting
- Customization and monitoring: Streaming telemetry
- Upgrade and manageability: In-Service Software Upgrade (ISSU), patchability, and config/replace.

 # 229 Switches should support CLI reporting

Accept. Every replaceable module, or Small Form-factor Pluggable (SFP) shows details on serial number (interface) slot and sub interface information in CLI of the switch.

 # 231 Switches should log usernames of authorized users

Accept. When a user logs in, the notification syslog message is generated, showing the user ID of the user logging in.

 # 239 Switches should support configuration management

Accept. The Catalyst 9000 Series Switches support Configuration Rollback.

Configuration Rollback is the ability to roll back to a previous configuration via the configure replace command. This command provides the capability to replace the current running configuration with any saved Cisco IOS configuration file. This functionality can be used to revert to a previous configuration state, effectively rolling back any configuration changes that were made since the previous configuration state was saved.

 # 248 Switches support N+1 redundant supervisors or management modules
Accept. The Catalyst 9400 Series Switches support N+1 power redundancy, supervisor, and fan tray.

 # 252 Hardware supporting N+1 supervisor/management modules
Accept. The Catalyst 9400 Series Switches support Cisco Nonstop Forwarding (NSF), which works with the Stateful Switchover (SSO) feature to minimize the amount of time a network is unavailable to users following a switchover. The main objective of NSF/ SSO is to continue forwarding IP packets following a Route Processor (RP) switchover.

 # 254 Modular switches should support individual upgrades of supervisor cards
Accept. The Catalyst 9400 Series Switches have a seamless software upgrade process. The upgrade can be done either via APIC-EM/DNA-Center or via Command Line Interface (CLI).

 # 257 Switches should support 802.3bt PoE type 3 or 802.3bt PoE type 4 power
Accept. Cisco Catalyst 9400 has planned support for 802.3bt.

 # 275 Hardware and architecture control plane protection
The Catalyst 9000 switch platform supports control plane policing.
Hardware architecture and packet walk-through of all Catalyst models can be found here:

Reference: https://www.ciscolive.com/c/dam/r/ciscolive/emea/docs/2019/pdf/BRKARC-3863.pdf
Reference: https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/BRKARC-3010.pdf

#291 ASIC Description - Describe the ASIC/processor used for traffic forwarding.
The Cisco Catalyst 9300 and 9400 Series switches are based on the UADP 2.0.
The Cisco Catalyst 9500 Series switches are based on either UADP 2.0 or UADP 3.0.
The Cisco Catalyst 9000 Series is built to see you through the next decade. Built on the foundation of the UADP ASIC, the switches provide a programmable pipeline and flexible hardware tables for future innovation and scale. The Cisco Catalyst 9000 Series promotes standards leadership for IEEE 802.3bz Density (mGig), 802.11ax Optimized (5G), and 802.3bt Scale (60/100W).

The Catalyst 9000 family of switches are built on two variants of UADP ASIC: UADP 2.0 and UADP 3.0. The architecture of both ASICs are similar, but they differ in switching capacity, port density, port speeds, buffering capability, and forwarding scalability.

UADP 2.0 ASIC is built using 28-nanometer technology with two cores, with each core capable of supporting up to 120 Gbps of bandwidth, for a total of 240 Gbps supporting a maximum forwarding capacity of 375M packets per second. Switches equipped with the UADP 2.0 ASIC support a total of up to 224,000 IPv4/112,000 IPv6 hardware tables, up to 54,000 of security ACL TCAM, and 2x16MB of shared buffer.

UADP 3.0 ASIC is built on 16-nanometer technology using two cores, with each core capable of supporting up to 800 Gbps of bandwidth, for a total of 1.6 Tbps supporting a maximum forwarding capacity of 1B packets per second. Switches equipped with the UADP 3.0 ASIC support up to a 416,000 for IPv4/IPv6 hardware table entries, up to 54,000 of security ACL TCAM, and 36MB of unified buffer. The Cisco Catalyst 9300 and 9400 Series switches are based on the UADP 2.0.

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 # 317 Available line-cards for chassis based switches
Multiple line card options listed here:
https://www.cisco.com/c/en/us/products/collateral/switches/catalyst-9400-series-switches/nb-06-cat9600-series-line-data-sheet-cte-en.html

 # 357 Maintenance
Accept. They added Accept in 358 with the following answer:
The Cisco 8540 Wireless Controller is backed by a warranty that includes:

- 3-year parts coverage
- 10-day Advance Replacement (AR)
- Cisco or its service center will use commercially reasonable efforts to ship a replacement within 10 working days after receipt of the RMA request. Actual delivery times might vary depending on customer location.

This warranty also includes a 90-day software warranty on media and ongoing downloads of BIOS, firmware, and drivers.

From a services perspective, all hardware and software components have the option to have Smart Net Total Care services applied to them for SLA-level coverage as well as access to our Technical Assistance Center (TAC). Cisco ONE-based SKUs will require

software subscription maintenance to retain portability of licensing. Within the Smart Net Total Care services framework, there are support options available with SLAs of:

- 8x5xNext Business Day (NBD)
- 8x5x4-hour, 24x7x4-hour
- 24x7x2-hour (depending on product and geography).

Pricing for each of these will be dependent on the support contract level chosen as well as the length and duration of the selected contract.

 # 359 Wireless Access Point Auto-Provisioning
Accept. The Lightweight Access Points (LAPs) are “zero touch” deployed, and no individual configuration of LAPs is required. The LAPs must first discover the Wireless LAN Controllers (WLCs) and register with them before the LAPs service wireless clients. For the WLC to be able to manage the LAP, the LAP should discover the controller and register with the WLC. Please see the steps below the LAP will go through in order to register to a WLC:

1. The LAPs issue a DHCP discovery request to get an IP address, unless it has previously had a static IP address configured.
2. The LAP sends Light Weight Access Point Protocol (LWAPP) discovery request messages to the WLCs.
3. Any WLC that receives the LWAPP discovery request responds with an LWAPP discovery response message.
4. From the LWAPP discovery responses that the LAP receives, the LAP selects a WLC to join.
5. The LAP then sends an LWAPP join request to the WLC and expects an LWAPP join response.
6. The WLC validates the LAP and then sends an LWAPP join response to the LAP.
7. The LAP validates the WLC, which completes the discovery and join process. The LWAPP join process includes mutual authentication and encryption key derivation, which is used to secure the join process and future LWAPP control messages.
8. The LAP registers with the controller.

 # 361 Controller Uplinks
Accept. The Cisco 8540 Wireless Controller has four 10-Gigabit Ethernet interfaces. It requires Small Form-Factor Pluggable Plus (SFP+) options (only Cisco SFP+s supported), including S-Class Optics.

These ports can also function as 4 x 1 Gigabit Ethernet interfaces, which also requires Small Form-Factor Pluggable (SFP) options (only Cisco SFPs supported), including S-Class Optics.

 # 363 Captive Portal
Accept. The Cisco ISE, which handles the authentication request for both wired and wireless, has the ability to either redirect to an external Captive Portal, or host the captive portal itself.

 # 365 Wireless Access Point Uplink
Accept. The Cisco 8540 Wireless Controller has four 10-Gigabit Ethernet interfaces. It requires Small Form-Factor Pluggable Plus (SFP+) options (only Cisco SFP+s supported) including S-Class Optics.

These ports can also function as 4 x 1 Gigabit Ethernet interfaces, which also requires Small Form-Factor Pluggable (SFP) options (only Cisco SFPs supported), including S-Class Optics.

 # 367 IGMP Snooping Support
Accept. The Cisco 9800 Wireless Controller supports IGMP snooping.

 # 369 Layer 3 Roaming
Accept. The Cisco 9800 Wireless Controller supports Layer 2/Layer 3 roaming reference.

 # 371 Dual-Stack feature parity
Accept. The Cisco 9800 Wireless Controller supports IPv4 and IPv6 dual stack.

 # 373 IPv6 RA Guard
Accept. The Cisco 9800 Wireless Controller supports IPv6 Router Advertisements (RA) Guard.

 # 375 IPv6 SLAAC support
Accept. The Cisco 9800 Wireless Controller supports IPv4 and IPv6 dual stack.

 # 377 IPv6 DHCPv6 support
Accept. The Cisco 9800 Series Wireless Controllers support mobility, security, and management for IPv6 and dual-stack clients.

 # 379 IPv6 multicast optimizations
Accept. The Cisco 9800 Series Wireless Controllers support IPv6 multicast optimization.

 # 383 Zero-Configuration bridging
Accept. The Cisco 9800 Series Wireless Controllers support Bonjour gateway functionality.

 # 385 Selective Zer0-configuration advertisements
Accept. The Cisco 9800 Series Wireless Controllers support full-featured management of Bonjour functionality.

 # 387 VLAN ID in RADIUS Attributes
Accept. Cisco Wireless LAN solution supports identity networking, which allows the network to advertise a single Service Set Identifier (SSID) but allows specific users to inherit different QoS or security policies based on their user profiles.

 # 389 VLAN Name RADIUS Attribute
Accept. When configuring the WLC to assign VLAN and WLAN mapping, you first create the interface and assign a VLAN ID. If you want a specific WLAN to use a VLAN, you will assign the WLAN the interface you created. In turn, the “name” of the interface rather than simply the VLAN ID number. For example, you can create an interface “Voice” and apply it to a set VLAN ID. When using that VLAN for a specific WLAN on the controller, you will choose “Voice.”

 # 391 SSID VLAN Assignment
Accept. The 9800 WLC supports up to 4,096 VLANs. You can map WLANs to VLANs on the WLC.

 # 393 Hospitality Access Points
Accept. The AP1815w meets this requirement.

 # 395 Hospitality Access Point frequency support
Accept. The AP1815w meets this requirement.

 # 397 Ceiling mounting options
Accept. The Cisco Aironet Series Access Points support several configurations—on a suspended ceiling, on a hard ceiling or wall, on an electrical or network box, and above a suspended ceiling.

 # 399 Remote worker support
Accept. The Cisco 9800 Series Wireless Controllers support remote access options.

 # 403 AP Tunneling Ethernet
Accept. This is known as FlexConnect. FlexConnect (previously known as Hybrid Remote Edge Access Point or H-REAP) is a wireless solution for branch office and remote office deployments. It enables customers to configure and control Access Points (APs) in a branch or remote office from the corporate office through a WAN link without deploying a controller

in each office. The FlexConnect access points can switch client data traffic locally and perform client authentication locally when their connection to the controller is lost. When they are connected to the controller, they can also send traffic back to the controller. In the connected mode, the FlexConnect access point can also perform local authentication.

 # 405 AP Tunneling VLAN support

Accept. This is known as FlexConnect. FlexConnect (previously known as Hybrid Remote Edge Access Point or H-REAP) is a wireless solution for branch office and remote office deployments. It enables customers to configure and control APs in a branch or remote office from the corporate office through a WAN link without deploying a controller in each office. The FlexConnect access points can switch client data traffic locally and perform client authentication locally when their connection to the controller is lost. When they are connected to the controller, they can also send traffic back to the controller. In the connected mode, the FlexConnect access point can also perform local authentication.

 # 407 Controller Capacity specifications by Campus

Accept. The 9800 WLC supports up to 64,000 clients. You can scale above this number by deploying multiple controllers. If needed, you can create a mobility group with the multiple controllers. A mobility group is a set of controllers identified by the same mobility group name that defines the realm of seamless roaming for wireless clients. By creating a mobility group, you can enable multiple controllers in a network to dynamically share information and forward data traffic when inter-controller or inter-subnet roaming occurs. Controllers in the same mobility group can share the context and state of client devices as well as their list of access points so that they do not consider each other's access points as rogue devices. With this information, the network can support inter-controller wireless LAN roaming and controller redundancy.

 # 409 Controller Redundancy

Accept. The Cisco 9800 Series Wireless Controllers support high availability.

 # 412 Wi-Fi Alliance 5 and 6 certification

Accept. The Cisco 9100 APs support IEEE 802.11 a/b/g/n/ac/ax Wi-Fi standards.

 # 414 Wi-Fi Alliance WPA2 Enterprise certification

Accept. The Cisco Aironet 9100 Series Access Points are Wi-Fi Alliance certified.

 # 416 Spatial Stream support

Accept. All Catalyst 9100 APs support at a minimum 4x4 MU-MIMO with 4 spatial streams.

 # 422. Dual-band support
Accept. The Cisco Aironet 9100 Series Access Points support flexible radio (either 2.4 GHz or 5 GHz).

 # 424 802.11n channel bonding
Accept. The Cisco Aironet 9100 Series Access Points support 802.11n channel bonding (20- and 4S0-MHz) channels.

 # 426 802.11ac channel bonding
Accept. The Cisco Aironet 9100 supports 20-, 40-, and 80-MHz channels.

 # 428 DFS support
Accept. The Cisco Aironet 9100 supports 5-GHz Dynamic Frequency Selection (DFS) channels.

 # 430 BSSID uniqueness
Accept. All Cisco lightweight access points support 16 BSSIDs per radio and a total of 16 wireless LANs (SSID) per access point.

 # 432 SSID count support
Accept. The Cisco Aironet Access Points support a maximum of 16 WLANs (SSID) per access point.

 # 434 Auto-channel selection
Accept. Cisco Radio Resource Management (RRM is supported. RRM includes Dynamic Channel Assignment (DCA), which allows autochannel selection for all Access Point radios.
 # 436 Channel-set selection for auto-assignment
Accept. The Cisco WLC 9800 allows administratively defining the set of channels used for auto-assignment for both 2.4-GHz and 5-GHz operation.

 # 438 Channel restriction for auto-channel assignment
Accept. The Cisco Wireless Controller supports dynamic channel allocation using the function called DCA.

Controllers can dynamically allocate access point channel assignments to avoid conflict and to increase capacity and performance. Channels are “reused” to avoid wasting scarce RF resources. In other words, channel 1 is allocated to a different access point far from the café, which is more effective than not using channel 1 altogether.

 # 440 Auto-power selection
Accept. The Cisco Wireless Controller supports controls of AP transmit power level using the Transmit Power Control (TPC) feature under RRM.

The Cisco Controller dynamically controls access point transmit power based on real-time wireless LAN conditions. You can choose between two versions of transmit power control: TPCv1 and TPCv2.

With TPCv1, typically, power can be kept low to gain extra capacity and reduce interference. With TPCv2, transmit power is dynamically adjusted with the goal of minimum interference. TPCv2 is suitable for dense networks. In this mode, there could be higher roaming delays and coverage hole incidents.

The Transmit Power Control (TPC) algorithm both increases and decreases an access point's power in response to changes in the RF environment.

 # 442 Basic and transmit rates
Accept. The Cisco Wireless Controller supports the selection of basic and transmit rates for 2.4- and 5-Ghz radios.

 # 444 Load balancing
Accept. Enabling aggressive load balancing on the controller allows lightweight access points to load balance wireless clients across access points. In addition, macro/micro implementations (2800/3800 I models) FRA manages client-load balancing across dual 5-GHz (radios) interfaces (macro/micro transition).

 # 446 Band steering
Accept. The Cisco 9800 Wireless Controller support Band Select. Band selection enables client radios that are capable of dual-band (2.4- and 5-GHz) operation to move to a less congested 5-GHz access point.

 # 448 Guard interval
Accept. The Cisco Wireless solution supports 802.11n/ac short guard interval.

 # 450 IP Multicast transmit rate
Accept. The Cisco WLC 9800 supports defining the data rate for multicast traffic.

 # 452 Device fingerprinting
Accept. The Cisco 9800 Wireless Controller with Cisco Identity Service Engine (ISE) can identify device OS type using DHCP "fingerprinting".

 # 454 Client isolation

Accept. The Cisco 9800 wireless controller can be integrated with the overlay Cisco ISE solution to provide differentiated access for guests and staff groups on the same SSID. Furthermore, ISE, when paired with DNA Center, allows for a full software-defined access. The Cisco SD-Access solution allows for what we call micro-segmentation. Guests are able to be postured into a guest's virtual network. Virtual networks are then further able to be segmented amongst themselves via contracts. The contracts are in direct sync with the ISE server.

 # 457 Single point for configuration

Accept. Cisco DNA offers centralized, intuitive management that makes it fast and easy to design, provision, and apply policies across your network environment. The GUI provides end-to-end network visibility and uses network insights to optimize network performance and deliver the best user and application experience.

 # 459 Centralized data plane

Accept. The Cisco 9800 Wireless Controller offers centralized configuration of all changes in the wireless network with the option to review any changes before they take effect. When the wireless solutions have the Access Points configured in local mode, all traffic is tunneled to the Wireless LAN Controller.

 # 461 Bridging wireless clients to LAN

Accept. This is known as FlexConnect. An example of states is central authentication, central switching, and central authentication, local switching. This can be configured on a per SSID, logical group, or AP basis.

 # 463 Multi-role support

Accept. User accounts can be centrally managed from TACACS+. Terminal Access Controller Access Control System Plus (TACACS+) is a client/server protocol that provides centralized security for users attempting to gain management access to a controller. It serves as a backend database similar to local and RADIUS. However, local and RADIUS provide only authentication support and limited authorization support while TACACS+ provides three services.

 # 465 Console port

Accept. The 9800 WLC includes a console port.

 # 467 Management and IP reachability

Accept. Management via IP reachability is the preferred method. Users are able to set the WLC to be administered via web browser via HTTPS if desired.

 # 469 SNMP Support
Accept. The Cisco Wireless Controller supports SNMPv3, SSHv2, and Secure Sockets Layer (SSL) for secure management.

 # 471 Management access control
Accept. The Cisco Wireless Controller supports Layer 2 and Layer 3 ACL. In addition to ACL's, user accounts can be centrally managed from TACACS+. Terminal Access Controller Access Control System Plus (TACACS+) is a client/server protocol that provides centralized security for users attempting to gain management access to a controller. It serves as a backend database similar to local and RADIUS. However, local and RADIUS provide only authentication support and limited authorization support while TACACS+ provides three services.

 # 473 RADIUS authentication
Accept. The Cisco Wireless Controller supports RADIUS authentication and authorization.

 # 475 Local account failover
Accept. When setting the authentication priority order, you can select the order used for authentication. In order to try TACACS+ or RADIUS first, you can have those at the top of the list. If the user name is not found, the WLC will try the local database (if selected in the authentication order).

 # 477 Controller SSID and User SNMP information
Accept. These are also visible in the WLC itself. There are over 300 SNMP traps each generating their own data signatures.

 # 479 Access Point SNMP information
Accept. These are also visible in the WLC itself. There are over 300 SNMP traps each generating their own data signatures.

 # 481 Encryption of RADIUS secrets
Accept. This is supported with Cisco Wireless Controllers. Enable, AAA, and local user passwords all have the option to be stored in clear text or stored with a Message Digest 5 (MD5) Hash.

 # 483 Encryption of local user passwords
Accept. This is supported with Cisco Wireless Controllers. Enable, AAA, and local user passwords all have the option to be stored in clear text or stored with an MD5 Hash.

 # 485 Configuration backup and restore
Accept. You can backup and restore configuration files from the 9800 WLC.

 # 487 Syslog support
Accept. The Cisco Wireless Controller supports System Message Logging (Syslog).

 # 489 Logging of administrator logins
Accept. The syslog looks like this: -AAA-6-USER_AUTH_PASSED: “User authenticated. Username: %.*s.”

 # 491 Logging of configuration changes
Accept. The Cisco 9800 Wireless Controller can log the username with configuration changes to the syslog server. This can be achieved via RADIUS or TACACS accounting and the wireless controller.

 # 493 Reporting of client IPv4 and IPv6 addresses
Accept. You can view the IPv4 and IPv6 addresses from within the “Client View” section of the monitoring client’s dashboard.

 # 495 Controller fail-over
Accept. The Cisco 9800 WLC supports stateful switchover of access points and clients (AP and Client SSO). AP SSO allows the Access Point (AP) to establish a CAPWAP tunnel with the active WLC and share a mirror copy of the AP database with the standby WLC. The APs do not go into the discovery state when the active WLC fails and the standby WLC takes over the network as the active WLC. This type of HA will allow the 9800 to failover to the HA 9800 without impacting services.

 # 497 MTU size for control channel
Accept. Cisco lightweight access points use the IETF standard CAPWAP to communicate with the controller and other lightweight access points on the network. The AP attempts to negotiate at the maximum CAPWAP Path Maximum Transmission Unit (PMTU) of 1485 bytes.

 # 499 Per-SSID RADIUS server support
Accept. Users must enter a valid username and password for the controller to authenticate users to the RADIUS server. If multiple databases are configured, you can specify the sequence in which the backend database must be tried.

 # 501 RADIUS fail-over
Accept. The primary RADIUS server (the server with the lowest server index) is assumed to be the most preferable server for the controller. If the primary server becomes unresponsive, the controller switches to the next active backup server (the server with the next lowest server index). The controller continues to use this backup server, unless you configure the

controller to fall back to the primary RADIUS server when it recovers and becomes responsive, or to a preferable server from the available backup servers.

 # 503 SSID in RADIUS Called-Station-ID

Accept. The Cisco Wave 2 Wireless Controller supports Remote Authentication Dial-In User Service (RADIUS). RADIUS is a client/server protocol that provides centralized security for users attempting to gain management access to a network. It serves as a backend database like local and TACACS+ and provides authentication and accounting services:

- Authentication—The process of verifying users when they attempt to log into the controller
- Accounting—The process of recording user actions and changes.

 # 505 Client MAC in RADIUS Calling-Station-ID

Accept. The Cisco 9800 Wireless Controller supports MAC authentication to provide simple authentication based on a user's MAC address.

 # 507 Controller administration by multiple admins

Accept. A browser-based GUI is built into each controller.
It allows up to five users to simultaneously browse into the controller HTTP or HTTPS (HTTP + SSL) management pages to configure parameters and monitor the operational status for the controller and its associated APs.

 # 509 Management administration by multiple admins

Accept. A user profile defines a user's login, password, and role (permissions).
You can configure both internal and external user profiles for any user. Internal user profiles reside in DNA Center and external user profiles reside on an external AAA server.

One default user profile with SUPER-ADMIN-ROLE permissions is created when you install DNA Center.

 # 511 Definition of configuration groups

Accept. In a typical deployment, all users on a WLAN are mapped to a single interface on the controller. Therefore, all users that are associated with that WLAN are on the same subnet or VLAN. However, you can choose to distribute the load among several interfaces or to a group of users based on specific criteria, such as individual departments (such as Marketing), by creating access point groups. Additionally, these access point groups can be configured in separate VLANs to simplify network administration.

 # 513 Licensing in a fail-over scenario

Accept. In a high availability (HA) architecture, one controller is configured as the primary controller and another controller as the secondary controller. After you enable HA, the

primary and secondary controllers are rebooted. During the boot process, the role of the primary controller is negotiated as active and the role of the secondary controller as standby-hot. After a switchover, the secondary controller becomes the active controller and the primary controller becomes the standby-hot controller. After subsequent switchovers, the roles are interchanged between the primary and the secondary controllers. The reason for switchovers are either because of manual trigger, a controller, or network failure.

 # 515 Client tracking and searching

Accept. See the global Search function to find items in the following categories anywhere in DNA Center:

- Activities: Search for DNA Center menu items, workflows, and features by name
- Applications: Search for them by name.
- Application Groups: Search for them by name.
- Hosts and Endpoints: Search for them by name, IP address, or MAC address.
- IP Pools: Search for them by name or IP address.
- Network Devices: Search for them by name, IP address, serial number, software version, platform, product family, or MAC address.
- Sites: Search for them by name.
- Users: Search for them by user name. Please note that case-insensitivity and substring search are not supported for user names in this release.
- Other Items: As new versions of DNA Center are released.

 # 517 SNTP support

Accept. Both of Cisco WLC and Management platforms support Network Time Protocol (NTP).

 # 520 POE minimums

Accept. The Catalyst 9100 APs require 802.3at to be fully functioning. Using 802.3af will result in degregaded radio performance. Example: 9115AX at 802.3at power will run 4x4 for 2.4 and 5GHz while at 802.3af the 2.4 and 5GHz radios will run at 2x2.

 # 522 Controller service and power supply redundancy

Accept. The Cisco 9800 wireless controller supports redundant power supply that helps ensure maximum availability.

 # 524 Controller function and power supply redundancy

Accept. The Cisco 9800 Wireless Controller supports redundant power supply that helps ensure maximum availability.

 # 526 Hot swappable power supplies

Accept. The Cisco 9800 Wireless Controller has hot-swappable redundant Alternating Current (AC) or Direct Current (DC) power supply and solid-state storage with no incremental system downtime.

 # 530 VLAN pooling

Accept. In a large network wireless environment, the Cisco Network Registrar (NR) server, which is a DHCP server, has multiple pools created based on VPN IDs or VRF names. Using these pools, you can assign IP address to a client with the help of the DHCP VPN Select option (DHCP option 82 and sub-option 151). When you enable DHCP VPN Select (DHCP option 82 and sub-option 151) on the controller interface, the controller sends the VPN ID or VRF name of the pool from which the IP address has to be assigned to the client. The DHCP VPN Select option enables easy-to-operate, shared usage of a centralized DHCP server, resulting in cost savings.

 # 532 Fast AP migration during a controller failure

Accept. The HA feature (that is, AP SSO) set within the Cisco Unified Wireless Network allows the AP to establish a CAPWAP tunnel with the active WLC and share a mirror copy of the AP database with the standby WLC. The APs do not go into the discovery state when the active WLC fails and the standby WLC takes over the network as the active WLC.

 # 534 Control wireless access based on MAC address

Accept. Cisco Wireless Controller supports MAC filtering for client or administrator authorization.

 # 538 DHCP enforcement

Accept. On the Cisco Wireless Controller you can configure DHCP on a per-interface or per-WLAN basis. We recommend that you use the primary DHCP server address that is assigned to a particular interface.

 # 540 Remote packet capture

Accept. The Cisco Wireless Controller offers packet capture capabilities. Among the capture options, there is Layer 4 Transmission Control Protocol (TCP)/User Datagram Protocol (UDP) port number.

 # 542 Distributed data plane support

Accept. This is the FlexConnect feature. FlexConnect (previously known as Hybrid Remote Edge Access Point or H-REAP) is a wireless solution for branch office and remote office deployments. It enables customers to configure and control access points in a branch or remote office from the corporate office through a WAN link without deploying a controller in each office. The FlexConnect access points can switch client data traffic locally and perform client authentication locally when their connection to the controller is lost. When they are

connected to the controller, they can also send traffic back to the controller. In the connected mode, the FlexConnect access point can also perform local authentication.

 # 545 Over-the-air packet capture

Accept. The Cisco Aironet 9100 Access Point supports Packet Capture. This process dumps data packets to a File Transfer Protocol (FTP) server for analysis while it continues to operate normally. The controller is used to start or stop packet capture for clients.

 # 547 Rogue access point detection

Accept. The Cisco Aironet 9100 Series AP can allow one of the radios to operate in Wireless Security Monitoring mode, allowing you to detect wireless security threats, interference, and combat rogue access. This valuable information can be culled in an easy-to-understand matrix to inform you about your customers. Flexible Radio Assignment also allows you to convert a radio into wireless service assurance mode, providing proactive health monitoring of the network.

Denial-of-Service or man-in-the-middle attacks are being dealt with on the WLC side. As an addition, when paired with DNA Center, administrators can control and provision Rogue Management right from the dashboard and see potential rogue APs from the wireless heat maps provided in the design dashboard.

 # 549 RF monitoring

Accept. Cisco 9100 APs have three radios—one radio can be assigned for RF scanning and another radio for serving clients. In security Monitoring and 5-GHz mode, one radio will serve 5-GHz clients, while the other is scanning the full spectrum for wIPS attackers, CleanAir interferers, and rogue devices.

 # 551 Logging of channel modifications

Accept. The controller logs when an AP changes channels and the reason why the AP changed channels. The log messages look something like this:
Channel changed for Base Radio MAC: xx.xx.xx.xx.xx.xx on 802.11b/g radio. Old Channel: 6. New Channel: 1. Why: Interference. Energy before/after change: -63/-85. Noise before/after change: -81/-79. Interference before/after change: -65/-113.

 # 553 Logging of power modifications

Accept. The previously shown log message includes references to power levels as well. Here is an example of what that log message would look like:
Channel changed for Base Radio MAC: xx.xx.xx.xx.xx.xx on 802.11b/g radio. Old Channel: 6. New Channel: 1. Why: Interference. Energy before/after change: -63/-85. Noise before/after change: -81/-79. Interference before/after change: -65/-113.

When thinking of this as a whole solution, DNA Center Assurance brings troubleshooting capabilities and user and client connection information to the administrator's finger tips. Items such as client Received Signal Strength Indication (RSSI) value and authentication can be tracked in real time to help find a resolution to potential issues.

 # 555 Interference classification
Accept. The Cisco Aironet 9100 Series supports various unprecedented RF innovations, starting with purpose- built chipset technology, HDX, ClientLink 4.0, and CleanAir Technology with 160 MHz Channel support.

When this is paired with DNA Center Assurance, it brings a whole new light to issues on the network.

 # 557 Ruggedized AP support
Accept. Both the Cisco WLCs and the DNA-Center solution support ruggedized outdoor APs. The 1560 and 1542 Series APs come in omni and directional models.

 # 559 802.11u HotSpot support
Accept. Both the 9100 and WLCs support 802.11u HotSpot Features.

 # 562 Access Point to Controller encryption
Accept. Cisco WLCs enable you to encrypt CAPWAP control packets (and optionally, CAPWAP data packets) that are sent between the AP and the Cisco WLC using DTLS. DTLS is a standards-track IETF protocol based on TLS. CAPWAP control packets are management packets exchanged between a controller and an access point while CAPWAP data packets encapsulate forwarded wireless frames.

 # 564 Hitless controller failover
Accept. The Cisco WLCs can be set up in HA pairs. In an HA pair, the controllers use the idea of Stateful Switch Over and Virtual IP assignments. Regarding failover timing, this is all configurable.

 # 572 Distinct RADIUS servers for MFA support
Deny. Currently not supported.

 # 574 Administrative GUI MFA support
Deny. Currently not supported.

 # 576 Multiple software image support on controllers
Accept. The Cisco 8540 Wireless Controller supports an active primary image as well as a backup image.

 # 578 Software version rollback support
Accept. The Cisco 9800 Wireless Controller supports an active primary image and a backup image. If the primary image becomes corrupted, you can use the bootloader to boot with the backup image.

 # 580 Configuration rollback support
Accept. The Cisco 9800 Wireless Controller supports configuration backup and restore. We recommend that you upload your Cisco WLC's configuration file to a server to back it up. If you lose your configuration, you can then download the saved configuration to the controller.

 # 582 Categorized debug log support
Accept. The Cisco 9800 Wireless Controller supports categorized debug logging on a per technology basis.

 # 584 Multiple syslog destination support
Accept. The Cisco Wireless Controller supports system logging, which allows controllers to log their system events to up to three remote syslog servers. The controller sends a copy of each syslog message as it is logged to each syslog server configured on the controller. Being able to send the syslog messages to multiple servers ensures that the messages are not lost due to the temporary unavailability of one syslog server.

 # 586 Assignment of preferences to individual APs or AP groups
Accept. This is accomplished by using AP group configurations and RF Profiles within them.

 # 588 Resource consumption monitoring
Accept. This is accomplished by using AP group configurations and RF Profiles within them.

 # 592 Customization of default dashboard
Accept. Cisco 9800 Wireless Controller Management and DNA Center support customization of default dashboard. You can create custom dashboards for monitoring your network. Dashboards contain one or more dashlets, which include charts, tables, geographic maps, and other types of information.

 # 594 Rate limiting based on SSID and RADIUS attributes
Accept. Cisco 9800 Wireless Controller support wireless rate limits, which can be defined on both upstream and downstream traffic. Rate limits can be defined per SSID and/or specified as a maximum rate limit for all clients. These rate limits can be individually configured.
You can use Quality of Service (QoS) roles. If you choose to create an entry on the RADIUS server for a guest user and enable RADIUS authentication for the WLAN on which web

authentication is performed, rather than adding a guest user to the local user database from the controller, you need to assign the QoS role on the RADIUS server itself.

 # 596 Flow monitoring support

Accept. The Cisco 9800 Wireless Controller only supports Netflow. This is an embedded instrumentation within the Cisco WLC software to characterize wireless network flows. NetFlow monitors each IP flow and exports the aggregated flow data to the external NetFlow collectors. NetFlow is future-proofed against new or developing protocols, because NetFlow Version 9 can be adapted to provide support for those protocols.

 # 598 Out of band management protocols

Accept. The Cisco 9800 Wireless Controller has a service port, which can be used for out-of-band management.

 # 602 Application level visibility

Accept. The Cisco 8540 Wireless Controller supports Application Visibility and Control (AVC), which classifies applications using deep packet inspection techniques with the Network-Based Application Recognition (NBAR) engine and provides application-level visibility and control (QoS) in wireless networks. After the applications are recognized, the AVC feature enables you to either drop, mark, or police the data traffic.

 # 604 Configuration backup transfer protocols

Accept. The Cisco 9800 Wireless Controller allows you to upload configuration files to a TFTP server. You can upload your Cisco WLC's configuration file to a server to back it up. If you lose your configuration, you can then download the saved configuration to the controller. You may refer to the configuration guide below.

 # 606 Dual-stack feature parity

Accept. The 9800 WLC supports IPv6. The configuration for IPv6 mobility is the same as IPv4 mobility and requires no separate software on the client side to achieve seamless roaming. The controllers must be part of the same mobility group. Both IPv4 and IPv6 client mobility are enabled by default.

 # 608 Simulate client authentication

Accept. All the issues that assurance is capable of monitoring in a customer environment are displayed. The issues are grouped and categorized as follows:

- Onboarding—Displays the wireless and wired client onboarding issues.
- Connectivity—Displays network connectivity issues such as OSPF, BGP tunnels, and so on.
- Connected—Displays client issues.
- Device—Displays device-related issues such as CPU, memory, fan, and so on.

- Availability—Displays device availability issues for APs, Cisco WLCs, and so on.
- Utilization—Displays utilization issues of APs, Cisco WLCs, radios, and so on.
- Application—Displays Application Experience issues.
- Sensor Test—Displays sensor global issues.

 # 617 E911 options

Wi-Fi E911 can be provided via the Cisco-enabled partner, RedSky. See the datasheet at the referenced link:
Reference: https://marketplace.cisco.com/catalog/solution/90780?pid=94963

 # 635 Channels supported

Refer to the section identifying Frequency band and 20-MHz operating channels on the following document: https://www.cisco.com/c/en/us/products/collateral/wireless/catalyst-9100ax-access-points/datasheet-c78-741988.html

 # 636 Azimuth and Elevation charts

Please refer to figures 27-43 of the following document located here:
https://www.cisco.com/c/en/us/products/collateral/wireless/catalyst-9100ax-access-points/deployment-guide-c07-741977.html

 # 645 Controller upgrade process

For the Cisco 9800 controller upgrade process, there are several steps required. These steps are detailed here:
https://www.cisco.com/c/en/us/td/docs/wireless/controller/9800/config-guide/b_wl_16_10_cg/software-maintenance-upgrade.html

 # 649 Mounting bracket

Please refer to figure 10-25 for various mounting options of the document located here:
https://www.cisco.com/c/en/us/products/collateral/wireless/catalyst-9100ax-access-points/deployment-guide-c07-741977.html#_Toc3418526

 # 662 Automated backups

Accept. We currently use RSYNC with Network File System (NFS) support coming in the future. We encrypt the backups before transmission as well.

 # 664 Restore from backup

Accept. The caveat today is that the system where the backup has been taken and the system in which the backup is being restored must be on the same software version for both system and packages.

 # 666 Two factor support
Accept. We support Two-Factor Authentication (2FA) for UI, and SSH is in testing.

 # 669 NAC deployable as a discreet system
Accept. Cisco ISE is never accessed directly by a client; instead, the MAB or 802.1x authentication methodology is brokered on behalf of the client by the respective network access device (Switch, Router, Firewall, Wireless LAN Controller, etc.).

 # 671 NAC platform scale
Accept. ISE supports multiple vectors of connectivity, including wired, wireless, and VPN.

 # 673 NAC deployable in a geographically redundant manner
Accept. ISE can be deployed to support up to 500,000 concurrent radius sessions across a spread-out geography. There are some latency requirements, which need to be met between ISE personas.

 # 675 NAC support for 802.1x authentication
Accept. ISE supports a wide range of allowed protocols.

 # 677 NAC support for MAC authentication
Accept. MAC Authentication Bypass (MAB) is a supported method for authentication/ authorization. Groups of MAC addresses can be configured through the ISE web portal and leveraged in policy sets.

 # 679 NAC support for captive portal authentication
Accept. ISE has a built-in web portal for guest access, which can be enacted as a default measure when devices do not meet organizational connectivity requirements.

 # 681 NAC support for RADIUS attributes
Accept. ISE has hundreds of pre-canned RADIUS attributes ready to be used inside of the policy sets. Advanced RADIUS attribute or non-standards can be defined through authorization profiles.

 # 683 NAC information regarding authentication attempts
Accept. Through the ISE web interface, the RADIUS Live Logs can be accessed, and details of every authentication attempt—whether failed or successful—is documented at great length. These can be used for operations and troubleshooting.

 # 685 NAC RBAC
Accept. Role-based access control (RBAC) is available within ISE, which allows different views for different groups of individuals.

 # 687 NAC profiling capabilities
Accept. Cisco ISE profiling is extensive, with hundreds of different device brands and types. Furthermore, custom profiles can be added through the web interface.

 # 689 NAC management of zero-configuration devices
Accept. Cisco ISE profiling would be a way to identify devices by the types which they are. This can be used to apply zero-touch configuration of like devices.

 # 691 NAC integration with directory services
Accept. Cisco ISE supports an array of identity sources, including Active Directory, Lightweight Directory Access Protocol (LDAP), Open Database Connectivity (ODBC), RADIUS, Token, RSA SecurID, and Security Assertions Markup Language (SAML).

 # 693 NAC delivery of dynamic policies
Accept. Cisco ISE can facilitate auto-smart-port configuration, downloadable ACLs, as well as dynamic VLAN assignments, and more.

 # 695 NAC redundancy
Accept. Cisco ISE is designed to work in a geographically redundant environment. Latency requirements of < 300 ms Round-Trip Time (RTT) are required between Policy Administration Node (PAN) personas.

 # 698 Monitoring of component groups
Accept. There are two ways to achieve this:
1) DNA Center allows users to create site hierarchy to group devices
2) DNA Center allows users to tag devices to form logical groups

 # 700 RBAC into monitoring solution
Accept. Currently we support four roles, which allow you to limit access depending on type of user.

 # 702 Monitoring – AP information
Accept. These are covered between Inventory and Assurance views.

 # 704 Monitoring - Client information
Accept. These are covered between Inventory and Assurance views.

 # 706 Monitoring – Switch information
Accept. These are covered between Inventory and Assurance views.

 # 708 Monitoring – Multiple clients on a single port
Accept. These are covered between Inventory and Assurance views.

 # 714 Management software integration with DUO two factor
Accept. We support Two-Factor Authentication (2FA) for UI, and SSH is in testing.

 # 725 Leaf 100Gbps support
Accept. The 93180YC-FX has 6 100Gbps ports and the C9336C-FX2 can support up to 36 100Gbps ports

 # 769 Anti-spoofing features
Accept. uRPF and IP Source Guard is supported.

 # 822 MAC table size
Accept. N9K-C93180YC-FX
512,000 MAC entries
N9K-C9336-FX2
256,000 MAC entries
N9K-C9364C and N9K-C9332C
92,000 MAC entries

 # 842 Zero-touch provisioning
Accept. POAP automates the process of upgrading software images and installing configuration files on devices that are being deployed in the network for the first time.

 # 852 Logging of administrative logins
Accept. It is supported by the Cisco Nexus 9000 Series. You can configure the syslog field user to do that. Also, you can create a comma-separated list of users or an asterisk (*) for all logged-in users.

 # 854 Logging of configuration changes
Accept. We can use the Authentication, Authorization, and Accounting (AAA) feature which allows you to verify the identity of, grant access to, and track the actions of users managing a Cisco NX-OS device. Cisco NX-OS devices support RADIUS or Terminal Access Controller Access Control System Plus (TACACS+) protocols.

 # 858 SNMP access control
Accept. Cisco NX-OS provides SNMP security and has user/group models and levels for SNMPv1, v2c, and v3. IP-based ACLs can also be used.

 # 860 SNMP interface attributes
Accept. Cisco NX-OS provides support for SNMP MIBs, traps, and notification. SNMP MIBs additional references are provided.

 # 868 Role-based access based on RADIUS attribute
Accept. You can create and manage user accounts and assign roles that limit access to operations on the Cisco Nexus 9000 Series device. Role-Based Access Control (RBAC) allows you to define the rules for an assigned role that restrict the authorization that the user must access management operations.

 # 875 Block architecture diagram
Block diagrams of Cisco Nexus 9000 models are illustrated in the Nexus 9000 Architecture document found here:
https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/BRKARC-3222.pdf

 # 876 Architecture - layer 2 decisions
Block diagrams and packet walks of Cisco Nexus 9000 models are illustrated in the Nexus 9000 Architecture document found here:
https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/BRKARC-3222.pdf

 # 877 Architecture - layer 3 decisions
Block diagrams and packet walks of Cisco Nexus 9000 models are illustrated in the Nexus 9000 Architecture document found here:
https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/BRKARC-3222.pdf

 # 878 Architecture – ACL decisions
Block diagrams and packet walks of Cisco Nexus 9000 models are illustrated in the Nexus 9000 Architecture document found here:
https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/BRKARC-3222.pdf

 # 882 Packet walk within a single ASIC
Packet walks are illustrated in Cisco Live documentation titled Nexus 9000 Architecture. A presentation can be viewed here:
https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/BRKARC-3222.pdf

 # 883 Packet walk within a single switch
Packet walks are illustrated in Cisco Live documentation titled Nexus 9000 Architecture. A presentation can be viewed here:
https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/BRKARC-3222.pdf

 # 920 Leaf Layer 3 VXLAN

Yes. Cisco Nexus 93180YC-FX supports VXLAN, and Cisco Nexus 9000 switches are designed for hardware-based VXLAN function.
https://www.cisco.com/c/en/us/td/docs/switches/datacenter/nexus9000/sw/93x/vxlan/configuration/guide/b-cisco-nexus-9000-series-nx-os-vxlan-configuration-guide-93x.html

 # 930 SSH command and interactive support

Yes. All Nexus devices support SSH and you can also gain shell access for direct scripting and/or programmatic access to the device's command-line interface (CLI) to perform various tasks and Power On Auto Provisioning (POAP) or Embedded Event Manager (EEM) actions. Please reference the NX-OS Programmability Guide located here:
https://www.cisco.com/c/en/us/td/docs/switches/datacenter/nexus9000/sw/92x/programmability/guide/b-cisco-nexus-9000-series-nx-os-programmability-guide-92x.html

 # 933 API support

Yes, both EVPN/VXLAN and ACI solutions can be managed via APIs. Please refer to the following documents for API references: https://developer.cisco.com/site/cisco-nexus-nx-api-references/ https://developer.cisco.com/docs/aci/#!introduction/aci-programmability
https://www.cisco.com/c/en/us/td/docs/switches/datacenter/sw/11_2_1/rest_api/rest_api_11_2_1.html

 # 937 Packet capture support

There are several tools in addition to spanning traffic (SPAN, ERSPAN) to capture packets. These tools are Ethanalyzer, Embedded Logic Analyzer Module (ELAM) and Packet Tracer. More details on these tools are provided here:
https://www.ciscolive.com/c/dam/r/ciscolive/emea/docs/2019/pdf/BRKARC-2011.pdf

 # 938 VXLAN troubleshooting

Use of VXLAN Ping, Traceroute and Pathtrace with VXLAN OAM; within and between sites along with VXLAN OAM for deep VXLAN visibility are tools that can be used for troubleshooting. More information on VXLAN OAM can be found here:
https://www.cisco.com/c/en/us/td/docs/switches/datacenter/nexus9000/sw/92x/vxlan-92x/configuration/guide/b-cisco-nexus-9000-series-nx-os-vxlan-configuration-guide-92x/b_Cisco_Nexus_9000_Series_NX-OS_VXLAN_Configuration_Guide_9x_chapter_0110.html

 # 955 Support Options

PARTNER TO PROVIDE OPTIONS - The client and/or customer has the option to choose the level of support on each of the identified Hardware and/or software technologies. The support options are something that Connection will always recommend, based upon the best practices of the current projects, and the needs of the University.

https://www.cisco.com/c/en/us/products/collateral/cloud-systems-management/smart-net-total-care/datasheet-c78-735459.html

 # 956 Hardware replacement without paid support

In order to RMA a device after the warranty has expired with no active service contract, you would need to recertify the device and obtain an active service contract to RMA the device. More info can be found here on the recertification process:
https://www.cisco.com/c/en/us/products/hw-sw-relicensing-program.html#~tab-faq

 # 972 Hardware processing of ACLs

Cisco Nexus 9300 switches supports IP ACL for IPv4 and IPv6 in hardware and these ACLs can be applied to both ingress and egress traffic. VLAN ACL is also supported. Refer to Cisco Nexus 9000 Series NX-OS Security Configuration Guide.
https://www.cisco.com/c/en/us/td/docs/switches/datacenter/nexus9000/sw/92x/security/configuration/guide/b-cisco-nexus-9000-nx-os-security-configuration-guide-92x.html

 # 973 Other security features

Cisco data center security solutions contain:

- Threat control and defense with intrusion prevention system (IPS)
- Application and content security
- Virtualization security (virtual firewall)
- Highly secure access

Further details can be referenced here:
https://www.cisco.com/c/dam/en/us/solutions/collateral/enterprise-networks/secure-data-center-solution/sales-tool-c96-740102.pdf?oid=aagsc008937

 # 978 Estimated end-of-sale

All hardware components and software proposed in this RFP are both in "Orderable Status," with full sale, deployment, and support features.
Cisco's End of Life Policy can be referenced here:
https://www.cisco.com/c/en/us/products/eos-eol-policy.html

 # 979 Estimated end-of-support for software

All hardware components and software proposed in this RFP are both in "Orderable Status," with full sale, deployment, and support features.
Cisco's End of Life Policy can be referenced here:
https://www.cisco.com/c/en/us/products/eos-eol-policy.html

 # 980 Estimated end-of-support for hardware

All hardware components and software proposed in this RFP are both in "Orderable Status," with full sale, deployment, and support features.

Cisco's End of Life Policy can be referenced here:
https://www.cisco.com/c/en/us/products/eos-eol-policy.html

 # 981 Estimated end-of-support for security and vulnerability patching
All hardware components and software proposed in this RFP are both in "Orderable Status," with full sale, deployment, and support features.
Cisco's End of Life Policy can be referenced here:
https://www.cisco.com/c/en/us/products/eos-eol-policy.html

 # 982 Estimated end-of-support for application
All hardware components and software proposed in this RFP are both in "Orderable Status," with full sale, deployment, and support features.
Cisco's End of Life Policy can be referenced here:
https://www.cisco.com/c/en/us/products/eos-eol-policy.html

 # 985 Service Level Agreement
SLA for support is dependent upon the level of support (SmartNet) that is associated with the devices in the solution. Please refer to this document for description of the service levels: https://www.cisco.com/c/en/us/products/collateral/cloud-systems-management/smart-net-total-care/datasheet-c78-735459.html

 # 986 Technical Assistance Method
Cisco TAC can be contacted via phone or email. Support cases can be opened via phone, email, and/or cisco.com. Please refer to this document for contact methods:
https://www.cisco.com/c/en/us/support/web/tsd-cisco-worldwide-contacts.html

 # 995 Multi-tenancy support
Multi-site with Cisco ACI is automated and orchestrated with the Multi-site orchestrator. More information can be found here:
https://www.cisco.com/c/en/us/solutions/collateral/data-center-virtualization/application-centric-infrastructure/white-paper-c11-739609.html

 # 998 API support
Cisco Nexus NX-API references can be found here: https://developer.cisco.com/site/cisco-nexus-nx-api-references/

 # 999 On-board scripting
All Nexus devices support SSH and you can also gain shell access for direct scripting and/or programmatic access to the device's command-line interface (CLI) to perform various tasks and Power On Auto Provisioning (POAP) or Embedded Event Manager (EEM) actions. Please reference the NX-OS Programmability Guide located here:

https://www.cisco.com/c/en/us/td/docs/switches/datacenter/nexus9000/sw/92x/programmability/guide/b-cisco-nexus-9000-series-nx-os-programmability-guide-92x.html

 # 1000 Misc. information
There are two white papers that further illustrate both ACI Multisite and VXLAN EVPN Multisite.
Please reference the following:
https://www.cisco.com/c/en/us/products/collateral/switches/nexus-9000-series-switches/white-paper-c11-739942.html
https://www.cisco.com/c/en/us/solutions/collateral/data-center-virtualization/application-centric-infrastructure/white-paper-c11-739609.html

 # 1009 Spanning tree support
Accept. The Cisco Catalyst 9000 Series Switches support IEEE 802.1D Spanning Tree Protocol (STP) and IEEE 802.1w Rapid Reconfiguration of Spanning Tree.

 # 1011 Spanning tree edge-port support
Accept. The Cisco Catalyst 9000 Series Switches support Port Fast and is part of the IEEE 802.1w Rapid Reconfiguration of Spanning Tree.

 # 1013 Spanning tree bpdu-filter support
Accept. The Cisco Catalyst 9000 Series Switches support user-configurable STP features. Catalyst 9000 allows the user to configure several different features as a part of the IEEE 802.1D implementation. These include Extended System ID, STP Port Priority, STP Port Cost, and Bridge Priority of a VLAN.

 # 1015 Spanning tree bpdu-protect support
Accept. The Cisco Catalyst 9000 Series Switches support BPDU Guard and Root Guard.

 # 1017 IEEE 802.1Q VLAN tagging support
Accept. The Cisco Catalyst 9000 Series Switches support IEEE 802.1Q VLAN.

 # 1019 Jumbo frame support
Accept. The Cisco Catalyst 9000 Series Switches support Jumbo frame of 9198 bytes.

 # 1021 MLAG support
Accept. The Cisco Catalyst 9000 Series Switches support Multi-Chassis link aggregation. There are no external controllers needed for the Multi-Chassis link aggregation.

 # 1033 Layer 2 virtualization over routed core
Accept. SD Access Solution

 # 1035 Storm control

Accept. Catalyst 9000 switches support Storm Control (or traffic suppression), which monitors packets passing from an interface to the switching bus and determines if the packet is unicast, multicast, or broadcast. The switch counts the number of packets of a specified type received within the 1-second time interval and compares the measurement with a predefined suppression-level threshold.

Storm control uses one of these methods to measure traffic activity:

- Bandwidth as a percentage of the total available bandwidth of the port that can be used by the broadcast, multicast, or unicast traffic
- Traffic rate in packets per second at which broadcast, multicast, or unicast packets are received
- Traffic rate in bits per second at which broadcast, multicast, or unicast packets are received
- Traffic rate in packets per second and for small frames. This feature is enabled globally. The threshold for small frames is configured for each interface.
-

With each method, the port blocks traffic when the rising threshold is reached. The port remains blocked until the traffic rate drops below the falling threshold (if one is specified) and then resumes normal forwarding. If the falling suppression level is not specified, the switch blocks all traffic until the traffic rate drops below the rising suppression level. In general, the higher the level, the less effective the protection against broadcast storms.

 # 1048 Virtualized Layer 3 support

Accept. Multiple Fabric sites in a single Fabric domain will be interconnected using a Transit. The SD-Access transit consists of Control plane nodes which helps interconnect multiple fabric sites.

There are two types of Transits:
SD-Access Transit - Enables a native SD-Access (LISP,VXLAN,CTS) fabric, with a domain-wide Control Plane node for inter-site communication.
IP- Based Transit - Leverages a traditional IP-based (VRF-LITE, MPLS) network, which requires remapping of VRFs and SGTs between sites.

 # 1109 Loop protection features

Accept. The Catalyst 9000 supports Spanning-Tree Loop protection mechanisms.

 # 1111 Mac table size

Accept. The Catalyst 9500 Series Switches support up to 82,000 MAC Addresses.

The Catalyst 9600 Series Switches with Supervisor Engine installed, support up to 82,000 MAC Addresses.

 # 1128 ARP/ND suppression in overlay
Accept. This is done natively in an SD-Access design.

 # 1137 Software upgrade process
Accept. The Cisco Catalyst 9600 supports ISSU with dual supervisors. The data plane continues to forward while the control plane of each respective supervisor is rebooted. The process would be to copy the image to the switch and start the ISSU process. Alternatively, if you look down the path of DNA Center Automation, software upgrades can be scheduled and pushed seamlessly via the DNA Center Console. The process here would be to use DNA Center as repository for the IOS-XE image. Push that image from one to as many switches as you want and perform an ISSU. This is known as the Software Image Management (SWIM) dashboard inside of the DNA Center Console.

 # 1143 Logging of administrative logins
Accept. When a user logs in, the notification syslog message is generated, showing the user ID of the user logging in.

 # 1149 SNMP MIB support
Accept. All Catalyst 9000 switches SNMP Object Identifiers (OIDs) can be queried as requested in this RFP.

 # 1213 Hardware architecture
For the Catalyst 9500 block diagrams refer to pages 130-133. For the Catalyst 9600 block diagrams refer to pages 160-161, 164-165. Reference document:
https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/5eU6DfQV/TECARC-2900.pdf

 # 1214 ASIC
UADP 3.0 ASIC is utilized in both the Catalyst 9500 and 9600 series switches. The UADP 3.0 ASIC contains dual cores, total bandwidth up to 1.6T, 54K TCAM entries and 36MB of buffers. More detailed information can be found here:
https://community.cisco.com/t5/networking-blogs/uadp-the-powerhouse-of-catalyst-9000-family/ba-p/3764605

 # 1215 ASIC - pipeline description

UADP ASICs support a flexible and programable pipeline. The ingress and egress programmable stages are illustrated on slide 199 located here:
https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2019/pdf/BRKARC-2035.pdf

Also reference slides 82-85 of this reference:
https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2016/pdf/BRKARC-3467.pdf

Connection
PUBLIC SECTOR SOLUTIONS
we solve IT

Service Level Agreement

Connection and Cisco have SLA's for a variety of the different products and services. Specific SLA's can be provided upon request if they are not otherwise offered. From a hardware & software warranty/maintenance perspective Connection and Cisco have SLA's that meet or exceed the requirements outlined in item #23. It is our full intent to meet or exceed the SLAs requested in item #24. Should market or inventory conditions warrant ETA's outside of 4 weeks the appropriate stakeholders at the university will be contacted within 24 hours of Connection being notified that there is a new ETA and what that ETA is.

University of Nebraska Master Pricing Agreement - Backbone

All prices are shown in USD

Line Number	Part Number	Description	Service Duration (Months)	Estimated Lead Time (Days)	Unit List Price	Qty	Unit Net Price	Disc(%)	Extended Net Price
1.0	**C9500-24Y4C-A**	Catalyst 9500 24x1/10/25G and 4-port 40/100G, Advantage	---	49	21,600.00	2	5,292.00	75.50	10,584.00
1.0.1	CON-SSSNT-C95024YA	SOLN SUPP 8X5XNBD Catalyst 9500 24-port 25/100G only, Adva	60	N/A	10,670.00	2	6,556.72	38.55	13,113.44
1.1	C9500-NW-A	C9500 Network Stack, Advantage	---	14	0.00	2	0.00	75.50	0.00
1.2	C9K-PWR-650WAC-R	650W AC Config 4 Power Supply front to back cooling	---	14	0.00	2	0.00	75.50	0.00
1.3	C9K-PWR-650WAC-R/2	650W AC Config 4 Power Supply front to back cooling	---	14	2,100.00	2	514.50	75.50	1,029.00
1.4	CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	---	7	0.00	4	0.00	75.50	0.00
1.5	C9K-F1-SSD-BLANK	Cisco pluggable SSD storage	---	14	0.00	2	0.00	75.50	0.00
1.6	NETWORK-PNP-LIC	Network Plug-n-Play License for zero-touch device deployment	---	3	0.00	2	0.00	75.50	0.00
1.7	C9500-DNA-24Y4C-A	C9500 DNA Advantage, Term License	---	14	0.00	2	0.00	75.50	0.00
1.7.0.1	C9500-DNA-L-A-5Y	DNA Advantage 5 Year License	60	N/A	11,830.00	2	2,898.35	75.50	5,796.70
1.8	SC9500HUK9-1612	Cisco Catalyst 9500H XE.16.12 UNIVERSAL	---	21	0.00	2	0.00	75.50	0.00
2.0	**SFP-10G-LR-S=**	10GBASE-LR SFP Module, Enterprise-Class	---	14	2,079.00	32	166.32	92.00	5,322.24
3.0	**C9500-48Y4C-A**	Catalyst 9500 48-port x 1/10/25G + 4-port 40/100G, Advantage	---	35	23,500.00	8	5,757.50	75.50	46,060.00
3.0.1	CON-SSSNT-C9504YA4	SOLN SUPP 8X5XNBD Catalyst 9500 48-port 25/100G only, Adva	60	N/A	9,645.00	8	5,926.85	38.55	47,414.80
3.1	C9500-NW-A	C9500 Network Stack, Advantage	---	14	0.00	8	0.00	75.50	0.00
3.2	C9K-PWR-650WAC-R	650W AC Config 4 Power Supply front to back cooling	---	14	0.00	8	0.00	75.50	0.00
3.3	C9K-PWR-650WAC-R/2	650W AC Config 4 Power Supply front to back cooling	---	14	2,100.00	8	514.50	75.50	4,116.00
3.4	CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	---	7	0.00	16	0.00	75.50	0.00
3.5	C9K-F1-SSD-BLANK	Cisco pluggable SSD storage	---	14	0.00	8	0.00	75.50	0.00
3.6	C9500-DNA-48Y4C-A	C9500 DNA Advantage, Term License	---	14	0.00	8	0.00	75.50	0.00
3.6.0.1	C9500-DNA-A-5Y	DNA Advantage 5 Year License	60	N/A	20,170.00	8	4,941.65	75.50	39,533.20
3.7	NETWORK-PNP-LIC	Network Plug-n-Play License for zero-touch device deployment	---	3	0.00	8	0.00	75.50	0.00
3.8	SC9500HUK9-1612	Cisco Catalyst 9500H XE.16.12 UNIVERSAL	---	21	0.00	8	0.00	75.50	0.00
4.0	**SFP-10G-LR-S=**	10GBASE-LR SFP Module, Enterprise-Class	---	14	2,079.00	128	166.32	92.00	21,288.96
5.0	**QSFP-100G-LR4-S=**	100GBASE LR4 QSFP Transceiver, LC, 10km over SMF	---	14	32,986.01	8	2,638.88	92.00	21,111.04
6.0	**QSFP-100G-LR4-S=**	100GBASE LR4 QSFP Transceiver, LC, 10km over SMF	---	14	32,986.01	2	2,638.88	92.00	5,277.76
7.0	**C9500-24Y4C-A**	Catalyst 9500 24x1/10/25G and 4-port 40/100G, Advantage	---	49	21,600.00	12	5,292.00	75.50	63,504.00
7.0.1	CON-SSSNT-C95024YA	SOLN SUPP 8X5XNBD Catalyst 9500 24-port 25/100G only, Adva	60	N/A	10,670.00	12	6,556.72	38.55	78,680.64
7.1	C9500-NW-A	C9500 Network Stack, Advantage	---	14	0.00	12	0.00	75.50	0.00
7.2	C9K-PWR-650WAC-R	650W AC Config 4 Power Supply front to back cooling	---	14	0.00	12	0.00	75.50	0.00
7.3	C9K-PWR-650WAC-R/2	650W AC Config 4 Power Supply front to back cooling	---	14	2,100.00	12	514.50	75.50	6,174.00
7.4	CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	---	7	0.00	24	0.00	75.50	0.00
7.5	C9K-F1-SSD-BLANK	Cisco pluggable SSD storage	---	14	0.00	12	0.00	75.50	0.00
7.6	NETWORK-PNP-LIC	Network Plug-n-Play License for zero-touch device deployment	---	3	0.00	12	0.00	75.50	0.00
7.7	C9500-DNA-24Y4C-A	C9500 DNA Advantage, Term License	---	14	0.00	12	0.00	75.50	0.00
7.7.0.1	C9500-DNA-L-A-5Y	DNA Advantage 5 Year License	60	N/A	11,830.00	12	2,898.35	75.50	34,780.20
7.8	SC9500HUK9-1612	Cisco Catalyst 9500H XE.16.12 UNIVERSAL	---	21	0.00	12	0.00	75.50	0.00
8.0	**SFP-10G-LR-S=**	10GBASE-LR SFP Module, Enterprise-Class	---	14	2,079.00	144	166.32	92.00	23,950.08
9.0	**SFP-10G-LR-S=**	10GBASE-LR SFP Module, Enterprise-Class	---	14	2,079.00	12	166.32	92.00	1,995.84
10.0	**C9606R**	Cisco Catalyst 9600 Series 6 Slot Chassis	---	21	12,000.00	2	2,940.00	75.50	5,880.00
10.0.1	CON-SSSNT-C9606R	SOLN SUPP 8X5XNBD Cisco Catalyst 9600	60	N/A	38,990.00	2	23,959.36	38.55	47,918.72
10.1	C9600-NW-A	Cisco Catalyst 9600 Network Advantage License	---	21	0.00	2	0.00	75.50	0.00
10.2	S9600UK9-1611	Cisco Catalyst 9600 XE 16.11 UNIVERSAL	---	21	0.00	2	0.00	75.50	0.00
10.3	C9600-CAMPUS-CORE	Catalyst 9600 Campus Core Deployment; For Tracking Only	---	21	0.00	2	0.00	75.50	0.00
10.4	C9606-FAN	Cisco Catalyst 9600 Series C9606 Chassis Fan Tray	---	21	0.00	2	0.00	75.50	0.00
10.5	C9606-SLOT-BLANK	Cisco Catalyst 9600 Series Blank for Chassis Module Slot	---	21	0.00	4	0.00	75.50	0.00
10.6	C9600-SUP-1	Cisco Catalyst 9600 Series Supervisor 1 Module	---	21	39,000.00	2	9,555.00	75.50	19,110.00
10.7	C9600-LC-24C	Cisco Catalyst 9600 Series 24-Port 40GE/12-Port 100GE	---	21	25,000.00	2	6,125.00	75.50	12,250.00
10.8	C9600-LC-48YL	Cisco Catalyst 9600 Series 48-Port 25GE/10GE/1GE	---	21	22,000.00	2	5,390.00	75.50	10,780.00
10.9	C9600-PWR-2KWAC	Cisco Catalyst 9600 Series 2000W AC Power Supply	---	21	3,000.00	8	735.00	75.50	5,880.00
10.10	CAB-TA-NA	North America AC Type A Power Cable	---	14	0.00	8	0.00	75.50	0.00
10.11	C9600-DNA-A	Cisco Catalyst 9600 DNA Advantage Term License	---	21	0.00	2	0.00	75.50	0.00
10.11.0.1	C9600-DNA-A-5Y	Cisco Catalyst 9600 DNA Advantage 5 Year License	60	N/A	41,500.00	2	10,167.50	75.50	20,335.00
10.12	C9K-F2-SSD-240GB	Cisco Catalyst 9600 Series 240GB SSD Storage	---	21	3,000.00	2	735.00	75.50	1,470.00
10.13	C9600-LC-48YL	Cisco Catalyst 9600 Series 48-Port 25GE/10GE/1GE	---	21	22,000.00	2	5,390.00	75.50	10,780.00
11.0	**SFP-10G-LR-S=**	10GBASE-LR SFP Module, Enterprise-Class	---	14	2,079.00	180	166.32	92.00	29,937.60

12.0	**QSFP-100G-LR4-S=**	100GBASE LR4 QSFP Transceiver, LC, 10km over SMF	---	14	32,986.01	4	2,638.88	92.00	10,555.52
13.0	**QSFP-100G-LR4-S=**	100GBASE LR4 QSFP Transceiver, LC, 10km over SMF	---	14	32,986.01	2	2,638.88	92.00	5,277.76
14.0	**C9500-24Y4C-A**	Catalyst 9500 24x1/10/25G and 4-port 40/100G, Advantage	---	49	21,600.00	2	5,292.00	75.50	10,584.00
14.0.1	CON-SSSNT-C95024YA	SOLN SUPP 8X5XNBD Catalyst 9500 24-port 25/100G only, Adva	60	N/A	10,670.00	2	6,556.72	38.55	13,113.44
14.1	C9500-NW-A	C9500 Network Stack, Advantage	---	14	0.00	2	0.00	75.50	0.00
14.2	C9K-PWR-650WAC-R	650W AC Config 4 Power Supply front to back cooling	---	14	0.00	2	0.00	75.50	0.00
14.3	C9K-PWR-650WAC-R/2	650W AC Config 4 Power Supply front to back cooling	---	14	2,100.00	2	514.50	75.50	1,029.00
14.4	CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	---	7	0.00	4	0.00	75.50	0.00
14.5	C9K-F1-SSD-BLANK	Cisco pluggable SSD storage	---	14	0.00	2	0.00	75.50	0.00
14.6	NETWORK-PNP-LIC	Network Plug-n-Play License for zero-touch device deployment	---	3	0.00	2	0.00	75.50	0.00
14.7	C9500-DNA-24Y4C-A	C9500 DNA Advantage, Term License	---	14	0.00	2	0.00	75.50	0.00
14.7.0.1	C9500-DNA-L-A-5Y	DNA Advantage 5 Year License	60	N/A	11,830.00	2	2,898.35	75.50	5,796.70
14.8	SC9500HUK9-1612	Cisco Catalyst 9500H XE.16.12 UNIVERSAL	---	21	0.00	2	0.00	75.50	0.00
15.0	**SFP-10G-LR-S=**	10GBASE-LR SFP Module, Enterprise-Class	---	14	2,079.00	32	166.32	92.00	5,322.24
16.0	**QSFP-100G-LR4-S=**	100GBASE LR4 QSFP Transceiver, LC, 10km over SMF	---	14	32,986.01	4	2,638.88	92.00	10,555.52
17.0	**C9606R**	Cisco Catalyst 9600 Series 6 Slot Chassis	---	21	12,000.00	4	2,940.00	75.50	11,760.00
17.0.1	CON-SSSNT-C9606R	SOLN SUPP 8X5XNBD Cisco Catalyst 9600	60	N/A	38,990.00	4	23,959.36	38.55	95,837.44
17.1	C9600-NW-A	Cisco Catalyst 9600 Network Advantage License	---	21	0.00	4	0.00	75.50	0.00
17.2	S9600UK9-1611	Cisco Catalyst 9600 XE 16.11 UNIVERSAL	---	21	0.00	4	0.00	75.50	0.00
17.3	C9606-FAN	Cisco Catalyst 9600 Series C9606 Chassis Fan Tray	---	21	0.00	4	0.00	75.50	0.00
17.4	C9606-SLOT-BLANK	Cisco Catalyst 9600 Series Blank for Chassis Module Slot	---	21	0.00	4	0.00	75.50	0.00
17.5	C9600-SUP-1	Cisco Catalyst 9600 Series Supervisor 1 Module	---	21	39,000.00	4	9,555.00	75.50	38,220.00
17.6	C9600-LC-24C	Cisco Catalyst 9600 Series 24-Port 40GE/12-Port 100GE	---	21	25,000.00	4	6,125.00	75.50	24,500.00
17.7	C9600-LC-48YL	Cisco Catalyst 9600 Series 48-Port 25GE/10GE/1GE	---	21	22,000.00	4	5,390.00	75.50	21,560.00
17.8	C9600-PWR-2KWAC	Cisco Catalyst 9600 Series 2000W AC Power Supply	---	21	3,000.00	16	735.00	75.50	11,760.00
17.9	CAB-TA-NA	North America AC Type A Power Cable	---	14	0.00	16	0.00	75.50	0.00
17.10	C9600-DNA-A	Cisco Catalyst 9600 DNA Advantage Term License	---	21	0.00	4	0.00	75.50	0.00
17.10.0.1	C9600-DNA-A-5Y	Cisco Catalyst 9600 DNA Advantage 5 Year License	60	N/A	41,500.00	4	10,167.50	75.50	40,670.00
17.11	C9K-F2-SSD-240GB	Cisco Catalyst 9600 Series 240GB SSD Storage	---	21	3,000.00	4	735.00	75.50	2,940.00
17.12	C9600-LC-48YL	Cisco Catalyst 9600 Series 48-Port 25GE/10GE/1GE	---	21	22,000.00	4	5,390.00	75.50	21,560.00
17.13	C9600-LC-48YL	Cisco Catalyst 9600 Series 48-Port 25GE/10GE/1GE	---	21	22,000.00	4	5,390.00	75.50	21,560.00
17.14	C9600-CAMPUS-COLL	Catalyst 9600 Collapsed Campus Core and Distribution	---	21	0.00	4	0.00	75.50	0.00
18.0	**SFP-10G-LR-S=**	10GBASE-LR SFP Module, Enterprise-Class	---	14	2,079.00	408	166.32	92.00	67,858.56
19.0	**QSFP-100G-LR4-S=**	100GBASE LR4 QSFP Transceiver, LC, 10km over SMF	---	14	32,986.01	4	2,638.88	92.00	10,555.52
20.0	**QSFP-100G-LR4-S=**	100GBASE LR4 QSFP Transceiver, LC, 10km over SMF	---	14	32,986.01	2	2,638.88	92.00	5,277.76
21.0	**C9500-16X-A**	Catalyst 9500 16-port 10Gig switch, Advantage	---	14	16,535.01	62	4,051.08	75.50	251,166.96
21.0.1	CON-SSSNT-C95K16XA	SOLN SUPP 8X5XNBD Catalyst 9500 16-por	60	N/A	6,795.75	62	4,175.99	38.55	258,911.38
21.1	C9500-NW-A	C9500 Network Stack, Advantage	---	14	0.00	62	0.00	75.50	0.00
21.2	PWR-C4-950WAC-R	950W AC Config 4 Power Supply front to back cooling	---	14	0.00	62	0.00	75.50	0.00
21.3	PWR-C4-950WAC-R/2	950W AC Config 4 Power Supply front to back cooling	---	14	2,100.00	62	514.50	75.50	31,899.00
21.4	CAB-TA-NA	North America AC Type A Power Cable	---	14	0.00	124	0.00	75.50	0.00
21.5	C9500-DNA-16X-A	C9500 DNA Advantage, Term licenses	---	14	0.00	62	0.00	75.50	0.00
21.5.0.1	C9500-DNA-L-A-5Y	DNA Advantage 5 Year License	60	N/A	11,830.00	62	2,898.35	75.50	179,697.70
21.6	NETWORK-PNP-NONE	Network Plug-n-Play Opt Out SKU	---	14	0.00	62	0.00	75.50	0.00
21.7	C9500-NM-BLANK	Catalyst 9500 network module blank cover	---	14	0.00	62	0.00	75.50	0.00
21.8	S9500UK9-1612	Cisco Catalyst 9500 XE 16.12 UNIVERSAL	---	14	0.00	62	0.00	75.50	0.00
22.0	**SFP-10G-LR-S=**	10GBASE-LR SFP Module, Enterprise-Class	---	14	2,079.00	204	166.32	92.00	33,929.28
23.0	**SFP-10G-LR-S=**	10GBASE-LR SFP Module, Enterprise-Class	---	14	2,079.00	62	166.32	92.00	10,311.84
24.0	**C9500-24Y4C-A**	Catalyst 9500 24x1/10/25G and 4-port 40/100G, Advantage	---	49	21,600.00	42	5,292.00	75.50	222,264.00
24.0.1	CON-SSSNT-C95024YA	SOLN SUPP 8X5XNBD Catalyst 9500 24-port 25/100G only, Adva	60	N/A	10,670.00	42	6,556.72	38.55	275,382.24
24.1	C9500-NW-A	C9500 Network Stack, Advantage	---	14	0.00	42	0.00	75.50	0.00
24.2	C9K-PWR-650WAC-R	650W AC Config 4 Power Supply front to back cooling	---	14	0.00	42	0.00	75.50	0.00
24.3	C9K-PWR-650WAC-R/2	650W AC Config 4 Power Supply front to back cooling	---	14	2,100.00	42	514.50	75.50	21,609.00
24.4	CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	---	7	0.00	84	0.00	75.50	0.00
24.5	C9K-F1-SSD-BLANK	Cisco pluggable SSD storage	---	14	0.00	42	0.00	75.50	0.00
24.6	NETWORK-PNP-LIC	Network Plug-n-Play License for zero-touch device deployment	---	3	0.00	42	0.00	75.50	0.00
24.7	C9500-DNA-24Y4C-A	C9500 DNA Advantage, Term License	---	14	0.00	42	0.00	75.50	0.00
24.7.0.1	C9500-DNA-L-A-5Y	DNA Advantage 5 Year License	60	N/A	11,830.00	42	2,898.35	75.50	121,730.70
24.8	SC9500HUK9-1612	Cisco Catalyst 9500H XE.16.12 UNIVERSAL	---	21	0.00	42	0.00	75.50	0.00
25.0	**SFP-10G-LR-S=**	10GBASE-LR SFP Module, Enterprise-Class	---	14	2,079.00	368	166.32	92.00	61,205.76

26.0	**QSFP-100G-LR4-S=**	100GBASE LR4 QSFP Transceiver, LC, 10km over SMF	---	14	32,986.01	50	2,638.88	92.00	131,944.00
27.0	**QSFP-100G-LR4-S=**	100GBASE LR4 QSFP Transceiver, LC, 10km over SMF	---	14	32,986.01	4	2,638.88	92.00	10,555.52
28.0	**DN2-HW-APL-XL**	DNA Center Appliance (Gen 2)	---	35	292,761.00	1	71,726.45	75.50	71,726.45
28.0.1	CON-SSSNT-DN2HWXL	SOLN SUPP 8X5XNBD DNA Center Appliance (Gen 2)	12	N/A	18,736.00	1	11,513.27	38.55	11,513.27
28.1	DNA-SW-1.3	Cisco DNA Center SW 1.3	---	21	0.00	1	0.00	75.50	0.00
28.2	CAB-C13-C14-2M	Power Cord Jumper, C13-C14 Connectors, 2 Meter Length	---	35	0.00	4	0.00	75.50	0.00
28.3	DN2-MR-X32G2RS-H	32GB DDR4-2666-MHz RDIMM/PC4-21300/dual rank/x4/1.2v	---	28	0.00	24	0.00	75.50	0.00
28.4	DN2-PCIE-ID10GF	Intel X710-DA2 dual-port 10G SFP+ NIC	---	28	0.00	1	0.00	75.50	0.00
28.5	DN2-SD-64G-S	64GB SD Card for UCS Servers	---	28	0.00	1	0.00	75.50	0.00
28.6	DN2-SD19TM1X-EV	1.9TB 2.5 inch Enterprise Value 6G SATA SSD	---	42	0.00	16	0.00	75.50	0.00
28.7	DN2-SD38T61X-EV	3.8TB 2.5 inch Enterprise Value 6G SATA SSD	---	35	0.00	2	0.00	75.50	0.00
28.8	DN2-TPM2-002	Trusted Platform Module 2.0 for UCS servers	---	28	0.00	1	0.00	75.50	0.00
28.9	DN2-C480-8HDD	UCS C480 M5 Drive Module for 8x HDD	---	35	0.00	3	0.00	75.50	0.00
28.10	DN2-C480-CM	UCS C480 M5 CPU Module w/o CPU, mem	---	35	0.00	2	0.00	75.50	0.00
28.11	DN2-CPU-8176	2.1 GHz 8176/165W 28C/38.50MB Cache/DDR4 2666MHz	---	35	0.00	4	0.00	75.50	0.00
28.12	DN2-MSTOR-SD	Mini Storage Carrier for SD (holds up to 2)	---	28	0.00	1	0.00	75.50	0.00
28.13	DN2-PSU1-1600W	Cisco UCS 1600W AC Power Supply for Rack Server	---	35	0.00	4	0.00	75.50	0.00
28.14	DN2-RAID-M5HD	Cisco 12G Modular RAID controller with 4GB cache	---	35	0.00	1	0.00	75.50	0.00
28.15	DN2-SD480GM1X-EV	480 GB 2.5 inch Enterprise Value 6G SATA SSD	---	28	0.00	2	0.00	75.50	0.00
28.16	DN2-PCIE-IQ10GF	Intel X710 quad-port 10G SFP+ NIC	---	42	0.00	1	0.00	75.50	0.00
28.17	SFP-10G-SR-S	10GBASE-SR SFP Module, Enterprise-Class	---	14	728.00	2	58.24	92.00	116.48
29.0	**DN2-HW-APL-L**	Cisco DNA Center Appliance (Gen 2) - 56 Core	---	28	152,103.04	2	37,265.24	75.50	74,530.48
29.0.1	CON-SSSNT-DN2HWA	SOLN SUPP 8X5XNBD DNA Center Appliance (Gen 2) 56-Core	60	N/A	48,674.60	2	29,910.54	38.55	59,821.08
29.1	DNA-SW-1.3	Cisco DNA Center SW 1.3	---	21	0.00	2	0.00	75.50	0.00
29.2	CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	---	7	0.00	4	0.00	75.50	0.00
29.3	DN2-MR-X32G2RS-H	32GB DDR4-2666-MHz RDIMM/PC4-21300/dual rank/x4/1.2v	---	28	0.00	24	0.00	75.50	0.00
29.4	DN2-PCIE-ID10GF	Intel X710-DA2 dual-port 10G SFP+ NIC	---	28	0.00	2	0.00	75.50	0.00
29.5	DN2-PSU1-770W	Cisco UCS 770W AC Power Supply for Rack Server	---	28	0.00	4	0.00	75.50	0.00
29.6	DN2-SD-64G-S	64GB SD Card for UCS Servers	---	28	0.00	2	0.00	75.50	0.00
29.7	DN2-SD19TM1X-EV	1.9TB 2.5 inch Enterprise Value 6G SATA SSD	---	42	0.00	16	0.00	75.50	0.00
29.8	DN2-TPM2-002	Trusted Platform Module 2.0 for UCS servers	---	28	0.00	2	0.00	75.50	0.00
29.9	DN2-RAID-M5	Cisco 12G Modular RAID controller with 2GB cache	---	28	0.00	2	0.00	75.50	0.00
29.10	DN2-CPU-8180	2.5 GHz 8180/205W 28C/38.50MB Cache/DDR4 2666MHz	---	28	0.00	4	0.00	75.50	0.00
29.11	DN2-MSTOR-SD	Mini Storage Carrier for SD (holds up to 2)	---	28	0.00	2	0.00	75.50	0.00
29.12	DN2-SD480GM1X-EV	480 GB 2.5 inch Enterprise Value 6G SATA SSD	---	28	0.00	4	0.00	75.50	0.00
29.13	DN2-PCIE-IQ10GF	Intel X710 quad-port 10G SFP+ NIC	---	42	0.00	2	0.00	75.50	0.00
29.14	SFP-10G-SR-S	10GBASE-SR SFP Module, Enterprise-Class	---	14	728.00	4	58.24	92.00	232.96
30.0	**C9500-48Y4C-A**	Catalyst 9500 48-port x 1/10/25G + 4-port 40/100G, Advantage	---	35	23,500.00	6	5,757.50	75.50	34,545.00
30.0.1	CON-SSSNT-C9504YA4	SOLN SUPP 8X5XNBD Catalyst 9500 48-port 25/100G only, Adva	60	N/A	9,645.00	6	5,926.85	38.55	35,561.10
30.1	C9500-NW-A	C9500 Network Stack, Advantage	---	14	0.00	6	0.00	75.50	0.00
30.2	C9K-PWR-650WAC-R	650W AC Config 4 Power Supply front to back cooling	---	14	0.00	6	0.00	75.50	0.00
30.3	C9K-PWR-650WAC-R/2	650W AC Config 4 Power Supply front to back cooling	---	14	2,100.00	6	514.50	75.50	3,087.00
30.4	CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	---	7	0.00	12	0.00	75.50	0.00
30.5	C9K-F1-SSD-BLANK	Cisco pluggable SSD storage	---	14	0.00	6	0.00	75.50	0.00
30.6	C9500-DNA-48Y4C-A	C9500 DNA Advantage, Term License	---	14	0.00	6	0.00	75.50	0.00
30.6.0.1	C9500-DNA-A-5Y	DNA Advantage 5 Year License	60	N/A	20,170.00	6	4,941.65	75.50	29,649.90
30.7	NETWORK-PNP-LIC	Network Plug-n-Play License for zero-touch device deployment	---	3	0.00	6	0.00	75.50	0.00
30.8	SC9500HUK9-1612	Cisco Catalyst 9500H XE.16.12 UNIVERSAL	---	21	0.00	6	0.00	75.50	0.00
31.0	**C9500-24Y4C-A**	Catalyst 9500 24x1/10/25G and 4-port 40/100G, Advantage	---	49	21,600.00	6	5,292.00	75.50	31,752.00
31.0.1	CON-SSSNT-C95024YA	SOLN SUPP 8X5XNBD Catalyst 9500 24-port 25/100G only, Adva	60	N/A	10,670.00	6	6,556.72	38.55	39,340.32
31.1	C9500-NW-A	C9500 Network Stack, Advantage	---	14	0.00	6	0.00	75.50	0.00
31.2	C9K-PWR-650WAC-R	650W AC Config 4 Power Supply front to back cooling	---	14	0.00	6	0.00	75.50	0.00
31.3	C9K-PWR-650WAC-R/2	650W AC Config 4 Power Supply front to back cooling	---	14	2,100.00	6	514.50	75.50	3,087.00
31.4	CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	---	7	0.00	12	0.00	75.50	0.00
31.5	C9K-F1-SSD-BLANK	Cisco pluggable SSD storage	---	14	0.00	6	0.00	75.50	0.00
31.6	NETWORK-PNP-LIC	Network Plug-n-Play License for zero-touch device deployment	---	3	0.00	6	0.00	75.50	0.00
31.7	C9500-DNA-24Y4C-A	C9500 DNA Advantage, Term License	---	14	0.00	6	0.00	75.50	0.00
31.7.0.1	C9500-DNA-L-A-5Y	DNA Advantage 5 Year License	60	N/A	11,830.00	6	2,898.35	75.50	17,390.10
31.8	SC9500HUK9-1612	Cisco Catalyst 9500H XE.16.12 UNIVERSAL	---	21	0.00	6	0.00	75.50	0.00
32.0	**C9500-16X-A**	Catalyst 9500 16-port 10Gig switch, Advantage	---	14	16,535.01	6	4,051.08	75.50	24,306.48
32.0.1	CON-SSSNT-C95K16XA	SOLN SUPP 8X5XNBD Catalyst 9500 16-por	60	N/A	6,795.75	6	4,175.99	38.55	25,055.94

32.1	C9500-NW-A	C9500 Network Stack, Advantage	---	14	0.00	6	0.00	75.50	0.00
32.2	PWR-C4-950WAC-R	950W AC Config 4 Power Supply front to back cooling	---	14	0.00	6	0.00	75.50	0.00
32.3	PWR-C4-950WAC-R/2	950W AC Config 4 Power Supply front to back cooling	---	14	2,100.00	6	514.50	75.50	3,087.00
32.4	CAB-TA-NA	North America AC Type A Power Cable	---	14	0.00	12	0.00	75.50	0.00
32.5	C9500-DNA-16X-A	C9500 DNA Advantage, Term licenses	---	14	0.00	6	0.00	75.50	0.00
32.5.0.1	C9500-DNA-L-A-5Y	DNA Advantage 5 Year License	60	N/A	11,830.00	6	2,898.35	75.50	17,390.10
32.6	NETWORK-PNP-NONE	Network Plug-n-Play Opt Out SKU	---	14	0.00	6	0.00	75.50	0.00
32.7	C9500-NM-BLANK	Catalyst 9500 network module blank cover	---	14	0.00	6	0.00	75.50	0.00
32.8	S9500UK9-1612	Cisco Catalyst 9500 XE 16.12 UNIVERSAL	---	14	0.00	6	0.00	75.50	0.00
33.0	**C9606R**	Cisco Catalyst 9600 Series 6 Slot Chassis	---	21	12,000.00	2	2,940.00	75.50	5,880.00
33.0.1	CON-SSSNT-C9606R	SOLN SUPP 8X5XNBD Cisco Catalyst 9600	60	N/A	38,990.00	2	23,959.36	38.55	47,918.72
33.1	C9600-NW-A	Cisco Catalyst 9600 Network Advantage License	---	21	0.00	2	0.00	75.50	0.00
33.2	S9600UK9-1611	Cisco Catalyst 9600 XE 16.11 UNIVERSAL	---	21	0.00	2	0.00	75.50	0.00
33.3	C9600-CAMPUS-CORE	Catalyst 9600 Campus Core Deployment; For Tracking Only	---	21	0.00	2	0.00	75.50	0.00
33.4	C9606-FAN	Cisco Catalyst 9600 Series C9606 Chassis Fan Tray	---	21	0.00	2	0.00	75.50	0.00
33.5	C9606-SLOT-BLANK	Cisco Catalyst 9600 Series Blank for Chassis Module Slot	---	21	0.00	4	0.00	75.50	0.00
33.6	C9600-SUP-1	Cisco Catalyst 9600 Series Supervisor 1 Module	---	21	39,000.00	2	9,555.00	75.50	19,110.00
33.7	C9600-LC-24C	Cisco Catalyst 9600 Series 24-Port 40GE/12-Port 100GE	---	21	25,000.00	2	6,125.00	75.50	12,250.00
33.8	C9600-LC-48YL	Cisco Catalyst 9600 Series 48-Port 25GE/10GE/1GE	---	21	22,000.00	2	5,390.00	75.50	10,780.00
33.9	C9600-PWR-2KWAC	Cisco Catalyst 9600 Series 2000W AC Power Supply	---	21	3,000.00	8	735.00	75.50	5,880.00
33.10	CAB-TA-NA	North America AC Type A Power Cable	---	14	0.00	8	0.00	75.50	0.00
33.11	C9600-DNA-A	Cisco Catalyst 9600 DNA Advantage Term License	---	21	0.00	2	0.00	75.50	0.00
33.11.0.1	C9600-DNA-A-5Y	Cisco Catalyst 9600 DNA Advantage 5 Year License	60	N/A	41,500.00	2	10,167.50	75.50	20,335.00
33.12	C9K-F2-SSD-240GB	Cisco Catalyst 9600 Series 240GB SSD Storage	---	21	3,000.00	2	735.00	75.50	1,470.00
33.13	C9600-LC-48YL	Cisco Catalyst 9600 Series 48-Port 25GE/10GE/1GE	---	21	22,000.00	2	5,390.00	75.50	10,780.00
34.0	**SFP-10G-LR-S=**	10GBASE-LR SFP Module, Enterprise-Class	---	14	2,079.00	20	166.32	92.00	3,326.40
35.0	**QSFP-100G-LR4-S=**	100GBASE LR4 QSFP Transceiver, LC, 10km over SMF	---	14	32,986.01	6	2,638.88	92.00	15,833.28
	Optional for Aggregation C9500-16X-A Switches								
36.0	**C9500-NM-8X=**	Cisco Catalyst 9500 8 x 10GE Network Module	---	14	4,100.00	6	1,004.50	75.50	6,027.00
37.0	**QSFP-100G-CU3M=**	100GBASE-CR4 Passive Copper Cable, 3m	---	14	373.00	60	29.84	92.00	1,790.40
38.0	**SFP-H10GB-CU3M=**	10GBASE-CU SFP+ Cable 3 Meter	---	14	110.00	80	8.80	92.00	704.00

Product Total	1,702,563.69
Service Total :	1,049,582.53
Subscription Total	533,105.30
Total Price:	**3,285,251.52**

University of Nebraska Master Pricing Agreement - Data Center

All prices are shown in USD

Line Number	Part Number	Description	Service Duration (Months)	Estimated Lead Time (Days)	Unit List Price	Qty	Unit Net Price	Disc(%)	Extended Net Price
1.0	**N9K-C9332C**	Nexus 9K ACI & NX-OS Spine, 32p 40/100G & 2p 10G	---	14	36,000.00	2	8,820.00	75.50	17,640.00
1.0.1	CON-SNT-N9KC9332	SNTC-8X5XNBD Nexus 9K ACI NX-OS Spine, 32p 40/100G	60	N/A	8,460.00	2	5,198.67	38.55	10,397.34
1.1	NXOS-9.2.3	Nexus 9500, 9300, 3000 Base NX-OS Software Rel 9.2.3	---	3	0.00	2	0.00	75.50	0.00
1.2	N3K-C3064-ACC-KIT	Nexus 3K/9K Fixed Accessory Kit	---	7	0.00	2	0.00	75.50	0.00
1.3	NXA-FAN-35CFM-PE	Nexus 2K/3K/9K Single Fan, 35CFM, port side exhast airflow	---	7	0.00	10	0.00	75.50	0.00
1.4	NXA-PAC-1100W-PE2	Nexus AC 1100W PSU - Port Side Exhaust	---	7	0.00	4	0.00	75.50	0.00
1.5	CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	---	7	0.00	4	0.00	75.50	0.00
1.6	NXOS-AD-XF	NX-OS Advantage License for Nexus 9300 (10G+) Platforms	---	14	15,000.00	2	3,675.00	75.50	7,350.00
1.6.0.1	CON-ECMU-N9SWADXF	SWSS UPGRADES NX-OS Advantage Lice	60	N/A	4,500.00	2	2,765.25	38.55	5,530.50
1.7	QSFP-100G-SR4-S	100GBASE SR4 QSFP Transceiver, MPO, 100m over OM4 MMF	---	14	1,995.00	20	488.78	75.50	9,775.60
1.8	QSFP-100G-CU1M	100GBASE-CR4 Passive Copper Cable, 1m	---	28	325.00	2	79.63	75.50	159.26
2.0	**N9K-C93180YC-EX**	Nexus 9300 with 48p 10/25G SFP+ and 6p 100G QSFP28	---	10	26,937.00	16	6,599.57	75.50	105,593.12
2.0.1	CON-SNT-93180YCX	SNTC-8X5XNBD Nexus 9300 with 48p	60	N/A	5,395.80	16	3,315.72	38.55	53,051.52
2.1	NXOS-9.2.3	Nexus 9500, 9300, 3000 Base NX-OS Software Rel 9.2.3	---	3	0.00	16	0.00	75.50	0.00
2.2	N3K-C3064-ACC-KIT	Nexus 3K/9K Fixed Accessory Kit	---	7	0.00	16	0.00	75.50	0.00
2.3	NXA-FAN-30CFM-B	Nexus 2K/3K/9K Single Fan, port side intake airflow	---	7	0.00	64	0.00	75.50	0.00
2.4	NXA-PAC-650W-PI	Nexus NEBs AC 650W PSU - Port Side Intake	---	7	0.00	32	0.00	75.50	0.00
2.5	CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	---	7	0.00	32	0.00	75.50	0.00
2.6	C1-SUBS-OPTOUT	OPT OUT PID FOR ACI ADV Subscription USE ONLY	---	14	0.00	16	0.00	75.50	0.00
2.7	NXOS-AD-XF	NX-OS Advantage License for Nexus 9300 (10G+) Platforms	---	14	15,000.00	16	3,675.00	75.50	58,800.00
2.7.0.1	CON-ECMU-N9SWADXF	SWSS UPGRADES NX-OS Advantage Lice	60	N/A	4,500.00	16	2,765.25	38.55	44,244.00
2.8	QSFP-100G-SR4-S	100GBASE SR4 QSFP Transceiver, MPO, 100m over OM4 MMF	---	14	1,995.00	16	488.78	75.50	7,820.48
2.9	QSFP-100G-CU1M	100GBASE-CR4 Passive Copper Cable, 1m	---	28	325.00	32	79.63	75.50	2,548.16
3.0	**N9K-C9332C**	Nexus 9K ACI & NX-OS Spine, 32p 40/100G & 2p 10G	---	14	36,000.00	2	8,820.00	75.50	17,640.00
3.0.1	CON-SNT-N9KC9332	SNTC-8X5XNBD Nexus 9K ACI NX-OS Spine, 32p 40/100G	60	N/A	8,460.00	2	5,198.67	38.55	10,397.34
3.1	NXOS-9.2.3	Nexus 9500, 9300, 3000 Base NX-OS Software Rel 9.2.3	---	3	0.00	2	0.00	75.50	0.00
3.2	N3K-C3064-ACC-KIT	Nexus 3K/9K Fixed Accessory Kit	---	7	0.00	2	0.00	75.50	0.00
3.3	NXA-FAN-35CFM-PE	Nexus 2K/3K/9K Single Fan, 35CFM, port side exhast airflow	---	7	0.00	10	0.00	75.50	0.00
3.4	NXA-PAC-1100W-PE2	Nexus AC 1100W PSU - Port Side Exhaust	---	7	0.00	4	0.00	75.50	0.00
3.5	CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	---	7	0.00	4	0.00	75.50	0.00
3.6	NXOS-AD-XF	NX-OS Advantage License for Nexus 9300 (10G+) Platforms	---	14	15,000.00	2	3,675.00	75.50	7,350.00
3.6.0.1	CON-ECMU-N9SWADXF	SWSS UPGRADES NX-OS Advantage Lice	60	N/A	4,500.00	2	2,765.25	38.55	5,530.50
3.7	QSFP-100G-SR4-S	100GBASE SR4 QSFP Transceiver, MPO, 100m over OM4 MMF	---	14	1,995.00	12	488.78	75.50	5,865.36
3.8	QSFP-100G-CU1M	100GBASE-CR4 Passive Copper Cable, 1m	---	28	325.00	2	79.63	75.50	159.26
4.0	**R-DCNM-SVR-10-K9=**	DCNM v10 - SW for Server - E-Delivery	---	3	0.00	1	0.00	75.50	0.00
4.0.1	CON-ECMU-DCNMSV10	SWSS UPGRADES DCNM V10 - SW for Server - Physical Deli	60	N/A	2,865.00	1	1,760.54	38.55	1,760.54
5.0	**DCNM-LAN-N93-K9=**	DCNM for LAN Advanced Edt. for Nexus 9300 switches	---	4	1,000.00	1	245.00	75.50	245.00
5.0.1	CON-ECMU-N93LANK9	SWSS UPGRADES DCNM for LAN Advanced Edt. for Nexus 9300 swit	60	N/A	1,145.00	1	703.60	38.55	703.60
6.0	**N9K-C9332C**	Nexus 9K ACI & NX-OS Spine, 32p 40/100G & 2p 10G	---	14	36,000.00	2	8,820.00	75.50	17,640.00
6.0.1	CON-SNT-N9KC9332	SNTC-8X5XNBD Nexus 9K ACI NX-OS Spine, 32p 40/100G	60	N/A	8,460.00	2	5,198.67	38.55	10,397.34
6.1	NXOS-9.2.3	Nexus 9500, 9300, 3000 Base NX-OS Software Rel 9.2.3	---	3	0.00	2	0.00	75.50	0.00
6.2	N3K-C3064-ACC-KIT	Nexus 3K/9K Fixed Accessory Kit	---	7	0.00	2	0.00	75.50	0.00
6.3	NXA-FAN-35CFM-PE	Nexus 2K/3K/9K Single Fan, 35CFM, port side exhast airflow	---	7	0.00	10	0.00	75.50	0.00
6.4	NXA-PAC-1100W-PE2	Nexus AC 1100W PSU - Port Side Exhaust	---	7	0.00	4	0.00	75.50	0.00
6.5	CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	---	7	0.00	4	0.00	75.50	0.00
6.6	NXOS-AD-XF	NX-OS Advantage License for Nexus 9300 (10G+) Platforms	---	14	15,000.00	2	3,675.00	75.50	7,350.00
6.6.0.1	CON-ECMU-N9SWADXF	SWSS UPGRADES NX-OS Advantage Lice	60	N/A	4,500.00	2	2,765.25	38.55	5,530.50
6.7	QSFP-100G-SR4-S	100GBASE SR4 QSFP Transceiver, MPO, 100m over OM4 MMF	---	14	1,995.00	20	488.78	75.50	9,775.60
6.8	QSFP-100G-CU1M	100GBASE-CR4 Passive Copper Cable, 1m	---	28	325.00	2	79.63	75.50	159.26

7.0	**N9K-C93180YC-EX**	Nexus 9300 with 48p 10/25G SFP+ and 6p 100G QSFP28	---	10	26,937.00	16	6,599.57	75.50	105,593.12
7.0.1	CON-SNT-93180YCX	SNTC-8X5XNBD Nexus 9300 with 48p	60	N/A	5,395.80	16	3,315.72	38.55	53,051.52
7.1	NXOS-9.2.3	Nexus 9500, 9300, 3000 Base NX-OS Software Rel 9.2.3	---	3	0.00	16	0.00	75.50	0.00
7.2	N3K-C3064-ACC-KIT	Nexus 3K/9K Fixed Accessory Kit	---	7	0.00	16	0.00	75.50	0.00
7.3	NXA-FAN-30CFM-B	Nexus 2K/3K/9K Single Fan, port side intake airflow	---	7	0.00	64	0.00	75.50	0.00
7.4	NXA-PAC-650W-PI	Nexus NEBs AC 650W PSU - Port Side Intake	---	7	0.00	32	0.00	75.50	0.00
7.5	CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	---	7	0.00	32	0.00	75.50	0.00
7.6	C1-SUBS-OPTOUT	OPT OUT PID FOR ACI ADV Subscription USE ONLY	---	14	0.00	16	0.00	75.50	0.00
7.7	NXOS-AD-XF	NX-OS Advantage License for Nexus 9300 (10G+) Platforms	---	14	15,000.00	16	3,675.00	75.50	58,800.00
7.7.0.1	CON-ECMU-N9SWADXF	SWSS UPGRADES NX-OS Advantage Lice	60	N/A	4,500.00	16	2,765.25	38.55	44,244.00
7.8	QSFP-100G-SR4-S	100GBASE SR4 QSFP Transceiver, MPO, 100m over OM4 MMF	---	14	1,995.00	16	488.78	75.50	7,820.48
7.9	QSFP-100G-CU1M	100GBASE-CR4 Passive Copper Cable, 1m	---	28	325.00	32	79.63	75.50	2,548.16
8.0	**N9K-C9332C**	Nexus 9K ACI & NX-OS Spine, 32p 40/100G & 2p 10G	---	14	36,000.00	2	8,820.00	75.50	17,640.00
8.0.1	CON-SNT-N9KC9332	SNTC-8X5XNBD Nexus 9K ACI NX-OS Spine, 32p 40/100G	60	N/A	8,460.00	2	5,198.67	38.55	10,397.34
8.1	NXOS-9.2.3	Nexus 9500, 9300, 3000 Base NX-OS Software Rel 9.2.3	---	3	0.00	2	0.00	75.50	0.00
8.2	N3K-C3064-ACC-KIT	Nexus 3K/9K Fixed Accessory Kit	---	7	0.00	2	0.00	75.50	0.00
8.3	NXA-FAN-35CFM-PE	Nexus 2K/3K/9K Single Fan, 35CFM, port side exhast airflow	---	7	0.00	10	0.00	75.50	0.00
8.4	NXA-PAC-1100W-PE2	Nexus AC 1100W PSU - Port Side Exhaust	---	7	0.00	4	0.00	75.50	0.00
8.5	CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	---	7	0.00	4	0.00	75.50	0.00
8.6	NXOS-AD-XF	NX-OS Advantage License for Nexus 9300 (10G+) Platforms	---	14	15,000.00	2	3,675.00	75.50	7,350.00
8.6.0.1	CON-ECMU-N9SWADXF	SWSS UPGRADES NX-OS Advantage Lice	60	N/A	4,500.00	2	2,765.25	38.55	5,530.50
8.7	QSFP-100G-SR4-S	100GBASE SR4 QSFP Transceiver, MPO, 100m over OM4 MMF	---	14	1,995.00	12	488.78	75.50	5,865.36
8.8	QSFP-100G-CU1M	100GBASE-CR4 Passive Copper Cable, 1m	---	28	325.00	2	79.63	75.50	159.26
9.0	**R-DCNM-SVR-10-K9=**	DCNM v10 - SW for Server - E-Delivery	---	3	0.00	1	0.00	75.50	0.00
9.0.1	CON-ECMU-DCNMSV10	SWSS UPGRADES DCNM V10 - SW for Server - Physical Deli	60	N/A	2,865.00	1	1,760.54	38.55	1,760.54
10.0	**DCNM-LAN-N93-K9=**	DCNM for LAN Advanced Edt. for Nexus 9300 switches	---	4	1,000.00	1	245.00	75.50	245.00
10.0.1	CON-ECMU-N93LANK9	SWSS UPGRADES DCNM for LAN Advanced Edt. for Nexus 9300 swit	60	N/A	1,145.00	1	703.60	38.55	703.60

Product Total	481,892.48
Service Total :	263,230.68
Subscription Total	0.00
Total Price:	**745,123.16**

AGREEMENT BETWEEN THE
BOARD OF REGENTS OF THE UNIVERSITY OF NEBRASKA
AND
GOVCONNECTION, INC., d/b/a CONNECTION

This Agreement sets forth the terms between The Board of Regents of the University of Nebraska a public body corporate and governing body of the University of Nebraska, having an address at 3835 Holdrege Street, Lincoln, NE 68583 (the "University") and GovConnection, Inc., d/b/a Connection, having an address at 732 Milford Road, Merrimack, NH 03054, (the "Provider") with regard to the performance by Provider of the services/deliverables contemplated herein and in reference to Bid # 3131-19-4321 Network Hardware Solutions.

RECITALS

WHEREAS, the University desires to obtain the services/deliverables of the Provider; and

WHEREAS, the Provider claims to have expertise and experience to provide such services/deliverables for the University;

THEREFORE, the University and the Provider hereby agree to the following terms, obligations and conditions:

1. Description of Services/Deliverables. The Provider agrees to provide the deliverables identified in an attached proposal and/or scope of work pertaining to Bid # 3131-19-4321 Network Hardware Solutions for each engagement which references this Agreement. The Provider agrees to perform to the satisfaction of the University during the term of this Agreement. The attachments, appendices, addendums, any exhibits and schedules hereto are an integral part of this Agreement and are deemed incorporated by reference herein.

2. Payment. In full consideration for the services/deliverables performed by the Provider under this Agreement, the University shall pay or cause to be paid to the Provider the invoiced amount for each engagement. Along with its invoice, the Provider shall submit adequate receipts and documentation as requested by the University to support reimbursement of all previously agreed upon incidental or reimbursable expenses. All payments due the Provider shall be made on a net 30 day basis. The Provider agrees that it is solely responsible for payment of income, social security, and other employment taxes due to the proper taxing authorities, and that the University will not deduct such taxes from any payments to the Provider hereunder, unless required by law.

3. Term. The term of this agreement shall begin on the date fully executed and remain in place for five year(s) (60 months). The contract many be renewed, by mutual agreement of both parties, in writing for five (5) additional one (1) year periods upon completion of the initial base contract period, provided written mutual concurrence of both parties is exercised in writing prior to the expiration of the existing contract. The length of the contract in its entirety will not exceed ten (10) years. The University of Nebraska reserves the right to contract certain work as needed to provide emergency or timely services, the introduction of new technology and/or as a result of general market conditions.

4. Confidentiality. "Confidential Information" shall mean any materials, written information, and data marked "Confidential" by the University or non-written information and data disclosed by the University that is identified at the time of disclosure to the Provider as confidential and is reduced to writing and transmitted to the Provider within thirty (30) days of such non-written disclosure. The Provider agrees to use the same degree of care it uses to protect its own confidential information and, to the extent permitted by law, to maintain the Confidential Information in strict confidence for a period of three (3) years from the date of termination of this Agreement. The obligations of this paragraph do not apply to information in the public domain or information that is independently known, obtained or discovered by the Provider, or that is hereafter supplied to the Provider by a third party without restriction.

5. Ownership of Work Product and Intellectual Property Rights. The Provider shall have no interest in the services/deliverables provided under this Agreement, and the University shall be the sole owner of all such services/deliverables, including all works authored, produced, developed or reduced to practice by the Provider during its' performance of the services/deliverables (the "Work Product"). Furthermore, the University shall be the sole owner of any and all intellectual property rights, including without limitation, all patent, copyright, trademark and trade secrets rights in and to the Work Product. The University shall have the right to secure appropriate

registration and protection for any and all intellectual property rights in and to the Work Product. Accordingly, the Provider hereby expressly assigns all right, title and interest in and to the Work Product, including any and all patent, copyright, trademark and/or trade secret rights thereto, to the University, and agrees to execute all documents required to evidence such assignment. Without limiting the foregoing, the Provider hereby grants to the University the sole and exclusive right throughout the world, in all languages, and in perpetuity, to use the Work Product pursuant to this Agreement. The Provider also hereby waives any and all claims it may now or hereafter have in any jurisdiction to so-called "moral rights" or rights of "droit moral" with respect to the use, results and/or proceeds of the Provider's services and Work Product. This provision shall survive the termination of this Agreement.

6. Termination. In the event that either party commits a material breach of this Agreement and fails to remedy or cure such breach within thirty (30) days after receipt of written notice thereof from the non-breaching party, the non-breaching party may, at its option and in addition to any other remedies which it may have at law or in equity, terminate this Agreement by sending written notice of termination to the other party. Such termination shall be effective as of the date of its receipt. Additionally, the University may terminate this Agreement for its convenience upon sixty (60) days prior written notice to the Provider. Upon any termination, the University shall promptly pay the Provider for all services rendered and costs incurred up to and including the effective date of termination.

7. Representations and Warranties. The Provider represents and warrants that in performing the services it will not be in breach of any agreement with a third party. The Provider also represents and warrants that no third party has any rights in, to, or arising out of, the Work Product rendered pursuant to the performance of the services. The Provider agrees to hold University and its respective assigns and licensees harmless from any loss, damage or expense, including court costs and reasonable attorneys' fees, that University and its assigns and licensees may suffer as a result of a breach or alleged breach of the foregoing warranties or as a result of claims or actions of any kind or nature resulting from the provision of the services or any use of the Work Product.

Each party warrants and represents that it has full power and authority to enter into and perform this Agreement, and that the person signing this Agreement on behalf of each party has been properly authorized and empowered to enter into this Agreement.

8. Independent Provider. The Provider is an independent provider and is solely responsible for maintenance and payment of any and all taxes, insurances and the like that may be required by federal, state or local law with respect to any sums paid hereunder. The Provider is not the University's agent or representative and has no authority to bind or commit the University to any agreements or other obligations.

9. Liability. Provider agrees to indemnify and hold the University, its regents, officers, employees, agents and students, harmless from any loss, claim, damage or liability of any kind arising out of or in connection with the Work Product provided by the Provider.

10. Insurance. The Provider shall at its own expense obtain and maintain throughout the term of this Agreement general commercial liability insurance against claims for bodily injury, death and property damage with limits of not less than one million dollars ($1,000,000) per occurrence, and three million dollars ($3,000,000) general aggregate, naming The Board of Regents of the University of Nebraska as an additional insured, to cover such liability caused by, or arising out of, activities of the Provider and its agents and/or employees while engaged in or preparing for the provision of the Services/deliverables. The Provider shall furnish to the University certificates of insurance evidencing that such insurance has been procured prior to commencement of such work.

11. Assignment. This Agreement is non-assignable and non-transferrable. Any attempt by either party to assign its obligations hereunder shall be void.

12. Amendment. This Agreement constitutes the entire understanding between the Provider and the University with respect to the subject matter hereof and may not be amended except by an agreement signed by the Provider and an authorized representative of the University.

13. Governing Law and Forum. This Agreement shall be governed by the laws of the State of Nebraska without giving effect to its conflicts of laws provisions. Any legal actions brought by either party hereunder shall be in the District Court of Lancaster County, Nebraska.

14. Conflict of Interest. No article or service shall be purchased from any University faculty or staff member without prior approval by the Vice Chancellor of Business and Finance and any such approved purchase shall comply fully with the requirements of the conflict of interest provisions of the Nebraska Political

Accountability and Disclosure Act, Neb. Rev. Stat., §§ 49-1493 through 49-14,104.

Provider certifies, to the best of its knowledge and belief, that there are no potential organizational conflicts of interest related to this Agreement. If Provider cannot so certify, it shall provide a disclosure statement to the University, which describes all relevant information concerning any potential conflict of interest under this Agreement. In the event the potential conflict of interest cannot be resolved, the University may declare this Agreement void and of no further force or effect and the University shall have no further obligations hereunder.

15. Personal Use Prohibited. University funds shall not be expended for articles or services which are for the personal use of staff or faculty members.

16. Work Status Verification. The Provider and its subcontractors shall use a federal immigration verification system to determine the work eligibility status of new employees physically performing services within the State of Nebraska pursuant to Neb. Rev. Stat. §§ 4-108 to 4-114 as amended.

17. Debarment List. No contract shall be awarded to any Provider/Bidder listed on the General Services Administration's List of Parties Excluded from Federal Procurement or Nonprocurement Programs in accordance with Executive Orders 12549 and 12689, "Debarment and Suspension," (the "Debarment List"). For contracts which in the aggregate exceed $25,000, Provider/Bidder specifically warrants and represents that it is not included on the Debarment List. Provider/Bidder further agrees that should it be included on the Debarment List at the time the contract/proposal is awarded, or at any time during which it performs its contractual obligations pursuant to the contract, such listing shall be considered a material breach of the contract between the University and the Provider.

18. Change Proposals. Material changes in scope, rush delivery, rework of items already approved or requests for additional revision cycles, services and/or deliverables beyond those listed herein hereafter known as change orders, shall not be effective until authorized representatives of both Parties execute a mutually acceptable written change order to this Agreement. Any fees arising from change orders, additional services, or deliverables not reflected herein will be invoiced upon completion. Change orders agreed to by email shall be valid and enforceable as if made part of this Agreement.

19. Taxpayer Transparency Act. Pursuant to Nebraska's Taxpayer Transparency Act (Neb. Rev. Stat. §84-602.01, as may be amended), as of July 1, 2014, the University of Nebraska is required to provide the Nebraska Department of Administrative Services with a copy of each contract that is a basis for an expenditure of state funds, including any documents incorporated by reference in the contract. Copies of all such contracts and documents are published by the Nebraska Department of Administrative Services at www.nebraskaspending.gov. It shall be the sole responsibility of the Provider to notify the University of any redactions to such contracts and documents under Neb. Rev. Stat. 84-712.05(3) prior to contract execution.

20. Vietnam Era Veterans' Readjustment Assistance Act (VEVRAA). If applicable, this Provider and subcontractors shall abide by the requirements of 41 CFR 60-300.5(a). This regulation prohibits discrimination against qualified protected veterans, and requires affirmative action by covered prime Providers and subcontractors to employ and advance in employment qualified protected veterans.

21. SECTION 503. If applicable, this Provider and any subcontractor shall abide by the requirements of 41 CFR 60-741.5(a). This regulation prohibits discrimination against qualified individuals on the basis of disability, and requires affirmative action by covered prime Providers to employ and advance in employment qualified individuals with disabilities.

22. Nondiscrimination. In accordance with the Nebraska Fair Employment Practice Act, Neb. Rev. Stat. §48-1122, Provider agrees that neither it nor any of its subcontractors shall discriminate against any employee, or applicant for employment to be employed in the performance of this Agreement, with respect to hire, tenure, terms, conditions or privilege of employment because of the race, color, religion, sex, disability, or national origin of the employee or applicant.

23. Logos or University Marks. The Provider shall not use or display any University campus name, logo, trademark, servicemark (individually a "Mark" and collectively the "Marks") and/or other indicia designated by the University as a source identifier, unless expressly authorized in writing by the University. Any unauthorized use of University Marks is expressly prohibited.

24. Right to Audit Privilege. The University reserves the right to audit or inspect work performed by the Provider under this Agreement. The University may participate directly or through an appointed representative, e.g. external auditor, in order to verify that the Services/deliverables related to this agreement

have been performed in accordance to the procedures indicated.

25. Continuation of Services. Provider agrees to continue to honor its ongoing obligations under this Agreement without interruption in the event of a bona fide dispute concerning payment or a dispute concerning any provision of this Agreement which may include time spent negotiating renewals.

26. Purchase Order Requirement. A Purchase Order shall be issued by the University to the Provider for payment in accordance with the terms of this Agreement. All invoice(s) submitted by the Provider shall make reference to the appropriate Purchase Order number to be eligible for payment.

27. Compliance. Provider will comply with all applicable laws, rules, regulations, ordinances and University policies in providing the Services/deliverables.

AGREED AND ACCEPTED:

GovConnection, Inc.:

By: _____

Printed Name:_____

Title:_____

Board of Regents of the University of Nebraska:

By: _____
Walter E. Carter, President

Attest: _____
Carmen K. Maurer, Corporation Secretary

Notice. Any notice to either party hereunder shall be in writing and shall be sent via mail to the following individuals:

To the Provider:
GovConnection, Inc. d/b/a Connection
Attention: Contracts & copy to: Legal
732 Milford Road
Merrimack, NH 03054

To the University:
University of Nebraska
3835 Holdrege Street
Lincoln, NE 68583
Attn: General Counsel

with a copy to:
University of Nebraska
6001 Dodge Street
Omaha, NE 68182
Attn: Andrew Buker

Appendix A – UNIVERSITY OF NEBRASKA TECHNOLOGY
Software/Services Standardized Agreement Language

Introduction

The purpose of this document is to incorporate specific terms and conditions pertinent to technology at the University of Nebraska. This document addresses select topics of particular importance to Information Technology Services ("ITS") in order to be compliant with Board of Regents Policies, as well as Nebraska State laws.

1. PILOT PROGRAM

ITS, at its sole discretion, may elect to conduct trial programs and/or proof of concepts under this Agreement ("Pilot Program"). If, after conducting a trial or proof of concept, ITS elects to continue with the full deployment, negotiations between ITS and the Service Provider regarding the requirements of the full deployment including all applicable royalties, fees, work plan, and appropriate timeline will occur. ITS makes no guarantee that such negotiations will occur. There may be fees related to the Pilot Program which will be negotiated between Service Provider and ITS on a case by case basis.

2. OWNERSHIP AND PROPRIETARY RIGHTS

2.1 Service Provider owns and retains all right, title and interest in Service Provider-Owned Materials. ITS owns and retains all right, title and interest in ITS's Owned Materials. ITS Students own and retain all right, title and interest in ITS Student-Owned Material. ITS acknowledges and agrees that, unless otherwise agreed by Service Provider in writing, Service Provider is the sole and exclusive owner of all rights, including but not limited to all patent rights, copyrights, trade secrets, trademarks, and other proprietary rights in the systems, programs, specifications, user documentation, and other Service Provider-Owned Materials used by Service Provider in the course of its provision of services hereunder. ITS also acknowledges and agrees that in entering into this Agreement, ITS acquires no ownership rights in Service Provider-Owned Materials. ITS shall not copy, transfer, sell, distribute, assign, display, or otherwise make Service Provider-Owned Materials available to third parties. Service Provider acquires no rights of ownership in or to the ITS owned Materials or the Student-Owned Materials; or anything that is provided to Service Provider by ITS, including but not limited to business processes, software and related documentation. Any modifications or enhancements to the ITS Owned Materials or the Student-Owned Materials including those suggested or implemented by Service Provider, shall belong to ITS. Service Provider agrees that its rights to use any such materials or data provided by ITS, including all ITS-owned Materials is limited to such use as is necessary to permit Service Provider to perform Services and obligations in this Agreement.

2.2 ITS has the responsibility for providing Service Provider with the copyright notice language to appear on websites, delivered course content and/or assessments, and on any related practice and/or demonstration materials. Service Provider will have the responsibility for ensuring that the copyright notice language provided to Service Provider by ITS will appear as provided on any applicable materials. Any copyright notice language or other language acknowledging Service Provider's ownership or other legal rights of Service Provider which appears on websites, course content and/or assessments, and in any practice and/or demonstrational materials will be limited to such language as is necessary to protect Service Provider's legal rights. Unless provided to Service Provider by ITS, no language acknowledging the legal rights of any third party shall appear on materials without the prior written consent of ITS.

2.3 Notwithstanding anything in the Agreement to the contrary, any and all Deliverables shall be the sole and exclusive property of ITS. Notwithstanding the foregoing, the intellectual capital (including without limitation, ideas, methodologies, processes, inventions and tools) developed or possessed by Service Provider prior to, or acquired during, the performance of the Scope of Work shall be Service Provider-Owned Material.

2.4 Upon ITS's request or upon the expiration or termination of this Agreement, Service Provider shall deliver or return all copies of the Work to ITS. Service Provider is permitted, subject to its obligations of confidentiality, to retain one copy of the Work for archival purposes and to defend its work product.

2.5 Service Provider and ITS intend this Agreement to be a contract for services and each considers any tangible work products identified as Deliverables ("Deliverables") during the Term or Terms of this Agreement to be a work made for hire. If for any reasons the Deliverables would not be considered a work made for hire under applicable law, Service Provider does hereby sell, assign and transfer to ITS, its successors, and assigns, the entire right, title and interest in and to the copyright and any registrations and copyright applications relating thereto and renewals and extensions thereof, and in and to all works based upon, derived from or incorporating the Deliverables, and in and to all income, royalties damages, claims and payments now or hereafter due or payable with respect thereto, and in and to all causes of action, either in law or equity for past, present, or future infringement based on the copyrights, and in and to all rights corresponding to the foregoing throughout the world. Service Provider agrees to execute all documents and to perform such other proper acts as ITS may deem necessary to secure for ITS the rights in the Deliverables.

2.6 Other than Deliverables and Service Provider-Owned Materials, the tangible property and work products created by Service Provider pursuant to this Agreement ("Work Product") shall mutually belong to ITS and Service Provider and each shall be free to use such Work Product without permission of or payment of royalty to the other. As to tangible products and work products identified as Deliverables during the Term or Terms of this Agreement, all Deliverables shall be owned exclusively by ITS.

2.7 ITS recognizes that Service Provider's business depends substantially upon the accumulation of learning, knowledge, data, techniques, tools, processes, and generic materials that it utilizes and develops in its engagements. ITS's business also depends substantially upon the accumulation and application of learning, knowledge, data, techniques, tools, processes, and generic materials that it utilizes and develops through collaboration with Service Providers and other service providers. Accordingly, to the extent material that is used in, enhanced, or developed in the course of providing Services hereunder is of a general abstract character, or may be generically re-used, and does not contain Confidential Information of ITS, then Service Provider will own such material including, without limitation: methodologies; delivery strategies, approaches and practices; generic software tools, routines, and components; generic content, research and background materials; training materials; application building blocks; templates; analytical models; project tools; development tools; inventions; solutions and descriptions thereof; ideas; and know-how (collectively "Know-how") developed by Service Provider and ITS will own the Know-how developed by ITS. To the extent such Know-how is contained or reflected in the Work Product, each party hereby grants the other a fully paid up, perpetual license to use such Know-how. Neither party will sublicense or sell Know-How of the other party to any third party, and will not use or exploit the Know-How of the other party to compete with the information technology and professional services of Service Provider or the educational services and delivery of the ITS.

3. DATA USE

As between the parties, ITS will own, or retain all of its rights in, all data and information that ITS provides to the Service Provider, as well as all data managed by Service Provider on behalf of ITS, including all output, reports, logs, analyses, and other materials relating to or generated by the Services, even if generated by the Service Provider, as well as all data obtained or extracted through ITS's or Service Provider's use of the Services (collectively, the ITS Data). The ITS Data also includes all data and information provided directly to Service Provider by ITS students and employees, and includes personal data, metadata, and user content. The ITS Data will be ITS's Intellectual Property and Service Provider will treat it as ITS's confidential and proprietary information. Service Provider will not use, access, disclose, or license or provide to third parties, any ITS Data, or materials derived therefrom, except: (i) to the extent necessary to fulfill Service Provider's obligations to ITS hereunder; or (ii) as authorized in writing by ITS. Without limiting the generality of the foregoing, Service Provider may not use any ITS Data, whether or not aggregated or de-identified, for product development, marketing, profiling, benchmarking, or product demonstrations, without, in each case, ITS's prior written consent. Upon request by ITS, Service Provider will deliver, destroy, and/or make available to ITS, any or all of the ITS Data.

4. PROPRIETARY AND CONFIDENTIAL INFORMATION

4.1 Service Provider acknowledges and understands that in connection with this Agreement, the performance of the Scope of Work and otherwise, Service Provider has had or shall have access to, has

obtained or shall obtain, or has been or shall be given the ITS's Confidential Information (as defined herein). For purposes of this Agreement, "Confidential Information" means all information provided by ITS, or ITS Students to Service Provider, including without limitation information concerning the ITS's business strategies, political and legislative affairs, students, employees, vendors, Service Providers, student records, customer lists, finances, properties, methods of operation, computer and telecommunications systems, software and documentation, student materials, student name and other identifying information which is generated by the student, such as biometrics. Confidential Information includes information in any and all formats and media, including without limitation oral communication, and includes the originals and any and all copies and derivatives of such information. Service Provider shall comply with all applicable federal, state and local laws restricting access, use and disclosure of protected information.

4.2 Service Provider shall use the Confidential Information only if and when required for the performance of the Services, and for no other purpose whatsoever, and only by Service Provider employees engaged in that performance. Service Provider may also share Confidential Information with its corporate affiliates and with agents and Service Providers who are bound by similar obligations of confidentiality and who need such information as part of Service Provider's performance under this Agreement. Service Provider shall forward any request for disclosure of Confidential Information to:

Information Technology Services
Canfield Administration Building North (ADMN) 332
Lincoln, NE 68588-0435

4.3 Service Provider acknowledges and understands that ITS is required to protect certain Confidential Information from disclosure under applicable law, including but not limited to the Family Educational Rights and Privacy Act ("FERPA"), the Gramm Leach Bliley Act ("GLBA"), or the Nebraska Public Records Law, including regulations promulgated thereunder, as the laws and regulations may be amended from time to time. The Confidential Information that is protected under FERPA was provided to the Service Provider as it is handling an institution service or function that would ordinarily be performed by ITS's employees. Service Provider agrees that it shall be obligated to protect the Confidential Information in its possession or control in accordance with the Privacy Laws and as a "school official" under FERPA. The Service Provider further agrees that it is subject to the requirements governing the use and re-disclosure of personally identifiable information from education records as provided in FERPA.

4.4 Service Provider may disclose Confidential Information as required by legal process. If Service Provider is required by legal process to disclose Confidential Information, Service Provider shall immediately notify ITS, and before disclosing such information shall allow ITS reasonable time to take appropriate legal action to prevent disclosure of the Confidential Information.

4.5 Service Provider's obligations with respect to Confidential Information shall survive the expiration or the termination of this Agreement.

4.6 Service Provider acknowledges that its failure to comply fully with the restrictions placed upon use, disclosure and access to Confidential Information may cause ITS grievous irreparable harm and injury. Therefore, any failure to comply with the requirements of this section may be a material breach of this Agreement.

4.7 Except to the extent otherwise required by applicable law or professional standards, the obligations under this section do not apply to information that (1) is or becomes generally known to the public, other than as a result of disclosure by Service Provider, (2) had been previously possessed by Service Provider without restriction against disclosure at the time of receipt by Service Provider, (3) was independently developed by Service Provider without violation of this Agreement, or (4) Service Provider and ITS agree in writing to disclose. To the extent allowed by Nebraska State Law, each party shall be deemed to have met its nondisclosure obligations under this section as long as it exercises the same level of care to protect the other's information as it exercises to protect its own Confidential Information.

4.8 Service Provider agrees to use Student-Owned Materials, ITS Owned Materials and ITS's Confidential Information only as necessary to perform its responsibilities under this Agreement, keep it confidential in

accordance with this Agreement and use reasonable commercial efforts to prevent and protect the contents of these materials, or any parts of them, from unauthorized disclosure. Further, Service Provider will take industry standard measures to protect the security and confidentiality of such information including controlled and audited access to any location where such confidential and proprietary data and materials reside while in the custody of Service Provider and employing security measures to prevent system attacks (e.g., hacker and virus attacks).

4.9 Upon termination, cancellation, expiration or other conclusion of the Agreement, Service Provider shall return all Confidential Information to ITS or, if return is not feasible, destroy any and all Confidential Information without the prior written authorization from ITS. If the Service Provider destroys the information, the Service Provider shall provide ITS with a certificate confirming the date of destruction of the data. Any data referred to in this section that is still within Service Provider's actual or constructive control shall be subject to the terms of this Agreement in perpetuity.

4.10 ITS will implement security measures at its offices and all other associated facilities to ensure the confidentiality of Service Provider's Confidential Information and materials in manner like that provided by ITS for its own information and materials identified as confidential under this Agreement. Unless otherwise provided by separate agreement, upon termination of this Agreement, ITS shall return to Service Provider all Service Provider-Owned Materials, including software, Source Code, and/or documentation provided to ITS by Service Provider; alternatively, and at Service Provider's option, ITS shall destroy any or all of the aforementioned beyond recoverability. ITS shall not retain any electronic or other copies of any Service Provider-Owned Materials or other Service Provider Proprietary and Confidential Information absent of prior written authorization from Service Provider.

4.11 Service Provider agrees to abide by the limitation on re-disclosure of personally identifiable information (PII) from education set forth in The Family Educational Rights and Privacy Act and with the terms set forth below. 34 CFR 99.33 (a)(2) states that the officers, employees and agents of a party that receives education record information from ITS may use the information but only for the purposes for which the disclosure of the information was made. Further, Service Provider agrees to protect all ITS sensitive data including all PII, financial, corporate business intelligence or intellectual property of ITS faculty, staff, and employees in accordance with generally accepted Information Security standards and best practices.

5. SOFTWARE

Service Provider hereby Warrants and Represents:

A. That it shall perform all of the Work in a professional manner in accordance with industry standards for software development and related services, and that the software development and related services will conform to the specifications in the Agreement.

B. Service Provider is the owner or authorized user of Service Provider software and all of its components, and Service Provider software and all of its components, to the best of Service Provider's knowledge, do not violate any patent, trademark, trade secret, copyright or any other right of ownership of any third party.

C. Service Provider software and its components are equipped and/or designed with systems intended to prevent industry known system attacks (e.g., hacker and virus attacks) and unauthorized access to Confidential Information.

D. Service Provider has used industry standards for vulnerability testing and software quality code reviews to ensure that software is free of any and all "time bombs," computer viruses, copy protect mechanisms or any disclosed or undisclosed features which may disable Service Provider software or render it incapable of operation (whether after a certain time, after transfer to another central processing unit, or otherwise).

6. TERMINATION

6.1 The University may terminate this Agreement upon thirty (30) days' written notice. Following termination, the University shall retain the right to (a) use the Software on the number of devices specified on Unified Edge Master Pricing Agreement for its own internal business purposes, (b) use and make copies of all Documentation; and (c) make a reasonable number of copies of the Software solely for back-up or archival purposes.

6.2 The University may terminate this Agreement immediately upon any breach by Service Provider of the terms of this Agreement, any Business Associate Addendum, or incorporated attachment hereto.

6.3 Service Provider may terminate this Agreement if the University intentionally and materially breaches this Agreement and then fails to correct such breach within thirty (30) days following receipt of written notice from Service Provider. In the event of an uncorrected breach by the University, the Service Provider shall be entitled to recover actual amounts owed by the University to Service Provider that accrued on or before the date of termination. Service Provider expressly waives and disclaims any right or remedy it may have to unilaterally de-install, disable or repossess any Software of any portion thereof.

6.4 The University's rights to the Software as provided in this Agreement will survive a bankruptcy claim by the Service Provider consistent with applicable laws. The rights granted under this Agreement shall be deemed a license of "intellectual property" for purposes of the United States Code, Title 11 ("Bankruptcy Code"), Section 365(n). In the event of the bankruptcy of Service Provider and a subsequent rejection of this Agreement, the University may elect to retain its license rights, subject to and in accordance with the provisions of the Bankruptcy Code or other applicable law.

6.5 The following Sections shall survive the expiration or termination of this Agreement: Grant of License; Ownership and Proprietary Rights; Warranties, Representations and covenants; Limitation of Liability; University Data; Privacy; Cyber Insurance; Termination; and Audit Rights. Any terms of this Agreement which by their nature extend beyond its termination remain in effect until fulfilled and apply to respective successors and assigns.

7. SECURITY

7.1 Service Provider will implement security measures at its offices and all other associated facilities in connection with Service Provider software to ensure the strictest confidentiality of ITS's Owned Materials, ITS's Confidential Information, and all other Confidential Information and materials. These measures will include, without limitation, encryption, use of a sign-on and access privilege system and other measures described in this Agreement, and such other measures as Service Provider deems necessary in its professional discretion. Service Provider shall impose these measures on all subcontractors used by Service Provider.

7.2 Service Provider shall endorse ITS's requirement to adhere to the University of Nebraska's (ITS) IT Security Standards (http://idm.unl.edu/authentication-services-policy). ITS is required to assess risks, ensure data integrity, and determine the level of accessibility that must be maintained. Specific activities include:

A. Identification of security, privacy, legal, and other organizational requirements for recovery of institutional resources such as data, software, hardware, configurations, and licenses at the termination of the contract.
B. Assessment of the Service Provider's security and privacy controls.
C. Including ITS's security and privacy requirements in the agreement.
D. Periodic reassessment of Service Provider services provisioned to ensure all contract obligations are being met and to manage and mitigate risk.

7.3 Service Provider shall (i) establish and maintain industry standard technical and organizational measures to help to protect against accidental damage to, or destruction, loss, or alteration of the materials; (ii) establish and maintain industry standard technical and organizational measures to help to protect against unauthorized access to the Services and materials; and (iii) establish and maintain network and internet security procedures, protocols, security gateways and firewalls with respect to the Services. Service Provider software and its components are equipped and/or designed with systems intended to prevent industry known system attacks (e.g., hacker and virus attacks) and unauthorized access to Confidential Information.

7.4 For the purposes of this article, a “Breach” has the meaning given to it under relevant Nebraska or federal law, for example; the Nebraska Financial Data Protection and Consumer Notification of Data Security Breach Act of 2006 (codified at Neb. Rev. Stat. § 87-802) (See 9.5). Service Provider’s report shall identify : (i) the nature of the unauthorized use or disclosure, (ii) the CDI used or disclosed, (iii) the identity of the individual or entity that received the unauthorized disclosure, (iv) any pertinent application, access, or security logs or analysis (v) the action(s) that the Service Provider has taken or shall take to mitigate any potentially negative effects of the unauthorized use or disclosure, and (vi) the corrective action(s) the Service Provider has taken or shall take to prevent future similar unauthorized uses or disclosures. Service Provider shall provide additional information in connection with the unauthorized disclosure reasonably requested by ITS.

In the event of a breach Service Provider agrees to promptly reimburse all costs to ITS arising from such breach, including but not limited to (i) costs of notification of individuals, (ii) credit monitoring and/or identity restoration services, (iii) time of ITS personnel responding to the breach, (iv) civil or criminal penalties levied against ITS, attorney’s fees, court costs, etc.

7.5 The contact for the ITS Computer Incident Response Team (CIRT) shall be identified as: 402-472-5700 or its-sec@nebraska.edu. Report any confirmed or suspected breach of University data to ITS’s CIRT within one hour of discovery or detection. Any confirmed or suspected computer security incidents not resulting in breach of University data shall be reported to ITS CIRT within 12 hours of discovery or detection.

7.6 ITS or an appointed audit firm (Auditors) has the right to audit Service Provider and its sub-vendors or affiliates that provide a service for the processing, transport or storage of ITS data. Audits will be at ITS’s sole expense which includes operational charges by Service Provider, except where the audit reveals material noncompliance with contract specifications, in which case the cost, inclusive of operational charges by Service Provider, will be borne by the Service Provider. In lieu of ITS or its appointed audit firm performing their own audit, if Service Provider has an external audit firm that performs a review, ITS has the right to review the controls tested as well as the results, and has the right to request additional controls to be added to the certified report for testing the controls that have an impact on its data.

7.7 The Federal Trade Commission has promulgated regulations collectively known as the “Red Flags Rule” with which ITS must comply. See 16 CFR 681. Under the Red Flags Rule, ITS must ensure that Service Provider either complies with ITS’s identity theft Program or that Service Provider has its own policies and procedures in place to detect and respond to identity theft Red Flags. Service Provider represents and warrants that is has reasonable policies and procedures in place to detect, prevent and mitigate identity theft. Service Provider shall review and comply with all relevant portions of ITS’s identity theft policy, if any, as well as any applicable ITS identity theft plan. Service Provider shall report any Red Flags that it detects in connection with the Agreement to ITS.

8. **CYBER INSURANCE**

The Service Provider agrees to purchase and maintain throughout the term of this Agreement a technology/professional liability insurance policy, including coverage for network security/data protection liability insurance (also called “cyber liability”) covering liabilities for financial loss resulting or arising from acts, errors, or omissions, in rendering technology/professional services or in connection with the specific services described in violation or infringement of any right of privacy, including breach of security and breach of security/privacy laws, rules or regulations globally, now or hereinafter constituted or amended;

Data theft, damage, unauthorized disclosure, destruction, or corruption, including without limitation, unauthorized access, unauthorized use, identity theft, theft of personally identifiable information or confidential corporate information in whatever form, transmission of a computer virus or other type of malicious code; and participation in a denial of service attack on third party computer systems;

Loss or denial of service;
No cyber terrorism exclusion;

With a minimum limit of $3,000,000 each and every claim and in the aggregate. Such coverage must include technology/professional liability including breach of contract, privacy and security liability, privacy regulatory

defense and payment of civil fines, payment of credit card provider penalties, and breach response costs (including without limitation, notification costs, forensics, credit protection services, call center services, identity theft protection services, and crisis management/public relations services).

Such insurance must explicitly address all of the foregoing without limitation if caused by an employee of the Service Provider or an independent contractor working on behalf of the Service Provider in performing services under this Agreement. Policy must provide coverage for wrongful acts, claims, and lawsuits anywhere in the world. Such insurance must include affirmative contractual liability coverage for the data breach indemnity in this Agreement for all damages, defense costs, privacy regulatory civil fines and penalties, and reasonable and necessary data breach notification, forensics, credit protection services, public relations/crisis management, and other data breach mitigation services resulting from a confidentiality or breach of security by or on behalf of the Service Provider.

9. MISCELLANEOUS TERMS

9.1 **Accessibility (**Section 508 ADAA Compliance). If the solution includes any end-user-facing human interface, such as an end-user device software component or web site form, file upload system, etc. the Service Provider hereby warrants that the products or services to be provided under this agreement comply with the accessibility guidelines of "Section 508 of the Rehabilitation Act of 1973" as amended as of the date of this agreement.

If the solution includes any end-user-facing human interface, such as an end-user device software component, web pages or site, video or audio playback, file upload system, mobile device components, etc., the Service Provider agrees to promptly respond to and resolve any complaint regarding accessibility of its products or services which is brought to its attention and the Service Provider further agrees to indemnify and hold harmless the University of Nebraska campuses and system using the Service Provider's products or services from any claim arising out of its failure to comply with the aforesaid requirements.

The University, at its discretion, may at any time test the Service Provider's products or services covered by this agreement to ensure compliance with Section 508. Testing that results in findings of non-compliance, shall result in a 25% reduction in the total cost of the products and/or services covered by this agreement if the non-compliance is not corrected within 30 days of being reported to the Service Provider in writing. All withheld amounts will be paid to the Service Provider upon correction of the non-compliance and acceptance by the University. Said acceptance not to be unreasonably withheld.

Failure to comply with these requirements shall constitute a breach and be grounds for termination of this agreement and a pro-rated refund of fees paid from the University for the remainder of original contract period.

9.2 **University & State College Participation.** In some instances, state colleges or state agencies may wish to explore the possibility of sharing in the benefits of this contract.

9.3 **Examination of Records.** ITS shall have access to and the right to examine any pertinent books, documents, papers, and electronic records such as logs of the Service Provider involving transactions and work related to this Agreement. Service Provider shall retain project records for a period of three (3) years from the date of final payment.

9.4 **Assistance with Litigation or Investigation.** E-Discovery: In order to provide ITS with the ability to be compliant with e-discovery rules, Service Provider must provide the following where "relevant data" might include any data stored regarding any person affiliated with ITS, access logs, activity logs, transaction logs, changes to access rights, etc., as detailed by the system architecture and practices provided by Service Provider.

AGREED AND ACCEPTED:

GovConnection, Inc.:

By: _____

Printed Name:_____

Title:_____

Board of Regents of the University of Nebraska:

By: _____
Walter E. Carter, President

Attest: _____
Carmen K. Maurer, Corporation Secretary

Notice. Any notice to either party hereunder shall be in writing and shall be served either personally or by registered or certified mail addressed to the following individuals:

To the Service Provider:
GovConnection, Inc. d/b/a Connection
Attention: Contracts & copy to: Legal
732 Milford Road
Merrimack, NH 03054

To the University:
University of Nebraska
3835 Holdrege Street
Lincoln, NE 68583
Attn: General Counsel

with a copy to:
University of Nebraska
6001 Dodge Street
Omaha, NE 68182
Attn: Andrew Buker

C. FOR INFORMATION ONLY

1. University of Nebraska Strategic Planning Framework Addendum X-C-1

2. University of Nebraska Strategic Framework Accountability Measures Addendum X-C-2

3. Calendar of establishing and reporting accountability measures Addendum X-C-3

4. University of Nebraska Strategic Dashboard Indicators Addendum X-C-4

5. Board of Regents agenda items related to the University of Nebraska Strategic Framework Addendum X-C-5

6. None. The proposed amendments of the Standing Rules of the Board of Regents are presented for information only in accordance with the requirements of Section 7.2 of the Standing Rules and Section 1.11 of the *Bylaws of the Board of Regents.* Approval of these amendments will be considered for the Regents' meeting on April 17, 2020. Addendum X-C-6

Addendum X-C-1

TO:	The Board of Regents Academic Affairs
MEETING DATE:	February 7, 2020
SUBJECT:	University of Nebraska Strategic Framework
RECOMMENDED ACTION:	For Information Only
PREVIOUS ACTION:	None
EXPLANATION:	Attached is the current version of the Strategic Framework document.
SPONSOR:	Walter E. Carter, President University of Nebraska
DATE:	January 21, 2020

INVESTING IN NEBRASKA'S FUTURE

Strategic Planning Framework

2014-2016

The University of Nebraska is a four-campus, public university which was created and exists today to serve Nebraskans through quality teaching, research, and outreach and engagement. We strive to be the best public university in the country as measured by the impact we have on our people and our state, and through them, the world. To do that, we must compete effectively with other institutions around the world for talented students and faculty. The future of Nebraska is closely tied to that of its only public university, and this framework guides university-wide and campus planning to help build and sustain a Nebraska that offers its citizens educational and economic opportunity and a high quality of life.

The framework consists of six overarching goals emphasizing access and affordability, quality academic programs, workforce and economic development, research growth, engagement with the state, and accountability. Each goal has a number of related objectives, strategies, and accountability measures developed for Board and university-wide monitoring over a multi-year period. Companion documents include an implementation tool with metrics and the schedule for monitoring by the Board, as well as a dashboard reflecting progress.

The university's efforts will not be limited to these priorities, as we expect to be able to measure progress in other areas given the interrelatedness of the objectives, other priorities of the Board and the President, and the ongoing strategic planning efforts of the four campuses. Campus plans are consistent with this framework and operate within its broader goals. Each campus has established a set of quality indicators that provide a means to evaluate achievement and momentum related to its principal objectives.

1. The University of Nebraska will provide the opportunity for Nebraskans to enjoy a better life through access to high quality, affordable undergraduate, graduate, and professional education.

    a. The university will strive to increase affordability and ensure qualified students are not denied access based on economic circumstances.

        i. Secure state funding sufficient to support access to high quality programs.

        ii. Keep tuition increases moderate and predictable for students and families, consistent with goals of both access and quality.

        iii. Expand need-based financial aid and effectively market opportunity and major aid programs (e.g. Collegebound Nebraska, Buffett Scholars, Thompson Learning Communities).

    b. Increase the percentage of Nebraska high school graduates (the state "college-going rate") who enroll at and graduate from the university.

        i. Increase enrollment, consistent with quality imperatives, to serve Nebraska's goals for increased educational attainment.

        ii. Increase each campus's undergraduate freshman-to-sophomore retention rate each year, with a goal of exceeding the average of its peer institutions.

        iii. Increase each campus's undergraduate six-year graduation rate, with a goal of exceeding the average of its peer institutions.

    c. Increase the diversity of those who enroll at and graduate from the university, employing measures permitted by state and federal law.

        i. Engage in partnerships with other higher education institutions, K-12, and the private sector to increase diversity of students who seek a post-secondary education, employing measures permitted by state and federal law.

    d. Expand lifelong educational opportunities, including those for non-traditional and transfer students.

    e. Promote adequate student preparation for success in higher education.

        i. Engage in pilot programs with Nebraska high schools for development of high school academies in partnership with the university.

ii. *Provide timely and usable information to middle school students, parents, teachers, and school administrators.*

f. Promote ease of transfer to the university from other higher education institutions.

i. *Improve programs for transfer from community colleges, state colleges, and other higher education institutions.*

g. Expand distance education programs, taking advantage of university-wide marketing and efficiencies and campus role and mission, strengths, and entrepreneurship.

i. *The University will offer a variety of its academic programs by distance education through Online Worldwide in an effort to provide access to the University of Nebraska to the people of the state and beyond the boundaries of the state who are unable to enroll in programs offered only on campus.*

2. The University of Nebraska will build and sustain undergraduate, graduate, and professional programs of high quality with an emphasis on excellent teaching.

a. Recruit and retain exceptional faculty and staff, with special emphasis on building and sustaining diversity.

i. *To help ensure competitiveness, faculty salaries and incentives (awarded on the basis of merit) and fringe benefits should exceed the average of peer institutions.*

ii. *Develop and maintain programs to enhance work/life conditions of faculty and staff, including overall campus climate.*

iii. *Each campus shall endeavor to meet the university's ongoing commitments to faculty diversity, employing measures permitted by state and federal law.*

iv. *Increase support for professorships and named/distinguished chairs.*

b. Pursue excellence through focus on targeted programs in areas of importance to Nebraska where the university can be a regional, national, and/or international leader (e.g. agriculture and natural resources, life sciences, information technology, and architectural engineering).

i. *Programs of Excellence funding shall be increased when practicable and results of allocations shall be periodically reviewed for impact.*

ii. *Resource allocation shall take advantage of distinct campus roles and missions to achieve overall university goals.*

iii. *Campuses are encouraged to collaborate to achieve overall university goals.*

c. Provide opportunities for global engagement of faculty through international teaching, research, and outreach exchanges, fellowships, and collaborations.

i. *Increase faculty participation in Fulbright and related programs.*

3. The University of Nebraska will play a critical role in building a talented, competitive workforce and knowledge-based economy in Nebraska in partnership with the state, private sector, and other educational institutions.

a. Work to stem and reverse the out-migration of graduates and knowledge workers.

b. Increase proportion of the most talented Nebraska high school students who attend the University of Nebraska.

i. *Increase enrollment of Nebraska students ranked in top 25% of their high school class.*

ii. *Increase support for merit-based scholarships.*

c. To attract talent to the state, increase the number of nonresident students who enroll at the university.

i. *Increase enrollment of nonresident undergraduate students at UNL, UNO, and UNK.*

d. To adequately prepare students for the global economy, significantly increase opportunities for international study and engagement.

i. *Significantly increase the number of undergraduates studying abroad, with the goal of ultimately providing the opportunity for every undergraduate to study abroad.*

ii. *Significantly increase the number of international undergraduates and graduates studying at the university.*

e. Encourage and facilitate the commercialization of research and technology to benefit Nebraska.

f. Develop and strengthen internship and service learning opportunities with business, education, government, military, and nonprofit organizations.

g. Engage in partnerships with government and the private sector to develop regional economic strength.

h. Pursue excellence in educational attainment aligned with the long-term interests of the state.

i. Analyze areas of future workforce demand, including job and self-employment opportunities in non-growth rural communities and economically disadvantaged urban areas, and strengthen or develop curricula and programs appropriate to the university in alignment with those areas.

ii. Develop educational programs that prepare students for the flexibility required to respond to the uncertainty of future workforce demands.

iii. Develop distance education and other educational programs that permit Nebraskans to prepare for jobs and opportunities to meet future workforce demands.

4. The University of Nebraska will pursue excellence and regional, national, and international competitiveness in research and scholarly activity, as well as their application, focusing on areas of strategic importance and opportunity.

a. Increase external support for research and scholarly activity.

i. Increase federal support for instruction, research and development, and public service.

ii. Inventory and forecast infrastructure (physical facilities, information technology, equipment) necessary to support continued growth in research activity and secure private and public support to eliminate deficiencies.

b. Increase undergraduate and graduate student participation in research and its application.

c. Encourage and support interdisciplinary, intercampus, inter-institutional, and international collaboration.

d. Improve the quantity and quality of research space through public and private support.

e. Focus resources on areas of strength in research where the university has the opportunity for regional, national, and international leadership and in areas of strategic importance to the health and economic strength of Nebraska (e.g. agriculture and life sciences; natural resources, especially water; prevention and cure of diseases such as cancer; and early childhood education).

i. Invest resources through the Nebraska Research Initiative, Programs of Excellence, and other sources to build capacity and excellence in research.

5. The University of Nebraska will serve the entire state through strategic and effective engagement and coordination with citizens, businesses, agriculture, other educational institutions, and rural and urban communities and regions.

a. Support economic growth, health, and quality of life through policy initiatives consistent with university mission.

b. Recognize and reward faculty innovation and effectiveness in outreach and engagement.

c. Support Nebraska's economic development.

i. Partner and collaborate with government and private sector to attract, retain, and spur business development and economic opportunity.

ii. Use university research and other resources to foster more effective relationships with the private sector.

d. Support entrepreneurship education, training, and outreach.

e. Collaborate with the public and private sectors to build successful regional, multistate, and international linkages.

f. Use university resources to engage Nebraskans outside cities where our major campuses are located.

i. Effectively use the Nebraska Rural Initiative and other university-wide and campus programs to develop excellence in supporting community development while creating quality economic opportunities throughout rural Nebraska.

ii. Effectively use regional research and extension operations and statewide extension for engagement with the university.

6. The University of Nebraska will be cost effective and accountable to the citizens of the state.

   a. Support the development of a sustainable university environment.

      i. Build a comprehensive long-range capital facilities planning process and provide a six-year capital construction plan, updated quarterly.

      ii. Implement the second phase of LB 605 to repair, renovate, and/or replace specific university facilities.

      iii. Campuses shall pursue energy efficiency.

      iv. Campuses shall promote through policies and scheduling effective utilization of university facilities.

   b. Maintain a safe environment for students, faculty, staff, and visitors.

      i. Develop and regularly monitor fire safety plans and procedures.

      ii. Collaborate with state and local government in disaster planning.

      iii. Develop and test campus plans for emergencies and disasters.

   c. Allocate resources in an efficient and effective manner.

      i. Use best practices in procurement and construction and other business engagement.

      ii. Leverage roles and missions of campuses to find savings and cost reductions through academic, administrative, and business process efficiencies and effectiveness.

      iii. Develop and report on matrix of business health indicators, including university debt.

   d. Maximize and leverage non-state support.

      i. Promote entrepreneurship and revenue-generating opportunities.

      ii. Collaborate with the University of Nebraska Foundation to secure private support for university priorities.

   e. Create and report performance and accountability measures.

   f. Maximize potential of information technology to support university's activities.

g. Provide accurate and transparent information to the public about college costs and student learning and success outcomes.

i. Participate in the Student Achievement Measure (SAM) program.

ii. Participate in the National Survey of Student Engagement (NSSE).

iii. Monitor student achievements on licensing and professional examinations.

iv. Participate and measure effectiveness of national pilot projects on learning assessment with the goal of adopting university measurements.

h. Implement awareness and education programs to assist all students in management of personal financial matters.

Addendum X-C-2

TO:	The Board of Regents Academic Affairs
MEETING DATE:	February 7, 2020
SUBJECT:	University of Nebraska Strategic Framework Accountability Measures
RECOMMENDED ACTION:	For Information Only
PREVIOUS ACTION:	None
EXPLANATION:	Attached is the current version of the strategic accountability measures.
SPONSOR:	Walter E. Carter, President University of Nebraska
DATE:	January 21, 2020

University of Nebraska

INVESTING IN NEBRASKA'S FUTURE

Strategic Planning Framework
2018-2020
Accountability Measures

1. **State Funding (1-a-*i*)**
   Secure state funding sufficient to support access to high quality programs.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
FY2019-20	To be developed as part of the 2019-2021 biennial budget request planning process.	June 2020	Business

2. **Tuition (1-a-*ii*)**
   Keep tuition increases moderate and predictable for students and families, consistent with goals of both access and quality.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
FY2019-20	To be developed as part of the 2019-2021 biennial budget request planning process.	June 2020	Business

3. **Need-based Financial Aid (1-a-*iii*)**
   Expand need-based financial aid and effectively market opportunity and major aid programs (e.g. Collegebound Nebraska, Buffett Scholars, Thompson Learning Communities).

Reporting Period	Accountability Measure	Report Date	Reporting Committee
FY2018-19	To be developed as part of the 2019-2021 biennial budget request planning process.	Jan. 2020	Academic

4. **Enrollment (1-b-*i*)**
   Increase enrollment, consistent with quality imperatives, to serve Nebraska's goals for increased educational attainment.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
Fall 2019	TBD	Dec. 2019	Academic

5. **Graduation Rates (1-b-*iii*)**
Increase each campus's undergraduate six-year graduation rate, with a goal of exceeding the average of its peer institutions.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
2017-18 Academic Year	1) Each campus will maintain or reach the average six-year graduation rate of its peers. 2) All prospective and current undergraduate students are regularly informed and assisted in obtaining the benefit of the University's four-year graduation guarantee.	Jan. 2020	Academic

6. **Faculty Merit Compensation (2-a-*i*)**
To help ensure competitiveness, faculty salaries and incentives (awarded on the basis of merit) and fringe benefits should exceed the average of peer institutions.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
FY2019-20	1) All salary increases should be awarded, to the extent possible, on the basis of merit. 2) Average faculty salaries on each campus shall meet or exceed the midpoint of peers. 3) Once the midpoint of peers has been met or exceeded, an exceptional merit fund shall be established to provide additional incentives related to performance.	June 2020	Business

7. **Faculty Diversity (2-a-*iii*)**
Each campus shall endeavor to meet the University's ongoing commitments to faculty diversity, employing measures permitted by state and federal law.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
Fall 2018	1) Increase faculty diversity, employing measures permitted by state and federal law. 2) Report on the diversity of the faculty and the relative rate of change in faculty composition as compared to peers.	Jan. 2020	Academic

8. **Nebraska Top 25% (3-b-*i*)**
Increase enrollment of Nebraska students ranked in top 25% of their high school class.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
Fall 2020	Maintain enrollment of first-time freshman ranked in the top quartile of their high school graduating class to 50.0% or greater.	Dec. 2020	Academic

9. **Merit-based Scholarships (3-b-*ii*)**
Increase support for merit-based scholarships.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
FY2018-19	Raise at least $9 million in private funds (endowment and/or spendable).	Jan. 2020	Academic

10. **Nonresident Student Enrollment (3-c-*i*)**
Increase enrollment of nonresident undergraduate students at UNL, UNO, and UNK.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
Fall 2020	Increase the number of domestic nonresident undergraduate students by 1.5% annually.	Dec. 2020	Academic

11. **Workforce Development (3-h-*i* and 3-h-*iii*)**
Analyze areas of future workforce demand, including job and self-employment opportunities in non-growth rural communities and economically disadvantaged urban areas, and strengthen or develop curricula and program appropriate to the University in alignment with those areas (3-h-i). Develop distance education and other educational programs that permit Nebraskans to prepare for jobs and opportunities to meet future workforce demands (3-h-iii).

Reporting Period	Accountability Measure	Report Date	Reporting Committee
Fall 2019	TBD	March 2020	Academic

12. **Research (4-a-*i*)**
Increase federal support for instruction, research and development, and public service.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
FY2018-19	Increase UNL and UNMC federal research expenditures by 20% more than the weighted total federal appropriations per year on a three-year rolling average.	March 2020	Academic

13. **Entrepreneurship (5-d)**
Support entrepreneurship education, training, and outreach.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
2019	Increase over previous year. Evaluate and modify annual targets as appropriate. 1) Entrepreneurship education a) Entrepreneurship student credit hours b) Number of entrepreneurship students	March 2020	Academic

	2) Entrepreneurship outreach a) Attendees at seminars provided b) Website visits 3) Business creation a) NU-affiliated companies formed		

14. **LB605 (6-a-*ii*)**
Implement the second phase of LB605 to repair, renovate, and/or replace specific University facilities.

*A capstone report on LB605 was presented to the Board of Regents in January 2011.

15. **Business Process Efficiencies (6-c-*ii*)**
Leverage roles and missions of campuses to find savings and cost reductions through academic, administrative, and business process efficiencies and effectiveness.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
2019 Calendar Year	1) Short-term Cash/Investments: Exceed average of similar fund types 2) Endowments: Exceed average of similar fund types 3) Debt: Maintain Aa1 rating; exceed 1.15 coverage 4) Capital: Report on Capital Queue 5) Human Resources: Meet midpoint of peers in faculty and staff salaries	1) June 2020 2) Jan. 2020 3) Jan. 2020 4) Quarterly 5) June 2020	Business

16. **Student Learning Assessment (6-g)**
Provide accurate and transparent information to the public about college costs and student learning and success outcomes.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
Fall 2019	1) Annual or other periodic review, as available, by the Board of performance on standardized examination and surveys, including the National Survey of Student Engagement and professional licensure examinations. 2) Annual review by the Board of participation in pilot programs to measure student learning outcomes, such as the Collegiate Learning Assessment.	August 2020	Academic

17. **Global Engagement - Student Abroad (3-d-*i*)**
Significantly increase the number of undergraduates studying abroad, with the goal of ultimately providing the opportunity for every undergraduate to study abroad.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
Academic Year 2018-19	By 2019-20, the number of students who have studied abroad will reach 1,780, an increase of 50% over the number in 2011-12.	August 2020	Academic

Metric was revised in January 2015 by the Academic Affairs committee with the consent of the incoming chair.

18. **Global Engagement - International Student Recruitment (3-d-*ii*)**
Significantly increase the number of international undergraduates and graduates studying at the University.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
Fall 2020	Continue progress toward doubling by 2020-21 the enrollment of international students by achieving average annual growth of slightly more than 7%.	Dec. 2020	Academic

Base academic year in the metric was corrected from 2009-10 to 2010-11 in November 2013; the number of students was unchanged.

19. **Distance Education (1-g-*i*)**
The University will offer a variety of its academic programs by distance education through University of Nebraska Online in an effort to provide access to the University of Nebraska to the people of the state and beyond the boundaries of the state who are unable to enroll in programs offered only on campus.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
Academic Year 2019-20	Growth in unduplicated headcount of distance only students, both resident and nonresident, at or above the national average growth for public four-year institutions as reported via IPEDS.	Dec. 2020	Academic

Addendum X-C-3

TO:	The Board of Regents Academic Affairs
MEETING DATE:	February 7, 2020
SUBJECT:	University of Nebraska calendar for establishing and reporting accountability measures
RECOMMENDED ACTION:	For Information Only
PREVIOUS ACTION:	None
EXPLANATION:	Attached is a calendar for establishing and reporting accountability measures.
SPONSOR:	Walter E. Carter, President University of Nebraska
DATE:	January 21, 2020

Strategic Framework Accountability Measure Reporting and Update Calendar

Revised for February 7, 2020 meeting

Board Meeting Date	**Academic Affairs Committee**	**Business Affairs Committee**
February 7, 2020	Need-based Financial Aid [1-a-iii] Graduation Rates [1-b-iii] Faculty Diversity [2-a-iii] Merit-based Scholarships [3-b-ii]	Administrative/Business Efficiencies [6-c-*ii*] *(Endowments, Debt, Capital Queue)*
April 17, 2020	Workforce Development [3-h-i/iii] Research [4-a-*i*] Entrepreneurship [5-d]	
June 26, 2020		State Funding [1-a-*i*] Tuition [1-a-*ii*] Faculty Merit Compensation [2-a-*i*] Administrative/Business Efficiencies [6-c-*ii*] *(Short-term Cash/Investments, Capital Queue, Human Resources)*
August 14, 2020	Student Learning Assessment [6-g] Global Engagement - Student Abroad [3-d-*i*]	
October 8, 2020		Administrative/Business Efficiencies [6-c-*ii*] *(Capital Queue)*
December 4, 2020	Enrollment [1-b-*i*] Nebraska Top 25% [3-b-*i*] Nonresident Student Enrollment [3-c-*i*] International Student Recruitment [3-d-*ii*] Distance Education [1-g-*i*]	

Addendum X-C-4

TO:	The Board of Regents Academic Affairs
MEETING DATE:	February 7, 2020
SUBJECT:	University of Nebraska Strategic Dashboard Indicators
RECOMMENDED ACTION:	For Information Only
PREVIOUS ACTION:	None
EXPLANATION:	Attached is the current version of the Strategic Framework Indicators.
SPONSOR:	Walter E. Carter, President University of Nebraska
DATE:	January 21, 2020

University of Nebraska Strategic Dashboard Indicators (Updated as of December 5, 2019)

State Funding Change (1.a.i) FY2019-20

Target	Outcome
State funding and cost mgmt.= <6% tuition increase	2019-20 3.0%

Tuition Change (1.a.ii) FY 2019-20

Target	Outcome
State funding and cost mgmt.= <6% tuition increase	2019-20 2.75%

Enrollment Change (1.b.i) Fall 2019

Target	Outcome
UNL= 2.9% increase	-1.9%
UNO= 4.5% increase	-1.8%
UNK= increase	-0.8%
UNMC= increase	+2.1%

Retention (1.b.i) Fall 2018

Target	Outcome
80% retention rate	80.7%

Need-Based Aid (1.a.iii) FY2017-18

Target	Outcome
Raise at least $9 million in private funds	Raised $14.3 million

Women Faculty (2.a.iii) Fall 2017

Target	Outcome
Increase over 2016	2017=37.61% 2016=37.14%

Minority Faculty (2.a.iii) Fall 2017

Target	Outcome
Increase over 2016	2017=22.55% 2016=20.75%

Top 25% Enrollment (3.b.i) Fall 2019

Target	Outcome
Increase to 50%	58.3%

Nonresident Students (3.c.i) Fall 2019

Target	Outcome
Increase 1.5% over 2018	4.2%

Merit-Based Aid (3.b.ii) FY2017-18

Target	Outcome
Raise at least $9 million in private funds	Raised $40.0 million

Study Abroad (3.d.i) AY2017-18

Target	Outcome
50% increase over 2011-12 number by 2019-20	28% increase since 2011-12

International Students (3.d.ii) Fall 2019

Target	Outcome
Double base of 3,018 students by 2019-20	-3.2% decrease from prior year (4,110)

Distance Education (3.g.i) Fall 2018

Target	Outcome
Resident and nonresident growth above public four-year national average	Resident = 13.88% Nonresident = -.63%

Six-Year Graduation Rate (1.b.iii) AY2016-17

Campus	Target	Outcome
UNL	Maintain or show progress toward reaching the average six-year graduation rate of peers	2017= -6.3% 2016= -6.3%
UNO		2017= -0.4% 2016= -1.5%
UNK		2017= 9.6% 2016= 5.3%
UNMC	Not applicable	Not Applicable

LEGEND: Target Met or Exceeded | Progress Toward Target | Target Not Met

University of Nebraska Strategic Dashboard Indicators (Updated as of December 5, 2019)

Federal Research Funding Growth (4.a.i)
UNL and UNMC
FY2017-18

	Campus	Target	Outcome
⬆	UNL	2.38%	2.13%
⬆	UNMC	5.96%	8.07%

Faculty Salaries (2.a.i)
FY2018-19

	Campus	Target	Outcome
⬆	UNL	Significant progress toward exceeding midpoint of peers	2019= -4.0% 2018= -4.8%
⬆	UNMC		2019= -2.9% 2018= -5.0%
	UNO		*
	UNK		*

	Indicator	Target	Outcome
⬆	**Four-Year Graduation Guarantee (1.b.iii) AY2016-17**	All prospective and current undergraduate students are informed about the University's four-year graduation guarantee.	All campuses have posted information about the four-year graduation guarantee on their websites and also have a link to four-year graduation guarantee information on the UNCA website.
⬆	**Faculty Salaries (2.a.1) Fall 2018**	Award all salary increases, to the extent possible, on the basis of merit.	Faculty salaries at UNL and UNMC may be based/granted entirely on merit, while faculty salaries at UNO and UNK are negotiated through the collective bargaining process and therefore the amount and method of distribution at UNO and UNK must be determined by agreement.
⬆	**Entrepreneurship (5.d) 2017**	Increase over FY 2014 baseline data for: 1) Entrepreneurship coursework hours 2) Entrepreneurship number of students 3) Entrepreneurship seminar attendees 4) Entrepreneurship website visits 5) NU-affiliated companies formed 6) NU Licensing activity 7) Business support-clients served 8) Business support-client investments 9) Business support-sales increases 10) Business support-jobs created 11) Business support-jobs saved	1) 2016=10,943; 2017=10,319 2) 2016=3,692; 2017=3,451 3) 2016=11,642; 2017=13,242 4) 2016=189,723; 2017=111,098 5) 2016=31; 2017=63 6) 2016=178; 2017=211 (patents filed), 2016=60; 2017=95 (patents awarded) 7) 2016=8,756; 2017=9,952 8) 2016=$343,578; 2017=$222,895 9) 2016=$458,142; 2017=$275,947 10) 2016=994; 2017=714 11) 2016=644; 2017=548

LEGEND: ⬆ **Target Met or Exceeded** | ⬆ **Progress Toward Target** | ⬇ **Target Not Met**

University of Nebraska Strategic Dashboard Indicators (Updated as of December 5, 2019)

	Indicator	Target	Outcome
↑	**Workforce Development (3.h.i and 3.h.iii) 2019**	Review new internal and external research on workforce needs and update categories of employment for purposes of aligning university programs to changing needs.	Faculty and state agency research has been reviewed. The University of Nebraska continues to monitor relevant faculty and agency research to identify emerging workforce opportunities and trends in the state.
↑	**Student Learning Assessment (6.g) Fall 2018**	1. Review performance on standardized examinations and surveys, including the National Survey of Student Engagement and professional licensure examinations. 2. Report on participation in pilot programs to measure student learning outcomes, such as the Collegiate Learning Assessment.	UNK, UNL and UNO currently participate in the National Survey of Student Engagement (NSSE). Performance on professional licensure examinations is generally above average for all campuses. Campuses are taking a variety of approaches to participation in pilot programs designed to measure learning outcomes, including exploring processes for assessing general studies requirements and past participation in the administration of the College Assessment of Academic Proficiency (CAAP).
	Business Process Efficiencies (6.c.ii)		
↑	**Short Term Cash Investments December 2018**	Exceed average of similar fund types.	The 2018 return on the State's Operating Investment Pool (1.2%) exceeded the benchmark value of 1.0%.
↓	**Endowments December 2018**	Exceed average of similar fund types.	Fund N endowments gained 0.5% for the year ending December 31, 2018 while the custom benchmark gained 4.8% over the same period.
↑	**Debt December 2018**	Maintain Aa2 rating and exceed 1.15 coverage.	Bond rating continues to be Aa1 and operations exceeded 1.15 debt service coverage.
↓	**Human Resources August 2018**	Meet midpoint of peers in faculty and staff salaries.	Faculty salaries at UNL and UNMC are below the midpoint of peers for 2018*.

Notes:

***UNO and UNK salaries are governed by collective bargaining.**

LEGEND: ↑ **Target Met or Exceeded** | ↑ **Progress Toward Target** | ↓ **Target Not Met**

Addendum X-C-5

TO:	The Board of Regents Academic Affairs
MEETING DATE:	February 7, 2020
SUBJECT:	Board of Regents agenda items related to the University of Nebraska Strategic Framework
RECOMMENDED ACTION:	For Information Only
PREVIOUS ACTION:	The current version of the framework appears as an information item at each Board of Regents meeting. April 2005 – The Board of Regents began development of the University of Nebraska "Strategic Framework - Accountability Measures" document.
EXPLANATION:	Attached is an explanation of the agenda items that are aligned with the strategic goals of the Board of Regents' Strategic Framework.
SPONSOR:	Walter E. Carter, President University of Nebraska
DATE:	January 21, 2020

Alignment of University's Strategic Goals with Board of Regents' Agenda Items
February 7, 2020

1. **The University of Nebraska will provide the opportunity for Nebraskans to enjoy a better life through access to high quality, affordable undergraduate, graduate, and professional education.**

   - Academic Affairs committee presentation on Student Accomplishments
   - Approve amendment to RP-5.2.1 related to Admission Standards
   - Approve amendment to RP-5.8.5 related to undergraduate Regents Scholarships
   - Approve an agreement with Enrollment Advisory Group, LLC for International Student Recruitment at UNK
   - Strategic Framework report on Need-Based and Merit-Based Financial Aid
   - Strategic Framework report on Graduation Rates
   - Report on Tuition Variances

2. **The University of Nebraska will build and sustain undergraduate, graduate, and professional programs of high quality with an emphasis on excellent teaching.**

   - Approve creation of a Master of Arts (MA) in Public Communication in the Department of Communication in the College of Arts and Sciences at UNK
   - Approve the establishment of the Nebraska Governance and Technology Center at UNL
   - Quarterly personnel report
   - Strategic Framework report on Faculty Diversity

3. **The University of Nebraska will play a critical role in building a talented, competitive workforce and knowledge-based economy in Nebraska in partnership with the state, private sector, and other educational institutions.**

   - Academic Affairs committee presentation on Student Accomplishments
   - Approve creation of a Master of Arts (MA) in Public Communication in the Department of Communication in the College of Arts and Sciences at UNK
   - Report on renaming the Bachelor of Science (BS) in Grazing Livestock Systems the Bachelor of Science (BS) in Grassland Systems in the Center for Grassland Studies in the College of Agricultural Sciences and Natural Resources at UNL

4. **The University of Nebraska will pursue excellence and regional, national, and international competitiveness in research and scholarly activity, as well as their application, focusing on areas of strategic importance and opportunity.**

   - Approve the establishment of the Nebraska Governance and Technology Center at UNL
   - Approve the creation of a departmental structure in the College of Allied Health Professions (CAHP) at UNMC

5. **The University of Nebraska will serve the entire state through strategic and effective engagement and coordination with citizens, businesses, agriculture, other educational institutions, and rural and urban communities and regions.**

6. **The University of Nebraska will be cost effective and accountable to the citizens of the state.**

   - Business Affairs committee presentation on 2018-2019 Audited Financial Statements
   - Accept the audited financial statements of the University of Nebraska and related entities

- Approve an agreement with Enrollment Advisory Group, LLC for International Student Recruitment at UNK
- Approve the Program Statement for the renovation of Nebraska Hall on the UNL campus to house the Enterprise Technology Services and Data Solutions teams
- Approve agreements with DataVizion LLC and GovConnection Inc. to provide equipment and related services for campus backbone and data center network solutions
- Approve amendments to the Audit, Risk, and Compliance Committee Charter
- Approve or accept various regular reports, including:
    - Report on Tuition Variances
    - Report on bids and contracts
    - Quarterly report of gifts, grants, contracts, and bequests
    - Quarterly report on Capital Construction Projects
- Accept report on naming of Ameritas Virtual Reality Dental Experience Hub within the Clinical and Virtual Simulation Laboratory at UNMC
- Accept report on Strauss Performing Arts Center Phase 2

TO:	The Board of Regents	Addendum X-C-6
	Business Affairs	
MEETING DATE:	February 7, 2020	
SUBJECT:	Amendment of the Standing Rules of the Board of Regents	
RECOMMENDED ACTION:	None. The proposed amendments of the Standing Rules of the Board of Regents are presented for information only in accordance with the requirements of Section 7.2 of the Standing Rules and Section 1.11 of the *Bylaws of the Board of Regents.* Approval of these amendments will be considered for the Regents' meeting on April 17, 2020.	
PREVIOUS ACTION:	The Standing Rules were last amended on June 28, 2019.	
EXPLANATION:	Attached are the proposed amendments to the Standing Rules of the Board of Regents: The first amendment rescinds previous amendments made to the process of officer selection adopted on December 3, 2015, and if this action item is approved, it is to be implemented effective as of the 2021 annual meeting with elections held for a chair and vice chair. The second amendment changes the name of the Business Affairs Committee to the Business and Finance Committee. With respect to the latter and upon final approval by the Board of Regents, the Corporation Secretary is authorized to adjust any reference to such committee to reflect the amended name.	
RECOMMENDED:	Executive Committee Board of Regents	
DATE:	January 21, 2020	

STANDING RULES OF THE BOARD OF REGENTS OF THE UNIVERSITY OF NEBRASKA

SECTION 1. **Structure of the Board**

1.1 **Membership**. The Board shall consist of the eight voting members elected from districts within the state and four non-voting student members, all as provided by the Constitution and laws of the State of Nebraska and the *Bylaws of the Board of Regents*.

1.2 **Officers**. The officers of the Board shall be the Chairperson and the Vice Chairperson, whom the Board shall, at its annual meeting, ~~s~~elect from among its voting members~~. A Vice Chairperson shall be elected at the annual meeting~~ for a term of one year~~, and thereafter, succeed to the office of Chairperson for a term of one year. A nominee eligible for Vice Chairperson must have sufficient remaining term as Regent, such that he or she may fulfill the duties of Chairperson the following year~~. If there is more than one nominee for an office, then the elections shall be by secret ballot and the total number of votes for each nominee shall be announced and entered into the minutes. The duties of the Chairperson and Vice Chairperson shall be those set forth in Section 1.3 of the *Bylaws of the Board* and Section 4.3 of these Rules. In the event that the Chairperson and the Vice Chairperson are both absent or otherwise unable to discharge their duties, the Board shall, by a majority vote of its members present and qualified to vote, select a presiding officer pro tempore.

1.3 **Committees**.

1.3.1 The Board shall have four standing committees: Executive, Academic Affairs, Audit, Risk and Compliance, and Business and Finance Committee ~~Affairs~~. The Board may from time to time create such other committees and task forces as it determines to be necessary.

1.3.2 The Executive Committee shall consist of the Chairperson, Vice Chairperson, the most recent past Chairperson, and an additional elected Regent, and one Student Regent both appointed by the Chairperson. The elected Regent appointed by the Board Chairperson may not be reappointed to a second consecutive term.

1.3.3 The Chairperson of the Board shall, after consulting with the other members of the Board, appoint the members of the Academic Affairs, Audit, Risk and Compliance, and Business and Finance Committee ~~Affairs~~ committees and select one member of each committee to serve as its chairperson. Such appointments shall be made each year, after the Board's annual meeting and before its next scheduled meeting. All proposed committee agenda topics will be submitted by the committee chairs to the Executive Committee for approval.

[The balance of the standing rules shall remain and are not amended pursuant to this Board of Regents action.]

D. REPORTS

1. Quarterly Personnel Reports for the period July through September 2019 Addendum X-D-1

2. Strategic Framework Metrics: Need-Based [1-a-iii] and Merit-Based [3-b-ii] Financial Aid, Graduation Rates [1-b-iii], Faculty Diversity [2-a-iii] Addendum X-D-2

3. Annual Tenure Density Report Addendum X-D-3

4. Tuition Variances Addendum X-D-4

5. Renaming the Bachelor of Science (BS) in Grazing Livestock Systems to the Bachelor of Science in Grassland Systems in the Center for Grassland Studies in the College of Agricultural Sciences and Natural Resources at the University of Nebraska-Lincoln (UNL) Addendum X-D-5

6. Report of Bids and Contracts Addendum X-D-6

7. Quarterly Report of Gifts, Grants, Contracts and Bequests Addendum X-D-7

8. Naming of Ameritas Virtual Reality Dental Experience Hub within the Clinical and Virtual Simulation Laboratory at the UNMC College of Dentistry Addendum X-D-8

9. Strauss Performing Arts Center Phase 2 Addendum X-D-9

10. Quarterly Status of Capital Construction Projects Addendum X-D-10

TO:	The Board of Regents Academic Affairs
MEETING DATE:	February 7, 2020
SUBJECT:	Personnel Reports
RECOMMENDED ACTION:	Report
PREVIOUS ACTION:	On December 10, 1994, the Board of Regents amended Section 3.2 of the *Bylaws of the Board of Regents* to delegate to the President, or administrative officers designated by the President, authority to make appointments in the Academic-Administrative staff to faculty positions and to administrative positions below the rank of Dean and equivalent ranks. Executive Memorandum No. 13 subsequently delegated authority to the Chancellors to make Academic-Administrative appointments below the level of Dean. Such appointments at the rank of assistant professor or above are required by the *Bylaws of the Board of Regents* to be reported to the Board after each quarter and maintained on file as a public record in the Office of the Corporation Secretary.
EXPLANATION:	A series of reports of campus personnel actions approved by each Chancellor during the 3rd quarter of 2019 is attached.
PROJECT COST:	None
SOURCE OF FUNDS:	None
APPROVED:	/s/ Susan M. Fritz Executive Vice President and Provost
DATE:	January 10, 2020

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT KEARNEY

NEW APPOINTEMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Artman, Bryan	Teacher Education	Assistant Professor	Specific	9/1/2019		56,400	AY	1.00
Bell, Chance	Family Studies	Assistant Professor	Specific	9/1/2019		60,000	AY	1.00
Bjornsen, Matthew	Accounting, Finance and Economics	Assistant Professor	Specific	9/1/2019		145,000	AY	1.00
Bohaty, Noelle	Music, Theatre and Dance	Assistant Professor	Specific	9/1/2019		51,195	AY	1.00
Borchers, Sarah	Accounting, Finance and Economics	Assistant Professor	Specific	9/1/2019		125,000	AY	1.00
Brachle, Benjamin	Industrial Technology	Assistant Professor	Specific	9/1/2019		86,500	AY	1.00
Catapano, Susan	Teacher Education	Professor	Continuous	9/1/2019		60,000	AY	0.50
		Cille and Ron Williams Endowed Community Chair for Early Childhood Education	Special	9/1/2019		60,000	AY	0.50
Danner, Natalie	Teacher Education	Associate Professor	Specific	9/1/2019		90,000	AY	1.00
		LaVonne Kopecky Plambeck Chair of Montessori Education	Special	9/1/2019		0	AY	0.00
Gage, Richard	Kinesiology and Sport Sciences	Assistant Professor	Specific	9/1/2019		56,000	AY	1.00
Garth, Timothy	Art and Design	Assistant Professor	Specific	9/1/2019		52,000	AY	1.00

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT KEARNEY

NEW APPOINTEMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Gensler, Scott	Mathematics and Statistics	Assistant Professor	Specific	9/1/2019		57,000	AY	1.00
Gottula, Todd	Communications and Marketing	Senior Director	Special	7/1/2019		101,000	FY	1.00
Hadley, Marilyn	Museum of Nebraska Art	Interim Director/Curator	Special	7/1/2019		39,000	FY	0.60
Henning, Judy	Teacher Education	Assistant Professor	Specific	7/1/2019		56,400	AY	1.00
Hossain, Md Liaquat	Cyber Systems	Professor	Continuous	9/1/2019		84,000	AY	0.60
		Department Chair (Includes Stipend)	Special	9/1/2019		61,224	AY	0.40
		Cope Professorship	Speical	9/1/2019	8/31/2024	10,000	AY	0.00
Luethke, Tiffani	Communication	Assistant Professor	Specific	9/1/2019		53,000	AY	1.00
Marshall, Brandon	Physics and Astronomy	Assistant Professor	Specific	9/1/2019		54,000	AY	1.00
Moen, Katherine	Psychology	Assistant Professor	Specific	9/1/2019		56,000	AY	1.00
Orr, Thomas	Kinesiology and Sport Sciences	Assistant Professor	Specific	9/1/2019		59,500	AY	1.00
Pec, Gregory	Biology	Assistant Professor	Specific	9/1/2019		56,000	AY	1.00
Petzet, John	Music, Theatre and Dance	Assistant Professor	Specific	9/1/2019		60,000	AY	1.00
Qolomany, Basheer	Cyber Systems	Assistant Professor	Specific	9/1/2019		85,000	AY	1.00

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT KEARNEY

NEW APPOINTEMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Teahon, Michael	Educational Administration	Associate Professor	Specific	9/1/2019		39,480	AY	0.60
		Department Chair (Includes Stipend)	Special	9/1/2019		31,544	AY	0.40
Tye, Nathan	History	Assistant Professor	Specific	9/1/2019		57,000	AY	1.00
White, April	G.W. Frank Museum	Interim Director	Special	7/1/2019		43,200	FY	1.00
Zuelow, Deb	Plambeck Early Childhood Education Center	Director	Special	7/8/2019		53,000	FY	1.00

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA-LINCOLN

NEW APPOINTEMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Abdurakhmonov, Mirzokhidjon	Management	Assistant Professor	Specific Term	8/19/2019		155,000	AY	1.00
Al-Tarazi, Motassem	Computer Science and Engineering	Assistant Professor of Practice	Special	8/27/2019	5/13/2022	84,000	AY	1.00
Anania, Katherine	School of Art, Art History and Design	Assistant Professor	Specific Term	8/19/2019		67,000	AY	1.00
Anway, Byron	School of Art, Art History and Design	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	57,000	AY	1.00
Barlow, Matthew	Management	Assistant Professor	Specific Term	8/19/2019		155,000	AY	1.00
Barrett, Scott	Psychology	Research Assistant Professor	Special	7/1/2019	6/30/2021	55,000	FY	1.00
Belcher, William	Anthropology	Assistant Professor	Specific Term	8/19/2019		75,000	AY	1.00
Bitterman, Patrick	Geography	Assistant Professor	Specific Term	8/19/2019		72,000	AY	1.00
Bohn, Christopher	Computer Science and Engineering	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	85,000	AY	1.00
Bonander, Allison	Communication Studies	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	58,000	AY	1.00
Brazeal, Kathleen	School of Biological Sciences	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	69,500	AY	1.00

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA-LINCOLN

NEW APPOINTEMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Campbell, Robert	Management	Assistant Professor	Specific Term	8/19/2019		155,000	AY	1.00
Checco, James	Chemistry	Assistant Professor	Specific Term	8/19/2019		78,000	AY	1.00
Cooper Owens, Deirdre	History	Associate Professor	Continuous	8/19/2019		95,000	AY	1.00
		Charles and Linda Wilson Professorship	Special	8/19/2019	5/10/2024	10,000	AY	0.00
Daggumati, Shruti	Computer Science and Engineering	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	81,000	AY	1.00
Dawson, Edward	Modern Languages and Literatures	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	56,500	AY	1.00
Dion, Paul	Finance	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	126,000	AY	1.00
Dotzel, Thomas	Marketing	Assistant Professor	Specific Term	8/19/2019		158,000	AY	1.00
Edwards, Katie	Nebraska Center for Research on Youth, Family and School	Associate Professor	Continuous	8/19/2019		120,000	AY	1.00
Eftekhar Azam, Saeed	Civil and Environmental Engineering	Research Assistant Professor	Special	9/16/2019	9/30/2020	61,320	FY	1.00
Eichhorn, Catherine	Chemistry	Assistant Professor	Specific Term	8/19/2019		78,000	AY	1.00
Farmer, Monique	Advertising	Assistant Professor of Practice	Special	7/19/2019	5/13/2022	75,000	AY	1.00

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA-LINCOLN

NEW APPOINTEMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Fleming, Jesse	Johnny Carson School of Theatre and Film	Assistant Professor	Specific Term	8/19/2019		80,000	AY	1.00
	Carson Center for Emerging Media Arts	Johnny Carson Center Professorship	Special	8/19/2019		5,000	AY	0.00
Friday, Nkenge	Office of Diversity and Inclusion	Assistant Vice Chancellor	Special	9/30/2019		125,000	FY	1.00
Ghashami, Mohammad	Mechanical and Materials Engineering	Assistant Professor	Specific Term	8/19/2019		96,000	AY	1.00
Ghose, Nirnimesh	Computer Science and Engineering	Assistant Professor	Specific Term	8/19/2019		101,000	AY	1.00
Gray, Tricia	Teaching, Learning and Teacher Education	Assistant Professor of Practice	Special	8/19/2019		66,000	AY	1.00
Grover, Piyush	Mechanical and Materials Engineering	Assistant Professor	Specific Term	8/19/2019		96,000	AY	1.00
Guo, Yinsheng	Chemistry	Assistant Professor	Specific Term	8/19/2019		78,000	AY	1.00
Haacker, Erin	Earth and Atmospheric Sciences	Assistant Professor	Specific Term	8/19/2019		74,000	AY	1.00
Harney, Patricia	Advertising	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	75,000	AY	1.00
Harris, Ling	School of Accountancy	Assistant Professor	Specific Term	8/19/2019		225,000	AY	1.00

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA-LINCOLN

NEW APPOINTEMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Hendricks, Jonathan	Management	Assistant Professor	Specific Term	8/19/2019		150,000	AY	1.00
Hodges, Timothy	Management	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	55,000	AY	0.50
	Clifton Strengths Institute	Executive Director	Special	8/19/2019	5/13/2022	66,000	AY	0.50
Hoeve, Casey	University Libraries	Associate Professor	Continuous	8/1/2019		77,500	FY	1.00
Hubbard, Nicholas	Psychology	Assistant Professor	Specific Term	8/19/2019		78,500	AY	1.00
Huryta, Deborah	Institutional Equity and Compliance	ADA Compliance Officer	Special	7/1/2029		85,000	FY	1.00
Hyde, Renee	Educational Administration	Associate Professor of Practice	Special	8/19/2019	5/13/2022	71,000	AY	1.00
Johnson, John	Athletics	Senior Deputy Athletic Director for Administration/Chief of Staff	Special	7/29/2019		250,000	FY	1.00
Kim, Kyungki	Durham School of Architectural Engineering and Construction	Assistant Professor	Specific Term	8/19/2019		96,000	AY	1.00
Kirk, Christina	Johnny Carson School of Theatre and Film	Director	Special	7/1/2019		140,000	FY	1.00
Kirk, Justin	Communication Studies	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	58,000	AY	1.00
Klassy, Garrett	Athletics	Senior Deputy Athletic Director for External Operations	Special	7/31/2019	7/30/2021	350,000	FY	1.00

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA-LINCOLN

NEW APPOINTEMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Klempa, Paul	Athletics	Head Coach-Women's Bowling	Special	9/1/2019		81,000	FY	1.00
Koch, Nathan	Glenn Korff School of Music	Assistant Professor	Specific Term	8/19/2019		65,000	AY	1.00
Kubick, Thomas	School of Accountancy	Associate Professor	Continuous	8/19/2019		280,000	AY	1.00
Kuo, Patty	Child, Youth and Family Studies	Assistant Professor	Specific Term	8/19/2019		73,000	AY	1.00
Laraoui, Abdelghani	Mechanical and Materials Engineering	Assistant Professor	Specific Term	8/19/2019		96,000	AY	1.00
Lather, Jennifer	Durham School of Architectural Engineering and Construction	Assistant Professor	Specific Term	8/19/2019		96,000	AY	1.00
Lee, Kejin	Nebraska Center for Research on Youth, Family and School	Research Assistant Professor	Special	9/1/2019	6/30/2020	65,000	FY	1.00
Livingston, Taylor	Anthropology	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	60,000	AY	1.00
Long, David	Johnny Carson School of Theatre and Film	Associate Professor	Specific Term	8/19/2019		77,000	AY	1.00
Loveall-Hague, Susan	Special Education and Communication Disorders	Assistant Professor	Specific Term	8/19/2019		80,000	AY	1.00
Maguire, Marcus	Durham School of Architectural Engineering and Construction	Assistant Professor	Specific Term	8/19/2019		98,000	AY	1.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Marshfield, Jonathan	College of Law	Assistant Professor	Specific Term	8/19/2019		110,000	AY	1.00
McManus, Brandi	Management	Assistant Professor of Practice	Special	8/19/2019	5/14/2021	90,000	AY	1.00
Melessa, Samuel	School of Accountancy	Assistant Professor	Specific Term	8/19/2019		230,000	AY	1.00
Omelian, Jacquelyn	Psychology	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	57,500	AY	1.00
Ordia, Kendra	Interior Design	Assistant Professor	Specific Term	8/19/2019		72,000	AY	1.00
Owen, Gabrielle	English	Assistant Professor	Specific Term	8/19/2019		65,000	AY	1.00
Page, Adam	Durham School of Architectural Engineering and Construction	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	94,000	AY	1.00
Palik, Kurt	Mechanical and Materials Engineering	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	94,000	AY	1.00
Palmer, Morgan	Classics and Religious Studies	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	54,000	AY	1.00
Panther, Grace	Civil and Environmental Engineering	Assistant Professor	Specific Term	8/19/2019		94,000	AY	1.00
Petsick, Frank	College of Business	Executive in Residence (Includes Stipend)	Special	8/19/2019	5/13/2022	101,500	AY	0.60
		Professor of Practice	Special	8/19/2019	5/13/2022	58,000	AY	0.40

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Pitt, Kevin	Special Education and Communication Disorders	Assistant Professor	Specific Term	8/19/2019		72,000	AY	1.00
Reichenberg, Raymond	Nebraska Center for Research on Youth, Family and School	Research Assistant Professor	Special	8/19/2019	6/30/2020	65,000	FY	1.00
Riggan, Benjamin	Electrical and Computer Engineering	Assistant Professor	Specific Term	8/19/2019		95,000	AY	1.00
Rodgers, Derek	Special Education and Communication Disorders	Research Assistant Professor	Special	8/19/2019	6/30/2021	72,000	FY	1.00
Rodgers, Naomi	Special Education and Communication Disorders	Assistant Professor	Specific Term	8/19/2019		72,000	AY	1.00
Roy, Tirthankar	Civil and Environmental Engineering	Assistant Professor	Specific Term	8/19/2019		92,000	AY	1.00
Schafhauser, Christopher	Mathematics	Assistant Professor	Specific Term	8/19/2019		78,000	AY	1.00
Sevier, Joshua	Special Education and Communication Disorders	Assistant Professor of Practice	Special	7/1/2019	6/30/2022	86,260	FY	1.00
Shepard, Robert	Geography	Assistant Professor	Specific Term	8/19/2019		68,000	AY	1.00

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Smith, Ashley	Johnny Carson School of Theatre and Film	Assistant Professor	Specific Term	8/19/2019		80,000	AY	1.00
	Carson Center for Emerging Media Arts	Johnny Carson Center Professorship	Special	8/19/2019		5,000	AY	0.00
Timpe, Brenden	Economics	Assistant Professor	Specific Term	8/19/2019		135,000	AY	1.00
Wakabayashi, Ken	Psychology	Assistant Professor	Specific Term	8/19/2019		78,500	AY	1.00
Wang, Yujia	Landscape Architecture Program	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	66,770	AY	1.00
Witt, Chelsea	Psychology	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	57,500	AY	1.00
Wolf, Marilyn	Computer Science and Engineering	Chairperson (Includes Stipend)	Special	9/1/2019		159,000	FY	0.60
		Professor	Continuous	9/1/2019		106,000	FY	0.40
Xu, Liang	Supply Chain Management and Analytics	Assistant Professor	Specific Term	8/19/2019		150,000	AY	1.00
Yesselman, Joseph	Chemistry	Assistant Professor	Specific Term	8/19/2019		78,000	AY	1.00
Zempleni, Sabine	Nutrition and Health Sciences	Assistant Professor of Practice	Special	8/19/2019	5/13/2022	60,000	AY	1.00

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NEW APPOINTEMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Akin, Heather	Agricultural Leadership Education and Communication	Assistant Professor	Specific Term	8/19/2019		78,000	AY	1.00
Ameyaw, Lord	Nebraska Forest Service	Assistant Forester	Special	7/15/2019	7/14/2022	65,000	FY	1.00
Guan, Yawen	Statistics	Assistant Professor	Specific Term	7/26/2019		87,000	AY	1.00
Headrick, James	Agricultural Leadership Education and Communication	Assistant Professor Practice	Special	8/19/2019	5/15/2020	50,000	AY	1.00
Kaskie, Shawn	West Central Research and Extension Center	Associate Extension Educator	Special	7/1/2019		70,000	FY	1.00
Kinley, Kylie	Eastern Nebraska Research and Extension Center	Assistant Extension Educator	Special	8/1/2019		58,700	FY	1.00
Koch, Kyle	Entomology	Assistant Extension Educator	Special	7/15/2019		66,500	FY	1.00
Lindsley, Dawn	4-H and Youth Development	Assistant Extension Educator	Special	9/24/2019		59,700	FY	1.00
Luxa, Jordan	Eastern Nebraska Research and Extension Center	Assistant Extension Educator	Special	7/1/2019		56,700	FY	1.00
O'Daniel, Sydney	West Central Research and Extension Center	Assistant Extension Educator	Special	7/15/2019		55,750	FY	1.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Panday, Sorab	Biological Systems Engineering	Research Professor	Special	7/1/2019		60,000	FY	0.12
Puntel, Laila	Agronomy and Horticulture	Assistant Professor	Specific Term	7/1/2019		77,000	AY	1.00
Ruth, Taylor	Agricultural Leadership Education and Communication	Assistant Professor	Specific Term	8/19/2019		70,000	AY	1.00
Song, Hyun Seob	Biological Systems Engineering	Associate Professor	Specific Term	8/19/2019		115,000	AY	1.00
Sun, Dongchu	Statistics	Research Professor	Special	8/19/2019	5/6/2022	130,000	AY	1.00
Teshome, Yalem	College of Agricultural Sciences and Natural Resources	Professor of Practice	Special	8/19/2019	5/13/2022	40,000	AY	0.50
Zhang, Ruizhi	Statistics	Assistant Professor	Specific Term	8/19/2019		86,500	AY	1.00
Zluticky, Ronald	4-H and Youth Development	Associate Extension Educator	Special	7/22/2019	8/1/2020	66,000	FY	1.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Abosch, Aviva	Neurosurgery	Professor	Continuous	7/1/2019		40,000	FY	1.00
		Chairperson (Stipend)	Special	7/1/2019		100,000	FY	0.00
		Nancy A. Keegan and Donald R. Voelte Jr. Chair (Stipend)	Special	7/1/2019	6/30/2024	40,000	FY	0.00
Aliyev, Nurlan	Internal Medicine	Assistant Professor	Special	7/1/2019		54,000	FY	1.00
Alonso, Windy	College of Nursing - Omaha Division	Assistant Professor	Health Prof	7/1/2019	6/30/2022	109,000	FY	1.00
Anderson, David	Ophthalmology and Visual Sciences	Assistant Professor	Health Prof	7/1/2019	6/30/2020	60,000	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		35,000	FY	0.00
Arcot Jayagopal, Lakshman	Neurological Sciences	Assistant Professor	Health Prof	7/29/2019	6/30/2020	55,000	FY	1.00
Avedissian, Sean	Pharmacy Practice and Science	Assistant Professor	Health Prof	8/1/2019	6/30/2021	115,000	FY	1.00
Baine, Michael	Radiation Oncology	Assistant Professor	Health Prof	7/31/2019	6/30/2020	45,000	FY	1.00
[1] Bassingthwaite, Brenda	Munroe-Meyer Institute	Associate Professor	Special	6/17/2019		90,100	FY	1.00

[1] Inadvertently omitted from 2nd quarterly report.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Beacom, Matthew	Environmental, Agricultural and Occupational Health	Assistant Professor	Special	9/1/2019		186,823	FY	1.00
Berrondo, Claudia	Surgery	Assistant Professor	Health Prof	9/1/2019	6/30/2021	45,000	FY	1.00
Bobr, Aleh	Pathology and Microbiology	Assistant Professor	Health Prof	7/1/2019	6/30/2020	60,000	FY	1.00
Bradford Bell, Elizabeth	Otolaryngology/Head and Neck Surgery	Assistant Professor	Health Prof	7/31/2019	6/30/2020	45,000	FY	1.00
Brinkworth, Amanda	Pathology and Microbiology	Assistant Professor	Special	9/1/2019		76,269	FY	1.00
Broadhurst, Mara	Pathology and Microbiology	Assistant Professor	Health Prof	9/5/2019	6/30/2020	60,000	FY	1.00
		Research Scientist (Stipend)	Special	9/5/2019	6/30/2020	127,000	FY	0.00
Brown, Brittany	Anesthesiology	Assistant Professor	Special	9/1/2019		110,000	FY	1.00
Buckland, Sydney	College of Nursing - Omaha Division	Assistant Professor	Special	8/19/2019	5/15/2020	73,500	AY	1.00
Burge, Stephanie	College of Nursing - Kearney Division	Clinical Assistant Professor	Special	7/1/2019		104,000	FY	1.00
Burnette, Courtney	Munroe-Meyer Institute	Professor	Health Prof	9/1/2019	6/30/2022	152,000	FY	1.00
		Director, Integrated Center for Autism Spectrum Disorders (Stipend)	Special	9/1/2019		18,000	FY	0.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Caha, Melissa	Pediatrics	Assistant Professor	Special	7/1/2019		45,100	FY	1.00
Cameron, Sarah	Internal Medicine	Assistant Professor	Special	7/3/2019		45,000	FY	1.00
Carabeo, Rey	Pathology and Microbiology	Professor	Health Prof	9/1/2019	6/30/2020	80,000	FY	1.00
		Research Scientist (Stipend)	Special	9/1/2019		89,000	FY	0.00
Carritt, Nicole	Academic Affairs	Director, Rural Health Initiatives	Special	7/1/2019		110,000	FY	1.00
Chen, Jie	Pathology and Microbiology	Assistant Professor	Health Prof	7/31/2019	6/30/2020	60,000	FY	1.00
Chesteen, George	Radiology	Assistant Professor	Special	7/1/2019		45,000	FY	1.00
Christensen, Stacie	Physical Therapy Education	Assistant Professor	Special	8/5/2019		84,000	FY	1.00
Christiansen, Andrew	Surgery	Assistant Professor	Health Prof	7/31/2019	6/30/2021	45,000	FY	1.00
Chundury, Rao	Ophthalmology and Visual Sciences	Assistant Professor	Health Prof	7/1/2019	6/30/2020	45,000	FY	1.00
Colella, Jennifer	Internal Medicine	Assistant Professor	Special	9/1/2019		45,000	FY	1.00
Cordts, Katrina	Psychiatry	Assistant Professor	Special	9/1/2019		88,000	FY	1.00
Cortes-Penfield, Nicolas	Internal Medicine	Assistant Professor	Health Prof	7/1/2019	6/30/2020	45,000	FY	1.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Cox, Jesse	Pathology and Microbiology	Assistant Professor	Health Prof	7/1/2019	6/30/2020	60,000	FY	1.00
Dawson, Rebekah	Cellular and Integrative Physiology	Professor	Continuous	8/12/2019		80,000	FY	1.00
		Research Scientist (Stipend)	Special	8/12/2019		88,000	FY	0.00
		Vice Chairperson (Stipend)	Special	8/12/2019		10,000	FY	0.00
		Director, CardiOmics (Stipend)	Special	8/12/2019		50,000	FY	0.00
	Internal Medicine	Assistant Chief, Basic and Translational Research (Stipend)	Special	8/12/2019		10,000	FY	0.00
Dennis, Matthew	Pediatrics	Assistant Professor	Health Prof	7/15/2019	6/30/2020	45,000	FY	1.00
Denton, Kevin	Radiology	Assistant Professor	Special	7/1/2019		45,000	FY	1.00
Dike, Chinenye	Pediatrics	Assistant Professor	Health Prof	7/29/2019	6/30/2020	45,000	FY	1.00
Farhangpour, Amir	Adult Restorative Dentistry	Associate Professor	Health Prof	9/1/2019	6/30/2022	130,000	FY	1.00
		Assistant Dean, Omaha Clinic (Stipend)	Special	9/1/2019		30,000	FY	0.00
Figy, Sean	Surgery	Assistant Professor	Health Prof	9/1/2019	6/30/2021	45,000	FY	1.00
Fishler, Kristen	Munroe-Meyer Institute	Assistant Professor	Special	9/1/2019		73,500	FY	1.00
Franta Bretscher, Erika	Munroe-Meyer Institute	Assistant Professor	Special	9/1/2019		72,000	FY	1.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Fredericks, Tricia	Obstetrics and Gynecology	Assistant Professor	Health Prof	7/31/2019	6/30/2021	65,000	FY	1.00
Golden, Amber	College of Nursing - Omaha Division	Assistant Professor	Special	8/26/2019	5/15/2020	68,645	AY.	1.00
Gormley, Jessica	Munroe-Meyer Institute	Assistant Professor	Special	8/12/2019		70,000	FY	1.00
Hajek, Karisa	Internal Medicine	Assistant Professor	Special	7/1/2019		45,000	FY	1.00
Hanish, Alyson	College of Nursing - Omaha Division	Assistant Professor	Health Prof	7/1/2019	6/30/2022	110,313	FY	1.00
Herley, Jody	College of Nursing - Northern Division	Clinical Assistant Professor	Special	8/19/2019	5/15/2020	70,000	AY	1.00
Hong, Nancy	Pediatrics	Assistant Professor	Health Prof	9/1/2019	6/30/2020	45,000	FY	1.00
Hotaling, Patricia	College of Nursing - Omaha Division	Clinical Assistant Professor	Special	8/19/2019	5/15/2020	69,750	AY	1.00
Jackson, Christina	Physical Therapy Education	Assistant Professor	Special	7/1/2019		60,705	FY	1.00
Jenkins, Jessie	Internal Medicine	Assistant Professor	Special	7/1/2019		45,000	FY	1.00
Khan Suheb, Mahammed	Internal Medicine	Assistant Professor	Special	8/1/2019		57,000	FY	1.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Klepper, Christian	Munroe-Meyer Institute	Assistant Professor	Special	9/1/2019		70,000	FY	1.00
Kotwal, Anupam	Internal Medicine	Assistant Professor	Health Prof	7/1/2019	6/30/2020	57,000	FY	1.00
Koukol, Clair	Growth and Development	Assistant Professor	Health Prof	8/1/2019	6/30/2022	117,000	FY	1.00
Lackore, Evin	Pediatrics	Assistant Professor	Special	8/1/2019		45,000	FY	1.00
Laurila, Joshua	Internal Medicine	Assistant Professor	Special	7/1/2019		45,000	FY	1.00
Lier, Lauren	College of Nursing - Omaha Division	Assistant Professor	Special	8/19/2019	5/15/2020	6,450	AY	0.10
Liewer, Susanne	Pharmacy Practice and Science	Clinical Associate Professor	Special	7/15/2019		172,378	FY	1.00
Lovelace, Kent	Dental Hygiene	Clinical Assistant Professor	Special	8/29/2019		10,240	FY	0.10
Maloney, Eamon	Internal Medicine	Assistant Professor	Health Prof	8/1/2019	6/30/2020	45,000	FY	1.00
Marshall, Amanda	Pediatrics	Assistant Professor	Health Prof	8/1/2019	6/30/2020	45,000	FY	1.00
Martinez Duarte, Ernesto	Pathology and Microbiology	Assistant Professor	Health Prof	7/1/2019	6/30/2020	60,000	FY	1.00
Mengist, Abraham	Epidemiology	Assistant Professor	Health Prof	7/26/2019	6/30/2021	100,000	FY	1.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Meredith, Thomas	Family Medicine	Assistant Professor	Health Prof	7/1/2019	6/30/2020	55,000	FY	1.00
		Associate Residency Program Director (Stipend)	Special	7/1/2019		2,750	FY	0.00
Meyer, Carrie	Library of Medicine	Assistant Professor	Special	9/16/2019		80,000	FY	1.00
		Head, Special Collections (Stipend)	Special	9/1/2019		5,000	FY	0.00
Miller, Jennifer	College of Nursing - Lincoln Division	Assistant Professor	Special	8/19/2019	5/15/2020	78,000	AY	1.00
Neitzke, Lisa	Munroe-Meyer Institute Psychology	Assistant Professor	Special	8/6/2019		73,500	FY	1.00
[2] Nester, Alex	Internal Medicine	Assistant Professor	Health Prof	7/1/2019	6/30/2020	33,750	FY	0.75
Nielsen, Shelly	Munroe-Meyer Institute Genetic Medicine	Assistant Professor	Special	9/1/2019		74,624	FY	0.80
Otten, Mac	Epidemiology	Professor	Special	7/1/2019		100,000	FY	0.50
Payne, Jason	Internal Medicine	Assistant Professor	Health Prof	8/12/2019	6/30/2020	45,000	FY	1.00
Putschoegl, Adam	Pediatrics	Assistant Professor	Health Prof	8/19/2019	6/30/2020	45,000	FY	1.00
Rafique, Muhammad	Anesthesiology	Associate Professor	Special	7/1/2019		45,000	FY	1.00

[2] Remainder of salary defrayed by VA Nebraska-Western Iowa Health Care System.

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Ramelb, Erin	Internal Medicine	Assistant Professor	Special	9/1/2019		45,000	FY	1.00
Ratnapradipa, Kendra	Epidemiology	Assistant Professor	Health Prof	7/1/2019	6/30/2021	105,000	FY	1.00
[3] Reinhardt, John	Adult Restorative Dentistry	Clinical Professor	Special	8/29/2019		6,400	FY	0.20
Rinehart, Valerie	Pediatrics	Assistant Professor	Health Prof	7/1/2019	6/30/2020	45,000	FY	1.00
Rohe, Samantha	Pediatrics	Assistant Professor	Health Prof	9/1/2019	6/30/2020	45,000	FY	1.00
Rohlfsen, Cory	Internal Medicine	Assistant Professor	Health Prof	7/1/2019	6/30/2020	45,000	FY	1.00
Ronspies, Carey	Munroe-Meyer Institute	Assistant Professor	Special	7/1/2019		157,288	FY	1.00
Rowley, Michael	Genetics, Cell Biology and Anatomy	Assistant Professor	Health Prof	8/1/2019	6/30/2020	60,000	FY	1.00
		Research Scientist (Stipend)	Special	8/1/2019		29,000	FY	0.00
Saathoff, Megan	Pediatrics	Assistant Professor	Special	7/1/2019		45,100	FY	1.00
Salomon, Jeffrey	Pediatrics	Assistant Professor	Health Prof	9/1/2019	6/30/2020	45,000	FY	1.00
Samuelson, Derrick	Internal Medicine	Assistant Professor	Health Prof	9/1/2019	6/30/2020	45,000	FY	1.00
		Research Scientist (Stipend)	Special	9/1/2019	6/30/2020	65,000	FY	0.00

[3] Professor Emeritus effective 4-11-19.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Sawatzke, Alexander	Orthopaedic Surgery	Assistant Professor	Health Prof	8/1/2019	6/30/2020	45,000	FY	1.00
Schindler, Lindsey	Family Medicine	Assistant Professor	Health Prof	7/31/2019	6/30/2020	55,000	FY	1.00
Schmidt, Erica	Neurological Sciences	Assistant Professor	Health Prof	9/23/2019	6/30/2020	45,000	FY	1.00
Shank, Jessica	Surgical Oncology	Assistant Professor	Health Prof	9/1/2019	6/30/2021	45,000	FY	1.00
Sharma, Smriti	Internal Medicine	Assistant Professor	Special	9/1/2019		27,000	FY	1.00
Sheehan, Meghan	Psychiatry	Assistant Professor	Special	9/1/2019		45,000	FY	1.00
Shirani, Afsaneh	Neurological Sciences	Assistant Professor	Health Prof	7/1/2019	6/30/2020	55,000	FY	1.00
Small, Bronwyn	Internal Medicine	Assistant Professor	Health Prof	7/1/2019	6/30/2020	45,000	FY	1.00
Snow, Ethan	Genetics, Cell Biology and Anatomy	Assistant Professor	Health Prof	8/1/2019	6/30/2020	60,000	FY	1.00
		Research Scientist (Stipend)	Special	8/1/2019		18,500	FY	0.00
Spaulding, Joanna	Hattie B. Munroe Center for Human Genetics	Assistant Professor	Special	9/1/2019		81,151	FY	1.00
Srinivas, Shubra	Pediatrics	Assistant Professor	Health Prof	7/1/2019	6/30/2020	45,000	FY	1.00
Strong-Bak, Whitney	Munroe-Meyer Institute	Assistant Professor	Special	8/1/2019		72,000	FY	1.00

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Sualy, Kunal	Anesthesiology	Assistant Professor	Special	9/16/2019		45,000	FY	1.00
Swanson, Sara	Pediatrics	Assistant Professor	Health Prof	9/1/2019	6/30/2020	45,000	FY	1.00
Taylor, Robert	Surgery	Assistant Professor	Health Prof	7/1/2019	6/30/2021	45,000	FY	1.00
Taylor, Veronica	Pediatrics	Assistant Professor	Health Prof	7/15/2019	6/30/2020	45,000	FY	1.00
Thoene, Melissa	Pediatrics	Assistant Professor	Special	7/1/2019		75,000	FY	1.00
Topolski, Diane	Internal Medicine	Assistant Professor	Special	9/1/2019		45,000	FY	1.00
Trippier, Paul	Pharmaceutical Sciences	Associate Professor	Health Prof	7/1/2019	6/30/2021	120,000	FY	1.00
Troy, Martine	Internal Medicine	Assistant Professor	Special	8/1/2019		45,000	FY	1.00
Tschirren, Jessica	College of Public Health	Assistant Dean, Student Affairs	Special	9/6/2019		110,975	FY	1.00
Vance, Laura	Internal Medicine	Assistant Professor	Special	8/1/2019		36,000	FY	0.80
Velasco, Danita	Munroe-Meyer Institute	Assistant Professor	Special	7/1/2019		157,288	FY	1.00
Voto, Hope	Physical Medicine and Rehabilitation	Assistant Professor	Health Prof	7/1/2019	6/30/2020	45,000	FY	1.00

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA MEDICAL CENTER

NEW APPOINTEMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Wehrmann, Daniel	Otolaryngology, Head and Neck Surgery	Assistant Professor	Health Prof	8/15/2019	6/30/2020	45,000	FY	1.00
Wellsandt, Michael	Physical Therapy Education	Assistant Professor	Special	9/16/2019		87,000	FY	1.00
[4] Wilhelm, Susan	College of Nursing-West Nebraska Division	Assistant Professor	Special	9/1/2019		10,726	FY	0.10
Winningham, Grace	Munroe-Meyer Institute	Assistant Professor	Special	8/1/2019		164,788	FY	1.00
Yamada, Angelica	Family Medicine	Assistant Professor	Health Prof	9/16/2019	6/30/2020	55,000	FY	1.00
Yelamanchili, Sowmya	Anesthesiology	Assistant Professor	Health Prof	7/15/2019	6/30/2020	89,000	FY	1.00
		Research Scientist (Stipend)	Special	7/15/2019	6/30/2020	19,000	FY	0.00
Zhang, Ying	Biostatistics	Professor	Health Prof	7/1/2019	6/30/2020	220,000	FY	1.00
		Chairperson (Stipend)	Special	7/1/2019		40,000	FY	0.00

[4] Professor Emeritus effective 7-1-19.

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

NEW APPOINTEMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Adams, Charmayne	Counseling	Assistant Professor	Specific	8/19/2019		65,000	AY	1.00
Bi, Chang	School of Communication	Assistant Professor	Specific	8/19/2019	7/28/2020	58,000	AY	1.00
Circo, Deborah	School of Social Work	Assistant Professor	Specific	8/19/2019		60,000	AY	1.00
Denton, Paul	Biology	Assistant Professor	Specific	8/19/2019		67,500	AY	1.00
Desyatova, Anastasia	Biomechanics	Assistant Professor	Specific	8/19/2019		85,000	AY	1.00
Du Laney, Claire	Criss Library	Assistant Professor	Specific	8/15/2019		50,000	FY	1.00
Gent, Whitney	School of Communication	Assistant Professor	Specific	8/19/2019		58,000	AY	1.00
Heckler, Nuriel	Public Administration	Assistant Professor	Specific	8/19/2019		62,000	AY	1.00
Hoang, Trang	Public Administration	Assistant Professor	Specific	8/19/2019	8/28/2022	65,000	AY	1.00
Hotchandani, Carolina	Goodrich Scholarship Program	Assistant Professor	Specific	8/19/2019		58,000	AY	1.00
Kamenskiy, Alexey	Biomechanics	Professor	Continuous	8/19/2019		150,000	FY	1.00
Kamm, James	Business and Finance	Assistant Vice Chancellor	Special	7/17/2019		150,000	FY	1.00
Kim, Hannah	Political Science	Assistant Professor	Specific	8/19/2019		62,000	AY	1.00

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

NEW APPOINTEMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Kupzyk, Sara	Psychology	Assistant Professor	Specific	8/19/2019		70,000	AY	1.00
LaLone, Nicolas	Information Systems and Quantitative Analysis	Assistant Professor	Specific	8/19/2019		102,500	AY	1.00
Maleckis, Kaspars	Biomechanics	Assistant Professor	Specific	8/19/2019		85,000	AY	1.00
Mastorakis, Spyridon	Computer Science	Assistant Professor	Specific	8/12/2019	7/11/2020	102,500	AY	1.00
Medeiros, Kelsey	Management	Assistant Professor	Specific	8/19/2019		120,000	AY	1.00
Montano, Samantha	Emergency Management and Disaster Science	Visiting Assistant Professor	Special	8/19/2019	5/15/2020	60,000	AY	1.00
Oh, Kwangsung	Computer Science	Assistant Professor	Specific	8/19/2019	8/10/2022	102,500	AY	1.00
Payne, Brian	Finance, Banking and Real Estate	Assistant Professor	Specific	8/19/2019		150,000	AY	1.00
Riley, Kevin	Educational Leadership	Assistant Professor	Special	8/19/2019	5/15/2020	45,000	AY	0.50
Riskowski, Ryan	Physics	Assistant Professor	Specific	8/19/2019		63,000	AY	1.00
Rodrigues De Almeida, Nathalia	Chemistry	Assistant Professor	Specific	8/19/2019	8/28/2022	63,000	AY	1.00

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

NEW APPOINTEMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Scheller, Daniel	Public Administration	Associate Professor	Continuous	8/19/2019		75,000	AY	1.00
Schenkelberg, Michaela	School of Health and Kinesiology	Assistant Professor	Specific	8/19/2019		65,000	AY	1.00
Smith, Lisa	School of Social Work	Visiting Assistant Professor	Special	8/19/2019	5/15/2020	60,000	AY	1.00
Storch, Sharon	School of Communication	Assistant Professor	Specific	8/19/2019		55,000	AY	1.00
Strube, Johnathon	Art and Art History	Assistant Professor	Specific	8/19/2019		55,000	AY	1.00
Sutera, David	School of Communication	Assistant Professor	Specific	8/19/2019		55,000	AY	1.00
Ta, Anh V	Management	Assistant Professor	Specific	8/28/2019	8/28/2022	125,000	AY	1.00
Torres Vitor, Fabio	Mathematics	Assistant Professor	Specific	8/19/2019	7/14/2020	70,000	AY	1.00
Watkins, Wayne	Walter Scott Jr. Scholarship Program	Executive Director	Special	8/1/2019	7/31/2022	250,000	FY	1.00
White, Kenneth	Writer's Workshop	Assistant Professor	Specific	8/19/2019		55,000	AY	1.00
Zhong, Xin	Computer Science	Assistant Professor	Specific	8/12/2019	8/22/2022	102,500	AY	1.00

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA-LINCOLN NCTA

NEW APPOINTEMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
Bautista Mendoza, Gloria	Nebraska College of Technical Agriculture	Assistant Professor	Special	9/1/2019		60,000	1.00

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA ADMINISTRATION

NEW APPOINTEMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Andrews, Matthew	EPSCoR	Director	Special	7/1/2019		212,625	FY	0.75
	School of Natural Resources	Professor	Continuous	7/1/2019		70,875	AY	0.25
Hewitt, John	Vice President and General Counsel	Senior Associate General Counsel	Special	9/16/2019		180,000	FY	1.00
Hoefer, Craig	Vice President and General Counsel	Senior Associate General Counsel	Special	8/6/2019		160,000	FY	1.00
Mart, Amy	Buffett Early Childhood Institute	Director, Professional Learning	Special	9/1/2019		126,500	FY	1.00

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT KEARNEY

ADJUSTMENTS

Annual salary increases are reflected in this report

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Bice, Matthew	Kinesiology and Sport Sciences	Associate Professor	Continuous	9/1/2019		31,037	AY	0.50
		Associate Professor	Specific		8/30/2019	31,037	AY	0.50
	Graduate Studies	Associate Dean (Includes Stipend)	Special	9/1/2019		36,260	AY	0.50
		Interim Associate Dean (Includes Stipend)	Special		8/30/2019	36,260	AY	0.50
Burkink, Timothy	International Education	Assistant Vice Chancellor for International Affairs	Special	7/1/2019		120,000	FY	0.80
		Dean of Business and Technology	Special		6/30/2019	172,218	FY	1.00
	Marketing, Agribusiness and Supply Chain Management	Professor	Specific	7/1/2019		30,000	FY	0.20
		N/A	N/A		6/30/2019	0	FY	0.00
Farrell, Timothy	Music, Theatre and Dance	Professor	Continuous	9/1/2019		97,912	AY	1.00
		Professor	Continuous		8/31/2019	58,747	AY	0.60
		N/A	N/A	9/1/2019		0	AY	0.00
		Department Chair (Includes Stipend)	Special		8/31/2019	44,389	AY	0.40

Shaded reflects new or ongoing appointment
Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT KEARNEY

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Forrest, Krista	Psychology	Professor	Continuous	9/1/2019		48,761	AY	0.60
		Professor	Continuous		8/31/2019	81,269	AY	1.00
		Department Chair (Includes Stipend)	Special	9/1/2019		37,732	AY	0.40
		N/A	N/A		8/31/2019	0	AY	0.00
Hall, Steven	Accounting, Finance and Economics	Professor	Continuous	9/1/2019		122,604	AY	1.00
		Professor	Continuous		8/31/2019	73,562	AY	0.60
		N/A	N/A	9/1/2019		0	AY	0.00
		Department Chair (Includes Stipend)	Special		8/31/2019	54,266	AY	0.40
Harms, Sherri	Cyber Systems	Professor	Continuous	9/1/2019		99,662	AY	1.00
		Professor	Continuous		8/31/2019	59,797	AY	0.60
		N/A	N/A	9/1/2019		0	AY	0.00
		Department Chair (Includes Stipend)	Special		8/31/2019	45,089	AY	0.40
Hof, David	Counseling and School Psychology	Professor	Continuous	9/1/2019		48,761	AY	0.60
		Professor	Continuous		8/31/2019	81,269	AY	1.00
		Department Chair (Includes Stipend)	Special	9/1/2019		37,732	AY	0.40
		N/A	N/A		8/31/2019	0	AY	0.00

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT KEARNEY

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Honeyman, Susan	English	Professor	Continuous	9/1/2019		81,269	AY	1.00
		Professor	Continuous		8/31/2019	40,635	AY	0.50
		N/A	N/A	9/1/2019		0	AY	0.00
	Arts and Sciences	Associate Dean (Includes Stipend)	Special		8/31/2019	45,858	AY	0.50
Kracl, Carrie	Teacher Education	Professor	Continuous			79,904	AY	1.00
		Professor	Continuous			79,904	AY	1.00
		Interim Department Co-Chair	Special	9/1/2019	8/31/2020	2,612	AY	0.00
		N/A	N/A		8/31/2019	0	AY	0.00
Longo, Peter	Political Science	Professor	Continuous	9/1/2019		95,225	AY	0.66
		Professor	Continuous		8/31/2019	145,000	AY	1.00
	Academic and Student Affairs	Associate Vice Chancellor	Special	9/1/2019		49,775	AY	0.34
		N/A	N/A		8/31/2019	0	AY	0.00

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Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT KEARNEY

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Newton Campbell, Julia	Criminal Justice	Associate Professor	Continuous	9/1/2019		50,969	AY	0.75
		Associate Professor	Continuous		8/31/2019	27,184	AY	0.40
		N/A	N/A	9/1/2019		0	AY	0.00
		Department Chair (Includes Stipend)	Special		8/31/2019	29,009	AY	0.35
	Thompson Scholars Learning Community	Faculty Coordinator	Special			16,990	AY	0.25
		Faculty Coordinator	Special			16,990	AY	0.25
Rogoff, Noah	Music, Theatre and Dance	Associate Professor	Continuous	9/1/2019		38,887	AY	0.60
		Associate Professor	Continuous		8/31/2019	48,608	AY	0.75
		Department Chair (Includes Stipend)	Special	9/1/2019		18,186	AY	0.20
		N/A	N/A		8/31/2019	0	AY	0.00
		Director of String Project	Special	9/1/2019		12,962	AY	0.20
		Director of String Project	Special		8/31/2019	16,203	AY	0.25

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT KEARNEY

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Strawhecker, Jane	Teacher Education	Professor	Continuous			48,762	AY	0.60
		Professor	Continuous			48,762	AY	0.60
		Assistant Chair (Includes Stipend)	Special			37,731	AY	0.40
		Assistant Chair (Includes Stipend)	Special			37,731	AY	0.40
		Interim Department Co-Chair	Special	9/1/2019	8/31/2020	2,612	AY	0.00
		N/A	N/A		8/31/2019	0	AY	0.00
Tenkorang, Frank	Marketing, Agribusiness and Supply Chain Management	Professor	Continuous			48,264	AY	0.60
		Professor	Continuous			48,264	AY	0.60
	Accounting, Finance and Economics	Interim Department Chair (Includes Stipend)	Special	9/1/2019		37,402	AY	0.40
	Family Studies	Department Chair (Includes Stipend)	Special		8/31/2019	37,402	AY	0.40
Twigg, Paul	Biology	Professor	Continuous			41,533	AY	0.50
		Professor	Continuous			41,533	AY	0.50
	Arts and Sciences	Associate Dean (Includes Stipend)	Special	9/1/2019		46,757	AY	0.50
		Interim Associate Dean (Includes Stipend)	Special		8/31/2019	46,757	AY	0.50

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT KEARNEY

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Volpe, Vernon	History	Professor	Continuous	9/1/2019		95,225	AY	1.00
		Professor	Continuous		8/31/2019	57,135	AY	0.60
		N/A	N/A	9/1/2019		0	AY	0.00
		Interim Department Chair (Includes Stipend)	Special		8/31/2019	43,314	AY	0.40
Wadkins, Theresa	Psychology	Professor	Continuous	9/1/2019		81,269	AY	1.00
		Professor	Continuous		8/31/2019	48,761	AY	0.60
		N/A	N/A	9/1/2019		0	AY	0.00
		Department Chair (Includes Stipend)	Special		8/31/2019	37,732	AY	0.40
Wells, Robert	History	Associate Professor	Continuous	9/1/2019		37,213	AY	0.60
		Associate Professor	Continuous		8/31/2019	62,022	AY	1.00
		Department Chair (Includes Stipend)	Special	9/1/2019		30,033	AY	0.40
		N/A	N/A		8/31/2019		AY	0.00
Wulf, Timbre	Criminal Justice	Associate Professor	Continuous	9/1/2019		37,142	AY	0.60
		Assistant Professor	Specific		8/31/2019	61,904	AY	1.00
		Department Chair (Includes Stipend)	Special	9/1/2019		29,986	AY	0.40
		N/A	N/A		8/31/2019	0	AY	0.00

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Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA-LINCOLN

ADJUSTMENTS

Annual salary increases are reflected in this report

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[5] Abadie, Roberto	Sociology	Research Assistant Professor	Special	8/1/2019		52,500	FY	1.00
		Research Assistant Professor	Special		7/31/2019	51,600	FY	1.00
[6] Al-Tarazi, Motassem	Computer Science and Engineering	Assistant Professor of Practice	Special	8/19/2019		87,000	AY	1.00
		Assistant Professor of Practice	Special		8/18/2019	84,000	AY	1.00
Babchuk, Wayne	Educational Psychology	Associate Professor of Practice	Special	8/19/2019		75,000	AY	1.00
		Associate Professor of Practice	Special		8/18/2019	37,500	AY	0.50
	Anthropology	NA	NA	8/19/2019		0		0.00
		Associate Professor of Practice	Special		8/18/2019	37,500	AY	0.50
[6] Bagheri, Hamid	Computer Science and Engineering	Assistant Professor	Specific Term	8/19/2019		116,213	AY	1.00
		Assistant Professor	Specific Term		8/18/2019	95,483	AY	1.00
[5] Balasubramanian, Balamurugan	Nebraska Center for Materials and Nanoscience	Research Assistant Professor	Special	7/1/2019		61,200	FY	1.00
		Research Assistant Professor	Special		6/30/2019	60,000	FY	1.00

[5] Salary increase for Research faculty not permanently budgeted.

[6] Computer Science and Engineering MOU agreement in creating School of Computer Science.

Shaded reflects new or ongoing appointment

Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA-LINCOLN

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
[7] Barney, Brett	University Libraries	Research Associate Professor	Special	7/1/2019		63,759 FY	1.00
		Research Associate Professor	Special		6/30/2019	62,817 FY	1.00
Bartelt-Hunt, Shannon	Graduate Studies	Associate Dean	Special	8/19/2019		0 AY	0.50
		Associate Dean (Includes Stipend)	Special		8/18/2019	61,042 AY	0.50
	Civil and Environmental Engineering - Lincoln	Voelte Keegan Chair	Special	7/1/2019	6/30/2024	10,000 AY	0.00
		NA	NA			0 AY	0.00
		Professor	Continuous	8/19/2019		60,000 AY	0.40
		Professor	Continuous		8/18/2019	54,937 AY	0.50
		Chairperson (Includes Stipend)	Special	8/19/2019		105,009 AY	0.60
		NA	NA			0 AY	0.00
Bauer, Lois Grace	English	Professor	Continuous			93,009 AY	1.00
		Professor	Continuous			93,009 AY	1.00
		Aaron Douglas Professorship	Special	8/19/2019	8/18/2024	5,000 AY	0.00
		NA	NA			0 AY	0.00

[7] Salary increase for Research faculty not permanently budgeted.

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Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA-LINCOLN

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
Berger, Eric	Law	Professor	Continuous			163,816 AY	1.00
		Professor	Continuous			163,816 AY	1.00
		Associate Dean	Special			10,000 AY	0.00
		Associate Dean	Special			10,000 AY	0.00
		Earl Dunlap Professorship	Special	8/19/2019	8/18/2024	10,000 AY	0.00
		NA	NA			0 AY	0.00
[8] Bohn, Christopher	Computer Science and Engineering	Assistant Professor of Practice	Special	8/19/2019		91,200 AY	1.00
		Assistant Professor of Practice	Special		8/18/2019	85,000 AY	1.00
[8] Bourke, Christopher	Computer Science and Engineering	Associate Professor of Practice	Special	8/19/2019		106,704 AY	1.00
		Associate Professor of Practice	Special		8/18/2019	97,408 AY	1.00
[8] Bradley, Justin	Computer Science and Engineering	Assistant Professor	Specific Term	8/19/2019		116,500 AY	1.00
		Assistant Professor	Specific Term		8/18/2019	93,526 AY	1.00

[8] Computer Science and Engineering MOU agreement in creating School of Computer Science.

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Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA-LINCOLN

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
Brunero, John	Philosophy	Professor	Continuous			95,405 AY	1.00
		Professor	Continuous			95,405 AY	1.00
		Robert R Chambers Distinguished Professorship	Special	8/19/2019	5/10/2024	6,000 AY	0.00
		Robert R Chambers Distinguished Professorship	Special		8/18/2019	6,000 AY	0.00
[9] Chan, Hau	Computer Science and Engineering	Assistant Professor	Specific Term	8/19/2019		114,080 AY	1.00
		Assistant Professor	Specific Term		8/18/2019	93,316 AY	1.00
[9] Choueiry, Berthe	Computer Science and Engineering	Associate Professor	Continuous	8/19/2019		120,000 AY	1.00
		Associate Professor	Continuous		8/18/2019	110,433 AY	1.00
Choobineh, Fred	Electrical and Computer Engineering	Professor	Continuous	7/1/2019		190,085 AY	1.00
		Professor	Continuous		6/30/2019	88,496 FY	0.40
		College Professor - Blackman/Lederer	Special			10,000 FY	0.00
		College Professor - Blackman/Lederer	Special			10,000 FY	0.00
	Nebraska EPSCoR	NA	NA	6/30/2019		0 FY	0.00
		Director	Special			140,735 FY	0.60

[9] Computer Science and Engineering MOU agreement in creating School of Computer Science.

Shaded reflects new or ongoing appointment

Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA-LINCOLN

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
Cole, Kevin	Mechanical and Materials	Professor	Continuous	8/19/2019		58,384 AY	0.50
		Professor	Continuous		8/18/2018	116,767 AY	1.00
Crabtree, Aaron	School of Accountancy	Director (Includes Stipend)	Special			139,307 AY	0.60
		Director (Includes Stipend)	Special			139,307 AY	0.60
		Associate Professor	Continuous			79,606 AY	0.40
		Associate Professor	Continuous			79,606 AY	0.40
		College Professorship - KPMG	Special	8/19/2019	8/18/2022	10,000 AY	0.00
		College Professorship - KPMG	Special		8/18/2019	10,000 AY	0.00
[10] Cui, Juan	Computer Science and Engineering	Assistant Professor	Specific Term	8/19/2019		121,000 AY	1.00
		Assistant Professor	Specific Term		8/18/2019	102,496 AY	1.00
[10] Daggumati, Shruti	Computer Science and Engineering	Assistant Professor of Practice	Special	8/19/2019		87,000 AY	1.00
		Assistant Professor of Practice	Special		8/18/2019	81,000 AY	1.00

[10] Computer Science and Engineering MOU agreement in creating School of Computer Science.

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Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA-LINCOLN

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
D'Alessio, Matteo	Civil and Environmental Engineering - Lincoln Water Center	Research Assistant Professor	Special	9/1/2019	6/30/2020	55,467 FY	1.00
		Research Assistant Professor	Special		8/31/2019	66,560 FY	1.00
[11] Deogun, Jitender	Computer Science and Engineering	Professor	Continuous	8/19/2019		142,649 AY	1.00
		Professor	Continuous		8/18/2019	139,250 AY	1.00
Dombrowski, Kirk	College of Arts and Sciences	Associate Dean, Research and Partnerships (Includes Stipend)	Continuous			87,890 AY	0.50
		Associate Dean, Research and Partnerships (Includes Stipend)	Continuous			87,890 AY	0.50
	Sociology	Professor	Continuous			79,900 AY	0.50
		Professor	Continuous			79,900 AY	0.50
		Bruhn/Othmer Professorship	Special			10,000 FY	0.00
		Bruhn/Othmer Professorship	Special			10,000 FY	0.00
	Nebraska Center for Virology	Interim Director	Special	7/1/2019	6/30/2020	32,790 FY	0.00
		NA	NA		6/30/2019	0 FY	0.00

[11] Computer Science and Engineering MOU agreement in creating School of Computer Science.

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Un-shaded reflects old appointment

PERSONNEL REPORT
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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
[12] Duncan, Brittany	Computer Science and Engineering	Assistant Professor	Specific Term	8/19/2019		117,155 AY	1.00
		Assistant Professor	Specific Term		8/18/2019	96,966 AY	1.00
Dussault, Patrick	Chemistry	Professor	Continuous			163,026 FY	1.00
		Professor	Continuous			163,026 FY	1.00
		Bessey Professorship	Special	8/19/2019	8/18/2024	5,000 FY	0.00
		Bessey Professorship	Special		8/18/2019	5,000 FY	0.00
Francis, Charles	Housing Administration	Interim Director	Special	7/1/2019	6/30/2020	155,408 FY	1.00
		Interim Director	Special		6/30/2019	150,596 FY	1.00

[12] Computer Science and Engineering MOU agreement in creating School of Computer Science.

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Un-shaded reflects old appointment

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
Frank, Tracy	Earth and Atmospheric Sciences	Professor	Continuous	8/19/2019		105,316 AY	1.00
		Professor	Continuous		8/18/2019	41,219 AY	0.40
		College Professorship/Othmer Schultz - Stratigraphy	Special	8/19/2019	5/10/2024	5,000 AY	0.00
		Chairperson (Includes Stipend)	Special		8/18/2019	66,830 AY	0.60
[13] Garvin, Brady	Computer Science and Engineering	Assistant Professor of Practice	Special	8/19/2019		91,200 AY	1.00
		Assistant Professor of Practice	Special		8/18/2019	75,486 AY	1.00
[13] Ghose, Nirnimesh	Computer Science and Engineering	Assistant Professor	Specific Term	8/19/2019		114,000 AY	1.00
		Assistant Professor	Specific Term		8/18/2019	101,000 AY	1.00
Grouverman, Alexei	Physics and Astronomy	Professor	Continuous			149,871 AY	1.00
		Professor	Continuous			149,871 AY	1.00
		Bessey Professorship	Special	8/19/2019	8/18/2024	5,000 AY	0.00
		Bessey Professorship	Special		8/18/2019	5,000 AY	0.00

[13] Computer Science and Engineering MOU agreement in creating School of Computer Science.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Hamernik, Debora	Research	Associate Vice Chancellor (Includes Stipend)	Continuous	8/15/2019		214,318	FY	0.90
		Associate Vice Chancellor (Includes Stipend)	Continuous			235,750	FY	1.00
	Executive Vice President and Provost	Interim Vice Provost	Continuous	8/15/2019		21,432	FY	0.10
		NA	NA			0		0.00
[14] Hasan, Mohammad	Computer Science and Engineering	Assistant Professor of Practice	Special	8/19/2019		91,200	AY	1.00
		Assistant Professor of Practice	Special		8/18/2019	80,404	AY	1.00
Homp, Michelle	Center for Science, Math, and Computer Education	Assistant Professor of Practice	Special	8/19/2019		38,378	AY	0.50
		Assistant Professor of Practice	Special		8/18/2018	46,905	FY	0.50
		Math Coordinator	Special	8/19/2019		38,378	AY	0.50
		Math Coordinator	Special		8/18/2019	46,905	FY	0.50

[14] Computer Science and Engineering MOU agreement in creating School of Computer Science.

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Hudgins, Jerry	Electrical and Computer Engineering	Chairperson (Includes Stipend)	Special			132,849	AY	0.60
		Chairperson (Includes Stipend)	Special			132,849	AY	0.60
		Professor	Continuous			75,914	AY	0.40
		Professor	Continuous			75,914	AY	0.40
	Center for Energy Sciences Research	Interim Director	Special	8/19/2019	8/31/2020	18,797	AY	0.00
		NA	NA			0	AY	0
[15] Jacobs, Margaret	History	Professor	Continuous	8/19/2019		193,007	AY	0.70
		Professor	Continuous		8/18/2019	153,380	AY	0.70
		Chancellor's Professorship	Special			10,000	AY	0.00
		Chancellor's Professorship	Special			10,000	AY	0.00
[15] Kantamneni, Neeta	Educational Psychology	Associate Professor	Continuous	8/19/2019		102,625	AY	1.00
		Associate Professor	Continuous		8/18/2009	89,797	AY	1.00

[15] Retention offer.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
[16] Khan, Bilal	Sociology	Professor	Continuous	8/19/2019		134,007 AY	0.90
		Professor	Continuous		8/18/2019	131,031 AY	1.00
		College Professorship-Happold	Special			5,000 AY	0.00
		College Professorship-Happold	Special			5,000 AY	0.00
	Computer Science and Engineering	Professor	Continuous	8/19/2019		14,890 AY	0.10
		NA	NA			0 AY	0.00
Lai, Rebecca	Chemistry	Associate Professor	Special			94,877 AY	1.00
		Associate Professor	Special			94,877 AY	1.00
		NA	NA	8/19/2019		0 AY	0.00
		Rosowski Professorship	Special		8/18/2019	3,000 AY	0.00

[16] Retention offer.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
Lewis, William	Mathematics	Professor	Continuous			95,474 AY	0.42
		Professor	Continuous			95,473 AY	0.42
		Douglas Professorship	Special	8/19/2019	8/18/2024	5,000 AY	0.00
		Douglas Professorship	Special		8/18/2019	5,000 AY	0.00
	Center for Science, Math, and Computer Education	Director	Continuous			63,488 AY	0.33
		Director	Continuous			63,488 AY	0.33
	Research	Director, STEM Education Research Initiative (Includes Stipend)	Special			50,903 FY	0.25
		Director, STEM Education Research Initiative (Includes Stipend)	Special			50,903 FY	0.25
Logan-Peters, Kay	University Libraries	Professor	Continuous			102,752 FY	1.00
		Professor	Continuous			102,752 FY	1.00
		NA	NA	7/1/2019		0 FY	0.00
		Digital Arts Coordinator	Special		6/30/2019	2,000 FY	0.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
Lorang, Elizabeth	University Libraries	Associate Professor	Continuous			77,824 FY	1.00
		Associate Professor	Continuous			77,824 FY	1.00
		Interim Associate Dean	Special	8/1/2019	9/30/2020	24,000 FY	0.00
		Interim Associate Dean	Special		7/31/2019	15,000 FY	0.00
[17] Lu, Ying	Computer Science and Engineering	Associate Professor	Continuous	8/19/2019		110,923 AY	1.00
		Associate Professor	Continuous		8/18/2019	107,172 AY	1.00
[17] Pierobon, Massimiliano	Computer Science and Engineering	Assistant Professor	Specific Term	8/19/2019		121,000 AY	1.00
		Assistant Professor	Specific Term		8/18/2019	98,899 AY	1.00
Mattingly, Alan	Glenn Korff School of Music	Professor	Continuous			84,746 AY	1.00
		Professor	Continuous			84,746 AY	1.00
		Assistant Director	Special	8/19/2019	5/15/2020	3,000 AY	0.00
		Assistant Director	Special		8/18/2019	2,000 AY	0.00

[17] Computer Science and Engineering MOU agreement in creating School of Computer Science.

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
Maxey-Harris, Charlene	University Libraries	Associate Professor	Continuous			80,698 FY	1.00
		Associate Professor	Continuous			80,698 FY	1.00
		Interim Associate Dean	Special			15,000 FY	0.00
		Interim Associate Dean	Special			15,000 FY	0.00
		Interim Chairperson (Discovery and Resource Management)	Special	7/1/2019	6/30/2020	10,000 FY	0.00
		Chairperson (Research and Instructional Services)	Special		6/30/2019	6,500 FY	0.00
McElravy, Larry	Graduate Studies	Interim Associate Dean (Includes Stipend)	Special	8/1/2019	7/31/2020	52,950 FY	0.50
		NA	NA			0 FY	0
	Agricultural Leadership Education and Communication	Assoc Professor	Continuous	8/1/2019		48,137 FY	0.50
		Assoc Professor	Continuous		7/31/2019	96,273 FY	1.00

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
McQuillan, Julia	Sociology	Chairperson	Continuous			76,229	AY	0.60
		Chairperson	Continuous			76,229	AY	0.60
		Professor	Continuous			46,198	AY	0.40
		Professor	Continuous			46,198	AY	0.40
		Willa Cather Professorship	Special	8/19/2019	8/18/2024	5,000	AY	0.00
		NA	NA			0	AY	0.00
Nelson, James	Special Education and Communication Disorders	Professor	Continuous			104,026	AY	1.00
		Professor	Continuous			104,026	AY	1.00
		Roos Family Professorship	Special			5,000	AY	0.00
		Roos Family Professorship	Special			5,000	AY	0.00
		Interim Director/Chair	Special	8/19/2019	5/15/2020	10,000	AY	0.00
		NA	NA					

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Neta, Maital	Psychology	Assistant Professor	Continuous			84,626	AY	1.00
		Assistant Professor	Continuous			84,626	AY	1.00
	Center for Brain, Biology and Behavior	Associate Director	Special			15,000	AY	0.00
		Associate Director	Special			15,000	AY	0.00
		Happold Professorship	Special	8/19/2019	5/10/2024	5,000	AY	0.00
		NA	NA			0	AY	0.00
[18] Nguyen, ThanhVu	Computer Science and Engineering	Assistant Professor	Specific Term	8/19/2019		116,213	AY	1.00
		Assistant Professor	Specific Term		8/18/2019	95,264	AY	1.00
[19] Nikolova, Stanislava	Finance	Associate Professor	Continuous	8/19/2019		250,000	AY	1.00
		Associate Professor	Continuous		8/18/2018	240,029	AY	1.00

[18] Computer Science and Engineering MOU agreement in creating School of Computer Science.

[19] Retention offer.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
O'Brien, Jonathan	Management	Chairperson (Includes Stipend)	Special	8/19/2019		137,566	AY	0.60
		NA	NA			0	AY	0
		Professor of Management	Continuous	8/19/2019		78,609	AY	0.40
		Professor of Management	Continuous		8/18/2019	196,523	AY	1.00
[20] Person, Suzette	Computer Science and Engineering	Associate Professor of Practice	Special	8/19/2019		129,281	AY	1.00
		Associate Professor of Practice	Special		8/18/2019	122,405	AY	1.00
Quinlan, Mary Kay	College of Journalism and Mass Communications	Associate Dean (Includes Stipend)	Special			104,345	FY	1.00
		Associate Dean (Includes Stipend)	Special			104,345	FY	1.00
	Advertising	College Professorship/Kearns	Special	7/1/2019	5/31/2022	15,000	FY	0.00
		College Professorship/Kearns	Special		6/30/2019	15,000	FY	0.00
Rajca, Suchada	Chemistry	Research Assistant Professor	Special	7/1/2019	6/30/2020	34,059	FY	0.50
		Research Assistant Professor	Special		6/30/2019	56,538	FY	0.83

[20] Computer Science and Engineering MOU agreement in creating School of Computer Science.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
[21] Ramamurthy, Byravamurthy	Computer Science and Engineering	Professor	Continuous	8/19/2019		147,365 AY	1.00
		Professor	Continuous		8/18/2019	135,942 AY	1.00
Redepenning, Jody	Chemistry	Chairperson (Includes Stipend)	Special	8/19/2019		68,773 AY	0.60
		Interim Chairperson (Includes Stipend)	Special		8/18/2019	65,311 AY	0.60
		Professor	Continuous			41,681 AY	0.40
		Professor	Continuous			41,681 AY	0.40
		Lucile Hac Chair of Chemistry Professorship	Special			10,000 AY	0.00
		NA	NA			0 AY	0.00
[21] Reichenbach, Stephen	Computer Science and Engineering	Professor	Continuous	8/19/2019		138,000 AY	1.00
		Professor	Continuous		8/18/2019	136,551 AY	1.00
[21] Revesz, Peter	Computer Science and Engineering	Professor	Continuous	8/19/2019		109,911 AY	1.00
		Professor	Continuous		8/18/2019	107,416 AY	1.00

[21] Computer Science and Engineering MOU agreement in creating School of Computer Science.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
[22] Riedesel, Charles	Computer Science and Engineering	Assistant Professor of Practice	Special	8/19/2019		91,200 AY	1.00
		Assistant Professor of Practice	Special		8/18/2019	79,467 AY	1.00
Rilett, Laurence	Civil and Environmental Engineering - Lincoln	Professor	Continuous			219,538 AY	1.00
		Professor	Continuous			219,538 AY	1.00
		College Professorship/Klaasmeyer Chair	Special	7/1/2019	6/30/2024	15,000 AY	0.00
		College Professorship/Klaasmeyer Chair	Special		6/30/2019	15,000 AY	0.00
Rowe, Clinton	Earth and Atmospheric Sciences	Chairperson (Includes Stipend)	Continuous	8/19/2019		55,926 AY	0.60
		NA	NA		8/18/2019	0 AY	0.00
		Professor	Continuous	8/19/2019		33,895 AY	0.40
		Professor	Continuous		8/18/2019	84,737 AY	1.00
[22] Samal, Ashok	Computer Science and Engineering	Professor	Continuous	8/19/2019		134,073 AY	1.00
		Professor	Continuous		8/18/2019	124,964 AY	1.00

[22] Computer Science and Engineering MOU agreement in creating School of Computer Science.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
Saraf, Ravi	Chemical and Biomolecular Engineering	Professor	Continuous			179,911 AY	1.00
		Professor	Continuous			179,911 AY	1.00
		College Professorship/Lowell E. and Betty L. Anderson	Special	7/1/2019	6/30/2024	10,000 FY	0.00
		College Professorship/Lowell E. and Betty L. Anderson	Special		6/30/2019	10,000 FY	0.00
[23] Schwadel, Philip	Sociology	Professor	Continuous			106,000 AY	1.00
		Professor	Continuous			93,967 AY	1.00
		College Professorship - Happold	Special	8/19/2019	5/10/2024	5,000 AY	0.00
		NA	NA			0 AY	0.00
[24] Scott, Stephen	Computer Science and Engineering	Associate Professor	Continuous	8/19/2019		132,000 AY	1.00
		Associate Professor	Continuous		8/18/2019	121,148 AY	1.00

[23] Retention offer.

[24] Computer Science and Engineering MOU agreement in creating School of Computer Science.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
Searls, Mindi	Center for Science, Math, and Computer Education	Research Assistant Professor	Special	8/19/2019	5/15/2020	49,556 AY	0.75
		Research Assistant Professor	Special		8/18/2019	33,037 AY	0.50
	Earth and Atmospheric Sciences	Research Assistant Professor	Special	8/19/2019	5/15/2020	16,518 AY	0.25
		Research Assistant Professor	Special		8/18/2019	33,037 AY	0.50
[25] Sharif, Bonita	Computer Science and Engineering	Assistant Professor	Specific Term	8/19/2019		121,000 AY	1.00
		Assistant Professor	Specific Term		8/18/2019	106,887 AY	1.00
Shenefelt, Lloyd	Architecture	Assistant Professor	Specific Term			67,320 AY	1.00
		Assistant Professor	Specific Term			67,320 AY	1.00
	College of Architecture	Bachman Professorship	Special	7/1/2019	6/30/2020	8,029 FY	0.00
		Bachman Professorship	Special		6/30/2019	10,000 FY	0.00

[25] Computer Science and Engineering MOU agreement in creating School of Computer Science.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
Shield, Jeffrey	Mechanical and Materials Engineering	Chairperson (Includes Stipend)	Special	8/19/2019		111,064 AY	0.60
		Chairperson (Includes Stipend)	Special		8/18/2019	74,043 AY	0.40
		Professor	Continuous	8/19/2019		74,043 AY	0.40
		Professor	Continuous		8/18/2019	111,064 AY	0.60
	College of Engineering	Robert W. Brightfelt Professorship - Engineering	Special	8/19/2019	6/30/2024	10,000 AY	0.00
		Robert W. Brightfelt Professorship - Engineering	Special		8/18/2019	15,000 AY	0.00
Simpson, Patricia	Modern Languages and Literatures	Professor	Continuous	8/19/2019		105,393 AY	1.00
		Professor	Continuous		8/18/2019	42,157 AY	0.40
		NA	NA	8/19/2019		0 AY	0.00
		Chairperson (Includes Stipend)	Special		8/18/2019	63,236 AY	0.60
[26] Skomski, Ralph	Nebraska Center for Materials and Nanoscience	Research Professor	Special	7/1/2019		93,477 FY	1.00
		Research Professor	Special		6/30/2019	91,644 FY	1.00

[26] Salary increase for Research faculty not permanently budgeted.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
[27] Soh, Leen-Kiat	Computer Science and Engineering	Professor	Continuous	8/19/2019		146,239 AY	1.00
		Professor	Continuous		8/18/2019	133,367 AY	1.00
[28] Spiegel, Amy	Social/Behavioral Science Research Consortium	Research Associate Professor	Special	7/1/2019		51,539 FY	0.62
		Research Associate Professor	Special			50,474 FY	0.62
Springer, Paul	Child, Youth and Family Studies	Associate Professor	Continuous	8/19/2019		17,700 AY	0.20
		Associate Professor	Continuous		8/18/2019	26,551 AY	0.30
	College of Education and Human Sciences	Interim Chairperson (Includes Stipend)	Special	8/19/2019	8/31/2020	94,573 AY	0.80
		Acting Associate Dean (Includes Stipend)	Special		8/18/2019	61,952 AY	0.70
[27] Srisa-An, Witawas	Computer Science and Engineering	Associate Professor	Continuous	8/19/2019		140,000 AY	1.00
		Associate Professor	Continuous		8/18/2019	127,616 AY	1.00

[27] Computer Science and Engineering MOU agreement in creating School of Computer Science.
[28] Salary increase for Research faculty not permanently budgeted.
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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
Steinacher, Gerald	History	Professor	Continuous			105,000 AY	1.00
		Professor	Continuous			105,000 AY	1.00
		James A. Rawley Professorship	Special	8/19/2019	5/10/2024	15,000 AY	0.00
		College Professorship/Hymen Rosenberg	Special		8/18/2019	5,000 AY	0.00
Storz, Jay	School of Biological Sciences	Professor	Continuous			114,349 AY	1.00
		Professor	Continuous			114,349 AY	1.00
		Willa Cather Professorship	Special	8/19/2019	8/18/2024	5,000 AY	0.00
		NA	NA			0 AY	0.00
Stump, Jordan	Modern Languages and Literatures	Professor	Continuous			108,117 AY	1.00
		Professor	Continuous			108,117 AY	1.00
		Willa Cather Professorship	Special	8/19/2019	8/18/2024	5,000 AY	0.00
		Willa Cather Professorship	Special		8/18/2019	5,000 AY	0.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
[29] Sturgis, Barbara	Center on Children, Families and the Law	Research Assistant Professor	Special	7/1/2019	6/30/2020	78,142 FY	0.68
		Research Assistant Professor	Special		6/30/2019	76,798 FY	0.68
Swearer, Susan	Educational Psychology	Professor	Continuous			59,297 AY	0.50
		Professor	Continuous			59,297 AY	0.50
		Cather Professorship	Special	8/19/2019	8/18/2024	5,000 AY	0.00
		Cather Professorship	Special		8/18/2019	5,000 AY	0.00
	Office of the Exective Vice Chancellor	Coordinator (Includes Stipend)	Special			71,156 AY	0.50
		Coordinator (Includes Stipend)	Special			71,156 AY	0.50
Vagts, Susan	Finance	Director (Includes Stipend)	Special			76,483 AY	0.60
		Director (Includes Stipend)	Special			76,483 AY	0.60
		Associate Professor of Practice	Special			43,704 AY	0.40
		Associate Professor of Practice	Special			43,704 AY	0.40
		College Professorship-D P Hayes Chair of Actuarial Science	Special	8/19/2019	8/18/2023	20,000 AY	0.00
		College Professorship-D P Hayes Chair of Actuarial Science	Special		8/18/2019	20,000 AY	0.00

[29] Salary increase for Research faculty not permanently budgeted.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
[30] Variyam, Vinodchandran	Computer Science and Engineering	Professor	Continuous	8/19/2019		139,303 AY	1.00
		Professor	Continuous		8/18/2019	126,860 AY	1.00
Vegso, Roland	English	Associate Professor	Continuous			85,783 AY	1.00
		Associate Professor	Continuous			85,783 AY	1.00
		Acting Chairperson	Special	8/19/2019		2,574 AY	0.00
		NA	NA		8/18/2019	0 AY	0.00
		Susan Rosowski Professorship	Special			3,000 AY	0.00
		Susan Rosowski Professorship	Special			3,000 AY	0.00
Velazquez, Isabel	Modern Languages and Literatures	Associate Professor	Continuous			68,389 AY	1.00
		Associate Professor	Continuous			68,389 AY	1.00
		Harold E. Spencer Professorship	Special	8/19/2019	8/17/2024	5,000 AY	0.00
		NA	NA			0 AY	0.00

[30] Computer Science and Engineering MOU agreement in creating School of Computer Science.

Shaded reflects new or ongoing appointment

Un-shaded reflects old appointment

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
[31] Vuran, Mehmet	Computer Science and Engineering	Professor	Continuous	8/19/2019		170,000 AY	1.00
		Professor	Continuous		8/18/2019	133,532 AY	1.00
Wakefield, Nathan	Mathematics	Assistant Professor of Practice	Special	8/19/2019	5/15/2020	49,368 AY	0.70
		Assistant Professor of Practice	Special		8/18/2019	35,263 AY	0.50
Walker, Mark	Mathematics	Professor	Continuous			118,950 AY	1.00
		Professor	Continuous			118,950 AY	1.00
		Cather Professorship	Special	8/19/2019	8/18/2034	5,000 AY	0.00
		Cather Professorship	Special		8/18/2019	5,000 AY	0.00
Walstad, William	Economics	Professor	Continuous			216,512 AY	1.00
		Professor	Continuous			216,512 AY	1.00
	Economic Education	College Professorship/John T & Mable Hay	Special	8/19/2019	8/18/2024	15,000 AY	0.00
		College Professorship/John T & Mable Hay	Special		8/18/2019	15,000 AY	0.00
Waterson, Charles	Management	Assistant Professor of Practice	Special	9/1/2019		56,657 AY	0.66
		Assistant Professor of Practice	Special			85,844 AY	1.00

[31] Computer Science and Engineering MOU agreement in creating School of Computer Science.

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Watkins, David	Earth and Atmospheric Sciences	Professor	Continuous			111,240 AY	1.00
		Professor	Continuous			111,240 AY	1.00
		Stout Distinguished Paleontology Professorship	Special	8/19/2019	5/10/2024	5,000 AY	0.00
		NA	NA			0 AY	0.00
Weber, Joseph	News - Editorial	Associate Professor	Continuous			91,462 AY	1.00
		Associate Professor	Continuous			91,462 AY	1.00
		College Professorship - Huse	Special	8/19/2019	8/18/2024	20,000 AY	0.00
		College Professorship - Huse	Special		8/18/2019	20,000 AY	0.00
Wei, Timothy	Mechanical and Materials Engineering	Professor	Continuous			211,847 AY	1.00
		Professor	Continuous			211,847 AY	1.00
	College of Engineering	Richard McNeel-College of Engineering Professorship	Special	7/1/2019	6/30/2024	20,000 FY	0.00
		Richard McNeel-College of Engineering Professorship	Special		6/30/2019	20,000 FY	0.00

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White, Laura	English	Professor	Continuous			89,929 AY	1.00
		Professor	Continuous			89,929 AY	1.00
		Weaver Professorship	Special	8/19/2019	8/18/2024	5,000 AY	0.00
		Weaver Professorship	Special		8/18/2019	5,000 AY	0.00
Wilson, Kim	College of Engineering	Special Assistant to the Dean	Special	7/1/2019		112,211 FY	0.75
	Landscape Architecture Program	Professor	Continuous		6/30/2019	112,211 FY	0.75
	Cooperative Extension Division	Professor	Continuous			37,673 FY	0.25
		Professor	Continuous			37,673 FY	0.25
Winkle, Kenneth	History	Professor	Continuous			118,220 AY	1.00
		Professor	Continuous			118,220 AY	1.00
		College Professorship/Thomas C Sorensen	Special	8/19/2019	8/18/2024	10,000 AY	0.00
		College Professorship/Thomas C Sorensen	Special		8/18/2019	10,000 AY	0.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
Wood, Charles	School of Biological Sciences	Professor	Continuous			139,613 AY	0.75
		Professor	Continuous			139,613 AY	0.75
		University Professorship/Lewis L Lehr	Special	8/19/2024	8/18/2024	15,000 AY	0.00
		University Professorship/Lewis L Lehr	Special		8/18/2019	15,000 AY	0.00
	Biochemistry	Professor	Continuous			46,476 AY	0.25
		Professor	Continuous			46,476 AY	0.25
	Office of the Executive Vice Chancellor	Director - Confucius Institute	Special			21,648 AY	0.00
		Director - Confucius Institute	Special			21,648 AY	0.00
	Nebraska Center for Virology	NA	NA	7/1/2019		0 AY	0.00
		Director	Special		6/30/2019	18,338 AY	0.00
[32] Xu, Lisong	Computer Science and Engineering	Associate Professor	Continuous	8/19/2019		127,772 AY	1.00
		Associate Professor	Continuous		8/18/2019	116,118 AY	1.00

[32] Computer Science and Engineering MOU agreement in creating School of Computer Science.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY	FTE
[33] Yu, Hongfeng	Engineering Computer Science	Associate Professor	Continuous	8/19/2019		140,000 AY	1.00
		Associate Professor	Continuous		8/18/2019	117,796 AY	1.00
	Holland Computing Center	Interim Director (Stipend)	Special			11,780 AY	0.00
		NA	NA			0 AY	0.00

[33] Computer Science and Engineering MOU agreement in creating School of Computer Science.

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Annual salary increases are reflected in this report

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[34] Adamowicz, Michael	College of Agricultural Sciences and Natural Resources	Director of Forensic Science (Includes Stipend)	Special	7/1/2019		34,172	FY	0.25
		Director of Forensic Science (Includes Stipend)	Special		6/30/2019	33,758	FY	0.25
		Associate Professor	Continuous	7/1/2019		93,193	FY	0.75
		Associate Professor	Continuous		6/30/2019	91,575	FY	0.75
Adams, Gerard	Plant Pathology	Associate Professor of Practice	Special	7/1/2019	6/30/2022	51,228	FY	0.50
		Associate Professor of Practice	Special		6/30/2019	50,342	FY	0.50
Agarkova, Irina	Plant Pathology	Research Assistant Professor	Special	7/1/2019	6/30/2020	54,534	FY	1.00
		Research Assistant Professor	Special		6/30/2019	53,204	FY	1.00
[34] Alfano, James	Plant Pathology	Professor	Continuous	7/1/2019		166,198	FY	1.00
		Professor	Continuous		6/30/2019	161,359	FY	1.00
		Professorship/Bessey	Special			5,000	FY	0.00
		Professorship/Bessey	Special			5,000	FY	0.00
Allen, James	Biochemistry	Research Assistant Professor	Special	8/1/2019	7/31/2022	56,000	FY	1.00
		Senior Research Associate	Special		7/31/2019	47,840	FY	1.00

[34] External market adjustment.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[35] Anderson, Troy	Entomology	Associate Professor	Continuous	9/1/2019		101,048	AY	1.00
		Associate Professor	Continuous		8/31/2019	98,010	AY	1.00
[35] Auchtung, Jennifer	Food Science and Technology	Assistant Professor	Specific Term	9/1/2019		84,043	AY	1.00
		Assistant Professor	Specific Term		8/31/2019	78,000	AY	1.00
Awada, Tala	Agricultural Research Division	Associate Dean/Associate Director (Includes Stipend)	Special	7/1/2019		185,000	FY	1.00
		Associate Dean/Associate Director (Includes Stipend)			6/30/2019	63,452	AY	0.50
	School of Natural Resources	N/A	N/A	7/1/2019		0	FY	0.00
		Professor	Continuous		6/30/2019	57,684	AY	0.50
[35] Baenziger, Peter Stephen	Agronomy and Horticulture	Professor	Continuous	7/1/2019		220,393	FY	1.00
		Professor	Continuous		6/30/2019	104,079	FY	0.50
		Professorship/Wheat Growers	Special			30,000	FY	0.00
		Professorship/Wheat Growers	Special			30,000	FY	0.00
	College of Agricultural Sciences and Natural Resources	N/A	N/A	7/1/2019		0	FY	0.00
		Interim Associate Dean (Includes Stipend)	Special		6/30/2019	114,486	FY	0.50

[35] External market adjustment.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[36] Banerjee, Simanti	Agricultural Economics	Associate Professor	Continuous	8/1/2019		110,821	AY	1.00
		Assistant Professor	Specific Term		7/31/2019	94,719	FY	1.00
Barksdale, Larry	College of Agricultural Sciences and Natural Resources	Assistant Professor of Practice	Special	9/1/2019	5/15/2020	60,865	AY	1.00
		Assistant Professor of Practice	Special		8/31/2019	59,668	AY	1.00
[37] Barletta, Raul	School of Veterinary Medicine and Biomedical Sciences	Professor	Continuous	7/1/2019		137,443	FY	1.00
		Professor	Continuous		6/30/2019	124,964	FY	1.00
[37] Baumert, Joseph	Food Science and Technology	Associate Professor	Continuous	7/1/2019		112,000	FY	1.00
		Associate Professor	Continuous		6/30/2019	98,819	FY	1.00
[37] Becker, Donald	Biochemistry	Professor	Continuous	7/1/2019		148,124	FY	0.90
		Professor	Continuous		6/30/2019	127,009	FY	0.90
		Director	Special	7/1/2019		32,917	FY	0.10
		Director	Special		6/30/2019	27,897	FY	0.10
		Professorship/Bessey	Special			5,000	FY	0.00
		Professorship/Bessey	Special			5,000	FY	0.00

[36] Includes promotion increase.

[37] External market adjustment.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[38] Behrends, Donnia	Nutrition and Health Sciences	Extension Educator	Special	7/1/2019		75,018	FY	1.00
		Associate Extension Educator	Special		6/30/2019	60,279	FY	0.90
[39] Benson, John	School of Natural Resources	Assistant Professor	Specific Term	7/1/2019		89,366	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	86,806	FY	1.00
[38, 39] Blanco, Humberto	Agronomy and Horticulture	Professor	Continuous	9/1/2019		120,030	AY	1.00
		Associate Professor	Continuous		8/31/2019	104,535	AY	1.00
[39] Blankenship, Erin	College of Agricultural Sciences and Natural Resources	Associate Dean (Includes Stipend)	Special	7/1/2019	6/30/2020	71,630	FY	0.50
		Associate Dean (Includes Stipend)	Special		6/30/2019	67,369	FY	0.50
	Statistics	Professor	Continuous	7/1/2019		65,119	FY	0.50
		Professor	Continuous		6/30/2019	61,245	FY	0.50
[39] Bradshaw, Jeffrey	Panhandle Research and Extension Center	Interim Associate Director (Includes Stipend)	Special	7/1/2019	12/31/2019	66,609	FY	0.50
		Interim Associate Director (Includes Stipend)	Special		6/30/2019	59,225	FY	0.50
		Associate Professor	Continuous	7/1/2019		60,554	FY	0.50
		Associate Professor	Continuous		6/30/2019	53,868	FY	0.50

[38] Includes promotion increase.

[39] External market adjustment.

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Un-shaded reflects old appointment

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	NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[40]	Brewer, Gary	Entomology	Professor	Continuous	7/1/2019		198,943	FY	1.00
			Professor	Continuous		6/30/2019	175,528	FY	1.00
[40, 41]	Brooks, Kathleen	Agricultural Economics	Associate Professor	Continuous	7/1/2019		128,176	FY	1.00
			Assistant Professor	Specific Term		6/30/2019	107,995	FY	1.00
[40, 41]	Burkey, Thomas	School of Veterinary Medicine and Biomedical Sciences	Professor	Continuous	7/1/2019		105,783	FY	1.00
			Associate Professor	Continuous		6/30/2019	91,607	FY	1.00
[40]	Calkins, Chris	Animal Science	Professor	Continuous	9/1/2019		158,476	AY	1.00
			Professor	Continuous		8/31/2019	146,475	AY	1.00
[40, 41]	Chizinski, Christopher	School of Natural Resources	Associate Professor	Continuous	7/1/2019		105,516	FY	1.00
			Assistant Professor	Specific Term		6/30/2019	86,738	FY	1.00
[40, 41]	Ciftci, Ozan	Food Science and Technology	Associate Professor	Continuous	9/1/2019		97,770	AY	1.00
			Assistant Professor	Specific Term		8/31/2019	88,082	AY	1.00
[40]	Ciobanu, Daniel	Animal Science	Associate Professor	Continuous	9/1/2019		107,487	AY	1.00
			Associate Professor	Continuous		8/31/2019	100,806	AY	1.00

[40] External market adjustment.
[41] Includes promotion increase.
Shaded reflects new or ongoing appointment
Un-shaded reflects old appointment

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	NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[42]	Clark, Halden	School of Veterinary Medicine and Biomedical Sciences	Assistant Professor of Practice	Special	8/1/2019	4/7/2020	93,000	FY	1.00
			Assistant Professor of Practice	Special		7/31/2019	85,000	FY	1.00
	Clarke, Jennifer	Agricultural Research Division Food Science and Technology	Director (Includes Stipend)	Special	7/1/2019		81,659	FY	0.49
			Director (Includes Stipend)			6/30/2019	79,901	FY	0.49
			Professor	Continuous	7/1/2019		77,261	FY	0.51
			Professor	Continuous		6/30/2019	75,598	FY	0.51
[43]	Clemente, Thomas	Agronomy and Horticulture	Professor	Continuous	7/1/2019		157,606	FY	1.00
			Professor	Continuous		6/30/2019	154,546	FY	1.00
			Professorship/Eugene W. Price	Special			10,000	FY	0.00
			Professorship/Eugene W. Price	Special			10,000	FY	0.00
[43]	Corman, Jessica	School of Natural Resources	Assistant Professor	Specific Term	7/1/2019		88,873	FY	1.00
			Assistant Professor	Specific Term		6/30/2019	86,402	FY	1.00

[42] Internal equity adjustment.
[43] External market adjustment.
Reflects new or ongoing appointment
Un-shaded reflects old appointment

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	NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
	Cortinas, Manuel	School of Veterinary Medicine and Biomedical Sciences	Assistant Professor of Practice	Special	7/1/2019	6/30/2022	108,896	FY	1.00
			Assistant Professor of Practice	Special		6/30/2019	103,820	FY	1.00
[44]	Creech, Cody	Panhandle Research and Extension Center	Assistant Professor	Specific Term	7/1/2019		92,031	FY	1.00
			Assistant Professor	Specific Term		6/30/2019	86,892	FY	1.00
[44]	Cupp, Andrea	Animal Science	Professor	Continuous	7/1/2019		154,632	FY	1.00
			Professor	Continuous		6/30/2019	147,065	FY	1.00
			Professorship/Irvin T. and Wanda Omtvedt	Special			10,000	FY	0.00
			Professorship/Irvin T. and Wanda Omtvedt	Special			10,000	FY	0.00
	Danao, Mary-Grace	Food Processing Center	Research Associate Professor	Special	7/1/2019	6/30/2022	92,150	FY	1.00
			Research Associate Professor	Special		6/30/2019	83,792	FY	1.00
	Das Choudhury, Sruti	School of Natural Resources	Research Assistant Professor	Special	8/1/2019	6/30/2022	76,870	FY	1.00
			Research Assistant Professor	Special		7/31/2019	76,870	FY	1.00
[44, 45]	Dauer, Jenny	School of Natural Resources	Associate Professor	Continuous	7/1/2019		100,733	FY	1.00
			Assistant Professor	Specific Term		6/30/2019	84,749	FY	1.00

[44] External market adjustment.
[45] Includes promotion increase.
Reflects new or ongoing appointment
Un-shaded reflects old appointment

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	NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[46, 47]	Dauer, Joseph	School of Natural Resources	Associate Professor	Continuous	7/1/2019		90,786	FY	1.00
			Assistant Professor	Specific Term		6/30/2019	89,312	FY	1.00
[46]	Downs, Melanie	Food Science and Technology	Assistant Professor	Specific Term	9/1/2019		78,652	AY	1.00
			Assistant Professor	Specific Term		8/31/2019	76,547	AY	1.00
[46, 47]	Drewnoski, Mary	Animal Science	Associate Professor	Continuous	7/1/2019		100,515	FY	1.00
			Assistant Professor	Specific Term		6/30/2019	89,704	FY	1.00
	Easterly, Amanda	Agronomy and Horticulture	Research Assistant Professor	Special	9/1/2019		65,000	FY	1.00
		Panhandle Research and Extension Center	Managerial/Professional	Other		8/31/2019	59,247	FY	1.00
	Elowsky, Christian	Agronomy and Horticulture	Assistant Professor of Practice	Special	8/17/2019	8/16/2021	73,327	FY	1.00
			Assistant Professor of Practice	Special		8/16/2019	73,327	FY	1.00
	Fagan, Helen	Agricultural Leadership Education and Communication	Assistant Professor of Practice	Special	7/1/2019	6/30/2022	79,050	FY	1.00
			Assistant Professor of Practice	Special		6/30/2019	62,000	FY	0.80
	Ferraro, Dennis	School of Natural Resources	Professor of Practice	Special	7/1/2019	6/30/2023	80,364	FY	1.00
			Professor of Practice	Special		6/30/2019	78,688	FY	1.00

[46] External market adjustment.
[47] Includes promotion increase.

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[48] Franco Cruz, Rodrigo	School of Veterinary Medicine and Biomedical Sciences	Associate Professor	Continuous	9/1/2019		99,135	AY	1.00
		Associate Professor	Continuous		8/31/2019	89,169	AY	1.00
[48] Franz, Trenton	School of Natural Resources	Associate Professor	Continuous	7/1/2019		104,472	FY	1.00
		Associate Professor			6/30/2019	99,972	FY	1.00
[49] Franzen-Castle	Nutrition and Health Sciences	Associate Professor	Continuous	7/1/2019		99,123	FY	1.00
		Associate Professor	Continuous		6/30/2019	94,350	FY	1.00
Frerichs, Nicole	College of Agricultural Sciences and Natural Resources	Assistant Dean	Special	7/1/2019		75,300	FY	1.00
		Managerial/Professional	Special		6/30/2019	53,066	FY	1.00
[48] Fulginiti, Lilyan	Agricultural Economics	Professor	Continuous	9/1/2019		160,695	AY	1.00
		Professor	Continuous		8/31/2019	152,047	AY	1.00
		Professorship/Roy Frederick	Special			10,000	AY	0.00
		Professorship/Roy Frederick	Special			10,000	AY	0.00

[48] External market adjustment.
[49] Internal equity adjustment.
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Un-shaded reflects old appointment

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[50] Funston, Richard	West Central Research and Extension Center	Professor	Continuous	7/1/2019		146,683	FY	1.00
		Professor	Continuous		6/30/2019	137,724	FY	1.00
		Professorship/Nebraska Beef Cow Calf	Special	7/1/2019	6/30/2020	10,000	FY	0.00
		Professorship/Nebraska Beef Cow Calf	Special		6/30/2019	10,000	FY	0.00
Galles, Beth	School of Veterinary Medicine and Biomedical Sciences	Associate Professor of Practice	Special	7/1/2019	6/30/2022	98,113	FY	1.00
		Associate Professor of Practice	Special		6/30/2019	96,189	FY	1.00
[50] Gamon, John	School of Natural Resources	Professor	Continuous	7/1/2019		151,625	FY	1.00
		Professor	Continuous		6/30/2019	144,677	FY	1.00
[50] Garcia Ruiz, Hernan	Plant Pathology	Assistant Professor	Specific Term	9/1/2019		92,618	AY	1.00
		Assistant Professor	Specific Term		8/31/2019	86,812	AY	1.00
[50] Giannakas, Konstantinos	Agricultural Economics	Professor	Continuous	9/1/2019		151,086	AY	1.00
		Professor	Continuous		8/31/2019	136,086	AY	1.00
		Professorship/Eberhard	Special			15,000	AY	0.00
		Professorship/Eberhard	Special			15,000	AY	0.00

[50] External market adjustment.

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Un-shaded reflects old appointment

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[51] Gilmore, Troy	School of Natural Resources	Assistant Professor	Specific Term	7/1/2019		89,498	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	85,703	FY	1.00
[51] Golick, Douglas	Entomology	Associate Professor	Continuous	9/1/2019		94,784	AY	1.00
		Associate Professor	Continuous		8/31/2019	91,075	AY	1.00
[51] Graef, George	Agronomy and Horticulture	Professor	Continuous	7/1/2019		165,907	FY	1.00
		Professor	Continuous		6/30/2019	155,601	FY	1.00
		Professorship/Soybean Breeding	Special	7/1/2019	6/30/2024	30,000	FY	0.00
		Professorship/Soybean Breeding	Special		6/30/2019	30,000	FY	0.00
[51] Grassini, Patricio	Agronomy and Horticulture	Associate Professor	Continuous	7/1/2019		109,269	FY	1.00
		Associate Professor	Continuous		6/30/2019	100,973	FY	1.00
[51] Guretzky, John	Agronomy and Horticulture	Associate Professor	Continuous	7/1/2019		111,018	FY	1.00
		Associate Professor	Continuous		6/30/2019	105,081	FY	1.00
[51, 52] Gustafson, Christopher	Agricultural Economics	Associate Professor	Continuous	7/1/2019		124,406	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	96,561	FY	1.00

[51] External market adjustment.

[52] Includes promotion increase.

Shaded reflects new or ongoing appointment

Un-shaded reflects old appointment

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Hallen-Adams, Heather	Food Science and Technology	Assistant Professor of Practice	Special	9/1/2019	8/31/2022	83,161	AY	1.00
		Assistant Professor of Practice	Special		8/31/2019	81,212	AY	1.00
Hanefeldt, Megan	Eastern Nebraska Research and Extension Center	Assistant Extension Educator	Special	9/1/2019		60,100	FY	1.00
		Managerial/Professional	Other		8/31/2019	35,735	FY	1.00
[53] Hanson, Paul	School of Natural Resources	N/A	N/A	7/1/2019		0	FY	0.00
		Associate Director (Includes Stipend)	Special		6/30/2019	60,086	FY	0.50
		Professor	Continuous	7/1/2019		113,698	FY	1.00
		Professor	Continuous		6/30/2019	54,624	FY	0.50
[53] Harris, Edward	Biochemistry	Associate Professor	Continuous	9/1/2019		106,815	AY	1.00
		Associate Professor	Continuous		8/31/2019	94,557	AY	1.00
[53] Harveson, Robert	Panhandle Research and Extension Center	Professor	Continuous	7/1/2019		119,284	FY	1.00
		Professor	Continuous		6/30/2019	112,228	FY	1.00

[53] External market adjustment.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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	NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[54, 55]	Hastings, Lindsay	Agricultural Leadership Education and Communication	Associate Professor	Continuous	7/1/2019		50,370	FY	0.50
			Assistant Professor	Specific Term		6/30/2019	40,641	FY	0.50
			Director/Clifton Professor	Special	7/1/2019		50,370	FY	0.50
			Director/Clifton Professor	Special		6/30/2019	50,370	FY	0.50
[54]	Hayes, Michael	School of Natural Resources	Professor	Special	7/1/2019		133,685	FY	1.00
			Professor	Special		6/30/2019	126,156	FY	1.00
[54]	Hein, Gary	Plant Health	Director (Includes Stipend)	Special	7/1/2019		131,108	FY	0.70
			Director (Includes Stipend)	Special		6/30/2019	119,479	FY	0.70
		Entomology	Professor	Continuous	7/1/2019		51,081	FY	0.30
			Professor	Continuous		6/30/2019	46,559	FY	0.30
[54]	Holding, David	Agronomy and Horticulture	Associate Professor	Continuous	9/1/2019		106,615	AY	1.00
			Associate Professor	Continuous		8/31/2019	97,077	AY	1.00
[54]	Howard, Reka	Statistics	Assistant Professor	Specific Term	7/1/2019		101,116	FY	1.00
			Assistant Professor	Specific Term		6/30/2019	96,508	FY	1.00

[54] External market adjustment.
[55] Includes promotion increase.
Reflects new or ongoing appointment
Un-shaded reflects old appointment

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[56] Hoy, Roger	Biological Systems Engineering	Professor	Continuous	7/1/2019		166,962	FY	1.00
		Professor	Continuous		6/30/2019	141,409	FY	1.00
[56] Hu, Qi	School of Natural Resources	Professor	Continuous	7/1/2019		85,219	FY	0.70
		Professor	Continuous		6/30/2019	80,342	FY	0.70
	Earth and Atmospheric Sciences	Professor	Special	7/1/2019		36,465	FY	0.30
		Professor	Special		6/30/2019	34,376	FY	0.30
[57] Hunt, Thomas	Entomology	Professor	Continuous	7/1/2019		116,026	FY	1.00
	Eastern Nebraska Research and Extension Center	Professor	Continuous		6/30/2019	113,418	FY	1.00
[56] Hutkins, Robert	Food Science and Technology	Professor	Continuous	7/1/2019		164,476	FY	1.00
		Professor	Continuous		6/30/2019	138,469	FY	1.00
		Professorship/Khem Shahani	Special			10,000	FY	0.00
		Professorship/Khem Shahani	Special			10,000	FY	0.00
Irmak, Sibel	Biological Systems Engineering	Research Associate Professor	Special	7/1/2019	6/30/2020	80,847	FY	1.00
		Research Associate Professor	Special		6/30/2019	79,200	FY	1.00

[56] External market adjustment.

[57] Change in duty station.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[58] Jackson-Ziems, Tamra	Plant Pathology	Professor	Continuous	7/1/2019		117,568	FY	1.00
		Professor	Continuous		6/30/2019	108,821	FY	1.00
[58] Joeckel, Robert	School of Natural Resources	Associate Director	Special	7/1/2019		76,078	FY	0.51
		Associate Director	Special		6/30/2019	67,191	FY	0.51
		Professor	Continuous	7/1/2019		25,766	FY	0.19
		Professor	Continuous		6/30/2019	23,770	FY	0.19
	Earth and Atmospheric Sciences	Professor	Special	7/1/2019		40,684	FY	0.30
		Professor	Special		6/30/2019	34,631	FY	0.30
[58] Kachman, Stephen	Statistics	Professor	Continuous	7/1/2019		134,830	FY	1.00
		Professor	Continuous		6/30/2019	124,974	FY	1.00
[58] Kaiser, Michael	Agronomy and Horticulture	Assistant Professor	Specific Term	9/1/2019		86,027	AY	1.00
		Assistant Professor	Specific Term		8/31/2019	83,041	AY	1.00
[58] Kammermann, John	School of Veterinary Medicine and Biomedical Sciences	Associate Professor	Continuous	7/1/2019		129,462	FY	1.00
		Associate Professor	Continuous		6/30/2019	124,187	FY	1.00

[58] External market adjustment.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[59] Karr, Lisa	Animal Science	Associate Professor	Continuous	7/1/2019		112,370	FY	1.00
		Associate Professor	Continuous		6/30/2019	105,794	FY	1.00
Kaslon, Lisa	Eastern Nebraska Research and Extension Center	Extension Educator	Special	7/1/2019		98,121	FY	1.00
		Extension Educator	Special		6/30/2019	47,602	FY	0.50
		N/A	N/A	7/1/2019		0	FY	0.00
		Assistant Director Intern	Special		6/30/2019	52,362	FY	0.50
Kelling, Clayton	College of Agricultural Sciences and Natural Resources	Associate Dean	Special	7/1/2019	6/30/2020	80,454	FY	0.40
		Associate Dean	Special		6/30/2019	79,070	FY	0.40
	School of Veterinary Medicine and Biomedical Sciences	Director	Special	7/1/2019	6/30/2020	120,681	FY	0.60
		Director	Special		6/30/2019	118,606	FY	0.40
[59] Keshwani, Deepak	Biological Systems Engineering	Associate Professor	Continuous	7/1/2019		113,662	FY	1.00
		Associate Professor	Continuous		6/30/2019	104,892	FY	1.00
[59, 60] Keshwani, Jennifer	Biological Systems Engineering	Associate Professor	Continuous	7/1/2019		110,491	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	94,156	FY	1.00

[59] External market adjustment.

[60] Includes promotion increase.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[61] Khalimonchuk, Oleh	Biochemistry	Associate Professor	Continuous	9/1/2019		104,826	AY	1.00
		Associate Professor	Continuous		8/31/2019	94,945	AY	1.00
		Professorship/Susan J. Rosowski	Special	8/19/2019	8/18/2024	3,000	AY	0.00
		N/A	N/A			0	AY	0.00
[61] Kievit, Forrest	Biological Systems Engineering	Assistant Professor	Specific Term	9/1/2019		94,664	AY	1.00
		Assistant Professor	Specific Term		8/31/2019	89,895	AY	1.00
Kim, Heejeong	Biochemistry	Research Assistant Professor	Special	9/1/2019	6/30/2020	29,250	FY	0.50
		Research Assistant Professor	Special		8/31/2019	58,500	FY	1.00
[61] Kim, Surin	Textiles, Merchandising and Fashion Design	Assistant Professor	Specific Term	7/1/2019		87,525	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	85,395	FY	1.00
[62] Knezevic, Stevan	Agronomy and Horticulture	Professor	Continuous	7/1/2019		102,261	FY	1.00
	Eastern Nebraska Research and Extension Center	Professor	Continuous		6/30/2019	101,049	FY	1.00
Knoll, Eric	Agricultural Leadership Education and Communication	Assistant Professor of Practice	Special	7/1/2019	6/30/2021	69,283	FY	1.00
		Assistant Professor of Practice	Special		6/30/2019	67,725	FY	1.00

[61] External market adjustment.

[62] Change in duty station.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[63] Kononoff, Paul	Animal Science	Professor	Continuous	7/1/2019		120,087	FY	1.00
		Professor	Continuous		6/30/2019	114,622	FY	1.00
[63] Korus, Jesse	School of Natural Resources	Assistant Professor	Specific Term	7/1/2019		90,701	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	85,987	FY	1.00
[63] Kreuser, William	Agronomy and Horticulture	Assistant Professor	Specific Term	7/1/2019		96,244	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	90,628	FY	1.00
[63] Lanhoso De Mattos, Fabio	Agricultural Economics	Associate Professor	Continuous	7/1/2019		124,684	FY	1.00
		Associate Professor	Continuous		6/30/2019	110,006	FY	1.00
[63] Lawrence, Nevin	Panhandle Research and Extension Center	Assistant Professor	Specific Term	7/1/2019		93,994	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	89,690	FY	1.00
[63] Lee, Jaekwon	Biochemistry	Professor	Continuous	9/1/2019		120,134	AY	1.00
		Professor	Continuous		8/31/2019	114,413	AY	1.00
[63] Lewis, Ronald	Animal Science	Professor	Continuous	7/1/2019		170,863	FY	1.00
		Professor	Continuous		6/30/2019	165,245	FY	1.00

[63] External market adjustment.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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	NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[64]	Little, Andrew	School of Natural Resources	Assistant Professor	Specific Term	7/1/2019		93,065	FY	1.00
			Assistant Professor	Specific Term		6/30/2019	86,000	FY	1.00
[64, 65]	Louis, Joe	Entomology	Associate Professor	Specific Term	9/1/2019		101,651	AY	1.00
			Associate Professor	Specific Term		8/31/2019	90,327	AY	1.00
	Lubben, Bradley	Agricultural Economics	Extension Associate Professor	Special	7/1/2019	8/31/2022	115,226	FY	1.00
			Extension Associate Professor	Special		6/30/2019	112,945	FY	1.00
	Luck, Joe	Biological Systems Engineering	Associate Professor	Continuous	9/1/2019		127,352	AY	1.00
			Associate Professor	Continuous		8/31/2019	127,352	FY	1.00
[64, 65]	MacDonald, James	Animal Science	Professor	Continuous	7/1/2019		129,203	FY	1.00
			Associate Professor	Continuous		6/30/2019	109,457	FY	1.00
[64]	Maharjan, Bijesh	Panhandle Research and Extension Center	Assistant Professor	Specific Term	7/1/2019		94,063	FY	1.00
			Assistant Professor	Specific Term		6/30/2019	90,366	FY	1.00

[64] External market adjustment.

[65] Includes promotion increase.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[66] Mahmood, Rezaul	School of Natural Resources	Director, High Plains Regional Climate Center (Includes stipend)	Special	7/1/2019		70,032	FY	0.50
		Director, High Plains Regional Climate Center (Includes stipend)			6/30/2019	65,476	FY	0.50
		Professor	Continuous	7/1/2019		63,665	FY	0.50
		Professor	Continuous		6/30/2019	59,524	FY	0.50
Manhani Mattos, Daniel	Agricultural Economics	Assistant Professor of Practice	Special	9/1/2019	8/31/2022	69,743	FY	1.00
		Assistant Professor of Practice	Special		8/31/2019	69,743	FY	1.00
[66] Markham, Jonathan	Biochemistry	Associate Professor	Continuous	9/1/2019		102,303	AY	1.00
		Associate Professor	Continuous		8/31/2019	93,984	AY	1.00
[66] Matkin, Gina Sue	Agricultural Leadership Education and Communication	Associate Professor	Continuous	7/1/2019		105,749	FY	1.00
		Associate Professor	Continuous		6/30/2019	102,120	FY	1.00

[66] External market adjustment.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[67] McElravy, Larry	Agricultural Leadership Education and Communication	Associate Professor	Continuous	8/1/2019		48,137	FY	0.50
		Associate Professor	Continuous		7/31/2019	96,273	FY	1.00
	Graduate Studies	Interim Associate Dean (Includes Stipend)	Special	8/1/2019	7/31/2020	52,950	FY	0.50
		N/A	N/A		7/31/2019	0	FY	0.00
[67] McFee, Renee	School of Veterinary Medicine and Biomedical Sciences	Assistant Professor	Specific Term	7/1/2019		128,177	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	112,517	FY	1.00
[67] McKee, Gregory	Agricultural Economics	Professor	Continuous	7/1/2019		148,438	FY	1.00
		Professor	Continuous		6/30/2019	144,086	FY	1.00
[68] McMechan, Anthony	Entomology	Assistant Professor	Specific Term	7/1/2019		84,806	FY	1.00
	Eastern Nebraska Research and Extension Center	Assistant Professor	Specific Term		6/30/2019	82,690	FY	1.00
[67] Meinke, Lance	Entomology	Professor	Continuous	7/1/2019		144,144	FY	1.00
		Professor	Continuous		6/30/2019	130,938	FY	1.00
Mekonnen, Mesfin Mergia	Water for Food Institute	Research Assistant Professor	Special	7/1/2019		65,000	FY	1.00
		Post Doc Research Associate	Other		6/30/2019	61,996	FY	1.00

[67] External market adjustment.

[68] Change in duty station.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[69] Messer, Tiffany	Biological Systems Engineering	Assistant Professor	Specific Term	7/1/2019		90,982	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	87,337	FY	1.00
Meyer, Timothy	Agricultural Economics	Associate Professor of Practice	Special	9/1/2019	5/15/2022	89,896	AY	1.00
		Associate Professor of Practice	Special		8/31/2019	84,393	AY	1.00
[69] Mieno, Taro	Agricultural Economics	Assistant Professor	Specific Term	7/1/2019		101,177	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	89,501	FY	1.00
[69] Mittelstet, Aaron	Biological Systems Engineering	Assistant Professor	Specific Term	7/1/2019		90,219	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	86,250	FY	1.00
[69] Mote, Benny	Animal Science	Assistant Professor	Specific Term	7/1/2019		102,947	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	100,133	FY	1.00
[69] Mower, Jeffrey	Agronomy and Horticulture	Associate Professor	Continuous	9/1/2019		103,039	AY	1.00
		Associate Professor	Continuous		8/31/2019	101,019	AY	1.00

[69] External market adjustment.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[70] Moxley, Rodney	School of Veterinary Medicine and Biomedical Sciences	Professor	Continuous	7/1/2019		210,195	FY	1.00
		Professor	Continuous		6/30/2019	194,368	FY	1.00
		Professorship/Bessey	Special			5,000	FY	0.00
		Professorship/Bessey	Special			5,000	FY	0.00
[70] Mulliniks, John	West Central Research and Extension Center	Assistant Professor	Specific Term	7/1/2019		99,691	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	96,900	FY	1.00
[71] Natarajan, Sathish	Nutrition and Health Sciences	Assistant Professor	Specific Term	9/1/2019		78,715	AY	1.00
		Assistant Professor	Specific Term		8/31/2019	75,234	AY	1.00
[70] Nogueira-Rodriguez, Lia	Agricultural Economics	Assistant Professor	Specific Term	7/1/2019		108,482	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	99,044	FY	1.00
[70] Obata, Toshihiro	Biochemistry	Assistant Professor	Specific Term	8/1/2019		84,600	AY	1.00
		Assistant Professor	Specific Term		7/31/2019	81,400	AY	1.00

[70] External market adjustment.
[71] Internal equity adjustment.

Reflects new or ongoing appointment
Un-shaded reflects old appointment

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
O'Donnell, Jill	Office of Vice President/ Vice Chancellor	Director, Yeutter Institute	Special	7/1/2019	5/1/2021	74,120	FY	0.80
		Director, Yeutter Institute	Special		6/30/2019	85,000	FY	1.00
		Professor of Practice	Special	7/1/2019	8/1/2021	18,530	FY	0.20
		N/A	N/A			0	FY	0.00
[72] Osorio, Fernando	School of Veterinary Medicine and Biomedical Sciences	Professor	Continuous	7/1/2019		173,673	FY	1.00
		Professor	Continuous		6/30/2019	164,790	FY	1.00
[72] Pannier, Angela	Biological Systems Engineering	Professor	Continuous	7/1/2019		127,779	FY	1.00
		Professor	Continuous		6/30/2019	123,608	FY	1.00
[72] Parsons, Jay	Agricultural Economics	Associate Professor	Specific Term	7/1/2019		121,225	FY	1.00
		Associate Professor	Specific Term		6/30/2019	115,879	FY	1.00
[72] Pattnaik, Asit	School of Veterinary Medicine and Biomedical Sciences	Professor	Continuous	9/1/2019		138,584	AY	1.00
		Professor	Continuous		8/31/2019	130,818	AY	1.00

[72] External market adjustment.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[73] Pegg, Mark	School of Natural Resources	Professor	Continuous	7/1/2019		118,844	FY	1.00
		Professor	Continuous		6/30/2019	112,353	FY	1.00
Peterson, Jeffrey	Agricultural Economics	Assistant Professor of Practice	Special	9/1/2019	5/15/2022	53,085	AY	0.50
		Assistant Professor of Practice	Special		8/31/2019	52,290	AY	0.50
[73] Peterson, Julie	West Central Research and Extension Center	Assistant Professor	Specific Term	7/1/2019		102,070	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	93,148	FY	1.00
[73] Piepenbrink, Kurt	Food Science and Technology	Assistant Professor	Specific Term	9/1/2019		82,635	AY	1.00
		Assistant Professor	Specific Term		8/31/2019	80,432	AY	1.00
[73, 74] Pitla, Santosh	Biological Systems Engineering	Associate Professor	Continuous	7/1/2019		108,825	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	93,251	FY	1.00
[73] Poletto, Jamilynn	School of Natural Resources	Assistant Professor	Specific Term	7/1/2019		91,747	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	86,982	FY	1.00
[73] Powell, Larkin	School of Natural Resources	Professor	Continuous	7/1/2019		138,224	FY	1.00
		Professor	Continuous		6/30/2019	122,218	FY	1.00

[73] External market adjustment.

[74] Includes promotion increase.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[75] Qi, Yi	School of Natural Resources	Assistant Professor	Specific Term	7/1/2019		95,923	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	87,000	FY	1.00
[75] Qiao, Xin	Panhandle Research and Extension Center	Assistant Professor	Specific Term	7/1/2019		89,891	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	84,962	FY	1.00
Rasmussen, Steven	Nebraska Forest Service	Forester	Special	9/3/2019		59,270	FY	0.60
		Forester	Special		9/2/2019	98,783	FY	1.00
[75] Rattalino Edreira, Juan Ignacio	Agronomy and Horticulture	Research Assistant Professor	Special	7/1/2019	5/31/2020	62,000	FY	1.00
		Research Assistant Professor	Special		6/30/2019	58,737	FY	1.00
[75] Reddy, N R Jayagopala	School of Veterinary Medicine and Biomedical Sciences	Professor	Continuous	7/1/2019		151,290	FY	1.00
		Professor	Continuous		6/30/2019	124,291	FY	1.00
[75] Redfearn, Daren	Agronomy and Horticulture	Associate Professor	Continuous	7/1/2019		107,502	FY	1.00
		Associate Professor	Continuous		6/30/2019	99,038	FY	1.00
[75] Roston, Rebecca	Biochemistry	Assistant Professor	Specific Term	9/1/2019		93,056	AY	1.00
		Assistant Professor	Specific Term		8/31/2019	86,322	AY	1.00

[75] External market adjustment.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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ADJUSTMENTS

	NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[76]	Rudnick, Daran	Biological Systems Engineering	Assistant Professor	Specific Term	7/1/2019		95,000	FY	1.00
		West Central Research and Extension Center	Assistant Professor	Specific Term		6/30/2019	88,692	FY	1.00
	Sabillon Galeas, Luis	Food Science and Technology	Assistant Professor of Practice	Special	9/1/2019		77,000	FY	1.00
			Post Doc Research Associate	Other		8/31/2019	45,981	FY	1.00
[77, 78]	Sayer, Erin	Biochemistry	Associate Professor of Practice	Special	7/1/2019		61,897	FY	1.00
			Assistant Professor of Practice	Special		6/30/2019	51,842	FY	1.00
[77]	Schmidt, Amy	Biological Systems Engineering	Associate Professor	Continuous	7/1/2019		103,924	FY	1.00
			Associate Professor	Continuous		6/30/2019	99,694	FY	1.00
[77]	Schnable, James	Agronomy and Horticulture	Associate Professor	Continuous	9/1/2019		110,000	AY	1.00
			Associate Professor	Continuous		8/31/2019	100,033	AY	1.00
[77]	Schoengold, Karina	Agricultural Economics	Associate Professor	Continuous	7/1/2019		115,135	FY	1.00
			Associate Professor	Continuous		6/30/2019	108,185	FY	1.00

[76] Change in duty station.
[77] External market adjustment.
[78] Includes promotion increase.

Reflects new or ongoing appointment
Un-shaded reflects old appointment

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Sessions. Tiffany	Eastern Nebraska Research and Extension Center	Assistant Extension Educator	Special	8/12/2019		59,200	FY	1.00
		Managerial/Professional	Other		8/11/2019	37,523	FY	1.00
[79] Shi, Yeyin	Biological Systems Engineering	Assistant Professor	Specific Term	7/1/2019		89,657	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	83,654	FY	1.00
[79] Shulski, Martha	School of Natural Resources	Director, Nebraska State Climate Office (Includes stipend)	Special	7/1/2019		41,399	FY	0.30
		Director, Nebraska State Climate Office (Includes stipend)	Special		6/30/2019	37,789	FY	0.30
		Associate Professor	Continuous	7/1/2019		87,816	FY	0.70
		Associate Professor	Continuous		6/30/2019	80,154	FY	0.70
[79] Sillman, Sarah	School of Veterinary Medicine and Biomedical Sciences	Assistant Professor	Specific Term	7/1/2019		116,991	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	110,000	FY	1.00
Sindelar, Meghan	Agricultural Leadership Education and Communication	Assistant Professor of Practice	Special	9/1/2019	5/10/2021	67,604	AY	1.00
		Assistant Professor of Practice	Special		8/31/2019	66,370	AY	1.00

[79] External market adjustment.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[80] Spangler, Matthew	Animal Science	Professor	Continuous	7/1/2019		124,920	FY	1.00
		Professor	Continuous		6/30/2019	118,544	FY	1.00
[81] Steffen, Jackie	Eastern Nebraska Research and Extension Center	Associate Extension Educator	Special	7/1/2019		68,475	FY	1.00
		Associate Extension Educator	Special		6/30/2019	63,474	FY	1.00
[80] Stephenson, Mitchell	Panhandle Research and Extension Center	Assistant Professor	Specific Term	7/1/2019		95,266	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	87,166	FY	1.00
[81] Stiles, Crystal	School of Natural Resources	Assistant Geoscientist	Special	7/1/2019		67,246	FY	1.00
		Assistant Geoscientist	Special		6/30/2019	61,244	FY	1.00
[80] Stokes, Jeffrey	Agricultural Economics	Professor	Continuous	7/1/2019		161,028	FY	1.00
		Professor	Continuous		6/30/2019	156,676	FY	1.00
		Professorship/Ronald Hanson	Special			15,000	FY	0.00
		Professorship/Ronald Hanson	Special			15,000	FY	0.00
[80] Suyker, Andrew	School of Natural Resources	Associate Professor	Continuous	7/1/2019		115,404	FY	1.00
		Associate Professor	Continuous		6/30/2019	109,405	FY	1.00

[80] External market adjustment.
[81] Internal equity adjustment.
Reflects new or ongoing appointment
Un-shaded reflects old appointment

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ADJUSTMENTS

	NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[82]	Thomas, Steven	School of Natural Resources	Professor	Continuous	7/1/2019		117,472	FY	1.00
			Professor	Continuous		6/30/2019	112,728	FY	1.00
[82]	Todd, Kim	Agronomy and Horticulture	Associate Professor	Continuous	7/1/2019		128,224	FY	1.00
			Associate Professor	Continuous		6/30/2019	110,602	FY	1.00
	Topliff, Christina	School of Veterinary Medicine and Biomedical Sciences	Associate Professor of Practice	Special	7/1/2019	6/30/2022	98,127	FY	1.00
			Associate Professor of Practice	Special		6/30/2019	96,203	FY	1.00
[82]	Turk, Judith	School of Natural Resources	Assistant Professor	Specific Term	7/1/2019		89,643	FY	1.00
			Assistant Professor	Specific Term		6/30/2019	85,532	FY	1.00
[82]	Tyre, Richard	School of Natural Resources	Professor	Continuous	7/1/2019		117,003	FY	1.00
			Professor	Continuous		6/30/2019	110,229	FY	1.00
[83]	Umphlett, Natalie	School of Natural Resources	Assistant Geoscientist	Special	7/1/2019		72,863	FY	1.00
			Assistant Geoscientist	Special		6/30/2019	67,923	FY	1.00

[82] External market adjustment.
[83] Internal equity adjustment.
Reflects new or ongoing appointment
Un-shaded reflects old appointment

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[84] Urrea Florez, Carlos	Panhandle Research and Extension Center	Associate Professor	Continuous	7/1/2019		115,608	FY	1.00
		Associate Professor	Continuous		6/30/2019	106,850	FY	1.00
[84] van Dijk, Karin	Biochemistry	Associate Professor	Continuous	7/1/2019		134,417	FY	1.00
		Associate Professor	Continuous		6/30/2019	114,856	FY	1.00
[84] Van Etten, James	Plant Pathology	Professor	Continuous	7/1/2019		252,544	FY	1.00
		Professor	Continuous		6/30/2019	243,106	FY	1.00
		Professorship/William B. Allington	Special			15,000	FY	0.00
		Professorship/William B. Allington	Special			15,000	FY	0.00
[84] VanWormer, Elizabeth	School of Veterinary Medicine and Biomedical Sciences	Assistant Professor	Specific Term	7/1/2019		116,118	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	108,765	FY	1.00
[84] Vu, Hiep L X	Animal Science	Assistant Professor	Specific Term	7/1/2019		124,612	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	117,093	FY	1.00

[84] External market adjustment.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Walia, Harkamal	Agronomy and Horticulture	Associate Professor	Continuous	9/1/2019		116,872	AY	1.00
		Associate Professor	Continuous		8/31/2019	114,783	AY	1.00
		Professorship/Heuermann	Special	9/1/2019	6/30/2024	20,000	FY	0.00
		Professorship/Heuermann	Special		8/31/2019	20,000	FY	0.00
[85] Wegulo, Stephen	Plant Pathology	Professor	Continuous	7/1/2019		128,162	FY	1.00
		Professor	Continuous		6/30/2019	112,906	FY	1.00
[85] Weissling, Thomas	Entomology	Associate Professor	Continuous	7/1/2019		99,193	FY	1.00
		Associate Professor	Continuous		6/30/2019	85,994	FY	1.00
[85] Wiebe, Matthew	School of Veterinary Medicine and Biomedical Sciences	Associate Professor	Continuous	9/1/2019		96,165	AY	1.00
		Associate Professor	Continuous		8/31/2019	86,906	AY	1.00
[85] Wilson, Mark	Biochemistry	Associate Professor	Continuous	7/1/2019		108,608	FY	1.00
		Associate Professor	Continuous		6/30/2019	99,284	FY	1.00
[85] Wilson, Richard	Plant Pathology	Associate Professor	Continuous	9/1/2019		111,861	AY	1.00
		Associate Professor	Continuous		8/31/2019	102,162	AY	1.00

[85] External market adjustment.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[86] Wright, Robert	Entomology	Professor	Continuous	7/1/2019		136,579	FY	1.00
		Professor	Continuous		6/30/2019	125,983	FY	1.00
[86] Wu-Smart, Judy	Entomology	Assistant Professor	Specific Term	7/1/2019		92,239	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	84,998	FY	1.00
[86] Yates, Dustin	Animal Science	Assistant Professor	Specific Term	7/1/2019		97,253	FY	1.00
		Assistant Professor	Specific Term		6/30/2019	92,377	FY	1.00
[86] Yiannaka, Amalia	Agricultural Economics	Professor	Continuous	9/1/2019		120,994	AY	1.00
		Professor	Continuous		8/31/2019	117,018	AY	1.00
[86] Yu, Jiujiu	Nutrition and Health Sciences	Assistant Professor	Specific Term	9/1/2019		79,166	AY	1.00
		Assistant Professor	Specific Term		8/31/2019	74,928	AY	1.00
[86] Zeng, Lirong	Plant Pathology	Associate Professor	Continuous	9/1/2019		101,263	AY	1.00
		Associate Professor	Continuous		8/31/2019	98,265	AY	1.00
[86] Zhang, Qi	Statistics	Assistant Professor	Specific Term	9/1/2019		94,506	AY	1.00
		Assistant Professor	Specific Term		8/31/2019	87,794	AY	1.00

[86] External market adjustment.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[87] Zhou, Yuzhen	Statistics	Assistant Professor	Specific Term	9/1/2019		88,641	AY	1.00
		Assistant Professor	Specific Term		8/31/2019	85,920	AY	1.00

[87] External market adjustment.

Reflects new or ongoing appointment

Un-shaded reflects old appointment

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ADJUSTMENTS

Annual salary increases are reflected in this report

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Abresch, Chad	Pediatrics	Assistant Professor	Health Prof	9/1/2019	6/30/2020	60,000	FY	1.00
		Assistant Professor	Special		8/31/2019	127,500	FY	1.00
		Research Scientist (Stipend)	Special	9/1/2019	6/30/2020	72,600	FY	0.00
		NA	NA			0	FY	0.00
		Vice Chair for Culture (Stipend)	Special	9/1/2019		10,000	FY	0.00
		NA	NA			0	FY	0.00
Armitage, James	Internal Medicine	Professor	Special	7/1/2019		198,742	FY	0.70
		Professor	Continuous		6/30/2019	255,789	FY	0.90
		Distinguished Cancer Research Professor (Stipend)	Special			29,947	FY	0.10
		Distinguished Cancer Research Professor (Stipend)	Special			29,947	FY	0.10
Bagenda, Danstan	Anesthesiology	Assistant Professor	Special			66,050	FY	1.00
		Assistant Professor	Special			66,050	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		21,950	FY	0.00
		NA	NA			0	FY	0.00

Shaded reflects new or ongoing appointment
Un-shaded reflects old appointment

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7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA MEDICAL CENTER

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Band, Hamid	Eppley Institute	Professor	Continuous			259,620	FY	1.00
		Professor	Continuous			259,620	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		65,550	FY	0.00
		Director of Center for Breast Cancer (Stipend)	Special		6/30/2019	31,000	FY	0.00
		Bruce Professor of Cancer	Special			0	FY	0.00
		Bruce Professor of Cancer	Special			0	FY	0.00
		NA	NA	7/1/2019		0	FY	0.00
		Associate Director for Translational Research (Stipend)	Special		6/30/2019	30,000	FY	0.00
Bares, Sara	Internal Medicine	Assistant Professor	Health Prof	7/1/2019		40,617	FY	1.00
		Assistant Professor	Special		6/30/2019	37,478	FY	0.93
Barksdale, Aaron	Emergency Medicine	Associate Professor	Health Prof			83,100	FY	1.00
		Associate Professor	Health Prof			83,100	FY	1.00
		Vice Chair for Research (Stipend)	Special	7/1/2019		10,000	FY	0.00
		Research Director (Stipend)	Special		6/30/2019	10,000	FY	0.00

Shaded reflects new or ongoing appointment
Un-shaded reflects old appointment

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Barthold, Claudia	Emergency Medicine	Associate Professor	Health Prof			96,341	FY	1.00
		Associate Professor	Health Prof			96,341	FY	1.00
		Vice Chair of Education (Stipend)	Special			10,000	FY	0.00
		Vice Chair of Education (Stipend)	Special			10,000	FY	0.00
		NA	NA	7/1/2019		0	FY	0.00
		Residency Program Director (Stipend)	Special		6/30/2019	10,000	FY	0.00
[88] Bennett, Robert	Internal Medicine	Professor	Health Prof			16,315	FY	0.15
		Professor	Health Prof			16,315	FY	0.15
		Diabetes, Endocrinology, and Metabolism Journal Club Organizer (Stipend)	Special	7/1/2019		5,000	FY	0.00
		NA	NA			0	FY	0.00
	Office of Animal Care and Use/Institutional Animal Care and Use Ccommittee	Executive Chair (Stipend)	Special			10,000	FY	0.00
		Executive Chair (Stipend)	Special			10,000	FY	0.00
Bessho, Tadayoshi	Eppley Institute	Associate Professor	Special	7/1/2019		115,404	FY	1.00
		Associate Professor	Health Prof		6/30/2019	115,404	FY	1.00

[88] Remaining salary defrayed by VA Nebraska-Western Iowa Healthcare System.

Shaded reflects new or ongoing appointment

Un-shaded reflects old appointment

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Bilek, Laura	Physical Therapy Education	Associate Professor	Health Prof			128,848	FY	0.92
		Associate Professor	Health Prof			128,848	FY	0.92
	Graduate Studies	Coordinator (includes stipend)	Special			11,529	FY	0.08
		Coordinator (includes stipend)	Special			11,529	FY	0.08
	Allied Health Administration	Associate Dean for Research (Stipend)	Special			10,847	FY	0.00
		Associate Dean for Research (Stipend)	Special			10,847	FY	0.00
	College of Allied Health Professions	Karen Linder Distinguished Professorship for Women's Health	Special	7/1/2019	6/30/2022	0	FY	0.00
		NA	NA			0	FY	0.00
Black, Adrian	Eppley Institute	Assistant Professor	Special	7/1/2019		55,992	FY	0.70
		Assistant Professor	Special		6/30/2019	82,620	FY	1.00
		Director of Tissue Sciences (Stipend)	Special			10,000	FY	0.00
		Director of Tissue Sciences (Stipend)	Special			10,000	FY	0.00
Black, Jennifer	Eppley Institute	Professor	Continuous			194,133	FY	1.00
		Professor	Continuous			194,133	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		26,200	FY	0.00
		Program Director (Stipend)	Special		6/30/2019	21,500	FY	0.00

Shaded reflects new or ongoing appointment
Un-shaded reflects old appointment

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Boesen, Erika	Cellular and Integrative Physiology	Associate Professor	Health Prof			106,662	FY	1.00
		Associate Professor	Health Prof			106,662	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		2,131	FY	0.00
		NA	NA			0	FY	0.00
Borgstahl, Gloria	Eppley Institute	Professor	Continuous			134,080	FY	1.00
		Professor	Continuous			134,080	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		5,400	FY	0.00
		Director of Crystallography (Stipend)	Special		6/30/2019	3,000	FY	0.00
Branecki, Chad	Emergency Medicine	Associate Professor	Health Prof			69,733	FY	1.00
		Associate Professor	Health Prof			69,733	FY	1.00
		Residency Program Director (Stipend)	Special	7/1/2019		10,000	FY	0.00
		NA	NA			0	FY	0.00

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Bronich, Tatiana	Pharmaceutical Sciences	Professor	Continuous			176,346	FY	1.00
		Professor	Continuous			176,346	FY	1.00
		Parke Davis Professorship (Stipend)	Special			10,000	FY	0.00
		Parke Davis Professorship (Stipend)	Special			10,000	FY	0.00
		Associate Director, Center for Drug Delivery	Special			0	FY	0.00
		Associate Director, Center for Drug Delivery	Special			0	FY	0.00
	College of Pharmacy	Associate Dean for Research and Graduate Studies (Stipend)	Special	7/1/2019		20,000	FY	0.00
		NA	NA			0	FY	0.00

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[89] Campbell, Walter	Pathology and Microbiology	Associate Professor	Health Prof	7/1/2019		70,000	FY	1.00
		Associate Professor	Health Prof		6/30/2019	132,035	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		65,160	FY	0.00
		NA	NA			0	FY	0.00
		Director, Public Health and Pathology (Stipend)	Special			10,000	FY	0.00
		Director, Public Health and Pathology (Stipend)	Special			10,000	FY	0.00
	Information Technology	Senior Director, Research and Technology (Stipend)	Special	7/1/2019		24,200	FY	0.00
		Senior Director, Research and Technology (Stipend)	Special		6/30/2019	14,200	FY	0.00

[89] Annual increase adjustment.

Shaded reflects new or ongoing appointment

Un-shaded reflects old appointment

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Caplan, Steven	Biochemistry and Molecular Biology	Professor	Continuous			148,058	FY	1.00
		Professor	Continuous			148,058	FY	1.00
		Vice Chair for Administration (Stipend)	Special	7/1/2019	6/30/2020	5,000	FY	0.00
		Vice Chair for Administration (Stipend)	Special		6/30/2019	5,000	FY	0.00
		Departmental Core Facility Director (Stipend)	Special	7/1/2019	6/30/2020	15,000	FY	0.00
		Departmental Core Facility Director (Stipend)	Special		6/30/2019	15,000	FY	0.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	5,922	FY	0.00
		NA	NA			0	FY	0.00
Case, Adam	Cellular and Integrative Physiology	Assistant Professor	Health Prof			89,427	FY	1.00
		Assistant Professor	Health Prof			89,427	FY	1.00
		Director of Hypoxia Core (Special)	Special			13,409	FY	0.00
		Director of Hypoxia Core (Special)	Special			13,409	FY	0.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	1,786	FY	0.00
		NA	NA			0	FY	0.00

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Chacon, Martha	Anesthesiology	Associate Professor	Health Prof	7/1/2019	6/30/2020	109,900	FY	1.00
		Associate Professor	Special		6/30/2019	109,900	FY	1.00
Chen, Li-Wu	Health Services Research and Administration	Professor	Continuous			183,634	FY	1.00
		Professor	Continuous			183,634	FY	1.00
	Center for Health Policy Analysis and Rural Health Research	Director (Stipend)	Special			5,000	FY	0.00
		Director (Stipend)	Special			5,000	FY	0.00
		NA	NA	7/1/2019		0	FY	0.00
		Chairperson (Stipend)	Special		6/30/2019	5,000	FY	0.00
Cheng, Pi-Wan	Biochemistry and Molecular Biology	Professor	Continuous			172,338	FY	1.00
		Professor	Continuous			172,338	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	3,447	FY	0.00
		NA	NA			0	FY	0.00

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Chittezham Thomas, Vinai	Pathology and Microbiology	Assistant Professor	Health Prof	7/1/2019	6/30/2020	60,000	FY	1.00
		Assistant Professor	Special		6/30/2019	103,785	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	45,861	FY	0.00
		NA	NA			0	FY	0.00
Colombo, John	Pediatrics	Professor	Special	7/1/2019		41,932	FY	0.30
		Professor	Special		6/30/2019	97,507	FY	0.70
Crump, Natalie	Internal Medicine	Assistant Professor	Special	7/1/2019		30,325	FY	0.75
		Assistant Professor	Special		6/30/2019	24,180	FY	0.60
Datta, Kaustubh	Biochemistry and Molecular Biology	Professor	Continuous			127,676	FY	1.00
		Professor	Continuous			127,676	FY	1.00
		Graduate and Postdoctoral Committee Vice Chair (Stipend)	Special			10,000	FY	0.00
		Graduate and Postdoctoral Committee Vice Chair (Stipend)	Special			10,000	FY	0.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	7,661	FY	0.00
		NA	NA			0	FY	0.00

Shaded reflects new or ongoing appointment
Un-shaded reflects old appointment

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Deegan, Rebecca	Biochemistry and Molecular Biology	Associate Professor	Health Prof			107,142	FY	1.00
		Associate Professor	Health Prof			107,142	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	9,640	FY	0.00
		NA	NA			0	FY	0.00
[90] Dhawan, Punita	Biochemistry and Molecular Biology	Associate Professor	Health Prof			54,446	FY	0.51
		Associate Professor	Health Prof			54,446	FY	0.51
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2019	7,549	FY	0.00
		NA	NA			0	FY	0.00
Dong, Jixin	Eppley Institute	Associate Professor	Health Prof			101,430	FY	1.00
		Associate Professor	Health Prof			101,430	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		8,570	FY	0.00
		Coordinator Cell Signaling (Stipend)	Special		6/30/2019	7,559	FY	0.00
Dong, Yuxiang	Pharmaceutical Sciences	Research Associate Professor	Special	7/1/2019		80,419	FY	0.90
		Research Associate Professor	Special		6/30/2019	83,223	FY	0.95

[90] Remaining salary defrayed by VA Nebraska-Western Iowa Healthcare System.

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Eisenhauer, Christine	College of Nursing - Northern Division	Associate Professor	Health Prof	9/1/2019	6/30/2022	112,000	FY	1.00
		Associate Professor	Special		8/31/2019	80,297	AY	1.00
El Ramahi, Razan	Internal Medicine	Assistant Professor	Special	7/1/2019		42,052	FY	0.93
		Assistant Professor	Special		6/30/2019	41,275	FY	0.92
ElGamal, Dalia	Eppley Institute	Assistant Professor	Health Prof			81,600	FY	1.00
		Assistant Professor	Health Prof			81,600	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		10,600	FY	0.00
		NA	NA			0	FY	0.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[91] Estabrooks, Paul	Health Promotion	Professor	Continuous	7/1/2019		192,300	FY	1.00
		Professor	Continuous		6/30/2019	167,319	FY	1.00
		Chairperson (Stipend)	Special	7/1/2019		19,202	FY	0.00
		Chairperson (Stipend)	Special		6/30/2019	40,000	FY	0.00
		Harold M. Maurer, MD Distinguished Chair of Public Health	Special	1/4/2019	1/3/2022	0	FY	0.00
		Harold M. Maurer, MD Distinguished Chair of Public Health	Special		1/3/2019	0	FY	0.00
Flegle, Janice	Munroe-Meyer Institute	Associate Professor	Special	8/1/2019		69,749	FY	0.60
		Associate Professor	Health Prof		7/31/2019	115,798	FY	1.00
		NA	NA	8/1/2019		0	FY	0.00
		Director (Stipend)	Special		7/31/2019	10,000	FY	0.00
Follett, Kenneth	Neurosurgery	Professor	Health Prof			134,199	FY	1.00
		Professor	Health Prof			134,199	FY	1.00
		NA	NA	7/1/2019		0	FY	0.00
		Nancy A. Keegan/Donald R. Voelte, Jr. Chair of Neurosurgery (Stipend)	Special		6/30/2019	40,000	FY	0.00

[91] Delay in reporting due to department not updating record in SAP.

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Freifeld, Alison	Internal Medicine	Professor	Special	9/7/2019		49,198	FY	0.50
		Professor	Special		9/6/2019	29,625	FY	0.30
	Epidemiology	NA	NA	9/7/2019		0	FY	0.00
		Professor	Special		9/6/2019	19,573	FY	0.20
Fries, Patti	Ophthalmology and Visual Sciences	Assistant Professor	Special	7/1/2019		20,100	FY	0.50
		Assistant Professor	Special		6/30/2019	10,200	FY	0.30
Gendelman, Howard	Pharmacology and Experimental Neuroscience	Chairperson (Includes Stipend)	Special			235,387	FY	0.49
		Chairperson (Includes Stipend)	Special			235,387	FY	0.49
		Professor	Continuous			145,739	FY	0.51
		Professor	Continuous			145,739	FY	0.51
		Research Scientist (Stipend)	Special	7/1/2019		7,211	FY	0.00
		NA	NA			0	FY	0.00

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Glenn, Emily	Library of Medicine	Associate Professor	Special			72,620	FY	1.00
		Associate Professor	Special			72,620	FY	1.00
		Associate Director (Stipend)	Special	7/1/2019		15,000	FY	0.00
		Interim Associate Director (Stipend)	Special		6/30/2019	15,000	FY	0.00
Goeller, Jessica	Anesthesiology	Associate Professor	Health Prof			40,500	FY	1.00
		Associate Professor	Health Prof			40,500	FY	1.00
		NA	NA	7/1/2019		0	FY	0.00
		Research Scientist (Stipend)	Special		6/30/2019	47,884	FY	0.00
Graeff-Armas, Laura	Internal Medicine	Associate Professor	Health Prof	7/1/2019		50,475	FY	1.00
		Associate Professor	Special		6/30/2019	40,300	FY	0.80

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Guda, Chittibabu	Genetics, Cell Biology and Anatomy	Professor	Continuous			180,572	FY	1.00
		Professor	Continuous			180,572	FY	1.00
		Director, Bioinformatics and Systems Biology (Stipend)	Special			50,000	FY	0.00
		Director, Bioinformatics and Systems Biology (Stipend)	Special			50,000	FY	0.00
		Research Scientist (Stipend)	Special			14,707	FY	0.00
		Research Scientist (Stipend)	Special			14,707	FY	0.00
		Vice Chair, Bioinformatics Research and Training (Stipend)	Special	7/1/2019		5,000	FY	0.00
		NA	NA			0	FY	0.00
	College of Medicine	Assistant Dean for Research and Development (Stipend)	Special	9/1/2019		5,000	FY	0.00
		NA	NA			0	FY	0.00
	Vice Chancellor for Research	Chief Bioinformatics and Research Computing Officer (Stipend)	Special			35,000	FY	0.00
		Chief Bioinformatics and Research Computing Officer (Stipend)	Special			35,000	FY	0.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Guo, Minglei	Pharmacology and Experimental Neuroscience	Assistant Professor	Health Prof	7/1/2019	6/30/2020	65,110	FY	1.00
		Assistant Professor	Special		6/30/2019	65,110	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		9,244	FY	0.00
		Research Scientist (Stipend)	Special		6/30/2019	19,392	FY	0.00
Hageman, Patricia	Physical Therapy Education	Professor	Continuous			139,278	FY	1.00
		Professor	Continuous			139,278	FY	1.00
		NA	NA	7/1/2019		0	FY	0.00
		Karen Linder Professorship for Women's Health	NA		6/30/2019	0	FY	0.00
Haggar, Faye	Anesthesiology	Assistant Professor	Special			91,000	FY	1.00
		Assistant Professor	Special			91,000	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	4,575	FY	0.00
		NA	NA			0	FY	0.00

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Hanna, Kathleen	College of Nursing - Omaha Division	Professor	Continuous			170,522	FY	1.00
		Professor	Continuous			170,522	FY	1.00
		Carol M. Wilson Endowed Chair in Nursing (Stipend)	Special	8/1/2019	6/30/2020	5,000	FY	0.00
		Carol M. Wilson Endowed Chair in Nursing (Stipend)	Special		7/31/2019	5,000	FY	0.00
Hansen, Bethany	Munroe-Meyer Institute	Assistant Professor	Special			82,575	FY	1.00
		Assistant Professor	Special			82,575	FY	1.00
		Associate Director (Stipend)	Special	8/1/2019		5,000	FY	0.00
		NA	NA			0	FY	0.00
Hanson, Corrine	Medical Nutrition Education	Associate Professor	Health Prof			97,640	FY	1.00
		Associate Professor	Health Prof			97,640	FY	1.00
		Associate Director (Stipend)	Special			3,675	FY	0.00
		Associate Director (Stipend)	Special			3,675	FY	0.00
	College of Allied Health Professions	M. Patricia and James W. Leuschen Professorship	Special	7/1/2019	6/30/2020	0	FY	0.00
		M. Patricia and James W. Leuschen Professorship	Special		6/30/2019	0	FY	0.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Harlow, Elizabeth	Internal Medicine	Assistant Professor	Special	7/1/2019		28,800	FY	0.70
		Assistant Professor	Special		6/30/2019	21,730	FY	0.53
Havens, Shane	Ophthalmology and Visual Sciences	Assistant Professor	Special	7/1/2019		12,080	FY	0.20
		Assistant Professor	Health Prof		6/30/2019	60,400	FY	1.00
Haynatzki, Gleb	Biostatistics	Professor	Continuous			181,048	FY	1.00
		Professor	Continuous			181,048	FY	1.00
		Graduate Program Chairperson (Stipend)	Special	8/1/2019		5,000	FY	0.00
		NA	NA			0	FY	0.00
Hewlett, Angela	Internal Medicine	Associate Professor	Special	7/1/2019		85,591	FY	0.93
		Associate Professor	Special		6/30/2019	73,938	FY	0.80

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Hollingsworth, Michael	Eppley Institute	Professor	Continuous			241,323	FY	1.00
		Professor	Continuous			241,323	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		68,500	FY	0.00
		Director of Pancreatic Cancer Research	Special		6/30/2019	22,250	FY	0.00
		NA	NA	7/1/2019		0	FY	0.00
		Director, Cancer Biomarkers Working Group (Stipend)	Special		6/30/2019	17,750	FY	0.00
		NA	NA	7/1/2019		0	FY	0.00
		Associate Director, Basic Research (Stipend)	Special		6/30/2019	20,000	FY	0.00
		Dr. and Mrs. Tim D. Leon Professor	Special			0	FY	0.00
		Dr. and Mrs. Tim D. Leon Professor	Special			0	FY	0.00
		Hugh W. and Jane A. Hunt Chair of Cancer Research	Special			0	FY	0.00
		Hugh W. and Jane A. Hunt Chair of Cancer Research	Special			0	FY	0.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Hu, Guoku	Pharmacology and Experimental Neuroscience	Assistant Professor	Health Prof	7/19/2019	6/30/2020	65,100	FY	1.00
		Assistant Professor	Special		6/30/2019	65,100	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	7,627	FY	0.00
		Research Scientist (Stipend)	Special		6/30/2019	19,400	FY	0.00
Hultquist, Teresa	College of Nursing - Omaha Division	Associate Professor	Continuous			121,506	FY	1.00
		Associate Professor	Continuous			121,506	FY	1.00
		Director of Evaluation (Stipend)	Special			3,000	FY	0.00
		Director of Evaluation (Stipend)	Special			3,000	FY	0.00
	Academic Programs	NA	NA	7/1/2019		0	FY	0.00
		Coordinator (Stipend)	Special		6/30/2019	750	FY	0.00

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Hyde, Ricia	Biochemistry and Molecular Biology	Associate Professor	Health Prof			96,134	FY	1.00
		Associate Professor	Health Prof			96,134	FY	1.00
		Post-Doctoral Committee Co-Chair (Stipend)	Special	7/1/2019	6/30/2020	5,000	FY	0.00
		Post-Doctoral Committee Co-Chair (Stipend)	Special		6/30/2019	5,000	FY	0.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	9,517	FY	0.00
		NA	NA			0	FY	0.00
Iqbal, Javeed	Pathology and Microbiology	Associate Professor	Health Prof	7/1/2019	6/30/2020	70,000	FY	1.00
		Associate Professor	Special		6/30/2019	132,126	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		64,769	FY	0.00
		NA	NA			0	FY	0.00
Ives, Claire	Pediatrics	Assistant Professor	Special	7/1/2019		36,080	FY	0.80
		Assistant Professor	Health Prof		6/30/2019	45,000	FY	1.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Jain, Maneesh	Biochemistry and Molecular Biology	Associate Professor	Health Prof			118,196	FY	1.00
		Associate Professor	Health Prof			118,196	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	11,701	FY	0.00
		NA	NA			0	FY	0.00
Jobes, Mary Jane	College of Nursing - Lincoln Division	Assistant Professor	Special	9/1/2019	5/11/2020	45,341	AY	0.60
		Assistant Professor	Health Prof		8/31/2019	73,367	AY	1.00
Johnson, Rachel	Internal Medicine	Assistant Professor	Health Prof	7/1/2019		45,233	FY	1.00
		Assistant Professor	Special		6/30/2019	33,850	FY	0.75
Kaldahl, Wayne	Surgical Specialties	Professor	Special	7/1/2019		30,914	FY	0.20
		Professor	Special		6/30/2019	76,519	FY	0.50
Karpf, Adam	Eppley Institute	Associate Professor	Continuous			137,255	FY	1.00
		Associate Professor	Continuous			137,255	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		18,475	FY	0.00
		Program Director (Stipend)	Special		6/30/2019	15,750	FY	0.00

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[92] Kharbanda, Kusum	Internal Medicine	Professor	Special	9/1/2019		63,500	FY	0.50
		Professor	Special		8/31/2019	54,446	FY	0.50
Kim, Jungyoon	Health Services	Assistant Professor	Special	8/1/2019		80,606	FY	0.85
		Assistant Professor	Special		7/31/2019	66,381	FY	0.70
Klassen, Lynell	Internal Medicine	Professor	Continuous			280,706	FY	1.00
		Professor	Continuous			280,706	FY	1.00
		Robert L. Grissom, MD Professor of Internal Medicine	Special	7/1/2019	6/30/2024	0	FY	0.00
		Robert L. Grissom, MD Professor of Internal Medicine	Special		6/30/2019	0	FY	0.00
[93] Konigsberg, Beau	Orthopedic Surgery	Associate Professor	Health Prof	7/1/2019	6/30/2020	91,355	FY	1.00
		Associate Professor	Health Prof		6/30/2019	67,968	FY	0.80
	College of Medicine	Assistant Dean for Admissions (Stipend)	Special			5,000	FY	0.00
		Assistant Dean for Admissions (Stipend)	Special			5,000	FY	0.00
Kortepeter, Mark	Epidemiology	Professor	Special	7/1/2019		137,642	FY	0.61
		Professor	Special		6/30/2019	135,386	FY	0.60

[92] Market adjustment.

[93] Remaining salary previously defrayed by VA Nebraska-Western Iowa Healthcare System.

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Lanik, Aaron	Family Medicine	Assistant Professor	Health Prof			45,300	FY	1.00
		Assistant Professor	Health Prof			45,300	FY	1.00
		Associate Director, Residency Program (Stipend)	Special	7/1/2019		2,750	FY	0.00
		NA	NA			0	FY	0.00
Lauer, Scott	Pathology and Microbiology	Associate Professor	Health Prof			50,300	FY	1.00
		Associate Professor	Health Prof			50,300	FY	1.00
		Linder Pathology Residency Director Distinguished Chair	Special	7/1/2019	6/30/2024	0	FY	0.00
		NA	NA			0	FY	0.00
[94] LeVan, Tricia	Epidemiology	Associate Professor	Continuous	7/1/2019		104,949	FY	0.75
		Associate Professor	Continuous		6/30/2019	52,790	FY	0.38
	Internal Medicine	Associate Professor	Special	7/1/2019		34,982	FY	0.25
		Associate Professor	Special		6/30/2019	17,596	FY	0.13

[94] Remaining salary previously defrayed by VA Nebraska-Western Iowa Healthcare System.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Lewis, Robert	Eppley Institute	Professor	Continuous			176,770	FY	1.00
		Professor	Continuous			176,770	FY	1.00
		Edward and Linda Robinson Professor of Cancer Research (Stipend)	Special			25,000	FY	0.00
		Edward and Linda Robinson Professor of Cancer Research (Stipend)	Special			25,000	FY	0.00
		Research Scientist (Stipend)	Special	7/1/2019		9,550	FY	0.00
		NA	NA			0	FY	0.00
		Director, Senior Faculty Mentor Program	Special			0	FY	0.00
		Director, Senior Faculty Mentor Program	Special			0	FY	0.00
		Program Director, Cancer Genes and Molecular Regulation	Special			0	FY	0.00
		Program Director, Cancer Genes and Molecular Regulation	Special			0	FY	0.00
Lin, Ming-Fong	Biochemistry and Molecular Biology	Professor	Continuous			150,951	FY	1.00
		Professor	Continuous			150,951	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		3,019	FY	0.00
		NA	NA			0	FY	0.00

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Lindeman, Marlene	College of Nursing - Omaha Division	Assistant Professor	Special	9/1/2019	5/15/2020	62,095	AY	0.80
		Assistant Professor	Health Prof		8/31/2019	75,357	AY	1.00
Longo, Matthew	Surgery	Professor	Health Prof			75,018	FY	1.00
		Professor	Health Prof			75,018	FY	1.00
		Chief, Vascular Surgery (Stipend)	Special	7/1/2019		25,000	FY	0.00
		NA	NA			0	FY	0.00
Lutz, Richard	Munroe-Meyer Institute	Associate Professor	Special	7/1/2019		102,361	FY	0.70
		Associate Professor	Special		6/30/2019	146,230		1.00
	Pediatrics	Associate Professor	Special	7/1/2019		0	FY	0.00
		Associate Professor	Health Prof		6/30/2019	0	FY	0.00
[95, 96] Lyons, William	Internal Medicine	Professor	Health Prof	7/1/2019	6/30/2020	66,528	FY	0.63
		Professor	Health Prof		6/30/2019	53,142	FY	0.50

[95] Remaining salary defrayed by VA Nebraska-Western Iowa Healthcare System.

[96] Salary discrepancy due to rounding.

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
MacDonald, Richard	Biochemistry and Molecular Biology	Professor	Continuous			151,024	FY	1.00
		Professor	Continuous			151,024	FY	1.00
		Vice Chair for Education (Stipend)	Special			5,000	FY	0.00
		Vice Chair for Education (Stipend)	Special			5,000	FY	0.00
		Medical Curriculum Director (Stipend)	Special			5,000	FY	0.00
		Medical Curriculum Director (Stipend)	Special			5,000	FY	0.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	7,551	FY	0.00
		NA	NA			0	FY	0.00
	College of Medicine	Chair, Medical Student Admissions Committee (Stipend)	Special			6,000	FY	0.00
		Chair, Medical Student Admissions Committee (Stipend)	Special			6,000	FY	0.00
Mahajan, Tina	Internal Medicine	Assistant Professor	Special	7/1/2019		25,180	FY	0.55
		Assistant Professor	Special		6/30/2019	22,800	FY	0.50
Maloney, Shannon	Health Promotion	Assistant Professor	Health Prof	9/1/2019	6/30/2021	94,347	FY	1.00
		Assistant Professor	Special		8/31/2019	94,347	FY	1.00

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PERSONNEL REPORT
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UNIVERSITY OF NEBRASKA MEDICAL CENTER

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Markin, Nicholas	Anesthesiology	Associate Professor	Health Prof	7/1/2019	6/30/2020	109,900	FY	1.00
		Associate Professor	Special		6/30/2019	100,000	FY	1.00
Marshall, Julie	Adult Restorative Dentistry	Associate Professor	Health Prof			152,633	FY	1.00
		Associate Professor	Health Prof			152,633	FY	1.00
		Advanced Standing Program Director (Stipend)	Special			12,000	FY	0.00
		Advanced Standing Program Director (Stipend)	Special			12,000	FY	0.00
		NA	NA	9/1/2019		0	FY	0.00
		Interim Chairperson (Stipend)	Special		8/31/2019	10,000	FY	0.00
McVicker, Benita	Internal Medicine	Associate Professor	Special			19,460	FY	0.25
		Associate Professor	Special			19,460	FY	0.25
		NA	NA	8/15/2019		0	FY	0.00
		Outcomes Research Scientist (Stipend)	Special		8/14/2019	34,300	FY	0.00
Michaelis, Maria	Anesthesiology	Associate Professor	Health Prof	7/1/2019	6/30/2020	110,000	FY	1.00
		Associate Professor	Special		6/30/2019	100,100	FY	1.00

Shaded reflects new or ongoing appointment
Un-shaded reflects old appointment

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Mohs, Aaron	Pharmaceutical Sciences	Associate Professor	Continuous			131,772	FY	1.00
		Associate Professor	Continuous			131,772	FY	1.00
		Director, Graduate Students (Stipend)	Special	7/1/2019		5,000	FY	0.00
		NA	NA			0	FY	0.00
Mollard, Elizabeth	College of Nursing - Lincoln Division	Assistant Professor	Special	9/1/2019		105,000	FY	1.00
		Assistant Professor	Special		8/31/2019	74,234	AY	1.00
Monaghan, Daniel	Pharmacology and Experimental Neuroscience	Professor	Continuous			170,152	FY	1.00
		Professor	Continuous			170,152	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	17,433	FY	0.00
		Research Scientist (Stipend)	Special		6/30/2019	23,500	FY	0.00
	Academic Affairs	Co-Director, Interdisciplinary Graduate Program in Biomedical Sciences (Stipend)	Special			15,000	FY	0.00
		Co-Director, Interdisciplinary Graduate Program in Biomedical Sciences (Stipend)	Special			15,000	FY	0.00

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Mott, Justin	Biochemistry and Molecular Biology	Associate Professor	Health Prof			118,056	FY	1.00
		Associate Professor	Health Prof			118,056	FY	1.00
		Medical Core Assistant Director (Stipend)	Special	7/1/2019	6/30/2020	7,500	FY	0.00
		Medical Core Assistant Director (Stipend)	Special		6/30/2019	7,500	FY	0.00
		Research Scientist (Stipend)	Special	7/1/2019		5,903	FY	0.00
		NA	NA			0	FY	0.00
Mukherjee, Urmila	Internal Medicine	Assistant Professor	Special	7/1/2019		25,225	FY	0.62
		Assistant Professor	Health Prof		6/30/2019	40,200	FY	1.00

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Natarajan, Amarnath	Eppley Institute	Professor	Continuous			170,261	FY	1.00
		Professor	Continuous			170,261	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		19,000	FY	0.00
		Associate Director, Honor's Thesis Program Facility (Stipend)	Special		6/30/2019	5,000	FY	0.00
		NA	NA	7/1/2019		0	FY	0.00
		Director, Chemical Synthesis and Nuclear Magnetic Resonance Core Facilities (Stipend)	Special		6/30/2019	10,000	FY	0.00
Noronha, Luke	Pediatrics	Assistant Professor	Health Prof	7/1/2019	6/30/2020	42,805	FY	1.00
		Assistant Professor	Special		6/30/2019	34,144	FY	0.80
[97] Osna, Natalia	Internal Medicine	Associate Professor	Special	7/21/2019		60,984	FY	0.83
		Associate Professor	Special		7/20/2019	11,088	FY	0.15

[97] Salary discrepancy due to rounding.

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Padanilam, Babu	Cellular and Integrative Physiology	Professor	Continuous			124,627	FY	1.00
		Professor	Continuous			124,627	FY	1.00
		Renal Program Director (Stipend)	Special	7/1/2019		10,000	FY	0.00
		NA	NA			0	FY	0.00
		Research Scientist (Stipend)	Special	7/1/2019		29,782	FY	0.00
		NA	NA			0	FY	0.00
Palanimuthu Ponnusamy, Moorthy	Biochemistry and Molecular Biology	Associate Professor	Health Prof	7/1/2019	6/30/2020	70,000	FY	1.00
		Associate Professor	Health Prof			49,455	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	55,102	FY	0.00
		Research Scientist (Stipend)	Special		6/30/2019	75,556	FY	0.00
Palm, David	Health Services Research and Administration	Associate Professor	Special			68,039	FY	0.60
		Associate Professor	Special			56,699	FY	0.50
	Center for Health Policy	Director (Stipend)	Special	8/1/2019		5,000	FY	0.00
		NA	NA			0	FY	0.00

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PERSONNEL REPORT
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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Patel, Kaushik	Cellular and Integrative Physiology	Professor	Continuous			185,949	FY	1.00
		Professor	Continuous			185,949	FY	1.00
		A. Ross McIntyre, PhD, MD, Professor of Physiology (Stipend)	Special			5,000	FY	0.00
		A. Ross McIntyre, PhD, MD, Professor of Physiology (Stipend)	Special			5,000	FY	0.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	1,908	FY	0.00
		NA	NA			0	FY	0.00
Pavlov, Youri	Eppley Institute	Professor	Health Prof			117,463	FY	1.00
		Professor	Health Prof			117,463	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		1,000	FY	0.00
		NA	NA			0	FY	0.00
Pendyala, Gurudutt	Anesthesiology	Assistant Professor	Health Prof			88,102	FY	1.00
		Assistant Professor	Health Prof			88,102	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	18,898	FY	0.00
		NA	NA			0	FY	0.00

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Petrosyan, Armen	Biochemistry and Molecular Biology	Assistant Professor	Health Prof	8/1/2019	6/30/2020	60,000	FY	1.00
		Assistant Professor	Special		7/31/2019	91,637	FY	1.00
		Research Scientist (Stipend)	Special	8/1/2019	6/30/2020	38,815	FY	0.00
		NA	NA			0	FY	0.00
Porter, Thomas	Internal Medicine	Professor	Health Prof	7/1/2019	6/30/2020	88,123	FY	1.00
		Professor	Health Prof		6/30/2019	78,247	FY	0.89
		Hubbard Chair of Cardiology	Special	7/1/2019	12/31/2023	0	FY	0.00
		Hubbard Chair of Cardiology	Special		6/30/2019	9,776	FY	0.11
Pounds, Leanne	Health Promotion	Assistant Professor	Special	7/1/2019		41,478	FY	0.50
		Assistant Professor	Special		6/30/2019	81,563	FY	1.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Premaraj, Sundaralingam	Growth and Development	Associate Professor	Continuous			143,037	FY	1.00
		Associate Professor	Continuous			143,037	FY	1.00
		Dr. and Mrs. Henry and Anne Cech Professor of Orthodontics (Stipend)	Special			8,500	FY	0.00
		Dr. and Mrs. Henry and Anne Cech Professor of Orthodontics (Stipend)	Special			8,500	FY	0.00
		Postgraduate Program Director (Stipend)	Special			10,000	FY	0.00
		Postgraduate Program Director (Stipend)	Special			10,000	FY	0.00
		Vice Chairperson (Stipend)	Special	7/1/2019		2,000	FY	0.00
		NA	NA			0	FY	0.00
Radhakrishnan, Prakash	Eppley Institute	Assistant Professor	Health Prof			92,803	FY	1.00
		Assistant Professor	Health Prof			92,803	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		12,197	FY	1.00
		Coordinator for Cancer Biomarkers (Stipend)	Special		6/30/2019	10,000	FY	0.00

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Ragunathan, Padmashri	Neurological Sciences	Assistant Professor	Health Prof	7/1/2019	6/30/2020	60,000	FY	1.00
		Assistant Professor	Special		6/30/2019	60,000	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	15,000	FY	0.00
		NA	NA			0	FY	0.00
Rakes, Angie	Anesthesiology	Associate Professor	Health Prof	7/1/2019	6/30/2020	125,300	FY	1.00
		Associate Professor	Special		6/30/2019	125,300	FY	1.00
Reed, Jill	College of Nursing - Kearney Division	Assistant Professor	Special	9/1/2019		107,370	FY	1.00
		Assistant Professor	Special		8/31/2019	77,060	AY	1.00
		Coordinator (Stipend)	Special			1,500	FY	0.00
		Coordinator (Stipend)	Special			1,500	FY	0.00
Reinhardt, Richard	Surgical Specialties	Professor	Continuous			183,505	FY	1.00
		Professor	Continuous			183,505	FY	1.00
		Dr. Bernard and Ann Moran Professor of Dentistry (Stipend)	Special	7/1/2019	6/30/2024	10,000	FY	0.00
		Dr. Bernard and Ann Moran Professor of Dentistry (Stipend)	Special		6/30/2019	10,000	FY	0.00

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Rennard, Stephen	Internal Medicine	Professor	Special	7/1/2019		37,464	FY	0.20
		Professor	Special		6/30/2019	42,035	FY	0.23
		Margaret A. Larson Professor of Respiratory Diseases	Special			0	FY	0.00
		Margaret A. Larson Professor of Respiratory Diseases	Special			0	FY	0.00
Rizzino, A. Angie	Eppley Institute	Professor	Continuous			180,882	FY	1.00
		Professor	Continuous			180,882	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		6,150	FY	1.00
		Program Director (Stipend)	Special		6/30/2019	3,000	FY	0.00

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[98] Rizzo, Matthew	Neurological Sciences	Professor	Continuous			204,556	FY	0.95
		Professor	Continuous			204,556	FY	0.95
		Chairperson (includes stipend)	Special			20,745	FY	0.05
		Chairperson (includes stipend)	Special			20,745	FY	0.05
		Director-Nebraska Neuroscience Alliance Clinical & Translational Research (stipend)	Special			25,000	FY	0.00
		Director-Nebraska Neuroscience Alliance Clinical & Translational Research (stipend)	Special			25,000	FY	0.00
		Frances and Edgar Reynolds Centennial Professor of Neurology	Special	4/1/2019	3/31/2024	0	FY	0.00
		Frances and Edgar Reynolds Centennial Professor of Neurology	Special		3/31/2019	0	FY	0.00

[98] Inadvertently omitted from second quarterly report.

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[99] Romberger, Debra	Internal Medicine	Professor	Continuous			35,803	FY	0.30
		Professor	Continuous			35,803	FY	0.30
		Chairperson (includes stipend)	Special			21,768	FY	0.10
		Chairperson (includes stipend)	Special			21,768	FY	0.10
		Henry J. Lehnhoff Professor of Internal Medicine	Special	7/1/2019	6/30/2024	0	FY	0.00
		Henry J. Lehnhoff Professor of Internal Medicine	Special		6/30/2019	0	FY	0.00
Sarvetnick, Nora	Surgery	Professor	Continuous			253,846	FY	1.00
		Professor	Continuous			253,846	FY	1.00
		Director, Nebraska Regenerative Medicine Project (Stipend)	Special			40,532	FY	0.00
		Director, Nebraska Regenerative Medicine Project (Stipend)	Special			40,532	FY	0.00
		Research Scientist (Stipend)	Special	7/1/2019		4,975	FY	0.00
		NA	NA			0	FY	0.00

[99] Remaining salary defrayed by VA Nebraska-Western Iowa Healthcare System.

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UNIVERSITY OF NEBRASKA MEDICAL CENTER

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Schmid, Kendra	Biostatistics	Professor	Continuous			88,829	FY	0.50
		Professor	Continuous			88,829	FY	0.50
		NA	NA	7/1/2019		0	FY	0.00
		Interim Chairperson (Stipend)	Special		6/30/2019	15,000	FY	0.00
	Graduate Studies	Assistant Dean (includes stipend)	Special			46,648	FY	0.15
		Assistant Dean (includes stipend)	Special			46,648	FY	0.15
	Academic Affairs	Director, Campus-wide Assessment (includes stipend)	Special			67,179	FY	0.35
		Director, Campus-wide Assessment (includes stipend)	Special			67,179	FY	0.35
Schultz, Harold	Cellular and Integrative Physiology	Professor	Continuous			156,856	FY	1.00
		Professor	Continuous			156,856	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	1,568	FY	0.00
		NA	NA			0	FY	0.00
Shade, Marcia	College of Nursing - Omaha Division	Assistant Professor	Health Prof	9/1/2019	6/30/2022	101,395	FY	1.00
		Assistant Professor	Special		8/31/2019	13,829	AY	0.20

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ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Shcherbakova, Polina	Eppley Institute	Professor	Continuous			107,557	FY	1.00
		Professor	Continuous			107,557	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		12,443	FY	0.00
		Coordinator Genomic Instability (Stipend)	Special		6/30/2019	3,331	FY	0.00
Siahpush, Mohammad	Health Services Research and Administration	Professor	Continuous	9/1/2019		182,345	FY	1.00
	Health Promotion	Professor	Continuous		8/31/2019	182,345	FY	1.00
	Health Services Research and Administration	Interim Chairperson (Stipend)	Special	7/1/2019		5,000	FY	0.00
		NA	NA			0	FY	0.00
	College of Public Health	Associate Dean for Research (Stipend)	Special			25,000	FY	0.00
		Associate Dean for Research (Stipend)	Special			25,000	FY	0.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Simonsen, Kari	Pediatrics	Professor	Continuous	7/1/2019		60,971	FY	0.60
		Professor	Continuous		6/30/2019	82,546	FY	0.75
		Vice Chair for Clinical and Academic Affairs (Stipend)	Special			10,000	FY	0.00
		Vice Chair for Clinical and Academic Affairs (Stipend)	Special			10,000	FY	0.00
	Academic Affairs	Assistant Vice Chancellor for Faculty Affairs and Mentorship (Includes Stipend)	Special	7/1/2019		64,432	FY	0.40
		Assistant Vice Chancellor for Faculty Affairs (Includes Stipend)	Special		6/30/2019	42,757	FY	0.25
[100] Singh, Amar	Biochemistry and Molecular Biology	Associate Professor	Health Prof			56,684	FY	0.54
		Associate Professor	Health Prof			56,684	FY	0.54
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	5,246	FY	0.00
		NA	NA			0	FY	0.00

[100] Remaining salary defrayed by VA Nebraska-Western Iowa Healthcare System.

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ADJUSTMENTS

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Singh, Pankaj	Eppley Institute	Professor	Continuous			180,462	FY	1.00
		Professor	Continuous			180,462	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		35,900	FY	0.00
		Coordinator Metabolomics (Stipend)	Special		6/30/2019	30,000	FY	0.00
Sitorius, Michael	Family Medicine	Professor	Continuous			64,682	FY	0.23
		Professor	Continuous			64,682	FY	0.23
		Chairperson (Includes Stipend)	Special			181,079	FY	0.65
		Chairperson (Includes Stipend)	Special			181,079	FY	0.65
		Milton G. Waldbaum, MD Professor of Family Practice	Special			31,689	FY	0.12
		Milton G. Waldbaum, MD Professor of Family Practice	Special			31,689	FY	0.12
	Academic Affairs	Senior Advisor to the Chancellor for Rural Health (Stipend)	Special	7/1/2019		10,000	FY	0.00
		NA	NA			0	FY	0.00

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Solheim, Joyce	Eppley Institute	Professor	Continuous			128,140	FY	1.00
		Professor	Continuous			128,140	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		28,600	FY	0.00
		Program Director (Stipend)	Special		6/30/2019	25,500	FY	0.00
Sorgen, Paul	Biochemistry and Molecular Biology	Professor	Continuous			148,756	FY	1.00
		Professor	Continuous			148,756	FY	1.00
		IDeA Networks for Biomedical Research Excellence Director (Stipend)	Special	7/1/2019		15,000	FY	0.00
		IDeA Networks for Biomedical Research Excellence Director (Stipend)	Special		6/30/2019	10,000	FY	0.00
		Research Scientist (Stipend)	Special	7/1/2019		8,925	FY	0.00
		NA	NA			0	FY	0.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Sorrell, Michael	College of Medicine	Professor	Special	7/1/2019		85,000	FY	0.41
		Professor	Special		6/30/2019	30,782	FY	0.15
	Internal Medicine	UNMC Distinguished Chair of Internal Medicine (Stipend)	Special			25,000	FY	0.00
		UNMC Distinguished Chair of Internal Medicine (Stipend)	Special			25,000	FY	0.00
Stauch, Kelly	Pharmacology and Experimental Neuroscience	Assistant Professor	Health Prof	7/1/2019	6/30/2020	60,000	FY	1.00
		Assistant Professor	Special			60,000	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	16,768	FY	0.00
		NA	NA		6/30/2019	0	FY	0.00

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Steinke, Laurey	Biochemistry and Molecular Biology	Associate Professor	Health Prof			95,659	FY	1.00
		Associate Professor	Health Prof			95,659	FY	1.00
		Project Based Learning Coordinator (Stipend)	Special	7/1/2019		2,500	FY	0.00
		Co-Coordinator Project Based Learning (Stipend)	Special		6/30/2019	5,000	FY	0.00
		Master's Program Co-Chair (Stipend)	Special	7/1/2019	6/30/2020	2,500	FY	0.00
		NA	NA			0	FY	0.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	9,470	FY	0.00
		NA	NA			0	FY	0.00
Tahirov, Tahir	Eppley Institute	Professor	Continuous			153,077	FY	1.00
		Professor	Continuous			153,077	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		8,000	FY	0.00
		Coordinator for Chromatin Structural Biology (Stipend)	Special		6/30/2019	4,500	FY	0.00

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NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Talmon, Geoffrey	Pathology and Microbiology	Professor	Health Prof			96,257	FY	1.00
		Professor	Health Prof			96,257	FY	1.00
		NA	NA	7/1/2019		0	FY	0.00
		Linder Pathology Residency Director Distinguished Chair	Special		6/30/2019	0	FY	0.00
	College of Medicine	Assistant Dean for Medical Education	Special			0	FY	0.00
		Assistant Dean for Medical Education	Special			0	FY	0.00
Teoh-Fitzgerald, Melissa	Biochemistry and Molecular Biology	Associate Professor	Health Prof			93,167	FY	1.00
		Associate Professor	Health Prof			93,167	FY	1.00
		Master's Program Co-Chair (Stipend)	Special	7/1/2019		2,500	FY	0.00
		NA	NA			0	FY	0.00
		Research Scientist (Stipend)	Special	7/1/2019		9,224	FY	0.00
		NA	NA			0	FY	0.00
Toews, Myron	Pharmacology and Experimental Neuroscience	Professor	Special	7/1/2019		6,252	FY	0.04
		Professor	Continuous		6/30/2019	156,295	FY	1.00

Shaded reflects new or ongoing appointment
Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA MEDICAL CENTER

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Waltman, Nancy	College of Nursing - Lincoln Division	Professor	Special	7/1/2019		93,320	FY	0.60
		Professor	Special		6/30/2019	75,870	FY	0.50
	Academic Programs	Coordinator (Stipend)	Special			1,500	FY	0.00
		Coordinator (Stipend)	Special			1,500	FY	0.00
Wang, Guangshun	Pathology and Microbiology	Associate Professor	Health Prof	7/1/2019	6/30/2020	70,000	FY	1.00
		Associate Professor	Special		6/30/2019	115,868	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019	6/30/2020	48,185	FY	0.00
		NA	NA			0	FY	0.00
Ward, Wendy	Surgery	Professor	Health Prof			76,868	FY	1.00
		Professor	Health Prof			76,868	FY	1.00
		Alton K. Wong, MD Distinguished Professor of Surgery	Special	7/1/2019	6/30/2024	0	FY	0.00
		NA	NA			0	FY	0.00
	College of Medicine	Associate Dean for Student Affairs (Stipend)	Special			10,000	FY	0.00
		Associate Dean for Student Affairs (Stipend)	Special			10,000	FY	0.00

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA MEDICAL CENTER

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Wehbi, Nizar	Health Services Research and Administration	Assistant Professor	Health Prof			100,049	FY	1.00
		Assistant Professor	Health Prof			100,049	FY	1.00
	Center for Health Policy	Acting Deputy Director (Stipend)	Special			2,500	FY	0.00
		Acting Deputy Director (Stipend)	Special			2,500	FY	0.00
	College of Public Health	Director, Masters of Health Program (Stipend)	Special	8/1/2019		5,000	FY	0.00
		NA	NA			0	FY	0.00
Wichman, Christopher	Biostatistics	Assistant Professor	Health Prof	7/1/2019	6/30/2021	118,014	FY	1.00
		Assistant Professor	Special		6/30/2019	113,475	FY	1.00
Willet, Megan	Family Medicine	Assistant Professor	Special	7/1/2019		22,767	FY	0.50
		Assistant Professor	Special		6/30/2019	27,200	FY	0.60
Wilson, Mark	Pediatrics	Associate Professor	Special	7/1/2019		21,497	FY	0.50
		Associate Professor	Special		6/30/2019	29,996	FY	0.70

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA MEDICAL CENTER

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Woods, Nicholas	Eppley Institute	Assistant Professor	Health Prof			89,191	FY	1.00
		Assistant Professor	Health Prof			89,191	FY	1.00
		Research Scientist (Stipend)	Special	7/1/2019		9,200	FY	0.00
		Program Director, Proteomics and Systems Biology Research (Stipend)	Special		6/30/2019	9,000	FY	0.00
Yee, Gary	Pharmacy Practice and Science	Professor	Continuous	7/1/2019		87,487	FY	0.50
		Professor	Continuous		6/30/2019	171,543	FY	1.00
	Academic Affairs	Associate Vice Chancellor for Academic Affairs (Includes Stipend)	Special	7/1/2019		107,487	FY	0.50
		NA	NA			0	FY	0.00
Zangrillo, Amanda	Munroe-Meyer Institute	Assistant Professor	Special			93,406	FY	1.00
		Assistant Professor	Special			93,406	FY	1.00
		Associate Director, Severe Behavior Program (Stipend)	Special	7/1/2019		9,000	FY	0.00
		NA	NA			0	FY	0.00

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA MEDICAL CENTER

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Zetterman, Rowen	Business and Finance	Associate Vice Chancellor for Planning	Special			45,577	FY	0.25
		Associate Vice Chancellor for Planning	Special			45,577	FY	0.25
	Academic Affairs	NA	NA	7/1/2019		0	FY	0.00
		Director Faculty Mentorship	Special		6/30/2019	44,485	FY	0.25
		NA	NA	7/1/2019		0	FY	0.00
		Associate Vice Chancellor for Academic Affairs (Includes Stipend)	Special		6/30/2019	108,970	FY	0.50
		Professor	Special	7/1/2019		0	FY	0.00
		Professor	Special		6/30/2019	0	FY	0.00
Zucker, Irving	Cellular and Integrative Physiology	Professor	Continuous			222,463	FY	0.96
		Professor	Continuous			222,463	FY	0.96
		Theodore F. Hubbard, MD, Chair of Cardiovascular Research	Special			9,261	FY	0.04
		Theodore F. Hubbard, MD, Chair of Cardiovascular Research	Special			9,261	FY	0.04
		Research Scientist (Stipend)	Special	7/1/2019		4,532	FY	0.00
		NA	NA			0	FY	0.00

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

Annual salary increases are reflected in this report

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Allen, Chris	School of Communication	Professor	Continuous	9/1/2019		81,584	AY	1.00
		Professor	Continuous		8/31/2019	80,293	AY	1.00
		Radio/TV Manager (Stipend)	Special	7/1/2019		24,000	FY	0.00
		NA	NA			0	FY	0.00
Armitage, Jack	School of Accounting	Professor	Continuous	9/1/2019		150,199	AY	1.00
		Professor	Continuous		8/31/2019	147,857	AY	1.00
		Distinguished Alumni Professorship of Accounting	Special	9/1/2019	8/31/2022	10,000	AY	0.00
		Distinguished Alumni Professorship of Accounting	Special		8/31/2019	10,000	AY	0.00
Barone, Timi	Sociology	Associate Professor	Continuous	9/1/2019		74,983	AY	1.00
		Associate Professor	Continuous		8/31/2019	73,770	AY	1.00
		NA	NA	9/1/2019		0	AY	0.00
		Director, Medical Humanities	Special		8/31/2019	1,200	AY	0.00
[101] Barron-McKeagney, Theresa	College of Public Affairs and Community Service	Associate Dean (Included Stipend)	Special	7/1/2019		136,890	FY	1.00
		Associate Dean (Included Stipend)	Special		6/30/2019	119,115	FY	1.00

[101] Change of contract length to 11 months and equity increase.

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Battisti, Danielle	History	Associate Professor	Continuous	9/1/2019		67,556	AY	1.00
		Assistant Professor	Continuous		8/31/2019	62,231	AY	1.00
		Charles W. and Mary C. Martin Professor of History	Special	9/1/2019	8/31/2021	4,500	AY	0.00
		NA	NA			0	AY	0.00
Beard, Christine	School of Music	Professor	Continuous	9/1/2019		72,505	AY	1.00
		Professor	Continuous		8/31/2019	71,308	AY	1.00
		Kayser Chair	Special	9/1/2019	8/31/2022	5,000	AY	0.00
		Regents/Foundation Professorship	Special		8/31/2019	5,000	AY	0.00
Blansett, Kent	History	Associate Professor	Continuous	9/1/2019		65,412	AY	1.00
		Associate Professor	Continuous		8/31/2019	64,332	AY	1.00
		NA	NA			0	AY	0.00
		Charles W. and Mary C. Martin Professor of Western American History	Special		8/31/2019	4,500	AY	0.00

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Blizek, William	Philosophy	Professor	Continuous	9/1/2019	8/31/2020	52,966	AY	0.50
		Professor	Continuous		8/31/2019	104,281	AY	1.00
		Peter Kiewit Distinguished Professorship	Special	9/1/2019	8/31/2020	5,000	AY	0.00
		Peter Kiewit Distinguished Professorship	Special		8/31/2019	5,000	AY	0.00
Boron, Julie	Gerontology	Associate Professor (Includes Stipend)	Continuous	9/1/2019		80,107	AY	1.00
		Associate Professor	Continuous		8/31/2019	75,246	AY	1.00
		Leo Missinne Professor of Gerontology	Special	9/1/2019	8/31/2024	5,000	AY	0.00
		NA	NA			0	AY	0.00
Bridgeford, Tracy	English	Professor	Continuous	9/1/2019		30,275	AY	0.40
		Professor	Continuous		8/31/2019	29,793	AY	0.40
		Chairperson (Includes Stipend)	Special	9/1/2019	8/31/2022	49,013	AY	0.60
		Chairperson (Includes Stipend)	Special		8/31/2019	48,289	AY	0.60
		Albert W and Helen J Jefferis Chair of English Literature	Special			3,000	AY	0.00
		Albert W and Helen J Jefferis Chair of English Literature	Special			3,000	AY	0.00

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Burton, Taricka	Multicultural Affairs	Interim Director	Special	7/1/2019	6/30/2020	80,000	FY	1.00
		Associate Director	Special		6/30/2019	54,926	FY	1.00
Carter, David	Counseling	Professor	Continuous	9/1/2019		81,301	AY	1.00
		Professor	Continuous		8/31/2019	79,990	AY	1.00
		NA	NA			0	AY	0.00
		Peter Kiewit Distinguished Professorship	Special		8/31/2019	5,000	AY	0.00
Casas, Juan	Graduate College	Associate Dean (Includes Stipend)	Special	7/1/2019		120,000	FY	1.00
	Psychology	Professor (Includes Stipend)	Continuous		8/31/2019	73,000	AY	1.00

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Celinscak, Mark	History	Assistant Professor	Specific	9/1/2019		57,703	AY	1.00
		Assistant Professor	Specific		8/31/2019	56,763	AY	1.00
		Director, Fried Academy for Holocaust & Genocide Studies (Stipend)	Special	9/1/2019	8/31/2020	10,000	AY	0.00
		NA				NA		
		Louis and Frances Blumkin Professor of Holocaust and Genocide Studies	Special	9/1/2019	8/31/2022	8,000	AY	0.00
		Louis and Frances Blumkin Professor of Holocaust and Genocide Studies	Special		8/31/2019	8,000	AY	0.00
Chen, Yu-Che	School of Public Administration	Professor	Continuous	9/1/2019		97,009	AY	1.00
		Professor	Continuous		8/31/2019	95,473	AY	1.00
		Isaacson Professorship	Special	9/1/2019	8/31/2022	5,000	AY	0.00
		NA	NA			0	AY	0.00
Clinkinbeard, Samantha	School of Criminology and Criminal Justice	Associate Professor	Continuous	9/1/2019		74,856	AY	1.00
		Associate Professor	Continuous		8/31/2019	73,514	AY	1.00
		Coordinator, Undergraduate Program-Omaha/Lincoln (Stipend)	Special	9/1/2019	8/31/2021	7,500	AY	0.00
		Coordinator, Undergraduate Program-Omaha/Lincoln (Stipend)	Special		8/31/2019	7,500	AY	0.00

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Conces, Rory	Philosophy	Associate Professor	Special	9/1/2019	8/31/2020	68,739	AY	1.00
		Associate Professor	Special		8/31/2019	67,605	AY	1.00
		Director, Human Rights Minor	Special	9/1/2019	8/31/2020	1,200	AY	0.00
		Director, Human Rights Minor	Special		8/31/2019	1,200	AY	0.00
Dando, Christina	Geography/Geology	Professor	Continuous	9/1/2019		30,893	AY	0.40
		Professor	Continuous		8/31/2019	75,969	AY	1.00
		Chaiperson (Includes Stipend)	Special	9/1/2019	8/31/2022	49,939	AY	0.60
		NA	NA			0	AY	0.00
Davis, Paul	Biology	Associate Professor	Continuous	9/1/2019		68,896	AY	1.00
		Associate Professor	Continuous		8/31/2019	67,759	AY	1.00
	Health Careers Resource Center	Director	Special	7/1/2019	6/30/2020	22,000	FY	0.00
		Director	Special		6/30/2019	15,000	AY	0.00
Dere, Ashlee	Geography/Geology	Associate Professor	Continuous	9/1/2019		67,656	AY	1.00
		Assistant Professor	Specific		8/31/2019	62,331	AY	1.00
		UNO Soils Laboratory and UNO Collegiate Soils Team Program Coordinator	Special	9/1/2019	8/31/2020	5,000	AY	0.00
		UNO Soils Laboratory and UNO Collegiate Soils Team Program Coordinator	Special		8/31/2019	5,000	AY	0.00

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
DeSanti, Brady	Philosophy/Religion	Associate Professor	Continuous	9/1/2019		64,678	AY	1.00
		Associate Professor	Continuous		8/31/2019	63,624	AY	1.00
		Director, Native American Studies Program (Stipend)	Special	9/1/2019	8/31/2020	3,600	AY	0.00
		NA	NA			0	AY	0.00
Dickson, Timothy	Biology	Associate Professor	Continuous	9/1/2019		67,722	AY	1.00
		Assistant Professor	Specific		8/31/2019	62,413	AY	1.00
		Director, Turkey Creek Preserve (Stipend)	Special	9/1/2019	8/31/2024	22,500	AY	0.00
		NA	NA			0	AY	0.00
Duran, Adrian	Art and Art History	Associate Professor	Continuous	9/1/2019		67,013	AY	1.00
		Associate Professor	Continuous		8/31/2019	26,310	AY	0.40
		NA	NA	9/1/2019		0	AY	0.00
		Division Coordinator (Includes Stipend)	Special		8/31/2019	43,067	AY	0.60
Ebdon, Carol	School of Public Administration	Professor	Continuous	9/1/2019		103,380	AY	1.00
		Professor	Continuous		8/31/2019	101,752	AY	1.00
		NA	NA			0	AY	0.00
		Regents/Foundation Professorship	Special		8/31/2019	5,000	AY	0.00

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Eikenberry, Angela	School of Public Administration	Professor	Continuous	9/1/2019		90,727	AY	1.00
		Professor	Continuous		8/31/2019	89,282	AY	1.00
		NA	NA			0	AY	0.00
		David Scott Diamond Professorship	Special		8/31/2019	3,000	AY	0.00
Fannin, Karen	School of Music	Associate Professor	Continuous	9/1/2019		65,640	AY	1.00
		Associate Professor	Continuous		8/31/2019	64,542	AY	1.00
		Assistant Director (Stipend)	Special			4,000	AY	0.00
		Assistant Director (Stipend)	Special			4,000	AY	0.00
		Edwin Clark Diamond Professorship	Special	9/1/2019	8/31/2022	3,000	AY	0.00
		NA	NA			0	AY	0.00
French, Jeffrey	Psychology	Professor	Continuous	9/1/2019	8/31/2021	50,706	AY	0.50
		Professor	Continuous		8/31/2019	99,708	AY	1.00
		D.B. and Paula Varner Professorship	Special	9/1/2017	8/31/2020	10,000	AY	0.00
		D.B. and Paula Varner Professorship	Special		8/31/2017	10,000	AY	0.00
		NA	NA			0	AY	0.00
		Director, Neuroscience (Stipend)	Special		8/31/2019	3,600	AY	0.00

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Grams, Laura	Philosophy	Associate Professor	Continuous	9/1/2019		73,041	AY	1.00
		Associate Professor	Continuous		8/31/2019	28,757	AY	0.40
		NA	NA	9/1/2019		0	AY	0.00
		Chairperson (Includes Stipend)	Special		8/31/2019	46,735	AY	0.60
Grandgenett, Nealy	Teacher Education	Professor	Continuous	9/1/2019		93,497	AY	1.00
		Professor	Continuous		8/31/2019	91,978	AY	1.00
		Dr. George and Sally Haddix Community Chair in STEM Education	Special	9/1/2019	8/31/2022	25,000	AY	0.00
		Dr. George and Sally Haddix Community Chair in STEM Education	Special		8/31/2019	25,000	AY	0.00
Helm, David	Art and Art History	Professor	Continuous	9/1/2019		82,824	AY	1.00
		Professor	Continuous		8/31/2019	81,563	AY	1.00
		NA	NA	9/1/2019		0	AY	0.00
		Edwin Clark Diamond Professorship	Special		8/31/2019	3,000	AY	0.00

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Hoflund, Amy Bryce	School of Public Administration	Associate Professor	Continuous	9/1/2019		75,185	AY	1.00
		Associate Professor	Continuous		8/31/2019	73,964	AY	1.00
		Blue Cross Blue Shield of Nebraska Chair of Health Care Administration and Policy	Special	9/1/2019	8/31/2024	20,000	AY	0.00
		NA	NA			0	AY	0.00
Holley, Lyn	Gerontology	Professor	Continuous	9/1/2019		97,911	AY	1.00
		Professor	Continuous		8/31/2019	96,341	AY	1.00
		Dr. Chuck Powell Professorship of Gerontology	Special	9/1/2019		3,000	AY	0.00
		Dr. Chuck Powell Professorship of Gerontology	Special		8/31/2019	3,000	AY	0.00
Hutt, Curtis	Philosophy/Religion	Associate Professor	Continuous	9/1/2019		66,671	AY	1.00
		Associate Professor	Continuous		8/31/2019	65,588	AY	1.00
		Director of Programming, Schwalb Center (Stipend)	Special	9/1/2019	8/31/2020	7,500	AY	0.00
		Director of Programming, Schwalb Center (Stipend)	Special		8/31/2019	7,500	AY	0.00

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Irwin, Jay	Sociology/Anthropology	Associate Professor	Continuous	9/1/2019		66,573	AY	1.00
		Associate Professor	Continuous		8/31/2019	65,483	AY	1.00
		Director, LGBTQ/Sexual Studies Minor	Special	9/1/2019	8/31/2020	1,200	AY	0.00
		Director, LGBTQ/Sexual Studies Minor	Special		8/31/2019	1,200	AY	0.00
Kearney, Joshua	School of Music	Assistant Professor/Assistant Director of Bands	Specific	9/1/2019		55,000	AY	1.00
		Instructor/Director of Bands	Special		8/31/2019	42,734	AY	1.00
Kelly, Christopher	Gerontology	Associate Professor	Continuous	9/1/2019		77,186	AY	1.00
		Associate Professor	Continuous		8/31/2019	75,915	AY	1.00
		NA	NA			0	AY	0.00
		Leo Missinne Professor of Gerontology	Special		8/31/2019	5,000	AY	0.00
Kelly-Vance, Lisa	Psychology	Professor	Continuous	9/1/2019		93,827	AY	1.00
		Professor	Continuous		8/31/2019	92,354	AY	1.00
		Peter Kiewit Distinguished Professorship	Special	9/1/2019	8/31/2022	5,000	AY	0.00
		Peter Kiewit Distinguished Professorship	Special		8/31/2019	5,000	AY	0.00

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Kilinc, Ramazan	Political Science	Associate Professor	Continuous	9/1/2019		71,071	AY	1.00
		Associate Professor	Continuous		8/31/2019	69,904	AY	1.00
		Director of Islamic Studies (Stipend)	Special	9/1/2019	8/31/2020	2,000	AY	0.00
		Director of Islamic Studies (Stipend)	Special		8/31/2019	2,000	AY	0.00
Lipschultz, Jeremy	School of Communication	Professor	Continuous	9/1/2019		97,916	AY	1.00
		Professor	Continuous		8/31/2019	96,387	AY	1.00
		Peter Kiewit Distinguished Professorship	Special	9/1/2019	8/31/2022	5,000	AY	0.00
		Isaacson Professorship	Special		8/31/2019	5,000	AY	0.00
McWilliams, M. Susan	Teacher Education	Associate Professor	Continuous	9/1/2019	8/31/2020	32,188	AY	0.50
		Associate Professor	Continuous		8/31/2019	63,448	AY	1.00
Mei, Wai-Ning	Physics	Professor	Continuous	9/1/2019		91,739	AY	1.00
		Professor	Continuous		8/31/2019	90,293	AY	1.00
		Milo Bail Chair in Physics	Special	9/1/2019	8/31/2022	5,000	AY	0.00
		Milo Bail Chair in Physics	Special		8/31/2019	5,000	AY	0.00

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Melanson, William	Philosophy	Associate Professor	Continuous	9/1/2019		27,742	AY	0.40
		Associate Professor	Continuous		8/31/2019	68,234	AY	1.00
		Chairperson (Includes Stipend)	Special	9/1/2019	8/31/2022	45,213	AY	0.60
		NA	NA			0	AY	0.00
Monardo, Anna	Writer's Workshop	Professor	Continuous	9/1/2019		79,822	AY	1.00
		Professor	Continuous		8/31/2019	78,564	AY	1.00
		Regents/Foundation Professorship	Special	9/1/2019	8/31/2022	5,000	AY	0.00
		NA	NA			0	AY	0.00
Nelson, Elaine	History	Assistant Professor	Specific	9/1/2019		62,186	AY	1.00
		Assistant Professor	Specific		8/31/2019	61,181	AY	1.00
		Charles W. and Mary C. Martin Professor of Western American History	Special	9/1/2019	8/31/2021	4,500	AY	0.00
		NA	NA			0	AY	0.00
Newman, Andrew	Philosophy	Professor	Continuous	9/1/2019	8/31/2022	43,210	AY	0.50
		Professor	Continuous		8/31/2019	85,077	AY	1.00

Shaded reflects new or ongoing appointment
Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Nordman, Russell	Art and Art History	Professor	Continuous	9/1/2019		29,886	AY	0.40
		Associate Professor	Continuous		8/31/2019	68,099	AY	1.00
		Division Coordinator (Includes Stipend)	Special	9/1/2019		48,427	AY	0.60
		NA	NA			0	AY	0.00
Obradovic, Lana	Political Science	Associate Professor	Continuous	9/1/2019		68,081	AY	1.00
		Assistant Professor	Specific		8/31/2019	62,770	AY	1.00
		Director, Holocaust Genocide Studies Minor	Special	9/1/2019	8/31/2020	1,200	AY	0.00
		Director, Holocaust Genocide Studies Minor	Special		8/31/2019	1,200	AY	0.00
Ostler, C.	Educational Leadership	Professor	Continuous	9/1/2019		87,166	AY	1.00
		Professor	Continuous		8/31/2019	85,796	AY	1.00
		Peter Kiewit Distinguished Professorship	Special	9/1/2019	8/31/2022	5,000	AY	0.00
		Peter Kiewit Distinguished Professorship	Special		8/31/2019	5,000	AY	0.00
Pelton, Julie	Sociology/Anthropology	Associate Professor	Continuous	9/1/2019		66,943	AY	1.00
		Associate Professor	Continuous		8/31/2019	65,847	AY	1.00
		Director, Sustainability Minor (Stipend)	Special	9/1/2019	8/31/2020	1,200	AY	0.00
		Director, Sustainability Minor (Stipend)	Special		8/31/2019	1,200	AY	0.00

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Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Pol, Louis	Marketing and Entrepreneurship	Professor	Continuous	9/1/2019		184,015	AY	1.00
	College of Business	Dean (Includes Stipend)	Special		8/31/2019	258,354	FY	1.00
Powell, Mary Ann	Sociology	Associate Professor	Continuous	9/1/2019	8/31/2022	36,305	AY	0.50
		Associate Professor	Continuous		8/31/2019	71,469	AY	1.00
Price, John	English	Professor	Continuous	9/1/2019		81,381	AY	1.00
		Professor	Continuous		8/31/2019	80,093	AY	1.00
		Director, Creative Nonfiction Program	Special	9/1/2019	3/31/2020	1,500	AY	0.00
		Director, Creative Nonfiction Program	Special		8/31/2019	3,000	AY	0.00
		Regents/Foundation Professorship	Special	9/1/2019	8/31/2022	5,000	AY	0.00
		NA	NA			0	AY	0.00
Reiter-Palmon, Roni	Psychology	Professor	Continuous	9/1/2019		89,335	AY	1.00
		Professor	Continuous		8/31/2019	87,805	AY	1.00
		D.B. and Paula Varner Professorship	Special			10,000	AY	0.00
		D.B. and Paula Varner Professorship	Special			10,000	AY	0.00
		Director, Center for Applied Psychological Services (Stipend)	Special	9/1/2019	8/31/2020	10,000	AY	0.00
		NA	NA			0	AY	0.00

Shaded reflects new or ongoing appointment
Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Ritter, Beth	Sociology/Anthropology	Associate Professor	Continuous	9/1/2019		74,480	AY	1.00
		Associate Professor	Continuous		8/31/2019	73,313	AY	1.00
		NA	NA	9/1/2019		0	AY	0.00
		Director, Native American Studies Program (Stipend)	Special		8/31/2019	3,600	AY	0.00
Robinson, Cynthia	Black Studies	Associate Professor	Continuous	9/1/2019		27,529	AY	0.40
		Associate Professor	Continuous		8/31/2019	27,084	AY	0.40
		Chairperson (Includes Stipend)	Special	9/1/2019	8/31/2022	49,294	AY	0.60
		Chairperson (Includes Stipend)	Special		8/31/2019	48,626	AY	0.60
Robinson, Todd	Writer's Workshop	Assistant Professor	Specific	9/1/2019		55,000	AY	1.00
		Instructor	Special		8/31/2019	41,362	AY	1.00
Rodie, Amy	College of Business	Acting Associate Dean (Includes Stipend)	Special	9/1/2019	1/31/2020	83,496*	FY	1.00
	Marketing and Entrepreneurship	Associate Professor	Continuous		8/31/2019	139,077	AY	1.00
		James R Schumacher Chair of Ethics	Special		8/31/2020	10,000	AY	0.00
		James R Schumacher Chair of Ethics	Special			10,000	AY	0.00

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Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Rogers, Jimmy	Mathematics	Associate Professor	Continuous	9/1/2019		29,693	AY	0.40
		Associate Professor	Continuous		8/31/2019	29,221	AY	0.40
		Chairperson (Includes Stipend)	Special	9/1/2019	8/31/2022	48,140	AY	0.60
		Chairperson (Includes Stipend)	Special		8/31/2019	47,433	AY	0.60
Roland, Thomas	School of Music	Professor	Continuous			72,746	AY	1.00
		Professor	Continuous			71,619	AY	1.00
		Coordinator, Distance Education (Stipend)	Special	9/1/2019	8/31/2020	15,000	AY	0.00
		NA	NA			0	AY	0.00
		Assistant Director, School of Music (Stipend)	Special	9/1/2019	8/31/2020	3,000	AY	0.00
		NA	NA			0	AY	0.00
Rowe, Wei	Finance, Banking and Real Estate	Professor	Continuous	9/1/2019		135,578	AY	1.00
		Professor	Continuous		8/31/2019	133,509	AY	1.00
		Nebraska Bankers Association Professorship	Special	9/1/2019	8/31/2022	10,000	AY	0.00
		Nebraska Bankers Association Professorship	Special		8/31/2019	10,000	AY	0.00

* Not annualized.

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Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Saltamacchia, Martina	History	Associate Professor	Continuous	9/1/2019		67,791	AY	1.00
		Associate Professor	Continuous		8/31/2019	66,706	AY	1.00
		NA	NA	9/1/2019		0	AY	0.00
		Charles W. and Mary C. Martin Professor of History	Special		8/31/2019	4,500	AY	0.00
Shi, Yong	Information Systems and Quantitative Analysis	Professor	Continuous	9/1/2019		136,026	AY	1.00
		Professor	Continuous		8/31/2019	133,870	AY	1.00
		Isaacson Professorship	Special	9/1/2019	8/31/2022	5,000	AY	0.00
		Isaacson Professorship	Special		8/31/2019	5,000	AY	0.00
Shuster, Robert	Geography/Geology	Associate Professor	Continuous	9/1/2019		82,160	AY	1.00
		Associate Professor	Continuous		8/31/2019	32,334	AY	0.40
		NA	NA	9/1/2019		0	AY	0.00
		Chairperson (Includes Stipend)	Special		8/31/2019	52,102	AY	0.60

Shaded reflects new or ongoing appointment
Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Singh, Harnoor	Student Success - Scott Scholarship Program	Director of Student Development, Scott Scholarship Program	Special	9/16/2019		104,405	FY	1.00
		Interim Director of Student Development, Scott Scholarship Program	Special		9/15/2019	95,000	FY	1.00
Slivka, Dustin	School of Health and Kinesiology	Associate Professor	Continuous	9/1/2019		72,513	AY	1.00
		Associate Professor	Continuous		8/31/2019	71,332	AY	1.00
		Dean's Award of Excellence Professorship	Special	9/1/2019	8/31/2024	10,000	AY	0.00
		Dean's Award of Excellence Professorship	Special		8/31/2019	10,000	AY	0.00
Sollars, Suzanne	Psychology	Associate Professor	Continuous	9/1/2019		84,718	AY	1.00
		Associate Professor	Continuous		8/31/2019	83,376	AY	1.00
		Director, Neuroscience (Stipend)	Special	9/1/2019	8/31/2020	3,600	AY	0.00
		NA	NA			0	AY	0.00

Shaded reflects new or ongoing appointment
Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Wohar, Mark	Economics	Professor	Continuous	9/1/2019		123,480	AY	1.00
		Professor	Continuous		8/31/2019	121,534	AY	1.00
		Eminent Scholar	Special			10,000	AY	0.00
		Eminent Scholar	Special			10,000	AY	0.00
		College of Business Administration Distinguished Professorship	Special	9/1/2019	8/31/2022	10,000	AY	0.00
		College of Business Administration Distinguished Professorship	Special		8/31/2019	10,000	AY	0.00
Wolcott, Peter	Information Systems and Quantitative Analysis	Professor	Continuous	9/1/2019		50,586	AY	0.40
		Professor	Continuous		8/31/2019	49,759	AY	0.40
		Chairperson (Includes Stipend)	Special	9/1/2019		79,473	AY	0.60
		Chairperson (Includes Stipend)	Special		8/31/2019	78,239	AY	0.60
		Mutual of Omaha Distinguished Chair of Information Science and Technology	Special	9/1/2019	8/31/2022	10,000	AY	0.00
		Mutual of Omaha Distinguished Chair of Information Science and Technology	Special		8/31/2019	10,000	AY	0.00

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Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA AT OMAHA

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Wolfenbarger, Lillian	Biology	Professor	Continuous	9/1/2019		35,472	AY	0.40
		Professor	Continuous		8/31/2019	34,904	AY	0.40
		Chairperson (Includes Stipend)	Special	9/1/2019	8/31/2022	56,809	AY	0.60
		Chairperson (Includes Stipend)	Special		8/31/2019	55,955	AY	0.60
Youn, Jong-Hoon	Computer Science	Professor	Continuous	9/1/2019		127,186	AY	1.00
		Professor	Continuous		8/31/2019	50,056	AY	0.40
		NA	NA	9/1/2019		0	AY	0.00
		Acting Chairperson (Includes Stipend)	Special		8/31/2019	78,685	AY	0.60
		Union Pacific Chair of Information Science and Technology	Special			10,000	AY	0.00
		Union Pacific Chair of Information Science and Technology	Special			10,000	AY	0.00

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Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA-LINCOLN NCTA

ADJUSTMENTS

Annual salary increases are reflected in this report

	NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
[102]	Berg, Barbara	Nebraska College of Technical Agriculture	Assistant Professor (Includes Stipend)	Special	7/1/2019		95,860	FY	1.00
			Assistant Professor (Includes Stipend)	Special		6/30/2019	90,244	FY	1.00
[102]	McConville, Jennifer	Nebraska College of Technical Agriculture	Associate Dean	Special	7/1/2019		118,134	FY	1.00
			Associate Dean	Special		6/30/2019	105,289	FY	1.00
[102]	Ramsdale, Bradford	Nebraska College of Technical Agriculture	Associate Professor	Special	7/1/2019		126,026	FY	1.00
			Associate Professor	Special		6/30/2019	116,477	FY	1.00
[12]	Reed, Eric	Nebraska College of Technical Agriculture	Associate Professor	Special	7/1/2019		100,960	FY	1.00
			Associate Professor	Special		6/30/2019	94,685	FY	1.00
[102]	Rittenhouse, Mary Ann	Nebraska College of Technical Agriculture	Associate Professor	Special	7/1/2019		102,775	FY	1.00
			Associate Professor	Special		6/30/2019	96,263	FY	1.00

[102] Internal equity adjustment.

Shaded reflects new or ongoing appointment

Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA ADMINISTRATION

ADJUSTMENTS

Annual salary increases are reflected in this report

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Askren, Mark	Office of the President	Senior Advisor to the President	Special	7/1/2019		285,409	FY	1.00
		Senior Advisor to the President	Special	7/1/2019	7/31/2019	85,623	FY	0.30
	Information Technology Services	NA	NA	8/1/2019		0	FY	0.00
		Vice Chancellor for Information Technology and Chief Information Officer	Special		7/31/2019	199,786	FY	0.70
[103] Bakken, Philip	Office of the President	Chief of Staff	Special	7/1/2019		200,000	FY	1.00
		Chief of Staff	Special		6/30/2019	155,000	FY	1.00
Basye, Alison	Vice President and General Counsel	Associate General Counsel	Special	7/8/2019		90,000	FY	0.50
		Associate General Counsel	Special		7/7/2019	101,610	FY	0.80
Blackman, Bret	Information Technology Services	Chief Information Officer	Special	7/1/2019		130,000	FY	0.50
		NA	NA		6/30/2019	0	FY	0.00
		Vice President, Information Technology	Special	7/1/2019		130,000	FY	0.50
		Associate Vice President	Special		6/30/2019	190,851	FY	1.00

[103] External market adjustment.

Shaded reflects new or ongoing appointment

Un-shaded reflects old appointment

PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA ADMINISTRATION

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Fritz, Susan	Office of the President	Interim President	Special	8/15/2019		540,000	FY	1.00
	Executive Vice President and Provost	Executive Vice President and Provost	Special		8/14/2019	357,000	FY	1.00
Hay, Brooke	Facilities Planning	Director, Capital Construction	Special	7/1/2019		138,996	FY	0.80
		Assistant Director Facilities Planning and Construction, Manager Capital	Special		6/30/2019	138,996	FY	1.00
	Facilities and Energy Services	Associate Vice President for Facilities	Special	7/1/2019		40,000	FY	0.20
		NA	NA		6/30/2019	0	FY	0
Jackson, David	Executive Vice President and Provost	Interim Executive Vice President and Provost	Special	8/15/2019		366,600	FY	1.00
		Vice Provost	Special		8/14/2019	239,700	FY	1.00
Mello, Heath	Vice President for University Affairs	Interim Vice President	Special	7/1/2019		243,000	FY	1.00
		Associate Vice President University Affairs/Director State Relations	Special		6/30/2019	167,888	FY	1.00

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PERSONNEL REPORT
7/1/2019 - 9/30/2019
UNIVERSITY OF NEBRASKA ADMINISTRATION

ADJUSTMENTS

NAME	UNIT	TITLE	APPT TYPE	BEGIN DATE	END DATE	SALARY		FTE
Polenske, Cheri	Information Technology Services	Assistant Vice President	Special	7/1/2019		180,000	FY	1.00
	Nebraska Student Information System	Director	Special		6/30/2019	146,074	FY	1.00
Tuttle, Heath	Information Technology Services	Assistant Vice President	Special	8/1/2019		190,000	FY	1.00
	University of Nebraska-Lincoln Office of the Executive Vice Chancellor	Assistant Vice Chancellor	Special		7/31/2019	169,032	FY	1.00

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TO:	The Board of Regents	Addendum X-D-2
	Academic Affairs	
MEETING DATE:	February 7, 2020	
SUBJECT:	BOR Strategic Framework Metrics	
RECOMMENDED ACTION:	Report	
PREVIOUS ACTION:	January 25, 2019 – The Board of Regents received reports on Faculty Diversity, Financial Aid and Graduation rates.	
EXPLANATION:	These reports provide data on the Board of Regent's Strategic Framework metrics on Need-Based Financial Aid, Merit-Based Financial Aid, Graduation Rates and Faculty Diversity. The current financial aid metric required that at least $9 million in private funds were raised for both need and merit-based financial aid--$21.5 million was raised in need-based aid while $34.9 million was raised in merit-based aid. The current graduation rate metric required that each campus maintain or reach the average six-year graduation rate of its peers. UNK (58.4% graduation rate; UNK peers 50.6%) exceeded the current metric while UNO (49.1% graduation rate; UNO peers 49.1%) matched the current metric and UNL did not (68.7% graduation rate; UNL peers 75.2%). The University of Nebraska has consistently maintained or increased its system-wide percentage of women faculty and faculty of color since 2001. In fall 2018, 37.90% of University of Nebraska faculty were women, slightly below the peer average percentage of 38.09%. The University of Nebraska's system-wide percentage of faculty of color for the same period was 21.42% compared to a peer average percentage of 23.26%.
SPONSOR:	Kristin E. Yates Associate Vice President for Institutional Research and Chief Data Officer
APPROVED:	/s/ Susan M. Fritz Executive Vice President and Provost
DATE:	January 10, 2020

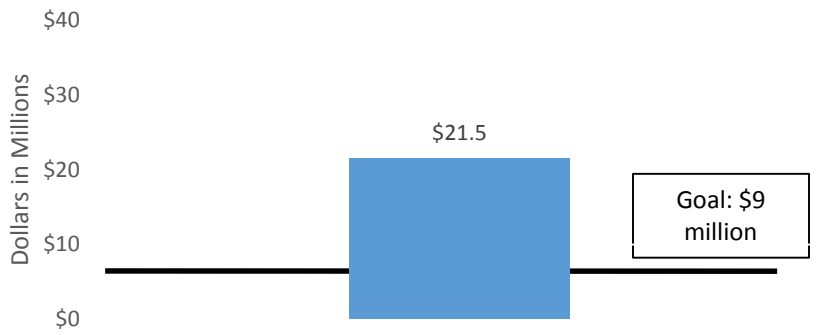
NEED-BASED FINANCIAL AID

Strategic Framework 1.a.iii Need-Based Financial Aid

FY 2018-19 Goal:

Raise at least $9 million in private funds (endowment and/or spendable).

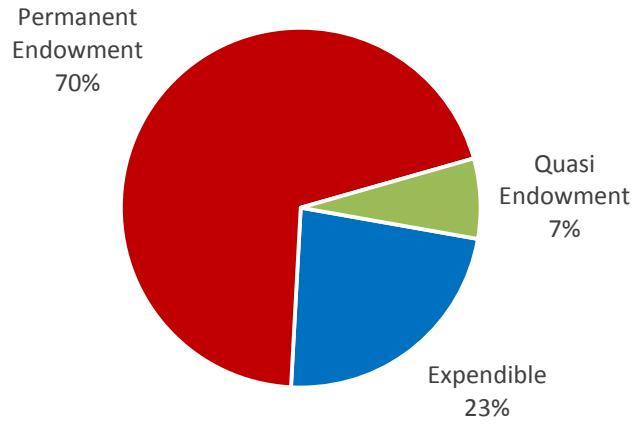
Foundation Need-Based Aid Funds 2018-19



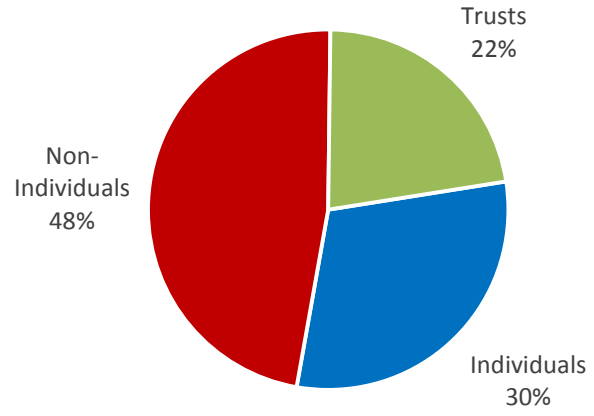
Key Facts

- Total need-based foundation aid funds in 2018-19 equaled $21,495,448.
- Permanent endowment funds accounted for the majority of need-based aid funds in 2018-19.
- Top sources of need-based foundation aid for 2018-19 included alumni, private foundations, trusts, and family foundations.

Foundation Need-Based Aid by Gift Type 2018-19



Foundation Need-Based Aid by Source 2018-19



Proposed Accountability Measure

1. The University of Nebraska will provide the opportunity for Nebraskans to enjoy a better life through access to high quality, affordable undergraduate, graduate and professional education.

    a. Maintain an affordable cost of education.

    iii. Expand need-based financial aid and effectively market opportunity and major aid programs.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
FY 2019-20	Raise at least $9 million dollars in private funds (endowment and/or spendable).	TBD	Academic
FY 2020-21	Raise at least $9 million dollars in private funds (endowment and/or spendable).	TBD	Academic
FY 2021-22	Raise at least $9 million dollars in private funds (endowment and/or spendable).	TBD	Academic

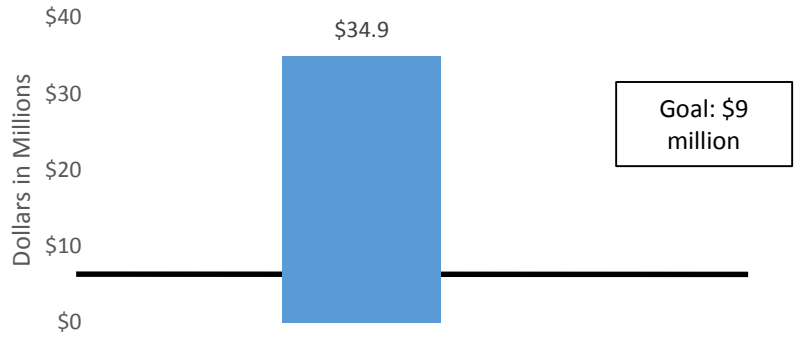
MERIT-BASED FINANCIAL AID

Strategic Framework 3.b.ii Merit-Based Financial Aid

FY 2018-19 Goal:

Raise at least $9 million in private funds (endowment and/or spendable).

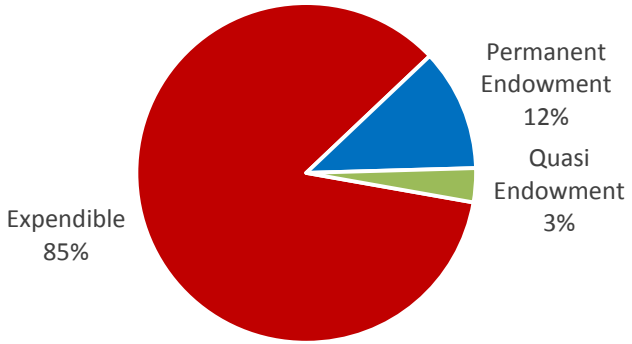
Foundation Merit-Based Aid Funds 2018-19



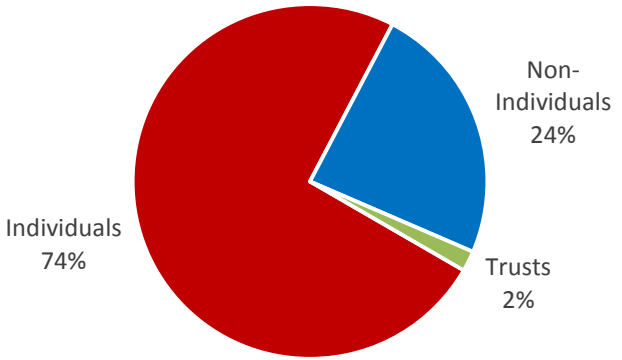
Key Facts

- Total merit-based foundation aid funds in 2018-19 equaled $34,947,107.
- Expendable funds accounted for the majority of merit-based aid funds in 2018-19.
- Top sources of merit-based foundation aid for 2018-19 included alumni, non-alumni and corporations.

Foundation Merit-Based Aid by Gift Type 2018-19



Foundation Merit-Based Aid by Source 2018-19



Proposed Accountability Measure

3. The University of Nebraska will play a critical role in building a talented, competitive workforce and knowledge-based economy in Nebraska in partnership with the state, private sector and other educational institutions.

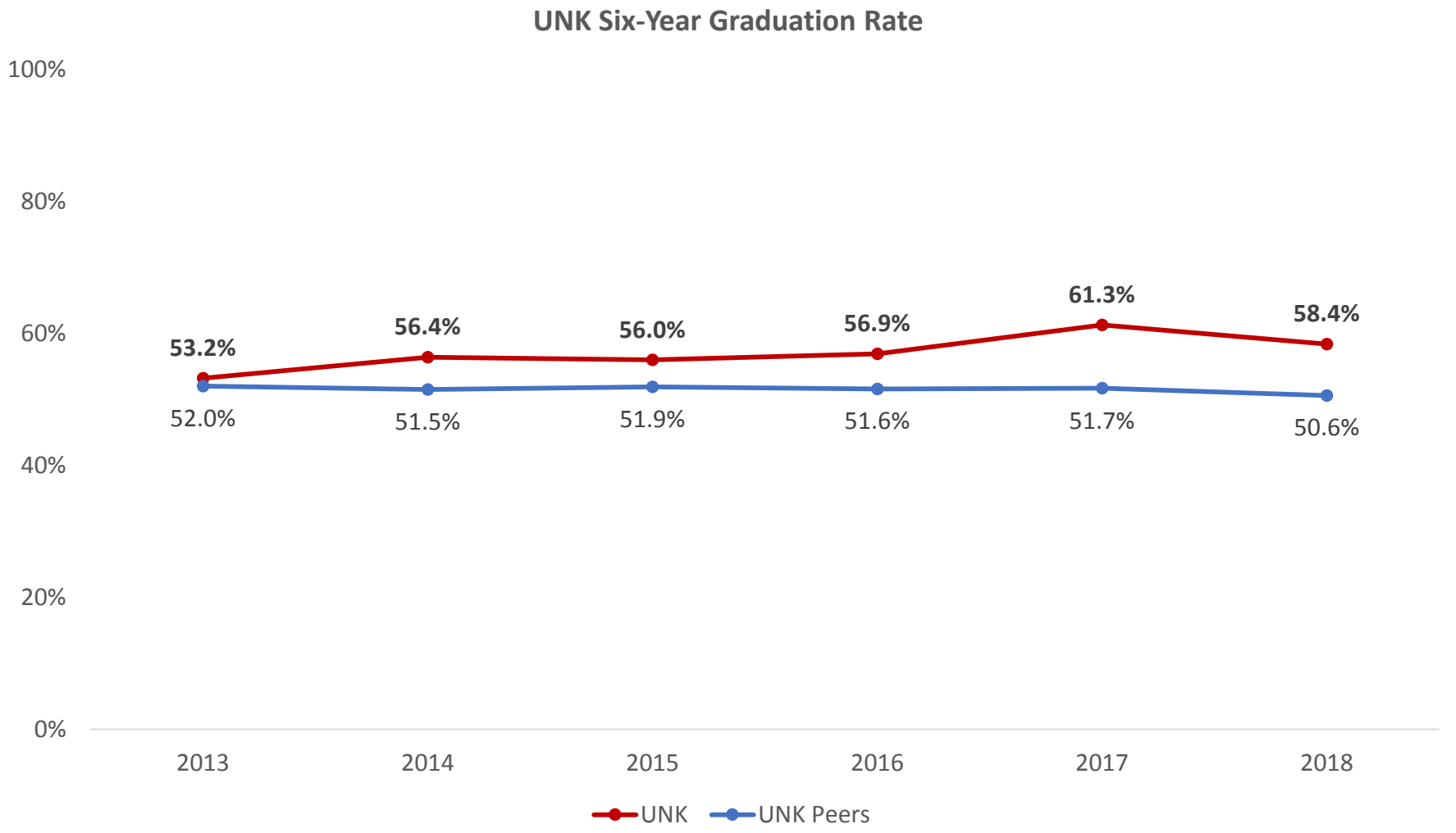
   b. Increase proportion of Nebraska high school students ranking in the top 25 percent of their classes that attend the University of Nebraska.

ii. Increase support for merit-based aid

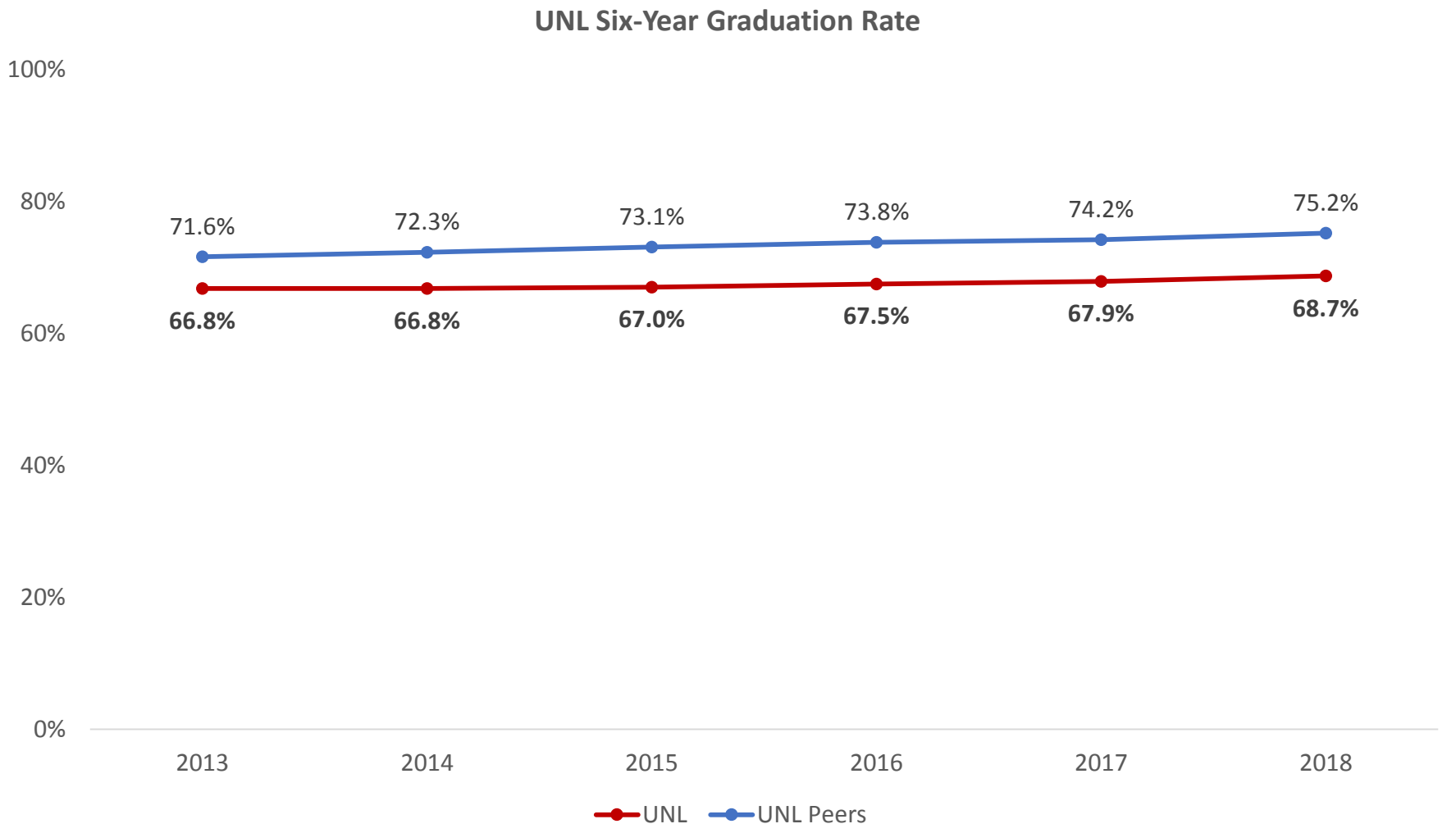
Reporting Period	Accountability Measure	Report Date	Reporting Committee
FY 2019-20	Raise at least $9 million dollars in private funds (endowment and/or spendable).	TBD	Academic
FY 2020-21	Raise at least $9 million dollars in private funds (endowment and/or spendable).	TBD	Academic
FY 2021-22	Raise at least $9 million dollars in private funds (endowment and/or spendable).	TBD	Academic

GRADUATION RATES

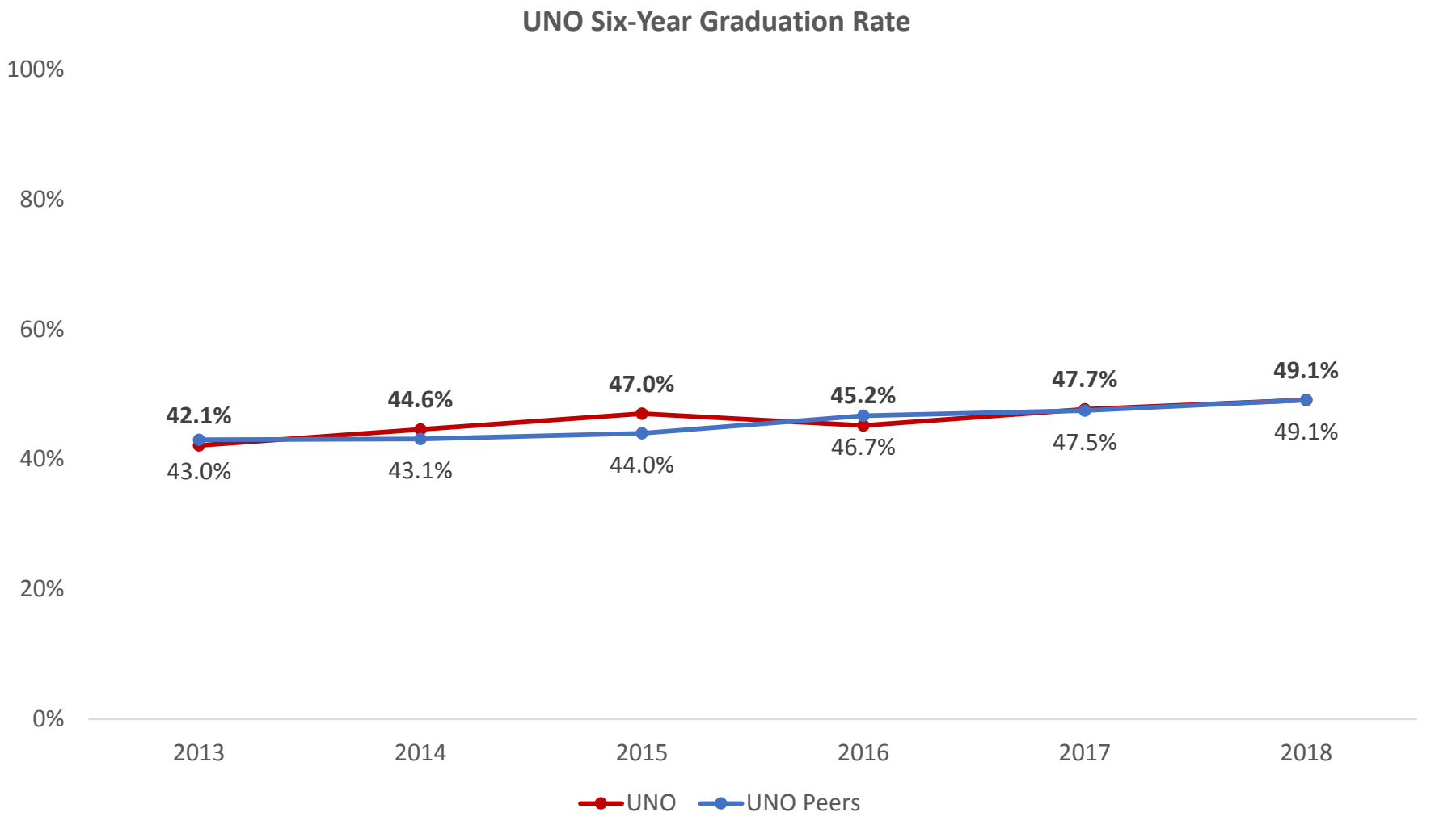
Strategic Framework 1.b.iii Graduation Rates	**AY 2018-19 Goal**: 1) Each campus will maintain or reach the average six-year graduation rate of its peers. 2) All prospective and current undergraduate students are regularly informed and assisted in obtaining the benefit of the University's four-year graduation guarantee.



Strategic Framework 1.b.iii Graduation Rates	**AY 2018-19 Goal**: 1) Each campus will maintain or reach the average six-year graduation rate of its peers. 2) All prospective and current undergraduate students are regularly informed and assisted in obtaining the benefit of the University's four-year graduation guarantee.



Strategic Framework 1.b.iii Graduation Rates	**AY 2018-19 Goal**: 1) Each campus will maintain or reach the average six-year graduation rate of its peers. 2) All prospective and current undergraduate students are regularly informed and assisted in obtaining the benefit of the University's four-year graduation guarantee.



Proposed Accountability Measure

1. The University of Nebraska will provide the opportunity for Nebraskans to enjoy a better life through access to high quality, affordable undergraduate, graduate and professional education.

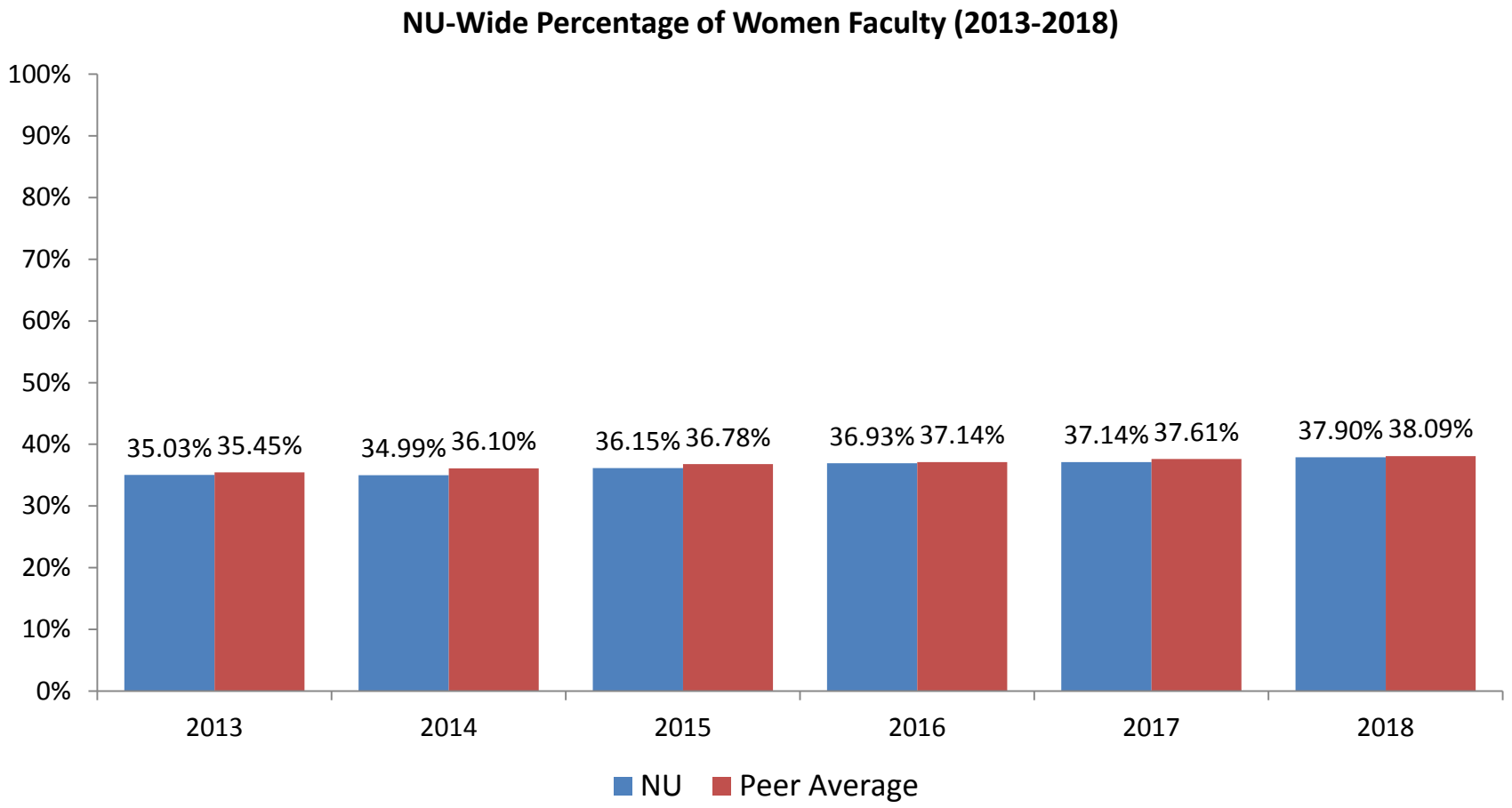
b. Increase the percentage of Nebraska high school graduates (the state "college-going rate") who enroll at and graduate from the university.

iii. Increase each campus's undergraduate six-year graduation rate, with a goal of exceeding the average of its peer institutions.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
2019-20 Academic Year	1) Each campus will maintain or reach the average six-year graduation rate of its peers. 2) All prospective and current undergraduate students are regularly informed and assisted in obtaining the benefit of the University's four-year graduation guarantee.	TBD	Academic

Strategic Framework 2.a.iii
Faculty Diversity
January 2020

1) Increase faculty diversity, employing measures permitted by state and federal law.
2) Report on the diversity of the faculty and the relative rate of change in faculty composition as compared to peers.



Strategic Framework 2.a.iii
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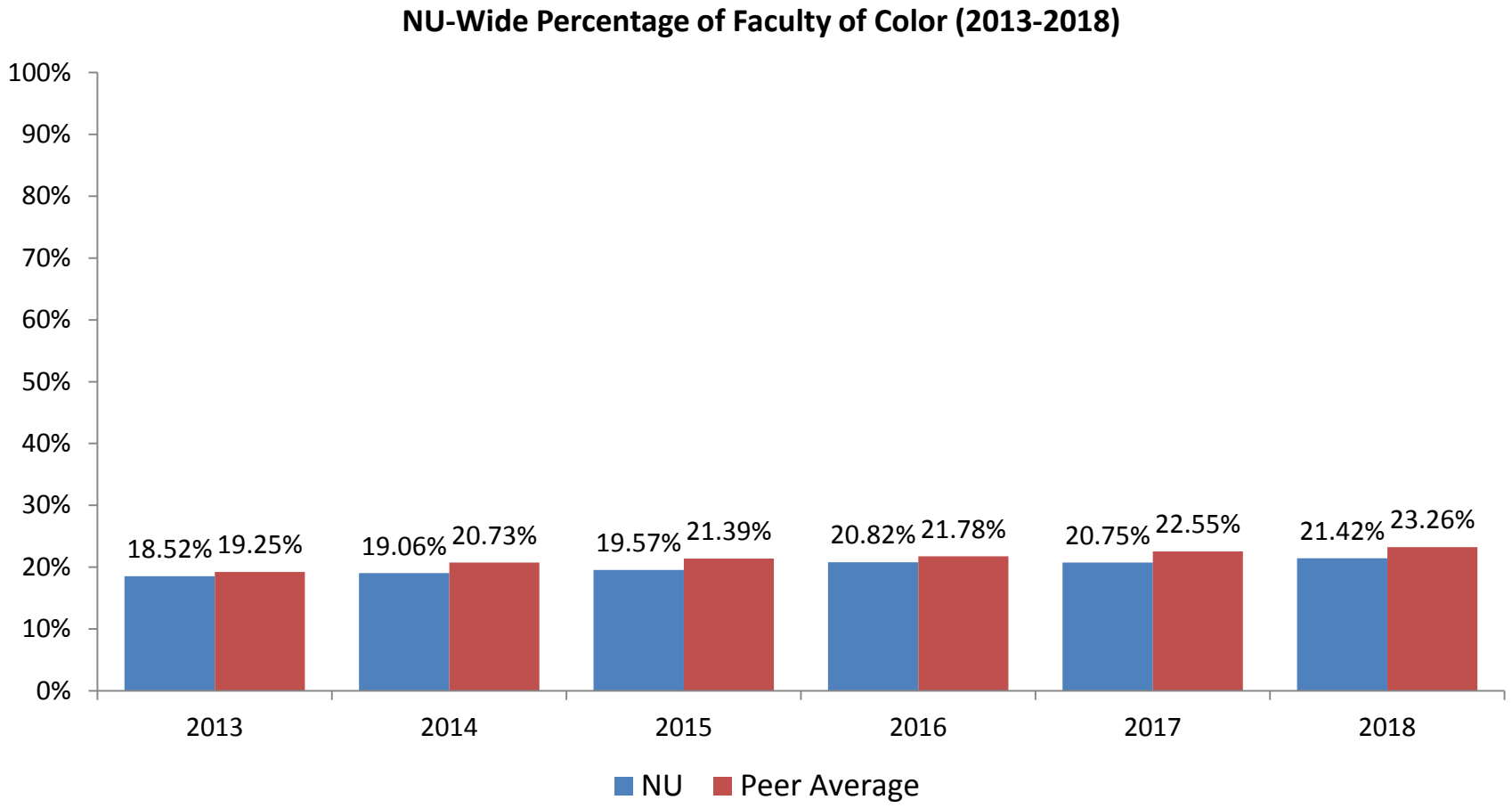
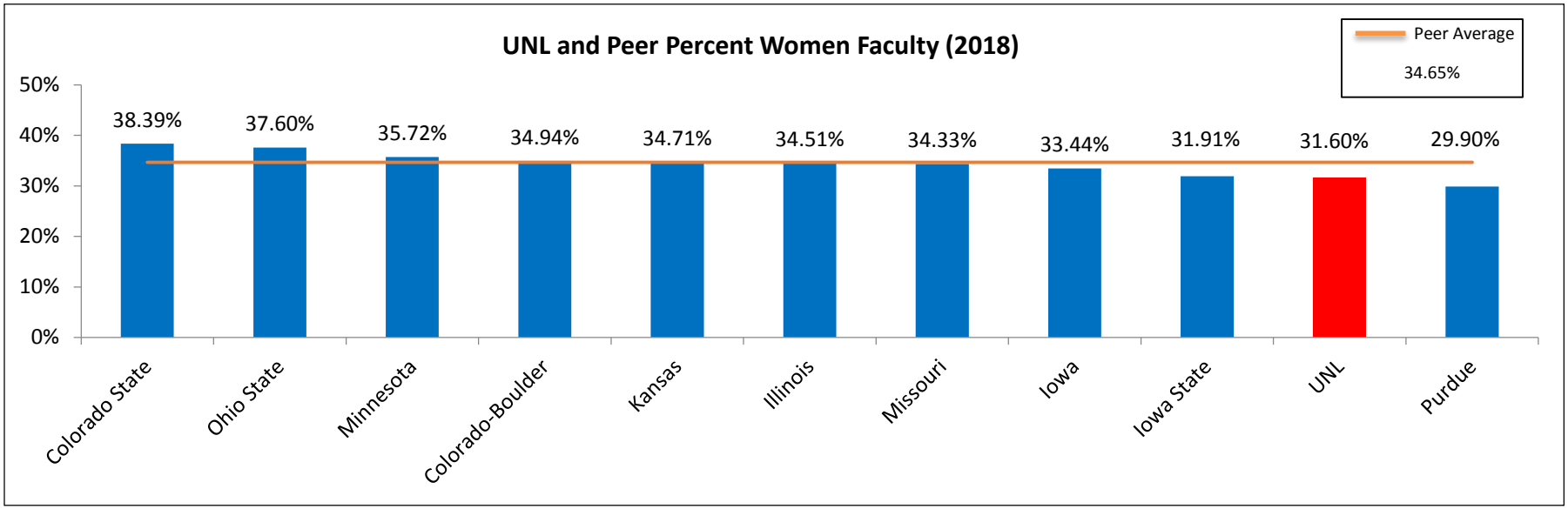
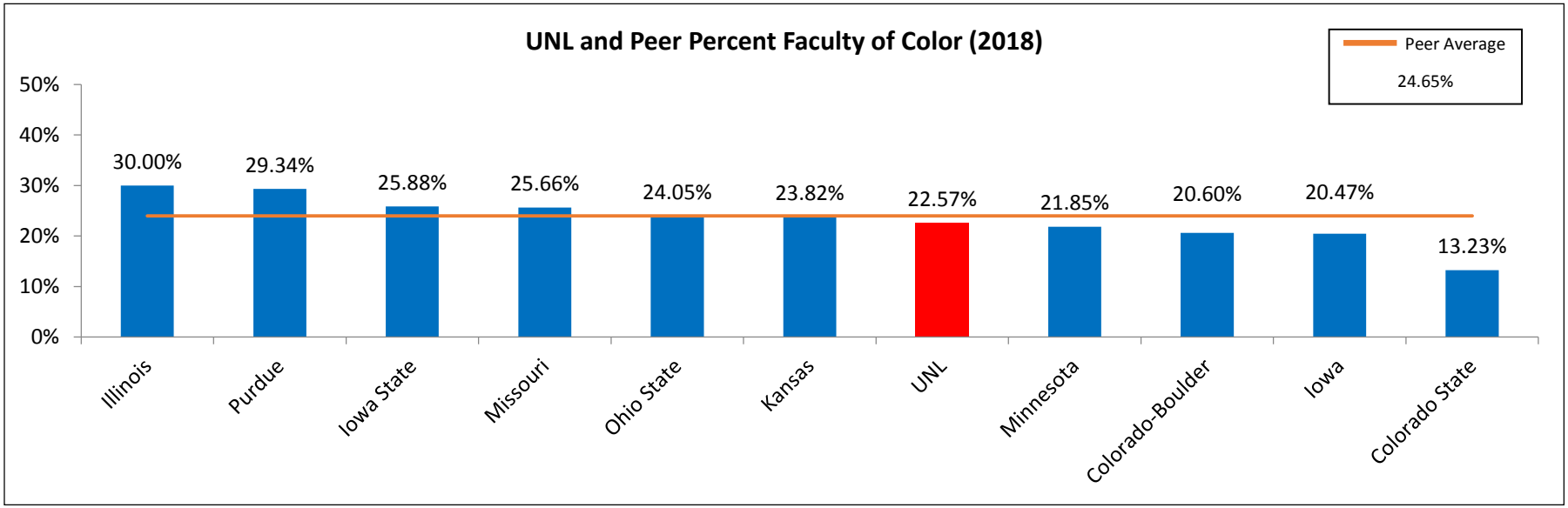


Strategic Framework 2.a.iii
Faculty Diversity

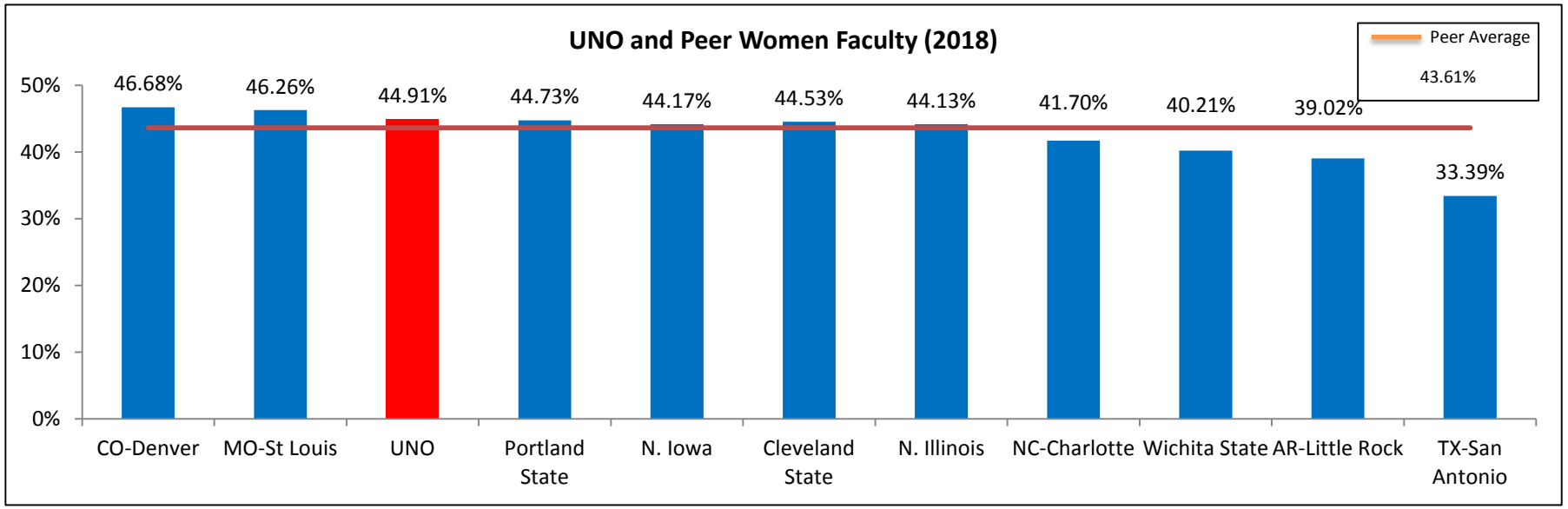
UNL

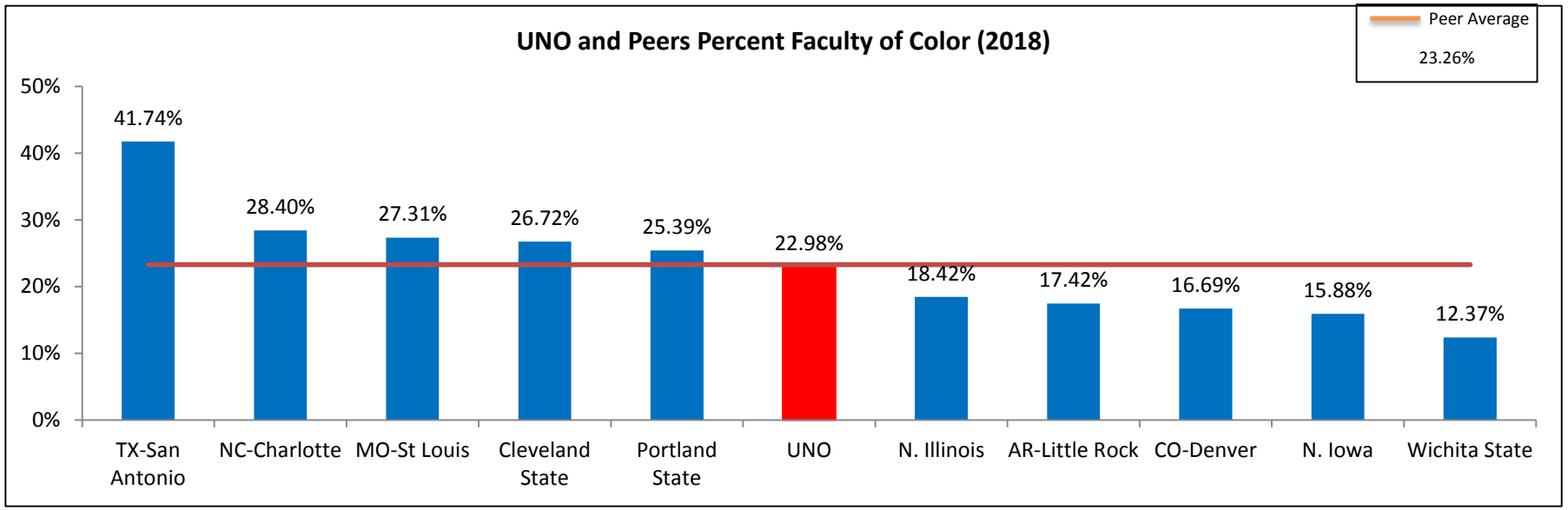




Strategic Framework 2.a.iii
Faculty Diversity

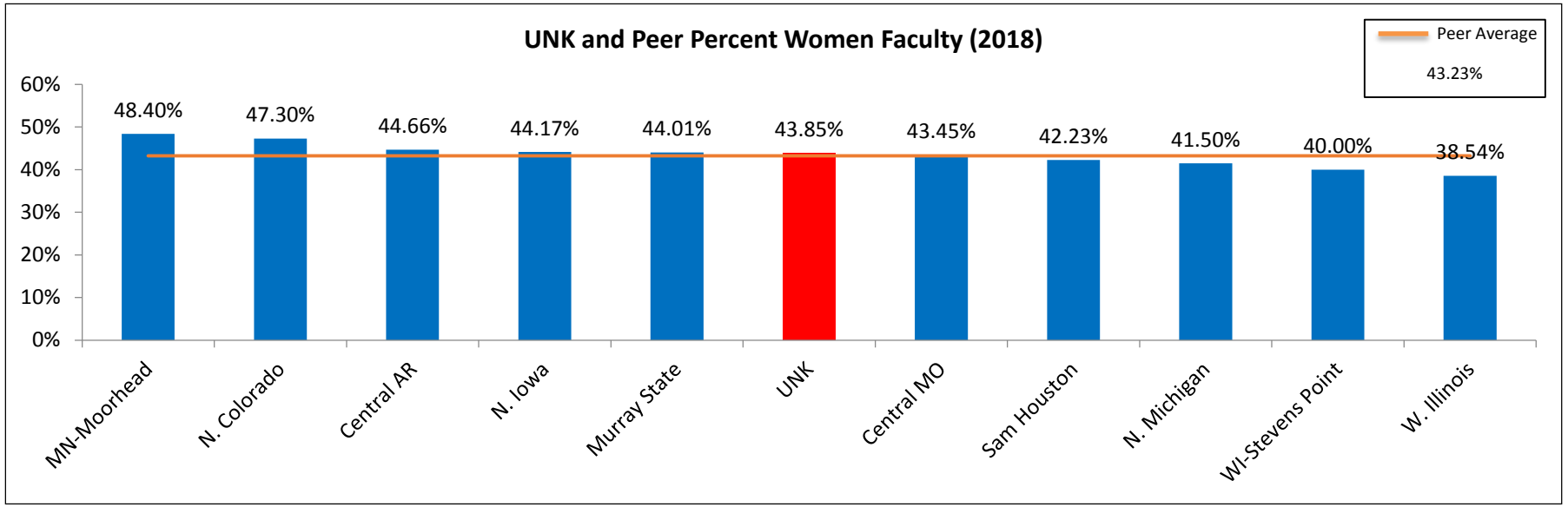
UNO

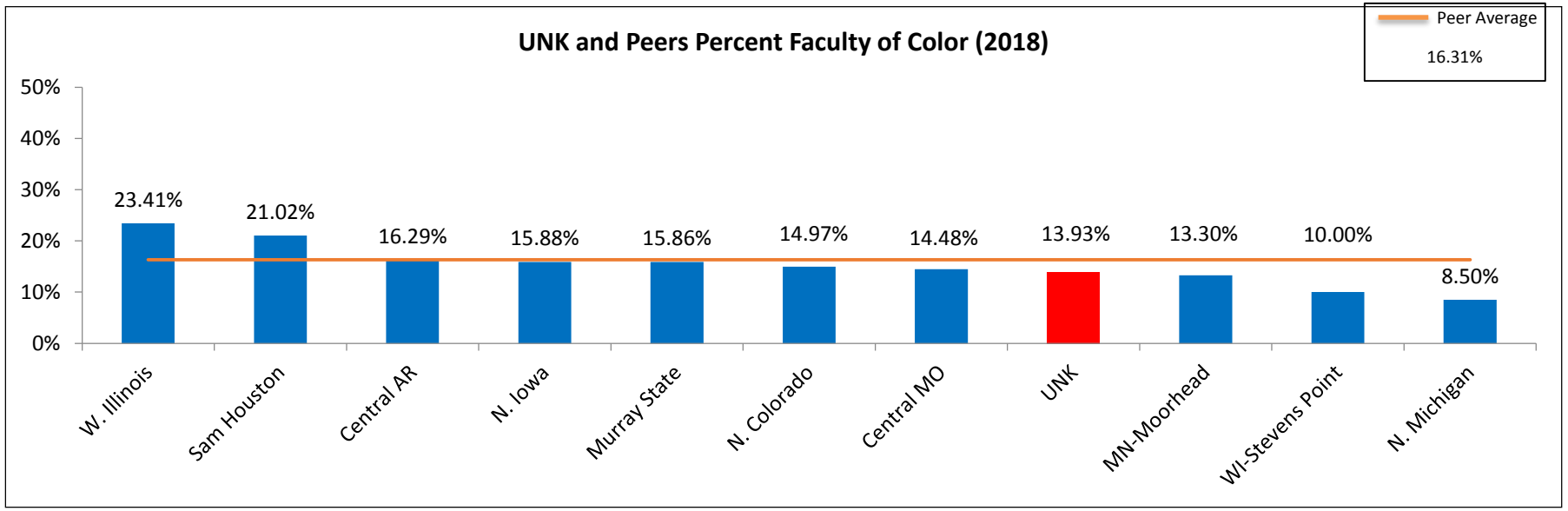




Strategic Framework 2.a.iii
Faculty Diversity

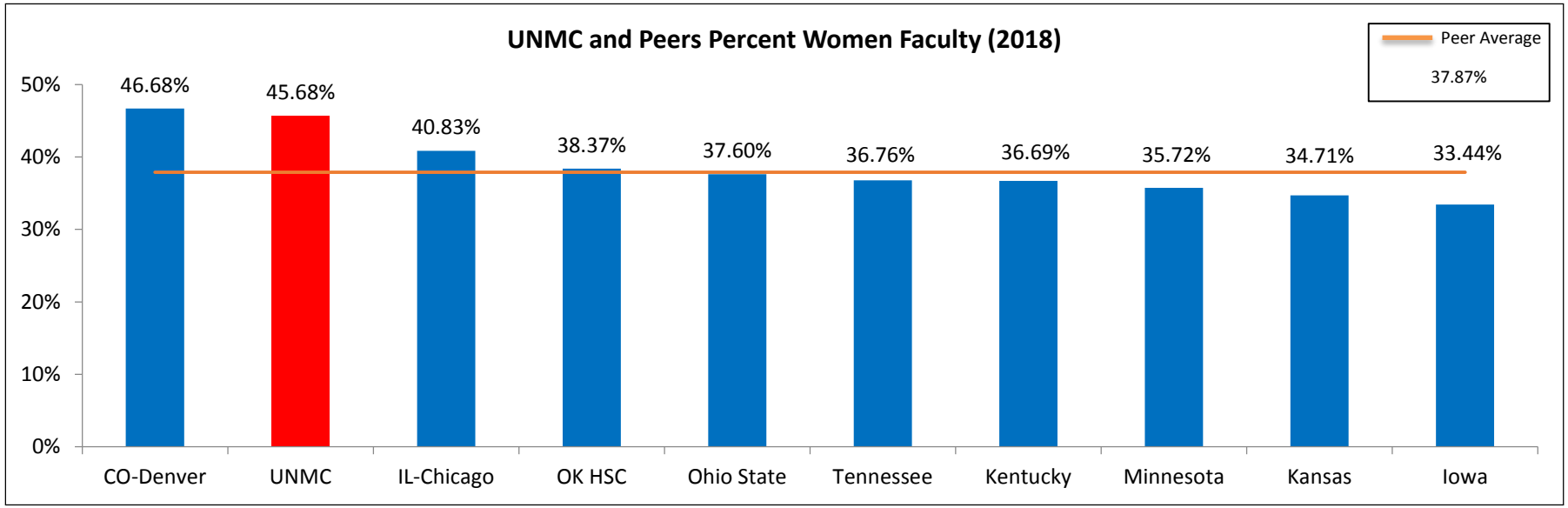
UNK

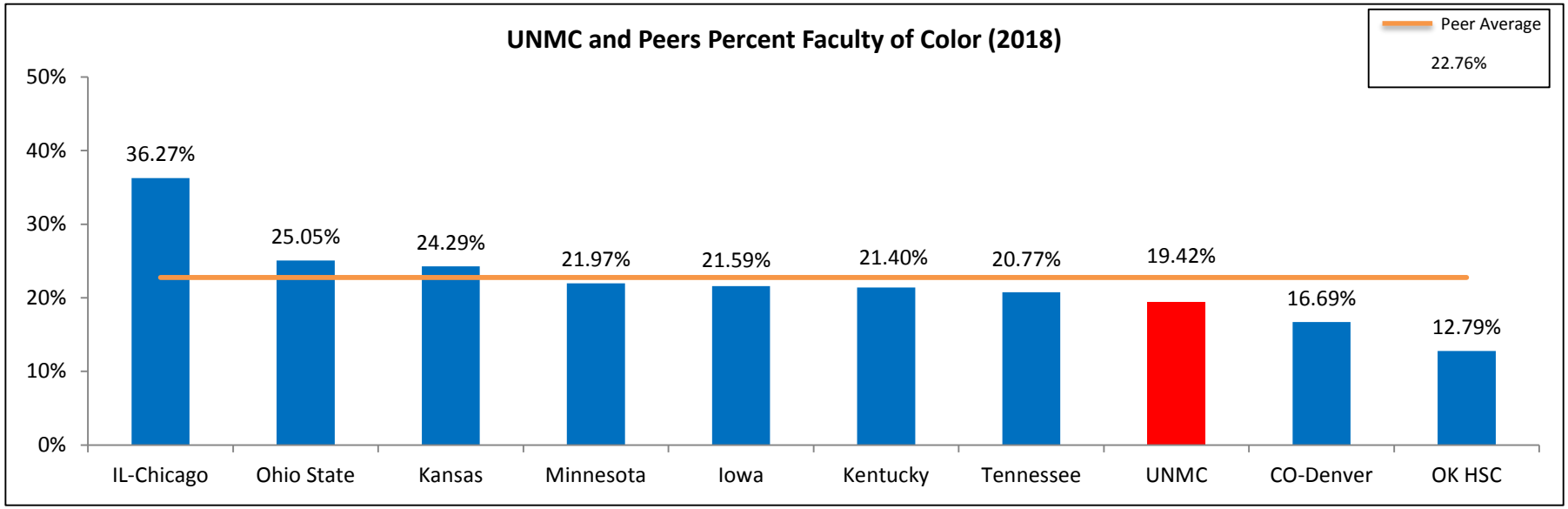




Strategic Framework 2.a.iii
Faculty Diversity

UNMC





Proposed Accountability Measure

2. The University of Nebraska will build and sustain undergraduate, graduate and professional programs of high quality with an emphasis on excellent teaching

   a. Recruit and retain exceptional faculty and staff, with special emphasis on building and sustaining diversity.

      iii. Each campus shall endeavor to meet the university's ongoing commitments to faculty diversity, employing measures permitted by state and federal law.

Reporting Period	Accountability Measure	Report Date	Reporting Committee
Fall 2019	1) Increase faculty diversity, employing measures permitted by state and federal law. 2) Report on the diversity of the faculty and the relative rate of change in faculty composition as compared to peers.	TBD	Academic
Fall 2020	1) Increase faculty diversity, employing measures permitted by state and federal law. 2) Report on the diversity of the faculty and the relative rate of change in faculty composition as compared to peers.	TBD	Academic
Fall 2021	1) Increase faculty diversity, employing measures permitted by state and federal law. 2) Report on the diversity of the faculty and the relative rate of change in faculty composition as compared to peers.	TBD	Academic

TO:	The Board of Regents	Addendum X-D-3
	Academic Affairs	
MEETING DATE:	February 7, 2020	
SUBJECT:	Tenure Density Report	
RECOMMENDED ACTION:	Report	
PREVIOUS ACTION:	January 25, 2019 – The Board of Regents accepted the Fall 2018 University of Nebraska Tenure Density Report.	
EXPLANATION:	The report includes headcounts and net changes across years for Faculty and Administrators with tenure status or in tenure-track positions on all campuses. The purpose of the report is to show the number and percentage of individuals that are tenured at each campus.	
PROJECT COST:	None	
SOURCE OF FUNDS:	None	
SPONSOR:	Susan M. Fritz Executive Vice President and Provost	
APPROVED:	Walter E. Carter President	
DATE:	January 10, 2020	

UNIVERSITY OF NEBRASKA

TENURE DENSITY

Fall 2019 Compared to Selected Previous Years

					Net Change Numbers and Percentage Points		
	2009	2014	2018	2019	1-yr	5-yr	10-yr
University Wide							
Tenured	1,698	1,668	1,597	1,625	28	(43)	(73)
Tenure-Track	444	497	547	525	(22)	28	81
Health Professions	461	484	639	677	38	193	216
Total	2,603	2,649	2,783	2,827	44	178	224
% Tenured	65.2%	63.0%	57.4%	57.5%	0.1%	-5.5%	-7.8%
UNL							
Tenured	918	886	855	869	14	(17)	(49)
Tenure-Track	264	287	323	311	(12)	24	47
Total	1,182	1,173	1,178	1,180	2	7	(2)
% Tenured	77.7%	75.5%	72.6%	73.6%	1.1%	-1.9%	-4.0%
UNL (city only)							
Tenured	682	653	626	620	(6)	(33)	(62)
Tenure-Track	202	192	230	231	1	39	29
Total	884	845	856	851	(5)	6	(33)
% Tenured	77.1%	77.3%	73.1%	72.9%	-0.3%	-4.4%	-4.3%
IANR							
Tenured	236	233	229	249	20	16	13
Tenure-Track	62	95	93	80	(13)	(15)	18
Total	298	328	322	329	7	1	31
% Tenured	79.2%	71.0%	71.1%	75.7%	4.6%	4.6%	-3.5%
UNMC							
Tenured	267	276	245	245	-	(31)	(22)
Tenure-Track*	-	-	-	-	-	-	-
Health Professions*	461	484	639	677	38	193	216
Total	728	760	884	922	38	162	194
% Tenured	36.7%	36.3%	27.7%	26.6%	-1.1%	-9.7%	-10.1%
UNO							
Tenured	335	338	333	334	1	(4)	(1)
Tenure-Track	108	115	131	128	(3)	13	20
Total	443	453	464	462	(2)	9	19
% Tenured	75.6%	74.6%	71.8%	72.3%	0.5%	-2.3%	-3.3%
UNK							
Tenured	178	168	164	177	13	9	(1)
Tenure-Track	72	95	93	86	(7)	(9)	14
Total	250	263	257	263	6	0	13
% Tenured	71.2%	63.9%	63.8%	67.3%	3.5%	3.4%	-3.9%

*Health professions faculty at UNMC are the functional equivalent of tenure-track faculty at other campuses.

TO:	The Board of Regents	Addendum X-D-4
	Academic Affairs	
MEETING DATE:	February 7, 2020	
SUBJECT:	Programs with Tuition Variances	
RECOMMENDED ACTION:	Report	
PREVIOUS ACTION:	March 29, 2019 – The Board of Regents received the Programs with Differential Tuition Rates report for AY2017-18.	
EXPLANATION:	Following approval of Regents Policy RP-5.7.4.10, Differential Tuition Rates, the President was granted authority to approve recommendations by which the campuses may vary the rate of tuition from that established by the Board. The purpose of such variable rates was to achieve University goals and objectives. Regents Policy RP-5.7.4.10 was amended in September, 2011 to provide for annual reporting of tuition variances. The attached report provides information about the variances granted on the Board-approved tuition rates for AY2018-19 and the impact of those actions, including any impact on access. In addition, this report also now provides specific information on programs with differential tuition rates and the use of funds generated by application of these differential rates.	
APPROVED:	/s/ Susan M. Fritz Executive Vice President and Provost	
DATE:	January 10, 2020	

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Campus: Nebraska College of Technical Agriculture

Program: Dual Credit

Approved: May, 2015

Differential: FY 2018-19 Tuition Rates were $131.50 and Dual Credit rates were $65.75
FY 2017-18 Tuition Rates were $127.50 and Dual Credit rates were $63.75

Description: Dual Credit classes at NCTA offer high school juniors and seniors an opportunity to take selected NCTA courses to enhance their high school curriculum. With dual credit classes:

- Students have an opportunity to experience the rigors of college coursework prior to attending the University;
- Program keeps students academically challenged throughout the senior year; and
- Students are provided with a head start on college studies, which offer greater flexibility with their academic programs.

Dual credit classes provide an important recruiting tool. Since 2006, NCTA has had students participate in the program from 135 high schools across Nebraska.

Explanation:

Year	Headcount	Student Credit Hours	Tuition Variance (Net)*
2018-19	74	260	$17,095
2017-18	93	268	$17,085

*Difference between the published tuition rate and the tuition discount.

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Campus: University of Nebraska at Kearney

Program: Dual Enrollment

Approved: Not Applicable

Differential: Beginning with Fall 2018, the Dual Enrollment Program at UNK is a fee-based program, not a tuition variance approved by the President. Data on the program is provided here for completeness. Prior to Fall 2018, the Dual Enrollment Program was tuition based. The cost per credit hour did not change.

Variance: Undergraduate tuition at UNK for 2018-2019 is $198.00 per student credit hour or $594.00 for a 3-credit hour course. Students in the dual enrollment program are charged $75.00 per credit hour. The variance per credit hour is $123.00.

Description: The Dual Enrollment Program allows high school juniors and seniors to earn college credit while still in high school. College-bound students can get a jump on their degree and maximize their time in advanced high school classes. Dual enrollment can provide enhanced curriculum opportunities that help students remain engaged in their junior and senior years of high school and help prepare for college level work.

UNK Dual Enrollment Program

	Number of Enrollments	Credit Hours Earned
Fall 2018-Spring 2019	282	1,594
Fall 2017-Spring 2018	312	1,728

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Campus: University of Nebraska-Lincoln

Program: Nebraska Now

Approved: June 13, 2016

Differential: Students in Nebraska Now courses pay a flat $250/course fee. The AY 2018-19 resident tuition rate was $245/credit hour. Nebraska Now courses diverge from the published resident tuition rates by 66%.

Description: Since 2005 the University of Nebraska-Lincoln has offered the Advanced Scholars program (currently called Nebraska Now), which allowed high school students to take on line courses offered by UNL at a reduced rate. The tuition rate of $100 per credit hour for Nebraska residents and $213 per credit hour for non-residents was most recently approved in April 2015 through the tuition variance - online tuition approval process.

During 2015-2016, UNL reviewed the Advanced Scholars program and determined that the program should not be limited to online courses only due to high school student demand and the potential for recruitment of new students. The program enrolls approximately 150-200 students each year, most from within Nebraska. Beginning in fall 2016, UNL Admissions plans to re-brand the Advanced Scholars program as the Nebraska Now program, expand course offerings to in-person and online courses, grow the size of the existing program, as well as enhance the quality of the student experience.

While the Nebraska Now program is distinct from Advanced Placement and dual-credit programs because students take courses from UNL faculty, we request to offer the same tuition variance as the recently approved dual-credit program at $250 flat fee per course versus the reduced tuition rate approved in April 2015. The competitive pricing allows the campus to grow the program and compete in the AP/dual-credit marketplace. In addition, the consistent tuition rate for high school students taking courses for credit at UNL within a program (dual-credit or Nebraska Now) will preclude confusion and misunderstanding among students, parents and high school counselors that would otherwise arise as a result of maintaining multiple tuition rates.

Explanation:

Year	Headcount	Student Credit Hours	Tuition Variance (Net)*
2017-18	323	1,019	($168,905)
2018-19	282	915	($153,675)

**Difference between the published tuition rate and the tuition discount.*

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Campus: University of Nebraska-Lincoln

Program: Department of Mathematics Dual Credit Offering of Math 208

Approved: March 29, 2016

Differential: Students in Math 208 pay a flat fee of $250 for each course enrollment. The AY 2018-19 tuition rate for resident students is $245 per credit hour. Because Math 208 is a 4-credit hour class, the differential rate diverges from the published tuition rate by 74.5%.

Description: The University of Nebraska-Lincoln sought approval to run a pilot program for offering dual credit courses with the Lincoln Public School system. Similar to the dual credit programs already offered by UNO and UNK, UNL's dual enrollment program enables academically talented high school students to earn UNL credit in special advanced high school courses. The courses are taught by UNL-approved high school faculty with preparation and support by UNL academic departments. Students concurrently enroll in their high school course and in a UNL course and they will receive both University of Nebraska credit and high school credit for their work. While this pilot initially focused on the offering of one math course at Lincoln East High School, we hope to expand course offerings at other LPS schools as appropriate to meet their student demand and interest.

Explanation:

Year	Headcount	Student Credit Hours	Tuition Variance (Net)*
2017-18	8	32	$5,840
2018-19	13	52	$9,100

*Difference between the published tuition rate and the tuition discount.

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Campus: University of Nebraska at Omaha

Program: Dual Enrollment

Approved: November 2006

Differential: The Dual Enrollment Program at UNO is a fee-based program, not a tuition variance approved by the President, data on the program is provided here for completeness.

Variance: Undergraduate tuition at UNO for 2018-2019 is $223.25 per student credit hour or $669.75 for a 3-credit hour course. Students in the dual enrollment program are charged $250.00 for a 3, 4 or 5 credit hour course, and for a 1-credit hour course, the cost is $160.00. For a 1-credit hour course, the variance is $63.25; for a 3-credit hour course, the variance is $419.75; for a 4-credit hour course, the variance is $643.00; for a 5 credit-hour course, the variance is $891.25.

Description: The Dual Enrollment Program allows academically talented students to earn college credit while still in high school. College-bound students can get a jump on their degree and maximize their time in advanced high school classes. Dual enrollment can provide enhanced curriculum opportunities that help students remain engaged in their junior and senior years of high school and help prepare for college level work.

The Dual Enrollment program is a fee-based program that is completely self-supporting. Fees are broken down as follows:

1. $94 AP exam (UNO pays cost of student's exam)
2. $80 UNO academic department supports collaboration with high school counterpart
3. $44 Program support
4. $25 AP support to participating districts
5. $6 UNO Library supports collaboration with high school Librarians
6. $1 UNO Records and Registration collaboration with high schools

UNO Dual Enrollment Program

	Number of Enrollments	Credit Hours Earned
Fall 2018-Spring 2019	5,355	18,564
Fall 2017-Spring 2018	5,521	18,688

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Campus: University of Nebraska at Omaha

Program: National Collegiate Network - Japan

Approved: October, 2013

Differential: The approved tuition variance for this program is 150% of the published tuition rate for resident undergraduate students.

Variance: 2018-19 Nonresident undergraduate $699.00/SCH
2018-19 National Collegiate Network of Japan $344.88/SCH

Description: The primary purpose of this program is to attract outstanding qualified undergraduate students from selected Japanese high schools to pursue a four-year baccalaureate education at the University of Nebraska at Omaha, as well as qualified students for one-year study abroad programs.

Explanation:

		Undergraduate	
Semester	**Headcount**	**SCH**	**Tuition Variance (Net)**
Summer 2019	4	9	($ 10,794)
Spring 2019	36	523	($ 157,671)
Fall 2018	37	522	($ 163,560)

*Difference between the published tuition rate and the tuition discount.

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Campus: University of Nebraska at Omaha

Program: David USA Education - China

Approved: February, 2015

Differential: The approved tuition variance for this program is 150% of the published tuition rate for resident undergraduate students.

Variance: 2018-19 Nonresident undergraduate $699.00/SCH
2018-19 David USA Education - China $344.88/SCH

Description: The primary purpose of this program is to attract outstanding qualified undergraduate students from selected Chinese high schools to pursue a four-year baccalaureate education at the University of Nebraska at Omaha, as well as qualified students for one-year study abroad programs.

Explanation:

		Undergraduate	
Semester	**Headcount**	**SCH**	**Tuition Variance (Net)**
Spring 2019	16	110	($ 65,595)
Fall 2018	14	189	($ 52,315)

*Difference between the published tuition rate and the tuition discount.

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Campus: University of Nebraska at Omaha

Program: Midwest China Council

Approved: September, 2013

Differential: The approved tuition variance for this program is 150% of the published tuition rate for resident undergraduate and graduate students.

Variance: 2018-19 Nonresident undergraduate $699.00/SCH
2018-19 Midwest China Council program undergraduate $344.88/SCH

Description: The primary purpose of this program is to attract outstanding qualified undergraduate and graduate students from selected Chinese high schools and colleges to pursue baccalaureate and graduate education at the University of Nebraska at Omaha.

Explanation:

		Undergraduate	
Semester	**Headcount**	**SCH**	**Tuition Variance (Net)**
Spring 2019	43	443	($ 147,214)
Fall 2018	35	503	($ 160,411)

Differential Tuition Reports

Differential Tuition Report for FY2018-19

Campus: University of Nebraska-Lincoln

College or Program: College of Architecture

Approved: June 8, 2012

Cost Center: 21-0202-5801

Differential: Differential tuition was initially implemented as a 25% premium over then-existing applicable tuition rates. This resulted in additional per credit hour charges of:

- $52 for undergraduate residents,
- $154 for undergraduate nonresidents,
- $69 for graduate residents, and
- $185 for graduate nonresidents.

The College also had a fee of $24 per credit hour that was incorporated into its tuition rate structure. The premiums over base tuition rates grow with approved tuition rate increases, as like increase percentages are applied to the differentiated rates.

Description: Differential tuition was approved in recognition of the increased costs associated with architectural education and the need to invest additional resources in the College in order to provide students with a competitive, quality education. With the only accredited professional programs in Architecture and Planning in the State, the College is a primary source of new professionals for the great many architectural firms in Nebraska.

Revenue:

Year	Headcount	Student Credit Hours	Differential Tuition Generated (Net)*
2018-19	852	12,115	$1,444,553
2017-18	886	12,275	$1,463,691
2016-17	924	12,475	$1,460,674
2015-16	971	12,126	$1,265,170
2014-15	928	10,858	$1,162,394
2013-14	900	10,410	$1,094,909

*Difference between the differential tuition and the published tuition rate.

Note: This figure does not represent the funding available to the College. The distribution to the College is reduced by the costs against this source of funds, namely remissions, scholarships/fellowships, academic services fee, and uncollectible accounts.

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Description of Reinvestment of Differential Tuition for the *past/reporting* year:

The major categories of investment originally proposed for differential tuition funding were teaching and technology capacity and advising and student services. The College's investments are aligned with those priorities:

- The College funded or partially funded several positions, including: Tenured/Tenure-Track faculty summer research, Lecturers and Lecturer/Ts, Graduate Admissions Coordinator, Communications Associate, Advisor, Assistant to the Dean, Peer Mentors, Ambassadors, and Shop Student Workers.
- Differential tuition funding continued to be used for student recruitment and retention efforts including website improvement, development of recruitment/marketing materials, recruitment events, and advising/recruiting related travel.
- In support of student learning, the college brought in guest critics so students would experience input from professional in the field; the college also offered support for studio trips and education abroad.
- Differential tuition was also used to support academic programs through faculty recruiting, faculty travel, and the purchase of hardware, software, and supplies for faculty.

Intentions for Reinvestment of Differential Tuition in the *current* year:

Differential tuition will fund targeted, strategic investments that support the operation of the College to fulfill its mission. All expenditures are intended for the purposes of directly and indirectly improving the education and services provided to the students of the College of Architecture.

Expenses:

Total Differential Tuition Generated 2018-19		$969,165
Prior Year Carryforward		$13,787
Subtotal		$982,952
Differential Tuition Expenditures 2018-19		
Operating		
Student Recruitment/Retention	($18,911)	
Support for Student Learning	($31,166)	
Academic Program Support	($169,462)	
Salary & Benefits:		
Staff[1]	($268,078)	
Students[2]	($28,170)	
Faculty[3]	($468,049)	
Subtotal	($983,836)	
Carryforward	($884)	

[1] Graduate Admissions Coordinator, Communications Associate, Shop Manager, Advisor, Assistant to the Dean

[2] Graduate Students, Peer Mentors, Shop Workers, Ambassadors (37 students)

[3] 14 full-time T/TT summer research, 18 Lecturers and Lecturer/Ts

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Differential Tuition Report for FY2018-19

Campus: University of Nebraska-Lincoln

College or Program: College of Business

Approved: June 17, 2011

Cost Center: Multiple

Differential: Differential tuition was initially implemented as a 25% premium over then-existing applicable tuition rates. This resulted in additional per credit hour charges of:

- $50 for undergraduate residents,
- $147 for undergraduate nonresidents,
- $65 for graduate residents, and
- $175 for graduate nonresidents.

The premiums over base tuition rates grow with approved tuition rate increases, as like increase percentages are applied to the differentiated rates.

Description: Differential tuition was approved in recognition of the increased costs associated with business education and the need to invest additional resources in the College in order to provide students with a competitive, quality education. Specifically noted was the College's growing enrollments and shrinking T/TT faculty.

Revenue:

Year	Headcount	Student Credit Hours	Differential Tuition Generated (Net)*
2018-19	8,316	101,088	$10,469,944
2017-18	8,418	102,601	$10,287,053
2016-17	8,421	99,603	$10,002,714
2015-16	8,041	89,033	$ 8,367,108
2014-15	7,594	84,471	$ 7,723,974

*Difference between the differential tuition and the published tuition rate.

Note: This figure does not represent the funding available to the College. The distribution to the College is reduced by the costs against this source of funds, namely tuition remissions, refunds, and uncollectible accounts.

Description of Reinvestment of Differential Tuition for the *past/reporting* year:

The major categories of investment originally proposed for differential tuition funding were teaching capacity and advising and student services. Consonant with that intent, all investments of differential tuition funds continue to be focused on enhancing the quality of students' education and experiences:

- With a 5 year trend of +9.7% enrollment growth in first time freshman, the College continues to invest in T/TT faculty, Professors of Practice, Lecturers, and graduate assistants in order to meet expanding academic needs created by continued growth.

- Differential tuition funds were used to provide continued improvement of student services programs and support through the expansion of undergraduate, graduate and Business Career Center programs and the Honors Academy. The College was able to continue to put a greater emphasis on recruitment and retention efforts through increased publicity, community outreach, special events, and the organization of a college Enrollment Management and Recruiting team. Differential funding continues to support the growth of the Business Minor, an 18-hour program designed for non- business students and which currently enrolls over 1,300 students. The College continued to improve the student services offices throughout the college to better serve students including the expansion of programs offered by the Teaching and Learning Center (TLC) in Howard L. Hawks Hall. This Center provides support to both faculty and students consistent with our teaching mission. One program managed by the TLC is our peer mentoring program in which undergraduate students assist faculty with large lecture classes. We have seen a significant success rate (over 75%) for students who use the mentoring and tutoring programs of the TLC. A small portion of differential tuition was used for equipment/software upgrades for faculty and professional staff across programs.

Intentions for Reinvestment of Differential Tuition in the *current* year:

Differential tuition funding will continue to be used as originally intended, as it is designated primarily for further new faculty hires in all departments (including related start-up costs) and continued growth in student services and programs, including the Honors Academy, Business Career Center, Enrollment Management/Recruiting, Business Advising and Student Engagement, and the Teaching and Learning Center.

Expenses:

Total Differential Tuition Generated 2018-19		$7,571,281
Prior Year Carryforward		$512,156
Subtotal		$8,083,437
Differential Tuition Expenditures 2018-19		
Operating		
Student Services and Programs	($389,186)	
Faculty Support[1]	($146,135)	
Equipment Upgrades	($70,787)	
Salary & Benefits:		
Faculty[2]	($4,776,739)	
Staff[3]	($1,970,487)	
Students[4]	($153,390)	
Subtotal	($7,506,724)	
Carryforward		$576,713

[1] Start-up, Faculty and Staff professional development

[2] 29 full-time T/TT, PoPs, and Lecturers; 13 part-time lecturers

[3] 28 full- and part-time staff in Career Services, Graduate Programs, Honors Academy, Business Advising and Student Engagement, and IT Services

[4] 1 Graduate assistant and 52 undergraduate student hourly workers

Differential Tuition Report for FY2018-19

Campus: University of Nebraska-Lincoln

College or Program: College of Engineering

Approved: June 17, 2011

Cost Center: Multiple

Differential: Differential tuition was initially implemented as a 25% premium over then-existing applicable tuition rates. This resulted an additional per credit hour charges of:

- $50 for undergraduate residents,
- $147 for undergraduate nonresidents,
- $65 for graduate residents, and
- $175 for graduate nonresidents.

The College also had a fee of $40 per credit hour that was incorporated into its tuition rate structure. The premiums over base tuition rates grow with approved tuition rate increases, as like increase percentages are applied to the differentiated rates.

Description: Differential tuition was approved in recognition of the increased costs associated with engineering education and the need to invest additional resources in the College to provide students with a competitive, quality education. Differential tuition was also identified as an essential component of enacting the College's strategic plans for growing its relevance and impact on workforce and economic development.

Revenue:

Year	Headcount	Student Credit Hours	Differential Tuition Generated (Net)*
2018-19	5,810	68,481	$10,440,450
2017-18	5,886	67,596	$ 9,923,357
2016-17	5,923	64,821	$ 9,529,604
2015-16	5,719	62,788	$ 8,638,331
2014-15	5,611	60,357	$ 8,176,906
2013-14	5,205	57,693	$ 7,255,795

*Difference between the differential tuition and the published tuition rate.

Note: These figures do not represent the funding available to the College. The distribution to the College is reduced by the costs against this source of funds, namely tuition remissions, refunds, and uncollectible accounts.

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Description of Reinvestment of Differential Tuition for the *past* reporting year:

The major investments made with differential tuition were designed to increase undergraduate enrollment capacity, to enhance educational and research quality, to increase support for laboratory research that addresses both fundamental engineering problems and applied solutions, particularly in nanoscale, biological, and energy related disciplines, and to prepare the College to become a partner with Nebraska Innovation Campus (NIC) and other economic development initiatives in the state. The following are ongoing priorities:

- Laboratory Equipment: Differential tuition continues to be used to upgrade and maintain instructional software, instrumentation and laboratory equipment across the College, including Biological Systems Engineering (BSE), the Durham School of Architectural Engineering and Construction (DSAEC), Electrical and Computer Engineering (ECE), Civil and Environmental Engineering (CEE), Computer Science and Engineering (CSCE), Chemical and Biomolecular Engineering (CHBE), and Mechanical and Materials Engineering (MME). For example, Civil Engineering purchased new, advanced laboratory equipment and materials for transportation, water resources, materials, environmental, and structures undergraduate and graduate classes. In MME, differential tuition was used to upgrade teaching labs, including adding two new microhardness testers, replacing 30-year-old equipment, as well as a 7-axis metrology tool for manufacturing. In CHBE, two storage rooms were converted to laboratory space and provided with appropriate supplies and equipment. In ECE, new oscilloscopes and digital signal analyzers were purchased for use in 5 undergraduate laboratory courses on the Scott Campus in Omaha. ECE continues to provide each student in its first semester Fundamentals class an educational robotic platform that helps them gain hands-on engineering experience early in their undergraduate curriculum. They also provide supplies for undergraduate labs and projects including meters, power supplies, oscilloscopes, electronic components, and electric motors. The College has also upgraded video conferencing and distance learning systems for meetings and classes taught between City and Scott Campuses.

- Engineering Student Services: Differential tuition is used to fund all of the staff in the College's Engineering Student Services (ESS) office. ESS staff play a critical role in the recruitment, advising, and retention of undergraduate and graduate engineering students. It is a team of dedicated professional staff and graduate assistants who provide a variety of services and programming to recruit and retain engineering students on City, East and Scott campuses. They provide professional advising to students in all of the College's academic units on all three campuses. ESS delivers a variety of programs and services to our students including a summer bridge program for high school students matriculating to the College, new student orientations, seminar courses, career coaching, academic recovery coaching, academic advising, tutoring in math/chemistry/physics, math preparation for incoming students, and professional development workshops for learning community and student organization leaders. To support students from traditionally underrepresented groups in STEM, ESS runs a Multicultural Engineering Program and a Women in Engineering Program.

- Student Activities and Recognized Student Organizations (RSOs): All academic units in the College used differential to support student design teams and undergraduate and graduate student travel to present at national and international conferences. The Durham School of Architectural Engineering and Construction uses differential tuition to fund student industry visits and national competitions. Differential tuition is also used to support the more than 40 RSOs active in the College. Major student groups supported in MME included the Husker Racing team, the Husker Motorsports team, the Aerospace Club (with numerous competition teams), and the Theme Park Design Group. Support allowed these teams to compete near and far, and to impact the local community. An example is when the Theme Park Design Group designed and built a play area with toys for the Lincoln Zoo. The Husker MotorSports team placed 8th in the nation out of 92 teams. Husker Racing finished 18th in the nation out of more than 100 teams in the season standings (compiled over 3 competitions).

- Professors of Practice: These faculty members generally come to the college following successful careers in engineering industry where they have demonstrated excellence in engineering practice. These faculty infuse this experience into the undergraduate curriculum through their teaching. The College has also hired several faculty with expertise in Disciplinary Based Education Research, whose scholarly work encompasses the study of teaching and learning in engineering.

- Teaching Capacity: Differential tuition is used to provide both long- and short-term teaching and tutoring capacity. Biological Systems Engineering funds some faculty salary and benefits and student workers who work as tutors and graders. Computer Science and Engineering, Chemical and Biomolecular Engineering, Mechanical and Materials Engineering, and Electrical and Computer Engineering use differential tuition to provide salary support for lecturers. Computer Science and Engineering also funds undergraduate teaching assistants to provide tutoring and grading. Computer Science and Engineering and Chemical and Biomolecular Engineering hire student workers to staff and operate their "Student Resource Center," a shared workspace in which students can do homework, work on projects with other students, and seek help from Center staff.

- Formal and Informal Learning Space: Differential tuition is used to renovate, improve and create both formal and informal learning space. Funds were also used to replaced videowalls in NH with 4K laser projectors and improved design, layout and reliability of a/v control systems. Also, classrooms were upgraded on both Lincoln and Scott campuses to add ceiling mounted microphones for hands-free conference and distance classes,

- As part of the Phase I renovations to Scott Engineering Center and the Link, the departments of Civil and Environmental Engineering and Electrical and Computer Engineering were relocated to remodeled office spaces in Nebraska Hall.

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Intentions for Reinvestment of Differential Tuition in the *current* reporting year:

- The College will continue to invest differential tuition in line with its strategic plan. This includes the continued support of the salaries and benefits of faculty who advance the teaching mission of the college and in the Engineering Student Services staff. The College will continue supporting The Complete Engineer Initiative, an extra and co-curricular program that develops non-technical skills, such as leadership and communication, in the College's undergraduate students. This is a distinctive feature of the College's undergraduate experience for which the College is garnering national attention. Differential tuition will continue to be used to create new and renovate existing formal and informal learning spaces and to update technology in classrooms, particularly distance classrooms. The College will continue upgrading instructional labs including computer equipment and software, advanced laboratory equipment, and paying for staff who support the senior capstone design courses. The College will continue to use differential tuition to provide support for student tutoring, extra- and co-curricular activities and industry visits. The College will continue to operate a shuttle service that runs among UNL, UNO, and UNMC.

Expenses:

Total Differential Tuition Generated 2018-19		$7,911,818
Prior Year Carryforward		$510,082
Subtotal		$8,421,900
Differential Tuition Expenditures 2018-19		
Operating		
Student Services and Programs	($1,266,163)	
Infrastructure	($1,669,386)	
College	($90,678)	
Capital Equipment, Renovation, Computer Hardware & Software	($460,986)	
Salary & Benefits:		
Faculty[1]	($689,150)	
Student Services Staff[2]	($1,659,106)	
Students[3]	($626,929)	
Other Staff[4]	($756,226)	
Commitments	($389,767)	
Subtotal	($7,608,391)	
Carryforward		$813,509

[1] 6 full-time and 5 part-time PoPs and Lecturers

[2] 25 full-time and 2 temp staff in Student Services

[3] 7 GAs and 277 undergraduate hourly

[4] 10 Full-time staff in IT Services and Communication

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Differential Tuition Report for FY2018-19

Campus: University of Nebraska at Omaha

College or Program: College of Business Administration

Approved: November 2014

Cost Center: 4106020600
4106020700

Differential: Differential tuition resulted in additional per credit hour charges of:

- $50 for resident undergraduate business courses;
- $75 for resident graduate business courses;
- $75 for Metropolitan Advantage Program (MAP) and nonresident undergraduate business courses; and
- $112.50 for Metropolitan Advantage Program (MAP) and nonresident graduate business courses.

Description: Approval to charge differential tuition was granted in recognition of the higher and increasing costs associated with business education. The additional financial resources generated by differential tuition enabled the college to improve the quality of the educational experience realized by enhancing student services and employing additional fulltime faculty.

Revenue:

Year	Headcount*	Student Credit Hours	Differential Tuition Generated (Net)**
2018-19	2,625	31,994	$2,323,614
2017-18	2,741	35,333	$2,177,749
2016-17	2,842	36,432	$2,131,148
2015-16	2,690	35,132	$2,008,276

* Non-duplicate enrollment headcount
**Difference between the differential tuition and the published tuition rate.
Note: This figure does not represent the funding available to the College. The distribution to the College is reduced by the costs against this source of funds, namely remissions, scholarships/fellowships, academic services fee, and uncollectible accounts.

Description of Reinvestment of Differential Tuition for the *past/reporting* year:

Enrollment growth, along with a more than 30 percent increase in the annual number of degrees conferred between 2010 and 2014, a shift in student composition (e.g., the rapid increase of in- resident students), and the rising salaries of business school faculty were responsible for the need for additional financial resources. The dollars generated by differential tuition were invested in hiring additional full-time faculty, providing enhanced student support, and otherwise improving student learning

experiences. These uses are consistent with the original intentions. Specifically, differential tuition revenue was used for:

- Continued support for the position commitments made during the initial year and the second year;
- Continued support for student financial literacy program;
- Provided support for CBA student international projects ;
- Provided start-up support for new faculty and staff;
- Provided support for faculty teaching; and
- Provided support for student research and learning.

The increase in faculty and staff numbers have allowed the college to strengthen and grow programs as well as increase the support needed for a changing and growing population. The quality of faculty and staff hired has been excellent and their impact on the college's culture is significant. CBA has continued its partnership with Wells Fargo Bank to deliver a financial literacy program that is open to all of the campus community. The college continues to work at leveraging differential tuition resources to obtain additional new resources (e.g., grants and scholarship donations) to further strengthen student support and programs. One differential position was open this past year, after a faculty member left UNO. The position has been filled. Overall, CBA students are realizing excellent value for their increased tuition.

Intentions for Reinvestment of Differential Tuition in the *current* year:

- Continue support for the commitments made during the past three years;
- Continue support for the student financial literacy program; and
- Continue support for CBA student international projects.

Expenses:

Total Differential Tuition Generated 2018-19		$1,739,743
Prior Year Carryforward		$630,763
Subtotal		$2,370,506
Differential Tuition Expenditures 2018-19		
Operating		
Student, Staff, and Faculty Support[1]	($75,623)	
Salary & Benefits:		
Student, Staff, and Faculty salary & benefits[2]	($1,570,512)	
Subtotal	($1,646,136)	
Carryforward		$724,370

[1] Support for international student projects, faculty and staff start up, student programs and activities, and faculty teaching

[2] 12 full-time T/TT and Lecturers and faculty stipend for financial literacy program.

7 full-time staff in Career Services, Advising, Undergraduate Programs and IT services.

1 graduate assistant, 3 peer advisor, and 4 student workers.

The carry forward will be used to:

- Invest in the growth of student programs and activities;
- Fund faculty and staff recruitment and start-up costs as needed; and
- Support student learning and faculty teaching.

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Differential Tuition Report for FY2018-19

Campus: University of Nebraska at Omaha

College or Program: College of Information Science and Technology (CIST)

Approved: November 2019

Cost Center: 4108021500

Differential: Differential tuition resulted in additional per credit hour charges of:

	Res UG	Res GR	NRes UG	NRes GR	MAP UG	MAP GR
On/Off Campus Rate	$223.25	$299.00	$699.00	$777.00	$334.87	$448.50
CIST Rate	$267.25	$336.75	$836.50	$941.25	$400.87	$505.12
CIST Differential	**$44.00**	**$37.75**	**$137.50**	**$164.25**	**$66.00**	**$56.62**

Description: The proposed differential rates for UNO IS&T programs matches UNL Engineering differential rates while the total tuition is still substantively lower than UNL engineering programs.

IS&T charges a differential tuition rate for all its undergraduate and graduate programs as outlined in the table below. Since the inception of CIST nearly 20 years ago, no differential tuition had been charged. In the meanwhile, CIST undergraduate programs had steadily grown, nearly doubling in total headcount in the past five years. In Fall 2016, CIST had 1,381 students enrolled with 981 in undergraduate programs. CIST undergraduate programs also have shown steady historical growth; however, given the constraints of the current international travel context, the college expects a slowing of graduate enrollment growth and even potentially a decline in international enrollment in its programs. Despite the large undergraduate enrollment growth exceeding 1,000 students in Fall 2017, the demand for CIST graduates, just in the region, continues to outstrip the number of graduates produced. As the total enrollment head count grows and stabilizes, the differential tuition revenue will allow the college to cover the costs of ancillary student support services that are predominantly funded from soft money at this time. These services include increasing number of advisors, tutoring support, communication and marketing support, and career counseling and advising. In addition, funds will be used to hire additional faculty to support the growing programs in CIST. Finally, 15-20% of the funds will be set aside to provide scholarships based on financial need to improve diversity and enhance the ability

to competitively recruit and retain students from Nebraska high schools

Revenue: The portion of differential revenue allocated to the college is shown in the following table (*).

CIST Revenue:

Year	Headcount	Student Credit Hours	Differential Tuition Generated (Net)*
2018-2019	Fall 2018: 1,280 Spring 2019: 1,283	19,275	$472,008 (of total $1,175,204)*

*Difference between the differential tuition and the published tuition rate.

Encumbered Permanent Allocation from 2018-19 Revenue:

CIST Faculty lines ($366,848) for 2019-20 and towards budget cuts in 2018-19 ($105,160).

Description of Reinvestment of Differential Tuition for the *past/reporting* year:

CIST spent $134,365 from 2018-19 (past year) on student support services, part-time instruction and graduate student support.

Intentions for Reinvestment of Differential Tuition in the *current* year:

The differential tuition funds were allocated to specific new faculty lines in AY 2019-20. Recruitment for those faculty is currently in process.

Expenses:

Total Differential Tuition Generated 2018-19		$472,008
Prior Year Carryforward		$337,643
Subtotal		$809,651
Differential Tuition Expenditures 2018-19		
Salary & Benefits (PERM)	($366,848)	
Budget Cut (PERM)	($105,160)	
Subtotal	($472,008)	
Carryforward		$337,643

The carry forward money of $337,643 from 2018-19 will be used for student support services, support for graduate students, start-up package for new faculty and part time instructions in 2019-20.

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Differential Tuition Report for FY2018-19

Campus: University of Nebraska at Omaha

College or Program: Graduate Studies/Academic Affairs

Approved: March 2018

Cost Center: 4122011400

Differential: For 2018-2019 differential tuition resulted in an additional per credit hour charges of $29.50 per graduate resident credit hour. FY 2017-8 graduate resident tuition was $269.50/SCH while FY 2018-19 graduate resident tuition was $299.00/SCH

Description: A two year process to equalize graduate resident tuition rates for UNO with UNL base graduate rate.

Revenue:

Year	Headcount	Student Credit Hours	Differential Tuition Generated (Net)*
2018-2019	4,753	14,203	$418,991

*Difference between the differential tuition and the published tuition rate.

Description of Reinvestment of Differential Tuition for the *past/reporting* year:

UNO's 2018-2019 permanent budget reduction and base budget to support faculty and academic programs.

Intentions for Reinvestment of Differential Tuition in the *current* year:

For 2019-2020, the funds will be used in Academic Affairs to support faculty and academic programs.

Expenses:

$270,971 was applied to UNO's 2018-2019 permanent budget reduction.
$148,020 was included in the base budget to support faculty and academic programs.

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Differential Tuition Report for FY2018-19

Campus: UNMC

College: College of Medicine (COM)

Approved: September 2016 (COM, COP, CON)

Cost Center(s): 3199090003, 3199090006, 3199190003, 3199190006, 3199090020, 3199090025, 3199190020, 3199190025

Differential: The tuition rates for the incoming Medical student classes that started in the Fall of 2017 or later were increased 5% more than the rates for students enrolled prior to the Fall of 2017.

Description: Differential tuition was approved in recognition of the need to invest additional resources in the College in order to provide students with a quality education and to allow us to remain competitive with our peer institutions. Increasing the tuition rate was needed to help manage the increasing costs associated with education as well as managing ongoing budget reductions.

Revenue:

Year	Headcount	Student Credit Hours	Differential Tuition Generated (Net)*
2019-20	385	Flat increase by 1,788	$688,380
2018-19	255	Flat increase by 1,740	$440,420
2017-18	130	Flat increase by 1,688	$219,440

*Difference between the differential tuition and the non-differential tuition rate.

Description of Reinvestment of Differential Tuition for the *past/reporting* year:

The funds were invested in the salaries of faculty who were involved in the teaching of student studying for their MD and MD/PhD degrees. A portion of the funds were also used for corresponding need based resident tuition scholarships.

Intentions for Reinvestment of Differential Tuition in the *current* year:

The funds will be invested in the salaries of faculty who were involved in the teaching of student studying for their MD and MD/PhD degrees.

Expenses:

Total Differential Tuition Generated 2017-18 and 2018-19		$561,600
Total Faculty Salary & Benefits 2017-18 and 2018-19	($561,600)	
Carryforward		$0

Differential Tuition Report for FY2018-19

Campus: UNMC

College: College of Pharmacy (COP)

Approved: September 2016

Cost Center: 3120015001

Differential: The approved tuition for this program is $3,500 (or 17%) over the non-differential tuition rate at the time of the request.

Description: Resident Tuition: UNMC's College of Pharmacy resident tuition rate was $19,114/year. Combined with the mandatory fee, UNMC COP placed at the bottom, or 10/10, in its peer group. With the resident tuition increase of $3,500, COP would rise less than the maximum of a single rank increase in its peer group.

It was important to note that the $14,000 tuition increase over the 4 years of the program is more than offset by the reduction of COP's prerequisite requirements from 90 semester hours to 64 semester hours that was implemented in the Fall of 2016. This reduction saves the students one full year of tuition and fees, housing and books worth approximately $20,000 at UNL at that time and even more at other undergraduate programs.

The additional revenue generated by this resident tuition rate increase will be used by the COP for the following:

- To hire approximately five additional faculty required due to new accreditation requirements becoming effective July 2016;
- Faculty salary adjustments; and
- Increase need based resident student scholarship for the professional programs.

Revenue:

Year	Headcount	Student Credit Hours	Differential Tuition Generated (Net)*
2017-18	53	720	$166,950
2018-19	106	1,440	$333,900
2019-20	162	2,160	$500,850

*Difference between the differential tuition and the non-differential tuition rate.

Description of Reinvestment of Differential Tuition for the *past/reporting* year:

Differential Tuition for last year was carried forward for the new dean to use to hire faculty. Dean Fletcher retired on January 6th, 2019. He thought it best to leave the decision on how to use the funds to incoming Dean Dr. Keith Olsen. Dean Olsen started on January 7th, 2019 and has been informed of the original intentions of the reinvestment.

In June 2019, our previous Associate Dean for Academic affairs stepped down but did not retire. He was replaced and previous carry forward dollars were used for his replacement.

A portion of the funds also were used for corresponding need-based resident tuition scholarships.

Intentions for Reinvestment of Differential Tuition in the *current* year:

The College is in the process of hiring an Assistant Professor for our Office of Experiential Programs (OEP) Office. The Accreditation Council for Pharmacy Education (ACPE) Standards 2016 has expanded the roles and responsibilities of experiential education, including robust assessment, intentional experiences, and greater quality assurance. Today, experiential education comprises 30% of the pharmacy curriculum. These experiences are integrated into all four years of the pharmacy curriculum through introductory and advanced pharmacy practice experiences (IPPE/APPE), requiring our students to be placed at educational sites throughout the state. The coordination of local, state, and regional sites, development of preceptors, experiential assessment, and program management requires organizational support.

The director of experiential programs is retiring 12/31/2019. We replaced that position and made it a Director/Assistant Dean for Experiential Programs.

Expenses:

Total Differential Tuition Generated 2017-18 thru 2019-20		$500,850
Prior Year Carryforward		$0
Subtotal		$500,850
Differential Tuition Expenditures 2017-18 thru 2019-20		
Salary & Benefits:		
2 faculty hired, including benefits & stipends	($232,378)	
Carryforward		$268,472

$150,000 of the carryforward will be used for Salary and benefits for hiring an Assistant Professor for our OEP Office. The balance of the remaining carryforward will be added to the final year of differential tuition to be used towards the original objectives of the differential tuition.

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Differential Tuition Report for FY2018-19

Campus:	UNMC
College:	College of Nursing (CON)
Approved:	September 2016 (COM, COP, CON) & spring 2018 (CON, COPH, COD)
Cost Center(s):	3199100110, 3199100111, 3199100112, 3199100113, 3199100114, 3199100115, 3199100116, 3199100118, 3199100120, 3199100400, 3199100402, 3199100404, 3199100406, 3199100408, 3199220110, 3199220111, 3199220112, 3199220113, 3199220114, 3199220115, 3199220116, 3199220118, 3199220120, 3199220400, 3199220402, 3199220404, 3199220406, 3199220408, 3199300111, 3199300112, 3199300113, 3199300114, 3199300115, 3199300116, 3199300118, 3199300120, 3199300400, 3199300402, 3199300404, 3199300406, 3199300408
Differential:	September 2016: The approved tuition for the undergraduate nursing program is 110% of the non-differential tuition rate of $300.75. September 2016: The approved tuition rate for the graduate nursing program is 110% of the non-differential tuition rate of $483.25. Spring 2018: The approved tuition for the undergraduate nursing program is 105% of the non-differential tuition rate of $330.75. Spring 2018: The approved tuition rate for the graduate nursing program is 105% of the non-differential tuition rate of $531.50.
Description:	Clinical agencies are requiring a reduction in the number of students in clinical rotations due to increased patient activity. The Nebraska Board of Nursing allows 10 students per faculty member, but an increasing number of clinical facilities are permitting no more than 6 students per faculty member. The differential tuition allows for the hiring of faculty to cover the greater number of clinical supervisors needed due to fewer students per cohort and to ensure that we have adequate faculty to meet accreditation and Board of Nursing standards. The differential tuition was requested to cover faculty market salary adjustments to keep pace with national standards due to the on-going nursing shortage, the widening gap between salaries offered to nurses practicing in clinical practice and those who work in academic faculty roles.

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Revenue:

	Year	# of Students	Student Credit Hours	Differential Tuition Generated
Undergraduate	2017-18	302	10,129	$303,870
	2018-19	610	19,937	$437,510
	2019-20*	260	7,950	$131,175
Graduate	2017-18	108	1,471	$70,976
	2018-19	189	3,352	$124,128
	2019-20*	186	3,194	$118,310

*Projection

Description of Reinvestment of Differential Tuition for the *past/reporting* year:

Differential tuition was used to provide market equity salary adjustments to 4 undergraduate and 1 graduate faculty member to lessen the 10.4% salary gap between CON faculty and national peers. Additionally, differential tuition covered the salary and benefits of new faculty hires to cover the increased need for clinical supervision. A portion of the funds also were used for corresponding need-based resident tuition scholarships.

Intentions for Reinvestment of Differential Tuition in the *current* year:

CON will utilize the differential tuition funds to make further faculty market adjustments to lessen the salary gap. The funds also will be used to continue covering the salaries and benefits for those faculty hired to cover clinical supervision.

Expenses:

Total Differential Tuition Generated 2018-19		$561,638
Prior Year Carryforward		$0
Subtotal		$561,638
Differential Tuition Expenditures 2018-19		
Salary & Benefits:		
Market adjustments	($11,277)	
New faculty hired	($550,361)	
Subtotal	($561,638)	
Carryforward		$0

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Differential Tuition Report for FY2018-19

Campus: UNMC

College: College of Dentistry (COD)

Approved: November 2016

Cost Centers: 3109200001, 3109050024

Differential: The differential tuition rate is 7% higher than the standard tuition rate. The differential tuition rate is being phased in with each newly-admitted class, starting with the Class of 2021.

Description: The differential tuition is necessary to further implement the new Clinical Education and Practice Model implemented in FY2016-17. The additional tuition will be used to make key equipment purchases and faculty hires to sustain the Clinical Education and Practice Model.

Revenue:

Year	Headcount	Differential Tuition Generated
2019-20	51	$109,250
2018-19	50	$107,100
2017-18	50	$104,750

Description of Reinvestment of Differential Tuition for the past reporting year:

The differential tuition was used to help purchase new computers, computer supplies and software, and provided salary support for part of a faculty salary line. A portion of the funds also were used for corresponding need-based resident tuition scholarships.

Intentions of Reinvestment of Differential Tuition in the current year:

Continue to make purchases of digital dentistry equipment, make technology purchases that support the new College of Dentistry iWall classroom, and fund faculty salaries and benefits that directly support teaching.

Expenses:

Total Differential Tuition Generated 2018-19		$107,100
Prior Year Carryforward		$0
Subtotal		$107,100
Differential Tuition Expenditures 2018-19		
Operating		
Computer Equipment, Supplies, and Software	($83,786)	
Salary & Benefits:		
Faculty hire (0.18 FTE)	($23,314)	
Subtotal	($107,100)	
Carryforward		$0

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Differential Tuition Report for FY2018-19

Campus: UNMC

College: College of Allied Health Professions (CAHP)

Approved: November 2016

Cost Center: 3104010051

Differential: The approved differential tuition rates for the CAHP programs are 110% of the previously approved, non-differential tuition rates.

Description: CAHP compared the tuition for the UNMC programs to the tuition of its competitors and calculated an increase that would not change relative cost. In the case of all but the Medical Nutrition program, that increase was 10%. Rather than seeking a different rate for Medical Nutrition, CAHP requested 10%, which did change the relative ranking among tuition peers from 7th out of 10 (with 10 being least expensive) to 6th out of 10.

Revenue:

Year	Headcount	Student Credit Hours	Differential Tuition Generated (Net)*
2019-20	89	2,556	$88,104
2018-19	571	9,326	$298,750

*Difference between the differential tuition and the non-differential tuition rate.

Description of Reinvestment of Differential Tuition for the *past/reporting* year:

CAHP requested funding to support strategic hires to establish student wellness programming, fund a curriculum specialist and assessment coordinator, fund initial start-up costs for an Occupational Therapy (OT) program and for the acquisition and maintenance of teaching and distance delivery technology.

In 17-18 funding was used to support a salary line for a post-doctoral research associate with the balance reserved for funding start-up costs for the OT program. Plans for student wellness programming have been put on-hold as a campus wide initiative takes shape.

In 18-19 the post-doc researcher took on a full time faculty role. This funding source has been redeployed to support a research graduate assistant. A curriculum assessment specialist was hired and is partially funded from this revenue source.

The OT Program Director was hired November 1, 2018 and is currently working on curriculum development, the accreditation application and other start-up activities. The CAHP is currently recruiting an OT Academic Field Work Coordinator, a faculty role needed to develop clinical sites for student training.

The CAHP is collaborating with campus leadership related to student wellness efforts but no direct expenses have yet been incurred.

A portion of the funds also were used for corresponding need-based, resident tuition scholarships.

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Intentions for Reinvestment of Differential Tuition in the *current* year:

In 2019-20 the CAHP will use the differential tuition revenue to continue to support a research assistant, curriculum assessment specialist and the OT program. If sufficient funds are generated, an additional staff role may be developed to support student and faculty growth in the Cytotechnology and Medical Nutrition programs.

Expenses:

2017-18		
Revenue		$154,040
Prior Year Carryforward		$0
Subtotal		$154,040
Expenditures		
Salary & Benefits:		
1-Post-doc	($46,777)	
Subtotal	($46,777)	
	$107,263	
2018-19		
Revenue		$298,750
Prior Year Carryforward		$107,263
Subtotal		$406,013
Expenditures		
Salary & Benefits:		
OT Program Director*	($101,910)	
Curriculum Coordinator	($13,948)	
Operating:		
OT Program Start up*	($7,676)	
Subtotal	($123,534)	
Carryforward		$282,479

*OT program director salary and benefits and operating expenses are reflected in the OT program cost center (3104120001) for tracking purposes, the funding source for that cost center is tuition differential funds.

Carry forward will continue to support the OT program startup expenses including director's salary, the Academic Fieldwork Coordinator currently being recruited and program operating expenses. Several additional faculty roles will be developed and filled in the next 18 months and all carry forward dollars will be needed to help cover those expenses. Tuition revenue from the OT program will ultimately be sufficient to cover program expenses but that revenue stream is not expected to begin until Fall 2021.

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Differential Tuition Report for FY2018-19

Campus: UNMC

College: College of Public Health (COPH)

Approved: Spring 2018

Cost Center(s): Distribution to all five departments. (3154100001 BIO Tuition, 3154200001 EAOH Tuition, 3154300001 EPI, 3154400001 HSRA Tuition and 3154500001 HP Tuition)

Differential: The approved differential tuition increase was 3% for the Public Health Professional Program students admitted the Fall 2018 semester and going forward. The resident rate per credit hour was raised from $435 to $449.

Description: In March 2018, Dr. Davies requested that we propose differential tuition increases for incoming students beginning with FY2018/19.

Revenue:

Year	Differential Tuition Generated (Net)*
2018-19	$37,337
2019-20	$37,337

*Difference between the differential tuition and the non-differential tuition rate.

Description of Reinvestment of Differential Tuition for the *past/reporting* year:

The additional funds derived from the differential tuition have been utilized towards faculty salary support. A portion of the funds also were used for corresponding need- based resident tuition scholarships.

Intentions for Reinvestment of Differential Tuition in the *current* year:

The additional funds derived from the differential tuition are being utilized towards faculty salary support.

Expenses:

Total Differential Tuition Generated 2018-19 and 2019-20		$37,337	per year
Prior Year Carryforward		$0	
Subtotal		$37,337	per year
Differential Tuition Expenditures 2018-19 and 2019-20			
Salary & Benefits:			
3 faculty hired ($37,337 per year)	($37,337)		
Subtotal	($37,337)		
Carryforward		$0	

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Differential Tuition Report for FY2018-19

Campus: UNMC

College: College of Dentistry (COD)

Approved: Spring 2018

Cost Centers: 3109100001, 3109050024

Differential: The differential tuition rate is 10% higher than the non-differential tuition rate for the Dental (DDS) students and 13% higher for the Dental Hygiene (DH) students. The Differential tuition rate is being phased in with each new admitted class, starting with the DDS Class of 2022 and the DH class of 2021.

Description: The differential tuition is necessary to make investments in information technology (IT) infrastructure and key faculty and staff hires that directly support our dental education programs.

Revenue:

Year	Headcount	Differential Tuition Generated
2019-20	51 DDS; 24 DH	$139,883
2018-19	50 DDS; 24 DH	$135,546

Description of Reinvestment of Differential Tuition for the past reporting year:

The differential tuition was used to help purchase new equipment for the Dental Hygiene program and assist with part-time faculty coverage for the Dental Hygiene program. A portion of the funds were also used for corresponding need based resident tuition scholarships.

Intentions of Reinvestment of Differential Tuition in the current year:

Continue to purchase IT equipment and fund faculty salaries and benefits that directly support teaching.

Expenses:

Total Differential Tuition Generated 2018-19		$135,546
Prior Year Carryforward		$0
Subtotal		$135,546
Expenditures		
Operating:		
Dental Hygiene cavitron units	($19,758)	
Salary & Benefits:		
Part-time faculty hire (0.20 FTE)	($18,905)	
Subtotal	($38,663)	
Carryforward		$96,883

Regents Policy 5.7.4 Programs with Tuition Variances
Academic Year 2018-19

Differential Tuition Report for FY2018-19

Campus: UNCA

College or Program: University of Nebraska Online

Approved: Date - Varies

Cost Center: Multiple

Differential: At the June 12, 2009 meeting, the BoR approved elimination of Regents Policy RP-5.7.6 Tuition Policy for Distance Education For-Credit Hours and approved the current policy that allows the University to set both in-state and out-of-state tuition for distance education courses through its regularly established procedures of either Board approval or Presidential approval for variances. Distance education tuition rates were set based on operating expenses, market comparisons and market competition beginning in FY 2010.

Description: University of Nebraska Online is the university-wide online learning initiative that pulls together under one brand the online programs offered by the NU campuses to serve the educational needs of Nebraskans and provide access to students who may otherwise not be able to enroll in NU degree programs. Through its branding and marketing of Online, the University of Nebraska has enhanced its presence throughout the world. The financial model assumes that campuses will recover campus expenses and that the distance education tuition would be used to support the development, delivery, and sustainability of online education. It is also expected that efficiencies due to consolidating some functions will reduce campus cost, thus enhancing net revenue at the campus level and providing new resources for investment in expansion of existing programs or development of new programs. NU Online will provide University-wide marketing, program development investments, a support structure to attract new enrollments, promote collaboration among the campuses, provide opportunities for faculty development, shared services, and dissemination of effective practices in online education. NU Online will assure that the NU campuses are authorized and in compliance with all laws and policies related to serving students in and outside the state of Nebraska.

Revenue: Gross distance education tuition revenue increased approximately 11% in FY19.

	Student Credit Hours										
	UNK		UNL		UNO		UNMC		TOTAL		Percent Change
Student Level	AY17/18	AY18/19	AY17/18	AY18/19	AY17/18	AY18/19	AY17/18	AY18/19	AY17/18	AY18/19	
Undergraduate	27,328	30,085	61,112	72,575	74,098	74,573	2,027	1,499	164,565	178,732	8.6%
Graduate	22,790	22,915	21,148	21,143	14,330	15,899	657	733	58,925	60,690	3.0%
Professional	-	-	74	84	-	-	2,268	2,169	2,342	2,253	-3.8%
Total All Campuses	**50,118**	**53,000**	**82,334**	**93,802**	**88,428**	**90,472**	**4,952**	**4,401**	**225,832**	**241,675**	**7.0%**

	Distance Education Tuition										
	UNK		UNL		UNO		UNMC*		TOTAL		Percent Change
Student Level	FY18	FY19	FY18	FY19	FY18	FY19	FY18	FY19	FY18	FY19	
Undergraduate	$ 7,379,376	$ 8,137,288	$ 20,242,634	$ 24,762,825	$ 24,219,962	$ 25,811,292	$ 511,773	$ 660,475	$ 52,353,745	$ 59,371,880	13.4%
Graduate	$ 7,799,081	$ 8,190,398	$ 8,800,810	$ 8,851,820	$ 5,681,226	$ 6,344,331	$ -	$ -	$ 22,281,117	$ 23,386,549	5.0%
Professional	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,468,649	$ 1,685,960	$ 1,468,649	$ 1,685,960	14.8%
Total All Campuses	**$ 15,178,457**	**$ 16,327,686**	**$ 29,043,444**	**$ 33,614,645**	**$ 29,901,188**	**$ 32,155,623**	**$ 1,980,422**	**$ 2,346,435**	**$ 76,103,511**	**$ 84,444,389**	**11.0%**

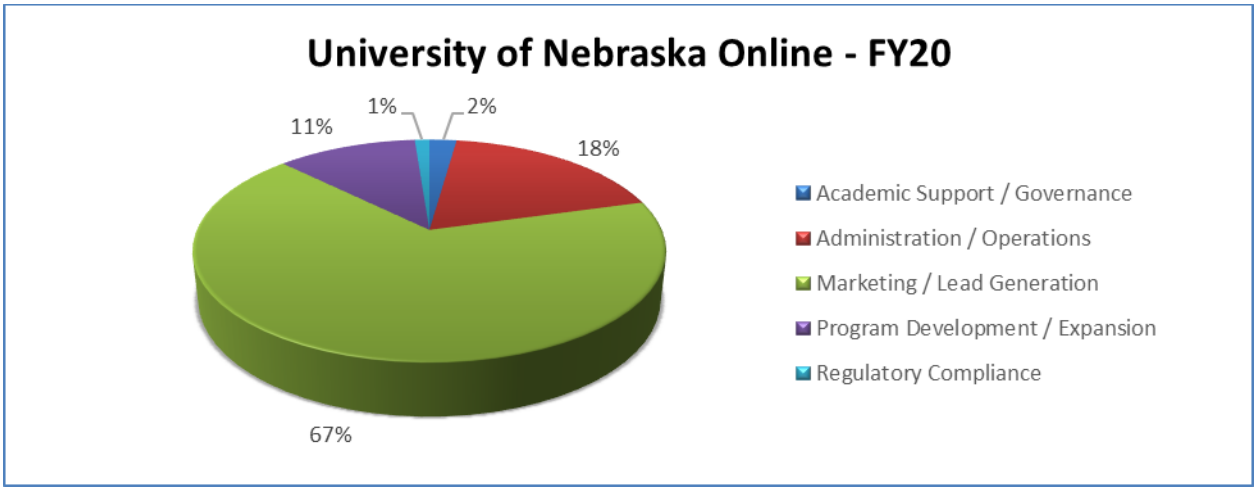
*UNMC includes all professional and graduate students as part of professional tuition revenue reporting

Intentions for Reinvestment of Differential Tuition in the *current* year:

In FY20, approximately 1.7% of gross distance education tuition or $1,472,940 (approximately 5% of the distance education tuition generated from students studying exclusively online) was held centrally to support the NU Online initiative. The remaining gross revenue (prior to remissions) was returned to the campuses to support development, instruction and support systems for distance education programs, online courses, and students.

Expenses: Below is a chart reflecting the resource allocation plan for the 1.7% held to support University of Nebraska Online.

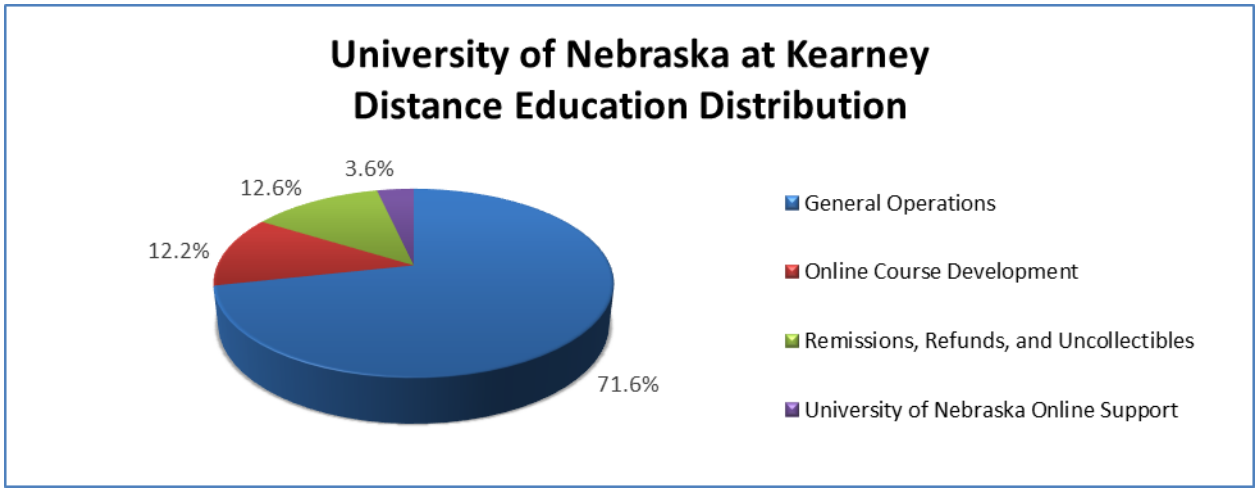
NU Online: $1,472,940



The following charts detail the distribution of distance education revenue by campus.

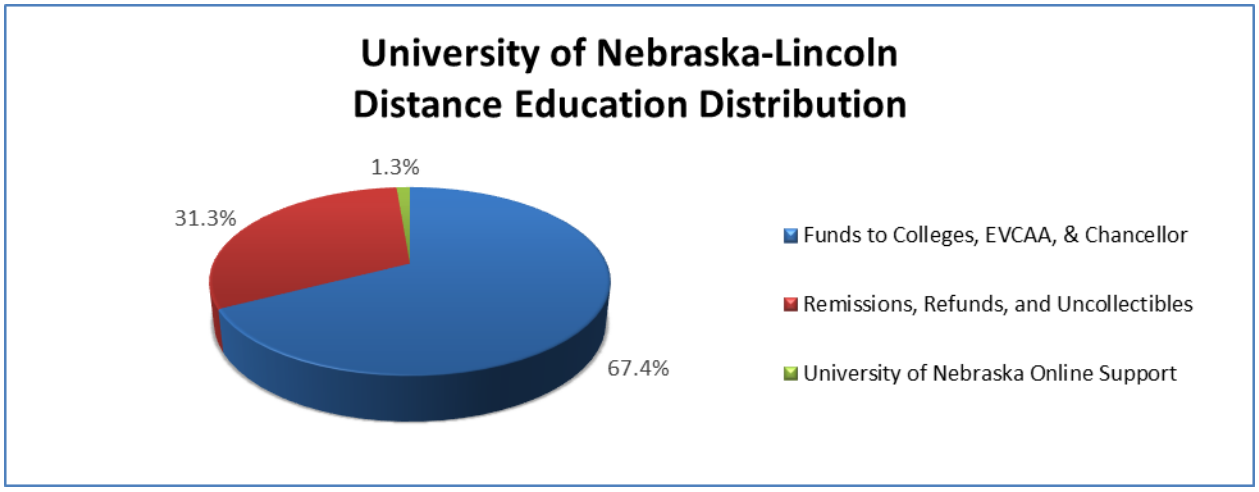
UNK: $16,327,686

About 12.2% is allocated to online development of courses; 3.6% to NU Online support; 12.6% to Remissions/Refunds/Un-collectibles; and 71.6% to general operations, including instruction, distance education/e-campus support, etc. UNK's FY20 contribution of distance education tuition to NU Online is $581,886.



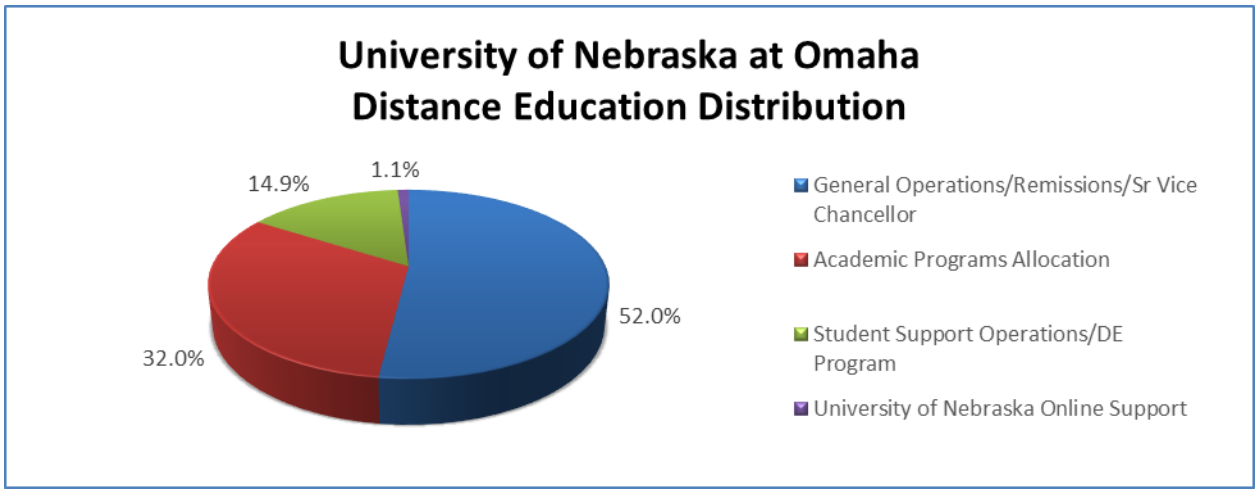
UNL: $33,614,645

On the UNL campus, of the $33.6 million in DE Tuition revenue for FY20, $433,568 of the DE Tuition is contributed to NU Online while $10.5 million funds remissions, refunds, and uncollectibles. The remaining $22.7 million is distributed between the academic colleges, the Office of the Executive Vice Chancellor, and the Chancellor's office to support development, instruction and support systems for distance education programs, courses, and students.



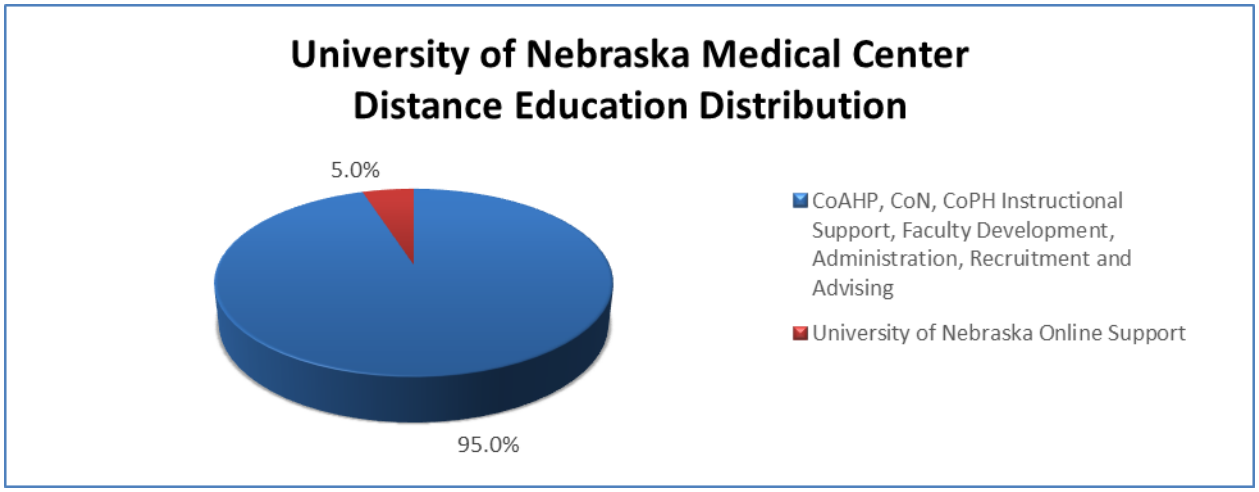
UNO: $32,155,623

The University of Nebraska at Omaha offers online courses and degree programs across the six colleges. The revenue generated from online courses ($32,155,623) is used to purposefully reinvest in distance education programs and support services, cover campus costs related to delivery of distance education, and support a plethora of critical programs, services, and initiatives across the institution. The chart below represents the breakdown of distance education tuition revenue in 2019-2020, with a significant portion of these funds (32%) being strategically reinvested back to the colleges and academic units. The distribution percentages in 2019-20 mirror the prior year (2018-19), as no substantial distribution changes have been made during a number of leadership transitions on the campus.



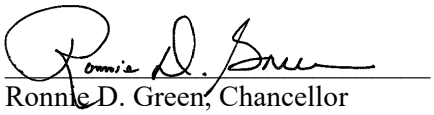
UNMC: $2,346,435

The revenue from Distance Education tuition returned to the University of Nebraska Medical Center is disbursed to the three colleges that offer distance education programs on our campus. Within each college the revenue is used to support faculty who deliver the distance education courses and to support staff who provide administrative support to these programs. In addition, these staff provide pre-admission, application and enrollment advising to our distance education students. UNMC's FY20 contribution of distance education tuition to NU Online is $117,332.

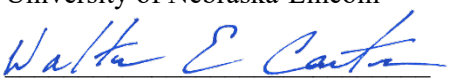


TO:	The Board of Regents	Addendum X-D-5
	Academic Affairs	
MEETING DATE:	February 7, 2020	
SUBJECT:	Renaming the Bachelor of Science (BS) in Grazing Livestock Systems to the Bachelor of Science in Grassland Systems in the Center for Grassland Studies in the College of Agricultural Sciences and Natural Resources at the University of Nebraska-Lincoln (UNL)	
RECOMMENDED ACTION:	Report	
PREVIOUS ACTIONS:	October 23, 1998 – The Board approved the establishment of an interdisciplinary major in Grazing Livestock Systems within the College of Agricultural Sciences and Natural Resources at UNL. July 16, 1994 – The Board approved the establishment of the Center for Grassland Studies.	
EXPLANATION:	The interdisciplinary undergraduate Bachelor of Science (BS) degree in Grazing Livestock Systems is a collaboration between the UNL Departments of Animal Science, Agricultural Economics and Agronomy and Horticulture. The curriculum originally was developed for those students whose career interests involved the production of livestock on range, pasture, and harvested forages. As the ranching industry evolved over the past 20 years, the management and business philosophies became more holistic and required integration of curricular content about ecosystem services (e.g., watershed, tourism, endangered species, and energy) and complementary uses of land resources. The curriculum has adjusted to these changes through targeted use of electives, relevant requirements, and student-centered, career-based advisor guidance. Changing the name of the degree program to a BS degree in Grassland Systems is an action that will better identify the breadth and diversity of content within the degree program and the career opportunities for graduates. This proposal has been reviewed by the Council of Academic Officers; it also has been reviewed by the Academic Affairs Committee.	
PROGRAM COST:	$0 (No new faculty, staff, or additional expenses will be required.)	
SOURCE OF FUNDS:	Not applicable	
SPONSOR:	Richard E. Moberly Interim Executive Vice Chancellor and Chief Academic Officer	

APPROVED:



Ronnie D. Green, Chancellor
University of Nebraska-Lincoln



Walter E. Carter, President
University of Nebraska

DATE: January 10, 2020

TO:	The Board of Regents	Addendum X-D-6
	Business Affairs	
MEETING DATE:	February 7, 2020	
SUBJECT:	Report of Bids and Contracts	
RECOMMENDED ACTION:	Report	
PREVIOUS ACTION:	None	
EXPLANATION:	The attached report is a summary of bids and contracts as provided by the campuses pursuant to Section 6.4 of the *Bylaws of the Board of Regents of the University of Nebraska* for the period ended November 27, 2020. The report outlines the following: type of action; campus; description and use of the product, service, or project; funding source; approved budget amount; contract amount; contractor or vendor; and a bid review or bid explanation if the low responsible bid was not accepted.	
APPROVED:	Chris J. Kabourek Vice President for Business and Finance | CFO	
DATE:	January 10, 2020	

University of Nebraska
Business Affairs Report – Bids and Contracts

Period Ending: November 27, 2019
Meeting Date: February 7, 2020

Type of Action	Campus	Description	Funding Source	Approved Budget Amount	Contract Amount	Contractor / Vendor	Bid Review or Explanation
Professional Services	UNL	Consulting Services for SDI (Service Delivery Initiative) Business Process Enhancement	Chancellor Funds (Non-State)	$1,305,000	$1,305,000	Huron Consulting Group	Professional Services
Professional Services	UNL	Consulting Services for RCM (Budget Model Redesign)	Chancellor Funds (Non-State)	$1,166,000	$1,166,000	Huron Consulting Group	RFP # 3022-18-8010
Construction	UNMC	MMI	Multiple	$91,085,210	$40,223,600	Meyers Carslile Leapley Construction	Construction Manager at Risk

*Approved budget amount for construction contracts represents the entirety of the project budget, whereas the contract amount is the amount pertaining to the particular activity within the construction contract.

TO: The Board of Regents Addendum X-D-7

Business Affairs

MEETING DATE: February 7, 2020

SUBJECT: University of Nebraska at Kearney
Report of Gifts, Grants, Contracts and Bequests accepted during the Quarter July 1, 2019 through September 30, 2019.

RECOMMENDED ACTION: Report

Description	Gifts A	Grants B	Bequests C	Contracts D	Totals
7/1/19-9/30/19	$ 917,265	$4,092,088	$0	$ 71,127	$ 5,080,480
10/1/19-12/31/19	$0	$0	$0	$0	$ 0
1/1/20-3/31/20	$0	$0	$0	$0	$ 0
4/1/20-6/30/20	$0	$0	$0	$0	$ 0
Fiscal YTD Totals	$ 917.265	$ 4,092,088	$0	$ 71,127	$14,543,172
2018-19 Totals	$4,385,676	$ 9,727,239	$0	$ 430,257	$14,543,172
2017-18 Totals	$4,777,379	$11,432,563	$18,828	$ 294,324	$16,523,094

A - Gifts of $100,000 and more are itemized on the attached pages
B - Grants of $1,000,000 and more are itemized on the attached pages
C - All bequests are itemized on the attached pages
D - Contracts of $400,000 and more are itemized on the attached pages

SPONSOR: Jon Watts
Vice Chancellor for Business and Finance

RECOMMENDED: _____
Douglas A, Kristensen, Chancellor
University of Nebraska at Kearney

DATE: December 11, 2019

University of Nebraska at Kearney

REPORT OF AWARDS
WHICH REQUIRE SEPARATE ITEMIZATION
ACCEPTED DURING THE QUARTER July 1, 2019 through September 30, 2019

Gifts/Bequests $100,000 and over

Donor	Purpose	Amount
Susan T. Buffett Foundation	Thompson Scholars 19-20	$ 753,999
	Subtotal	$0
	Total amount of gifts under $100,000	$ 163,266
Total Gifts for the Quarter		$ 917,265

* *

Grants $1,000,000 and over

Grantor	Grantee Department	Purpose	Amount
US Dept. of Education	Financial Aid	Student Aid	$3,515,883
	Subtotal		$ 0
	Total amount of all Grants under $1,000,000		$ 576,205
	Total Grants for the Quarter		$4,092,088

* *

Contracts $400,000 and over

Grantor	Grantee Department	Purpose	Amount
	Subtotal		$ 0
	Total amount of all Contracts under $400,000		$ 71,127
	Total Contracts for the Quarter		$ 71,127

TO: The Board of Regents

Business Affairs

MEETING DATE: February 7, 2020

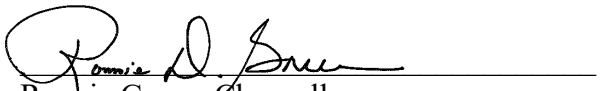
SUBJECT: University of Nebraska-Lincoln
Report of Gifts, Grants, Contracts and Bequests accepted during the Quarter July 1, 2019 through September 30, 2019

RECOMMENDED ACTION: Report

	Gifts A	Grants B	Bequests C	Contracts D	Totals
Description					
7/1/19-9/30/2019	$258,807	$62,367,571	$0	$7,788,785	$70,415,163
10/1/19-12/31/2019	0	0	0	0	0
1/1/20-3/31/2020	0	0	0	0	0
4/1/20-6/30/2020	0	0	0	0	0
Fiscal YTD Totals	$258,807	$62,367,571	$0	$7,788,785	$70,415,163
2018-19 Totals	$1,877,849	$230,135,752	$1,000,000	$38,186,669	$271,200,270
2017-18 Totals	$2,228,251	$207,034,899	$0	$55,546,173	$264,809,323

A - Gifts of $100,000 or more are itemized on the attached pages
B - Grants of $1,000,000 and more are itemized on the attached pages
C - All bequests are itemized on the attached pages
D - Contracts of $400,000 and more are itemized on the attached pages

SPONSOR: Bob Wilhelm
Vice Chancellor for Research & Economic Development

APPROVED: 
Ronnie Green, Chancellor
University of Nebraska-Lincoln

DATE: December 11, 2019

University of Nebraska-Lincoln
REPORT OF AWARDS
WHICH REQUIRE SEPARATE ITEMIZATION
ACCEPTED DURING THE QUARTER 07/01/2019 – 09/30/19

Gifts/Bequests $100,000 and over

Donor	Purpose		Amount
		Subtotal	$0
		Total amount of gifts under $100,000	$258,807
		Total Gifts for the Quarter	$258,807

* *

Grants $1,000,000 and over

Grantor	Grantee Department	Purpose	Amount
NSF	Jim Lewis Center for Science, Mathematics & Computer Education	Educating Undergraduate Students for STEM Career Opportunities in Nebraska: Networks, Experiential-Learning, & Computational Thinking	$3,580,869
DHHS-Admin for Children & Families	Michelle Graef Center on Children, Families and the Law	Quality Improvement Center for Development Workforce	$3,500,000
NSF-EPSCoR	Harkamal Walia Department of Agronomy and Horticulture	RII Track-2 FEC: Comparative Genomics and Phenomics Approach to Discover Genes Underlying Heat Stress Resilience in Cereals	$2,784,901
DHHS- Nat Inst Gen Medical Sci	Janos Zempleni Department of Nutrition and Health Sciences	Nebraska Center for the Prevention of Obesity Diseases through Dietary Molecules	$2,325,627
Dept of Education	Alexandra Torkelson-Trout Dept of Special Education and Communication Disorders	Fostering Educational Success: Reconnecting Families, Empowering Youth	$2,177,752
NSF-EPSCoR	Dirac Twidwell Jr Department of Agronomy and Horticulture	RII Track-2 FEC: Resilience Informatics for the Convergence of Critical Capacities to Address Regional-Scale Environmental Change	$1,964,386
Dept of Agriculture-FS	John Erixson NE State Forest Service	Cooperative Forestry Program	$1,792,473

DOD- Office of Naval Research-MURI	Alexander Sinitskiy Department of Chemistry	DNA- Enabled Hierarchical Assembly of Graphene Electronics	$1,500,000
Dept of Agriculture-NIFA	Brad Lubben Dept of Agricultural Economics	North Central Extension Risk Management Education Center	$1,082,736
Dept of Energy	Martin Centurion Dept of Physics and Astronomy	Probing Nuclear and Electronic Dynamics in Ultrafast Ring- Conversion Molecular Reactions	$1,060,467
Ne Dept Education	Amanda Witte Nebraska Center for Research on Children, Youth, Families and Schools	Nebraska Multi-Tiered System of Support Implementation Support Team	$1,032,646
Dept of Agriculture-ARS	Archie Clutter Dean's Office for Agricultural Research Division	Support Effort for Developing Scientific Information and New Technology to Solve High Priority Problems for U.S. Beef, Sheep and Swine Industries	$1,000,000
		Subtotal	$23,801,857
		Total amount of all Grants under $1,000,000	$38,565,714
		Total Grants for the Quarter	$62,367,571

* *

Contracts $400,000 and over

Grantor	Grantee Department	Purpose	Amount
		Subtotal	$0
		Total amount of all Contracts under $400,000	$7,788,785
		Total Contracts for the Quarter	$7,788,785

TO: The Board of Regents
Business Affairs

MEETING DATE: February 7, 2020

SUBJECT: UNIVERSITY OF NEBRASKA MEDICAL CENTER
Report of Gifts, Grants, Contracts and Bequests accepted during the Quarter July 1, 2019, through September 30, 2019

RECOMMENDED ACTION: Report

Description	Gifts A	Grants B	Bequests C	Contracts D	Totals
7/1/2019-9/30/2019	$25,093	$44,936,258	$0	$19,248,746	$64,210,097
10/1/19-12/31/2019	$0	$0	$0	$0	$0
1/1/2020-3/31/2020	$0	$0	$0	$0	$0
4/1/2020-6/30/2020	$0	$0	$0	$0	$0
Fiscal YTD Totals	$25,093	$44,936,258	$0	$19,248,746	$64,210,097
2018-19 Totals	$936,187	$117,019,088	$0	$43,384,698	$161,339,973
2017-18 Totals	$635,866	$102,621,022	$0	$54,744,727	$158,001,615

A - Gifts of $100,000 and more are itemized on the attached pages
B - Grants of $1,000,000 and more are itemized on the attached pages
C - All bequests are itemized on the attached pages
D - Contracts of $400,000 and more are itemized on the attached pages

SPONSOR: Jennifer L. Larsen, M.D.
Vice Chancellor of Research

APPROVED: _____
Jeffrey P. Gold, M.D., Chancellor
UNIVERSITY OF NEBRASKA MEDICAL CENTER

DATE: January 10, 2020

UNIVERSITY OF NEBRASKA MEDICAL CENTER
REPORT OF AWARDS
WHICH REQUIRE SEPARATE ITEMIZATION
ACCEPTED DURING THE QUARTER JULY 1, 2019 – SEPTEMBER 30, 2019

Gifts/Bequests $100,000 and over

Donor	Purpose	Amount
-		
	Subtotal	$0
	Total amount of gifts under $100,000	$25,093
	Total Gifts for the Quarter	$25,093

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Grants $1,000,000 and over

Grantor	Grantee Department	Purpose	Amount
DHHS/NIH/NIGMS	---New--- Neurological Sciences	Great Plains IDeA-CTR	$3,977,738
DHHS/NIH/NIAID	---New--- Pathology/Microbiology	Staphylococcal Biofilm and Disease	$2,358,655
NE DHHS - LB595	---New--- Eppley Inst Faculty	LB595 Tobacco Tax Center Research Grant	$1,300,000
DHHS/NIH/NCI	---New--- Eppley Inst Faculty	Fred and Pamela Buffett Cancer Center Support Grant	$2,107,000
DHHS/NIH/NIDA	---New--- Pharmacology/Exp Neuroscience	LASER ART for HIV-1 Control and Elimination	$1,768,353
DHHS/NIH/NHLBI	---New--- Cellular/Integrative Physiology	Neuro-Circulatory Function in Chronic Heart Failure	$1,622,387
DHHS/NIH/NIMH	---New--- Neurological Sciences	Developmental Multimodal Imaging of Neurocognitive Dynamics (Dev-MIND)	$1,285,534
DHHS/CDC/NIOSH	---New--- COPH Environ, Agri & Occ Health	Central States Center for Agricultural Safety and Health (CS-CASH)	$1,912,503
Grantor	Grantee Department	Purpose	Amount
		Subtotal	$16,332,170
		Total amount of all Grants under $1,000,000	$28,604,088
		Total Grants for the Quarter	$44,936,258

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Contracts $400,000 and over

Grantor	Grantee Department	Purpose	Amount
NE DHHS	---New--- MMI Administration	Medically Handicapped Children's Program (MHCP)	$1,118,380
DHHS/ASPR/BARD A	---New--- Vice Chancellor for Research	Training, Simulation and Quarantine Services (TSQC)	$2,509,891
NE DHHS	---New--- Int Med Infectious Diseases	AIDS Drug Assistance Program [ADAP] Ryan White Title II Program (Part B)	$2,813,458
Ryan Foundation	---New--- Obstetrics/Gynecology	Transitional Research Agreement with the Ryan Foundation for Dr. Rohan Fernando	$500,001
Theranova, LLC.	---New--- Physical Therapy Education	Wearable Vibration Device to Prevent Bone Loss in Postmenopausal Women (NIA, Phase II SBIR)	$943,074
University of Southern California	---New--- Neurological Sciences	Anti-Amyloid Treatment in Asymptomatic Alzheimer_sDisease (A4) Open Label Extension Study	$511,575
Zealand Pharma A/S	---New--- Surgery-Transplant	A Double-Blinded Phase 3 Extension Trial Assessing the Long-Term Safety and Efficacy of Glepaglutide in Patients with Short Bowel Syndrome (SBS)	$418,887
National Strategic Research Institute	---New--- COPH Environ, Agri & Occ Health	Target Acquisition of Reference Materials Augmenting Capabilities (TARMAC) Initiative Next Generation Sequencing (NGS) Research Support	$478,000
Gilead Sciences, Inc.	---New--- Int Med GI	A Phase 3, Randomized, Double-Blind, Placebo-Controlled Study Evaluating the Safety, Tolerability, and Efficacy of GS-9674 in Non-Cirrhotic Subjects with Primary Sclerosing Cholangitis	$408,117
AbbVie, Inc.	---New--- Int Med GI	A Multicenter, Randomized, Double-Blind, Placebo-	$542,307

	Controlled 52-Week Maintenance and an Open-Label Extension Study of the Efficacy and Safety of Risankizumab in Subjects with Crohn's Disease Who Responded to Induction Treatment in M16-006 or M15-991; or Co	
Subtotal		$10,243,690
Total amount of all Contracts under $400,000		$9,005,056
Total Contracts for the Quarter		$19,248,746

TO: The Board of Regents

Business Affairs

MEETING DATE: February 7, 2020

SUBJECT: University of Nebraska at Omaha
Report of Gifts, Grants, Contracts and Bequests accepted during the Quarter July 1, 2019 through September 30, 2019.

RECOMMENDED ACTION: Report

Description	Gifts A	Grants B	Bequests C	Contracts D	Totals
7/1/19-9/30/2019	$2,655,242	$19,666,239	$0	$140,824	$22,462,305
10/1/19-12/31/2019	$ 0		$0	0	0
1/1/20-3/31/2020	$ 0		$0	0	0
4/1/20-6/30/2020	$ 0		$	0	0
Fiscal YTD Totals	$2,655,242	$19,666,239	$0	$140,824	$22,462,305
2018-2019 Totals	$10,327,027	$35,974,794	$0	$1,517,318	$47,819,139
2017-2018 Totals	$10,379,869	$40,438,396	$314,925	$1,603,259	$52,736,449

A - Gifts of $100,000 and more are itemized on the attached pages
B - Grants of $1,000,000 and more are itemized on the attached pages
C - All bequests are itemized on the attached pages
D - Contracts of $400,000 and more are itemized on the attached pages

SPONSOR: Douglas A. Ewald
Vice Chancellor for Business, Finance and Business Development

RECOMMENDED: _____
Jeffrey P. Gold, Chancellor
University of Nebraska at Omaha

DATE: December 11, 2019

UNIVERSITY OF NEBRASKA AT OMAHA
REPORT OF AWARDS
WHICH REQUIRE SEPARATE ITEMIZATION
ACCEPTED DURING THE QUARTER *July 1 – September 30, 2019*

Gifts/Bequests $100,000 and over

Donor	Purpose	Amount
NU Foundation	Summer, 2019 Scholarships	435,579
NU Foundation	Glacier Creek Land Purchase	508,755
NU Foundation	Glacier Creek Land Purchase	1,504,172
	Subtotal	$2,448,506
	Total amount of gifts under $100,000	$206,736
	Total Gifts for the Quarter	$2,655,242

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Grants $1,000,000 and over

Grantor	Grantee Department	Purpose	Amount
U.S. Department of Education	Financial Aid	Student Aid	$6,399,437
U.S. Department of State	International Programs	Instruction	$1,299,960
National Science Foundation	Mathematics	Applied Research	$1,177,299
National Institutes of Health	Biomechanics	Applied Research	$2,163,462
	Subtotal		$11,040,158
	Total amount of all Grants under $1,000,000		$8,626,081
	Total Grants for the Quarter		$19,666,239

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Bequests

Donor	Purpose	Amount
		$0
	Subtotal	$0
	Total Bequests for the Quarter	0

* *

Contracts $400,000 and over

Grantor	Grantee Department	Purpose	Amount
	Subtotal		$0
	Total amount of all Contracts under $400,000		$140,824
	Total Contracts for the Quarter		$140,824

TO:	Board of Regents	Addendum X-D-8
	Business Affairs	
MEETING DATE:	February 7, 2020	
SUBJECT:	Naming of Ameritas Virtual Reality Dental Experience Hub within the Clinical and Virtual Simulation Laboratory at the UNMC College of Dentistry	
RECOMMENDED ACTION:	Report	
BACKGROUND:	The UNMC College of Dentistry's preclinical laboratory last underwent a major renovation in the late 1990s. Dr. Guthmiller and her team developed a plan that merged the existing bench laboratories in the lower level of the college into a single 5,500-square-foot clinical and virtual simulation laboratory with the latest technology available today to meet the needs of our dental learners. This laboratory features unique educational/simulation spaces for students of the College. The renovation also creates a separate 700-square-foot space for a digital design studio with access to the latest software to design restorations and dentures using CAD/CAM technology and equipment such as milling machines, 3D printers and other technology.	
EXPLANATION:	The Ameritas Virtual Reality Dental Experience Hub will support the equipment, technology and programmatic costs associated with the clinical, virtual and digital simulation laboratories project. Located within the clinical and virtual simulation laboratory, it will host five Simodont VR Simulators. VR simulators provide students with the opportunity to not only gain instant feedback, but also to practice various procedures using virtual reality through haptics and real-time assessments of performance. With the naming of this area as stated above, the Board of Regents expresses its deepest gratitude and appreciation for the Donors' generous support to the University of Nebraska and UNMC.	
SPONSOR:	Douglas A. Ewald Vice Chancellor for Business, Finance and Business Development	
APPROVED:	Jeffrey P. Gold, M.D., Chancellor University of Nebraska Medical Center Walter E. Carter, President University of Nebraska	
DATE:	January 10, 2020	

TO:	The Board of Regents Business Affairs	Addendum X-D-9
MEETING DATE:	February 7, 2020	
SUBJECT:	Strauss Performing Arts Center Phase 2	
RECOMMENDED ACTION:	Report	
PREVIOUS ACTION:	None	
EXPLANATION:	Attached is the Whitepaper for the Strauss Performing Arts Center Phase 2	
SPONSORS:	Chris J. Kabourek Vice President | CFO	
APPROVED:	Walter E. Carter, President University of Nebraska	
DATE:	January 10, 2020	

Board of Regents Business Affairs Committee Briefing Whitepaper

Subject: Strauss Performing Arts Center Phase 2

January 10, 2020

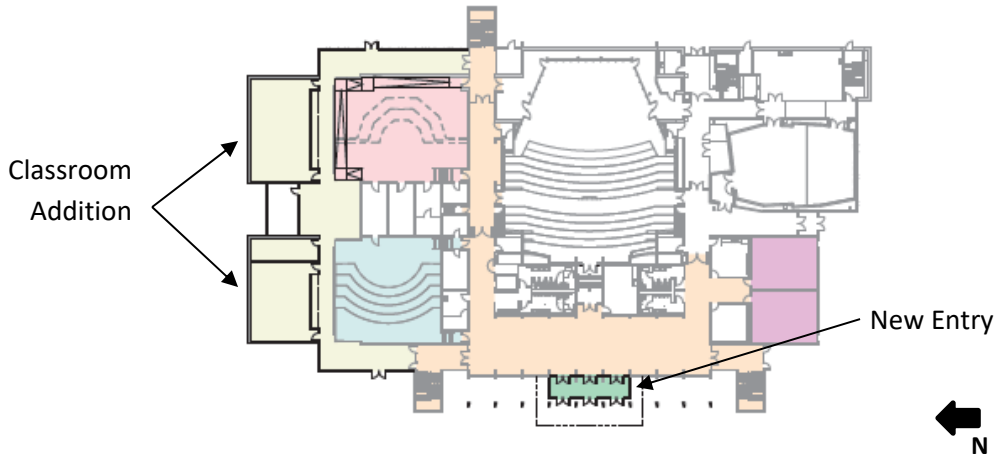
OVERVIEW:
The University of Nebraska at Omaha (UNO) is pleased to share information regarding the phase two project of the Strauss Performing Arts Center renovation and expansion. When the totality of the recent Strauss project was developed, it had to be broken into two phases in order to financially cover it. This will complete the Strauss renovation and allow even more effective growth of the impact of the School of Music on our community.

PROJECT COST:
Total project cost is budgeted at $4,582,800. The totality of the funds have been raised for this project and have already been transferred to the University of Nebraska Foundation.

PROJECT DESCRIPTION:
The project is at the Strauss Performing Arts Center on UNO's Dodge Campus. It will provide a new, formal entry on the West side of the building and a new classroom addition with one or two classrooms for 30-35 persons each. The computer lab will be expanded, which may be accomplished by renovation of two existing classrooms. The project will also remodel one rehearsal room and update AV & lighting in a second rehearsal room. Up to 27 practice rooms will have acoustic upgrades. Mechanical work will include the repairs of piping and ductwork under the brick tile floor in the lobby and the brick tile floor on the first floor will be replaced with a new floor.

The project construction work is planned to commence in May 2020.

BACKGROUND:
In the spring of 2013, a Space Masterplan was developed for the Strauss Performing Arts Center. The majority of the plan became the Strauss expansion and renovation project that was substantially completed in February 2019. The plan also outlined a new main entry and other work that was not included in the final scope of the project. Since the Strauss expansion and renovation project was completed, the School of Music has successfully secured funding for the final scope. The new work will greatly assist the School of Music's mission to stimulate the highest standards of excellence in music education, performance, research, creativity, entrepreneurship, technology, advocacy and service.



Tentative Floor Plan

TO:	The Board of Regents Business Affairs	Addendum X-D-10
MEETING DATE:	February 7, 2020	
SUBJECT:	Quarterly Status of Capital Construction Projects	
RECOMMENDED ACTION:	Report	
EXPLANATION:	This is a summary report of projects included in the Quarterly Capital Construction Report required by state statute. Inclusion in the report commences with Board of Regents approval and ends one year following substantial completion. The report fulfills the requirements of R.P.6.3.6.2.e and R.P. 6.3.6.4 and contains the campus and project name, designer and contractor, contracting method, contract status, stage of construction, and approved budget categories for the period ending September 30, 2019. The report is available at: https://nebraska.edu/-/media/projects/unca/offices-policies/business-and-finance-office/docs/facilities/reports/2019-09-30quarterlystatusofcapitalconstructionprojects.pdf?la=en	
SPONSOR:	Brooke Hay Interim Associate Vice President for Facilities Management	
RECOMMENDED:	Chris J. Kabourek Chris Kabourek Vice President for Business and Finance | CFO	
DATE:	January 10, 2020	

University of Nebraska Quarterly Status Report
Board of Regents Approved Capital Construction Projects

As of September 30, 2019

KEARNEY

Nebraskan Student Union Remodel

BoR Schedule Dates

Project Approved:	3/31/2017
Construction Start:	12/15/2017
Construction Complete:	8/1/2018
Phase:	Warranty

Contracts

Sub. Comp.	Provider	Date	Amount	CO No.	CO Amt.	Contracting Method
	Schemmer Associates, Inc.	5/30/2017	$392,900	3	$61,155	A/E Four Year Consultant
9/6/2018	Hausmann Construction	8/16/2017	$4,648,490	4	($339,490)	CM at Risk

Approved Budget

Construction:	$4,889,700
Non Construction:	$1,110,300
Total Project Cost:	$6,000,000
% funds expended:	90%

Funding Source

Auxiliary	$1,000,000
Revenue Bonds	$5,000,000
Total Funding	$6,000,000

Otto Olsen Replacement Building (LB957)

BoR Schedule Dates

Project Approved:	1/27/2017
Construction Start:	5/30/2018
Construction Complete:	10/31/2019
Phase:	Construction

Contracts

Sub. Comp.	Provider	Date	Amount	CO No.	CO Amt.	Contracting Method
	BCDM Architects	4/18/2017	$1,458,000			A/E Consultant Selection
4/16/2020	Hausmann Construction	6/22/2018	$24,229,898	6	$324,985	CM at Risk

Approved Budget

Construction:	$24,276,500
Non Construction:	$5,723,500
Total Project Cost:	$30,000,000
% funds expended:	50%

Funding Source

State Appropriations	$30,000,000
Total Funding	$30,000,000

Plambeck Early Childhood Education Center (LB957)

BoR Schedule Dates

Project Approved:	1/27/2017
Construction Start:	8/28/2018
Construction Complete:	10/30/2019
Phase:	Warranty

Contracts

Sub. Comp.	Provider	Date	Amount	CO No.	CO Amt.	Contracting Method
	RDG Planning & Design	2/8/2017	$545,000	2	$105,400	A/E Four Year Consultant
9/2/2019	Hampton Enterprises	8/28/2018	$5,088,365	3	$214,646	Low Responsible Bid

Approved Budget

Construction:	$6,305,000
Non Construction:	$1,495,000
Total Project Cost:	$7,800,000
% funds expended:	71%

Funding Source

Private/Trust	$1,000,000
Revolving	$4,800,000
State Appropriations	$2,000,000
Total Funding	$7,800,000

Storm & Sanitary Sewer Replacement

BoR Schedule Dates

Project Approved:	8/11/2017
Construction Start:	5/15/2018
Construction Complete:	5/15/2019
Phase:	Warranty

Contracts

Sub. Comp.	Provider	Date	Amount	CO No.	CO Amt.	Contracting Method
	Olsson Associates	8/25/2017	$105,500			A/E Four Year Consultant
9/17/2018	Midlands Contracting, Inc.	6/13/2018	$1,162,710	4	($17,389)	Low Responsible Bid

Approved Budget

Construction:	
Non Construction:	$3,000,000
Total Project Cost:	$3,000,000
% funds expended:	104%

Funding Source

Campus Funds	$3,000,000
Total Funding	$3,000,000

University of Nebraska Quarterly Status Report
Board of Regents Approved Capital Construction Projects

As of September 30, 2019

KEARNEY

Village Flats (Student Housing)

BoR Schedule Dates	
Project Approved:	4/10/2015
Construction Start:	1/11/2017
Construction Complete:	7/1/2018
Phase: Warranty	

Contracts

Sub. Comp.	Provider	Date	Amount	CO No.	CO Amt.	Contracting Method
	Holland Basham Architects	10/5/2015	$1,089,836			A/E Consultant Selection
7/23/2018	Hausmann Construction	1/11/2017	$13,591,094	11	$228,268	CM at Risk

Approved Budget

Construction:	$14,000,000
Non Construction:	$2,000,000
Total Project Cost:	$16,000,000
% funds expended:	8%

Funding Source

Revenue Bonds	$4,000,000
Revenue Bonds	$12,000,000
Total Funding	$16,000,000

University of Nebraska Quarterly Status Report
Board of Regents Approved Capital Construction Projects

As of September 30, 2019

LINCOLN

C.Y. Thompson Dinsdale Family Learning Commons

BoR Schedule Dates

Project Approved:	9/19/2014
Construction Start:	7/1/2019
Construction Complete:	11/30/2020
Phase:	Construction

Contracts

Sub. Comp.	Provider	Date	Amount	CO No.	CO Amt.	Contracting Method
	DLR Group Inc	2/11/2015	$1,260,000	1	$78,500	A/E Consultant Selection
10/29/2020	Sampson Construction Company	8/26/2019	$15,779,000			Low Responsible Bid

Approved Budget

Construction:	$16,877,000
Non Construction:	$5,623,000
Total Project Cost:	$22,500,000
% funds expended:	9%

Funding Source

Private/Trust	$20,000,000
Campus Funds	$2,500,000
Total Funding	$22,500,000

Carson Center for Emerging Media Arts

BoR Schedule Dates

Project Approved:	10/5/2017
Construction Start:	8/8/2018
Construction Complete:	7/31/2019
Phase:	Warranty

Contracts

Sub. Comp.	Provider	Date	Amount	CO No.	CO Amt.	Contracting Method
	HDR Architecture, Inc.	10/20/2017	$600,000			A/E Four Year Consultant
8/15/2019	Hampton Enterprises	8/9/2018	$4,676,290	7	$605,410	Low Responsible Bid

Approved Budget

Construction:	$5,953,000
Non Construction:	$3,047,000
Total Project Cost:	$9,000,000
% funds expended:	68%

Funding Source

Private/Trust	$9,000,000
Total Funding	$9,000,000

Devaney Sports Center Gymnastics Training Facility

BoR Schedule Dates

Project Approved:	8/11/2017
Construction Start:	8/1/2018
Construction Complete:	12/1/2019
Phase:	Construction

Contracts

Sub. Comp.	Provider	Date	Amount	CO No.	CO Amt.	Contracting Method
	The Clark Enersen Partners	10/23/2017	$896,000			A/E Consultant Selection
12/28/2019	Hausmann Construction	7/31/2018	$11,059,000	6	($3,326)	Low Responsible Bid

Approved Budget

Construction:	$11,583,000
Non Construction:	$2,493,000
Total Project Cost:	$14,076,000
% funds expended:	60%

Funding Source

Auxiliary	$14,076,000
Total Funding	$14,076,000

Hamilton Hall 3rd Floor North Renovation

BoR Schedule Dates

Project Approved:	12/4/2018
Construction Start:	12/30/2019
Construction Complete:	8/31/2020
Phase:	Design

Contracts

Sub. Comp.	Provider	Date	Amount	CO No.	CO Amt.	Contracting Method
	The Clark Enersen Partners	5/23/2019	$243,000			A/E Four Year Consultant
	Contractor TBD					Low Responsible Bid

Approved Budget

Construction:	$2,838,000
Non Construction:	$562,000
Total Project Cost:	$3,400,000
% funds expended:	6%

Funding Source

Campus Funds	$3,400,000
Total Funding	$3,400,000

University of Nebraska Quarterly Status Report
Board of Regents Approved Capital Construction Projects

As of September 30, 2019

LINCOLN

Life Sciences Annex Gnotobiotic Vivarium Addition

BoR Schedule Dates

Project Approved:	12/4/2018
Construction Start:	8/30/2019
Construction Complete:	7/30/2020
Phase:	Construction

Contracts

Sub. Comp.	Provider	Date	Amount	CO No.	CO Amt.	Contracting Method
	The Clark Enersen Partners	12/10/2018	$289,000			A/E Four Year Consultant
	Cheever Construction	8/29/2019				Low Responsible Bid

Approved Budget

Construction:	$4,159,000
Non Construction:	$841,000
Total Project Cost:	$5,000,000
% funds expended:	7%

Funding Source

Private/Trust	$5,000,000
Total Funding	$5,000,000

Loop Road Renovation

BoR Schedule Dates

Project Approved:	8/11/2017
Construction Start:	5/1/2018
Construction Complete:	11/30/2018
Phase:	Warranty

Contracts

Sub. Comp.	Provider	Date	Amount	CO No.	CO Amt.	Contracting Method
	Olsson Associates	11/21/2017	$149,125			A/E Four Year Consultant
8/31/2018	K2 Construction	5/18/2018	$2,045,674	2	($48,331)	Low Responsible Bid

Approved Budget

Construction:	
Non Construction:	$2,685,000
Total Project Cost:	$2,685,000
% funds expended:	100%

Funding Source

Auxiliary	$2,685,000
Total Funding	$2,685,000

Mabel Lee Hall Replacement Building (LB957)

BoR Schedule Dates

Project Approved:	6/1/2017
Construction Start:	10/1/2019
Construction Complete:	5/1/2021
Phase:	Design

Contracts

Sub. Comp.	Provider	Date	Amount	CO No.	CO Amt.	Contracting Method
	Sinclair Hille Architects	10/11/2017	$2,450,000	1	$307,846	A/E Consultant Selection
	Contractor TBD					Low Responsible Bid

Approved Budget

Construction:	$36,450,000
Non Construction:	$9,550,000
Total Project Cost:	$46,000,000
% funds expended:	5%

Funding Source

State Appropriations	$40,000,000
Private/Trust	$6,000,000
Total Funding	$46,000,000

University of Nebraska Quarterly Status Report
Board of Regents Approved Capital Construction Projects

As of September 30, 2019

LINCOLN

Nebraska East Union Renovation

BoR Schedule Dates		Contracts							Approved Budget	
Project Approved:	10/5/2017	**Sub. Comp.**	**Provider**	**Date**	**Amount**	**CO No.**	**CO Amt.**	**Contracting Method**	Construction:	$24,086,000
Construction Start:	10/1/2018		RDG Planning & Design	3/20/2018	$1,510,000	1	$206,000	A/E Consultant Selection	Non Construction:	$4,509,000
Construction Complete:	8/1/2020	6/5/2020	Hausmann Construction	10/17/2018	$15,000	1	$21,565,881	CM at Risk	Total Project Cost:	$28,595,000
Phase: Construction									% funds expended:	36%
									Funding Source	
									Campus Funds	$1,995,000
									Campus Funds	$7,100,000
									Auxiliary	$1,100,000
									Revenue Bonds	$18,400,000
									Total Funding	$28,595,000

Scott Engineering Center Renovation & Link Replacement (LB957)

BoR Schedule Dates		Contracts							Approved Budget	
Project Approved:	8/3/2018	**Sub. Comp.**	**Provider**	**Date**	**Amount**	**CO No.**	**CO Amt.**	**Contracting Method**	Construction:	$64,226,000
Construction Start:	6/17/2019		RDG Planning & Design	11/30/2018	$5,651,000			A/E Consultant Selection	Non Construction:	$11,230,000
Construction Complete:	9/16/2022		Hausmann Construction	12/11/2018				CM at Risk	Total Project Cost:	$75,456,000
Phase: Design									% funds expended:	4%
									Funding Source	
									Private/Trust	$5,456,000
									State Appropriations	$70,000,000
									Total Funding	$75,456,000

University of Nebraska Quarterly Status Report
Board of Regents Approved Capital Construction Projects

As of September 30, 2019

MEDICAL CENTER

2016 Utility Energy Infrastructure Upgrade

BoR Schedule Dates

Project Approved:	1/29/2016
Construction Start:	3/30/2016
Construction Complete:	5/15/2017
Phase:	Warranty

Contracts

Sub. Comp.	Provider	Date	Amount	CO No.	CO Amt.	Contracting Method
	Morrissey Engineering	1/26/2017	$220,000	1	($69,000)	A/E Four Year Consultant
5/15/2017	Midwest Mechanical Contractors of	9/26/2016	$1,313,600	2	$17,802	Low Responsible Bid
11/15/2018	Sampson Construction Company	9/11/2017	$1,500,000	1	$62,751	Low Responsible Bid
8/31/2016	Trane US Inc	3/30/2016	$1,011,937	1	$105,337	Low Responsible Bid
8/31/2016	Trane US Inc	4/6/2016	$425,000			Low Responsible Bid

Approved Budget

Construction:	$13,694,000
Non Construction:	$1,306,000
Total Project Cost:	$15,000,000
% funds expended:	100%

Funding Source

Facilities Corp	$15,000,000
Total Funding	$15,000,000

Davis Global Center for Advanced Interprofessional Learning

BoR Schedule Dates

Project Approved:	10/9/2015
Construction Start:	1/10/2017
Construction Complete:	11/25/2018
Phase:	Construction

Contracts

Sub. Comp.	Provider	Date	Amount	CO No.	CO Amt.	Contracting Method
	The Clark Enersen Partners	3/7/2016	$4,480,000	8	$1,634,771	A/E Consultant Selection
12/15/2019	Sampson Construction Company	5/24/2017	$60,633,000	41	$11,007,483	Low Responsible Bid
4/28/2017	Hausmann Construction	1/10/2017	$1,794,000	4	$323,394	Low Responsible Bid

Approved Budget

Construction:	$76,093,898
Non Construction:	$45,707,102
Total Project Cost:	$121,801,000
% funds expended:	76%

Funding Source

Private/Trust	$79,870,000
Federal	$16,931,000
State Appropriations	$25,000,000
Total Funding	$121,801,000

Durham Outpatient Center Dentistry Clinic Expansion

BoR Schedule Dates

Project Approved:	8/3/2018
Construction Start:	
Construction Complete:	
Phase:	Construction

Contracts

Sub. Comp.	Provider	Date	Amount	CO No.	CO Amt.	Contracting Method
	Schemmer Associates, Inc.	1/9/2018	$82,560			A/E Four Year Consultant
8/8/2020	Meyers-Carlisle-Leapley Constructio	3/13/2019	$1,015,400	1	$158,519	Low Responsible Bid
	Patterson Dental Supply, Inc.	11/6/2018	$631,275			Sole Source

Approved Budget

Construction:	$1,639,000
Non Construction:	$986,574
Total Project Cost:	$2,625,574
% funds expended:	66%

Funding Source

Campus Funds	$2,625,574
Total Funding	$2,625,574

University of Nebraska Quarterly Status Report
Board of Regents Approved Capital Construction Projects

As of September 30, 2019

MEDICAL CENTER

Williams Science Hall Renovation (LB957)

BoR Schedule Dates		Contracts							Approved Budget	
Project Approved:	6/1/2017	**Sub. Comp.**	**Provider**	**Date**	**Amount**	**CO No.**	**CO Amt.**	**Contracting Method**	Construction:	$10,462,000
Construction Start:	10/1/2018		RDG Planning & Design	10/2/2017	$602,000	1	$164,000	A/E Consultant Selection	Non Construction:	$2,211,000
Construction Complete:	5/31/2020	8/28/2020	Meco-Henne Contractors, Inc.	4/22/2019	$9,321,000			Low Responsible Bid	Total Project Cost:	$12,673,000
Phase: Construction									% funds expended:	8%
									Funding Source	
									Private/Trust	$2,673,000
									State Appropriations	$10,000,000
									Total Funding	$12,673,000

Wittson Hall Renovation & Wigton Heritage Center (LB957)

BoR Schedule Dates		Contracts							Approved Budget	
Project Approved:	8/11/2017	**Sub. Comp.**	**Provider**	**Date**	**Amount**	**CO No.**	**CO Amt.**	**Contracting Method**	Construction:	$21,844,000
Construction Start:	11/1/2018		HDR Architecture, Inc.	10/13/2017	$1,018,500			A/E Consultant Selection	Non Construction:	$4,156,000
Construction Complete:	7/1/2021	12/2/2020	Hausmann Construction	2/26/2019	$19,730,000			Low Responsible Bid	Total Project Cost:	$26,000,000
Phase: Construction									% funds expended:	16%
									Funding Source	
									State Appropriations	$18,000,000
									Private/Trust	$8,000,000
									Total Funding	$26,000,000

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OMAHA

Arts & Sciences Hall Renovation (LB957)

BoR Schedule Dates		Contracts							Approved Budget	
Project Approved:	10/5/2017	**Sub. Comp.**	**Provider**	**Date**	**Amount**	**CO No.**	**CO Amt.**	**Contracting Method**	Construction:	$10,184,729
Construction Start:	7/15/2018		Farris Engineering	2/13/2018	$649,000			A/E Four Year Consultant	Non Construction:	$1,815,271
Construction Complete:	8/1/2020	7/31/2020	Meco-Henne Contractors, Inc.	10/9/2018	$6,020,000	4	$802,819	Low Responsible Bid	Total Project Cost:	$12,000,000
Phase: Construction									% funds expended:	42%
									Funding Source	
									Revenue Bonds	$12,000,000
									Total Funding	$12,000,000

Biomechanics Research Building Addition

BoR Schedule Dates		Contracts							Approved Budget	
Project Approved:	8/11/2017	**Sub. Comp.**	**Provider**	**Date**	**Amount**	**CO No.**	**CO Amt.**	**Contracting Method**	Construction:	$9,751,800
Construction Start:	5/1/2018		Schemmer Associates, Inc.	8/14/2017	$648,000	3	$76,069	A/E Four Year Consultant	Non Construction:	$1,858,200
Construction Complete:	9/1/2019	8/8/2019	Meyers-Carlisle-Leapley Constructio	1/22/2018	$24,380	1	$9,505,428	CM at Risk	Total Project Cost:	$11,610,000
Phase: Warranty									% funds expended:	74%
									Funding Source	
									Private/Trust	$11,610,000
									Total Funding	$11,610,000

Durham Science Center Renovation

BoR Schedule Dates		Contracts							Approved Budget	
Project Approved:	12/4/2018	**Sub. Comp.**	**Provider**	**Date**	**Amount**	**CO No.**	**CO Amt.**	**Contracting Method**	Construction:	$14,364,000
Construction Start:	5/31/2020		Consultant TBD					A/E Consultant Selection	Non Construction:	$5,636,000
Construction Complete:	8/30/2022		Contractor TBD					CM at Risk	Total Project Cost:	$20,000,000
Phase: Planning									% funds expended:	2%
									Funding Source	
									Private/Trust	$20,000,000
									Total Funding	$20,000,000

Mammel Hall Addition

BoR Schedule Dates		Contracts							Approved Budget	
Project Approved:	10/3/2018	**Sub. Comp.**	**Provider**	**Date**	**Amount**	**CO No.**	**CO Amt.**	**Contracting Method**	Construction:	$12,849,000
Construction Start:	9/1/2019	4/30/2021	Weitz Company, LLC	8/7/2019	$12,000,000			Design-Build	Non Construction:	$4,151,000
Construction Complete:	4/1/2021								Total Project Cost:	$17,000,000
Phase: Design									% funds expended:	10%
									Funding Source	
									Private/Trust	$17,000,000
									Total Funding	$17,000,000

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Munroe-Meyer Institute Facility Replacement (LB957)

BoR Schedule Dates

Project Approved:	3/29/2019
Construction Start:	6/1/2019
Construction Complete:	6/1/2020
Phase: Design	

Contracts

Sub. Comp.	Provider	Date	Amount	CO No.	CO Amt.	Contracting Method
	Altus Architectural Studios	9/13/2018	$2,389,932			A/E Consultant Selection
	Meyers-Carlisle-Leapley Constructio					CM at Risk

Approved Budget

Construction:	$38,221,000
Non Construction:	$46,864,210
Total Project Cost:	$85,085,210
% funds expended:	39%

Funding Source

State Appropriations	$10,000,000
Auxiliary	$5,000,000
Campus Funds	$2,500,000
Private/Trust	$67,585,210
Total Funding	$85,085,210

Strauss Performing Arts Center Addition & Renovation (LB957)

BoR Schedule Dates

Project Approved:	7/22/2016
Construction Start:	6/23/2017
Construction Complete:	12/31/2018
Phase: Warranty	

Contracts

Sub. Comp.	Provider	Date	Amount	CO No.	CO Amt.	Contracting Method
	HDR Architecture, Inc.	9/7/2016	$1,200,000	4	$41,060	A/E Consultant Selection
1/21/2019	Weitz Company, LLC	4/1/2015	$13,724,000	5	$469,741	CM at Risk

Approved Budget

Construction:	$14,083,000
Non Construction:	$4,217,000
Total Project Cost:	$18,300,000
% funds expended:	96%

Funding Source

State Appropriations	$9,000,000
Campus Funds	$300,000
Private/Trust	$9,000,000
Total Funding	$18,300,000

Lincoln, Nebraska
December 19, 2019

The Board of Regents of the University of Nebraska met on December 19, 2019, at 12:04 p.m. in the board room at Varner Hall, 3835 Holdrege Street, Lincoln, Nebraska, in a publicly convened session, the same being open to the public and having been preceded by advance publicized notice, a copy of which is attached to the minutes of this meeting as Attachment 1 (page 190).

In compliance with the provisions of *Neb. Rev. Stat.* § 84-1411, printed notice of this meeting was sent to each member of the Board and was posted in the first floor lobby of Varner Hall. In addition, copies of such notice were sent to the Lincoln Journal Star, Omaha World Herald, the Daily Nebraskan, the Gateway, the Antelope, the Kearney Hub, and the Lincoln office of the Associated Press on December 11, 2019.

Regents present:
Timothy Clare, Chairman
Howard Hawks
Paul Kenney
Elizabeth O'Connor
Bob Phares
Jim Pillen, Vice Chairman
Robert Schafer
Barbara Weitz
Nicole Kent, University of Nebraska at Kearney
Emily Johnson, University of Nebraska-Lincoln
Keith Ozanne, University of Nebraska Medical Center
Aya Yousuf, University of Nebraska at Omaha

University officials present:
Susan M. Fritz, Interim President
David S. Jackson, Interim Executive Vice President and Provost
Carmen K. Maurer, Corporation Secretary
Jeffrey P. Gold, Chancellor, University of Nebraska Medical Center and University of Nebraska at Omaha
Christopher J. Kabourek, Vice President for Business and Finance | CFO
Heath M. Mello, Interim Associate Vice President for University Affairs and Director of State Relations-elect
James P. Pottorff, Vice President and General Counsel

University officials not present:
Ronnie D. Green, Chancellor, University of Nebraska-Lincoln
Douglas A. Kristensen, Chancellor, University of Nebraska at Kearney
Michael J. Boehm, Vice President for Agriculture and Natural Resources

I. CALL TO ORDER

II. ROLL CALL

The Board convened at 12:04 p.m. in the boardroom of Varner Hall, 3835 Holdrege Street, Lincoln, Nebraska. Attendance is indicated above.

III. APPROVAL OF MINUTES AND RATIFICATION OF ACTIONS

Motion — Moved by Kenney and seconded by Pillen to approve the minutes and ratify the actions of the regularly scheduled meeting on December 5, 2019.

Action — Student Opinion: Voting Aye: Kent, Ozanne, Yousuf, and Johnson. Voting Aye: Hawks, Kenney, O'Connor, Phares, Pillen, Schafer, Weitz, and Clare. Motion carried.

Chairman Clare announced the location of the Open Meetings Act in the board room.

IV. RESOLUTIONS

None

V. HEARINGS

None

VI. PUBLIC COMMENT

None

Motion — Moved by Weitz and seconded by Ozanne that the Board go into closed session as authorized by Neb. Rev. Stat. § 84-1410 for the protection of the public interest, and to prevent needless injury to the reputation of persons who have not requested a public hearing, for the purpose of holding a discussion limited to the following subject:

- Personal and job matters of persons who have not requested a public hearing.

Action — Student Opinion: Voting Aye: Ozanne, Yousef, Johnson, and Kent. Voting Aye: Kenney, O'Connor, Phares, Pillen, Schafer, Weitz, Clare, and Hawks. Motion carried.

The Board went into closed session at 12:15 p.m. The Board reconvened the open meeting at 12:23 p.m.

VII. UNIVERSITY ADMINISTRATIVE AGENDA
A. ACADEMIC AFFAIRS
University of Nebraska

Motion — Moved by Clare and seconded by Phares to approve item VII-A-1, as follows:

VII-A-1 — Approve a revised Contract of Employment for Walter E. Carter, Jr. as President of the University of Nebraska for an Initial Term commencing on January 1, 2020, and ending December 31, 2024, as well as service as President-elect for purposes of transition coordination and planning for the period of time commencing December 16, 2019, through December 31, 2019

Action — Student Opinion: Voting Aye: Yousuf, Johnson, Kent, and Ozanne. Voting Aye: O'Connor, Phares, Pillen, Schafer, Weitz, Clare, Hawks, and Kenney. Motion carried.

Motion — Moved by Clare and seconded by Phares to approve item VII-A-2

VII-A-2 — Approve creation of a Presidential Transition Committee

Regent Clare moved that President-elect Carter, in consultation with the Board of Regents, select a transition committee, noting that the committee should be agile, and therefore not too big. No more than ten to fifteen persons should comprise the committee to represent constituencies such as Regents, students, faculty, staff, alumni, supporters, and the business and agriculture communities. Other constituencies may be identified as valuable to this process, as well. President-elect Carter indicated that he would hope this committee might support his goal to write a five-year strategy within the first 100 days of taking office.

Regent Phares seconded the motion, and both Regents accepted a friendly amendment offered by Regent Hawks clarifying that no additional Board action is necessary with respect to the authorization or creation of the transition committee.

Further discussion ensued.

Action — Student Opinion: Voting Aye: Johnson, Kent, Ozanne, and Yousuf. Voting Aye: Phares, Pillen, Schafer, Weitz, Clare, Hawks, Kenney, and O'Connor. Motion carried.

VIII. ADJOURNMENT

There being no further business, the meeting was adjourned by Chairman Clare at 12:28 p.m.

Respectfully submitted,

_____
Carmen K. Maurer
Corporation Secretary

_____
Timothy F. Clare
Chairman of the Board

ATTACHMENT 1

NOTICE OF MEETING

Notice is hereby given that the Board of Regents of the University of Nebraska will meet in a publicly convened session on Thursday, December 19, 2019, at 12:00 p.m. in the board room of Varner Hall, 3835 Holdrege Street, Lincoln, Nebraska.

When so posted, the full agenda for the meeting will be available for inspection in the office of the Corporation Secretary of the Board of Regents, Varner Hall, 3835 Holdrege Street, Lincoln, Nebraska, or at https://nebraska.edu/regents/agendas-minutes

A copy of this notice will be delivered to the Lincoln Journal Star, the Omaha World-Herald, the Daily Nebraskan, the Gateway, the Antelope, the Kearney Hub, the Lincoln office of the Associated Press, members of the Board of Regents, and the President's Council of the University of Nebraska.

Dated: December 11, 2019

Carmen K. Maurer
Corporation Secretary
Board of Regents
University of Nebraska

Board of Regents
Varner Hall | 3835 Holdrege Street | Lincoln, NE 68583-0745 | 402.472.3906 | FAX: 402.472.1237 | nebraska.edu/regents