

CISCO *Live!*

ALL IN

#CiscoLive



The bridge to possible

UCS X-Series

Blurring the Line Between Rack and Blade for Modern Applications

Ravi Mishra, UCSX Product Manager
@ravmishr
BRKCLD-3010

CISCO *Live!*

#CiscoLive



Cisco Webex App

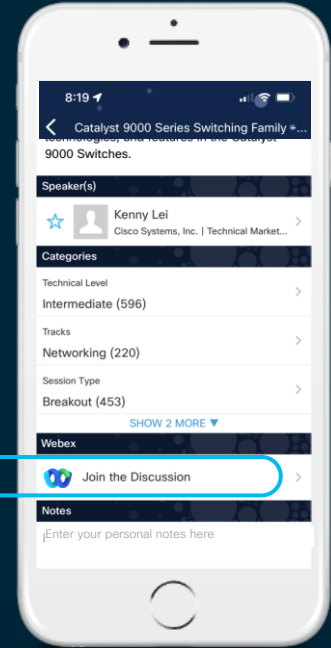
Questions?

Use Cisco Webex App to chat with the speaker after the session

How

- 1 Find this session in the Cisco Live Mobile App
- 2 Click “Join the Discussion”
- 3 Install the Webex App or go directly to the Webex space
- 4 Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until June 17, 2022.



<https://cicolive.ciscoevents.com/cicolivebot/#BRKCLD-3010>



~~Agenda~~

Storyline

- Challenges
- Solution
- Deep dive
- Examples
- Special Guest

The cast



Alex

“The IT Admin”



Mary

“ML Engineer”

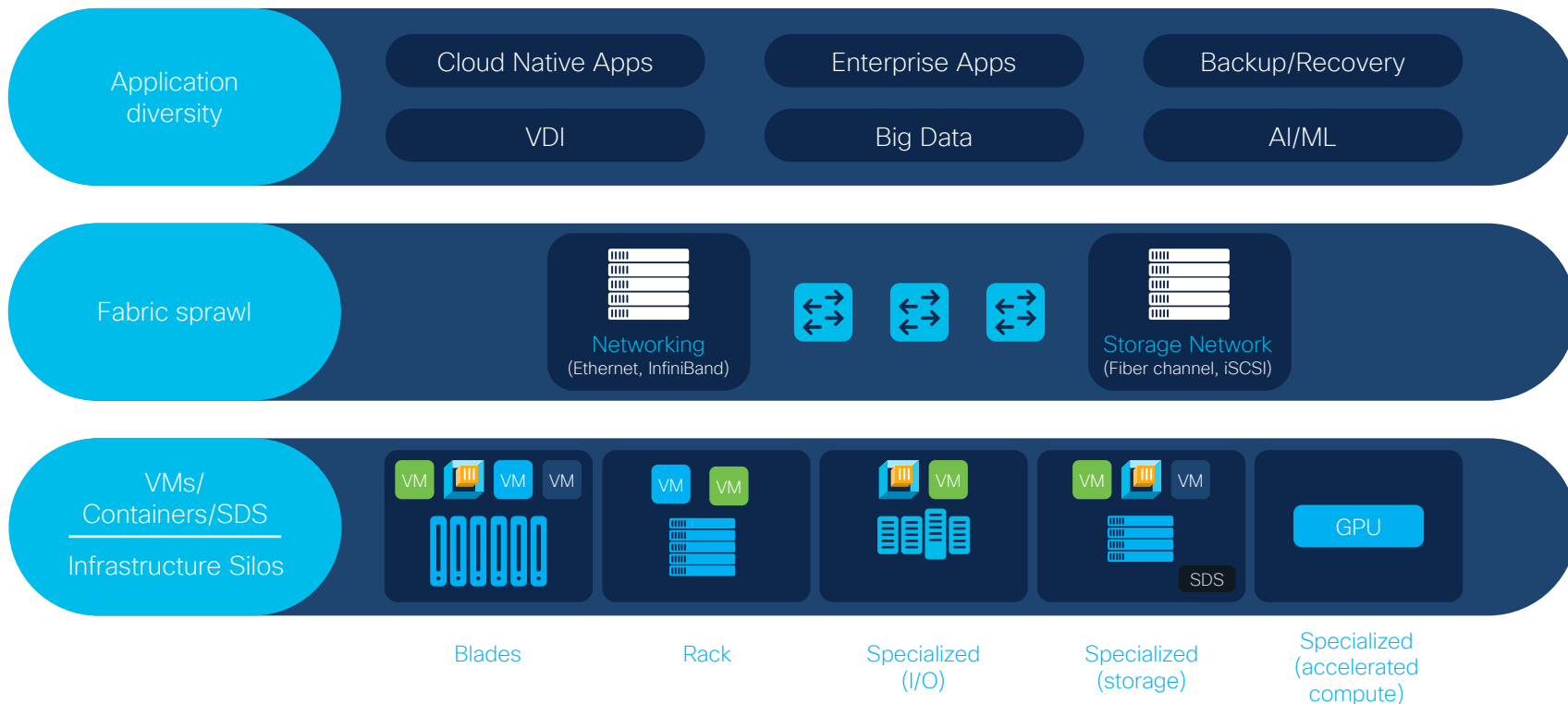


Jim

“The CIO”



Architectural silos drive complexity





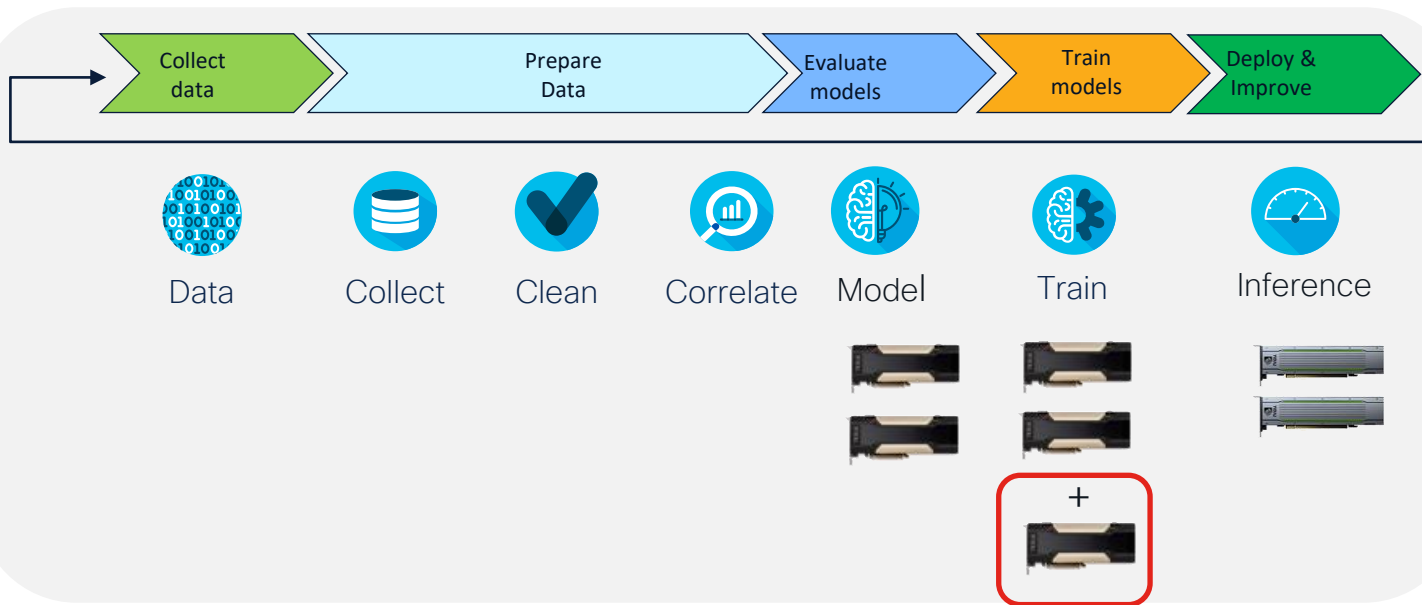
A Lot Has Changed... and Continues to Change





Application needs resources

Typical Machine Learning/AI Pipeline



Challenges



Application growth

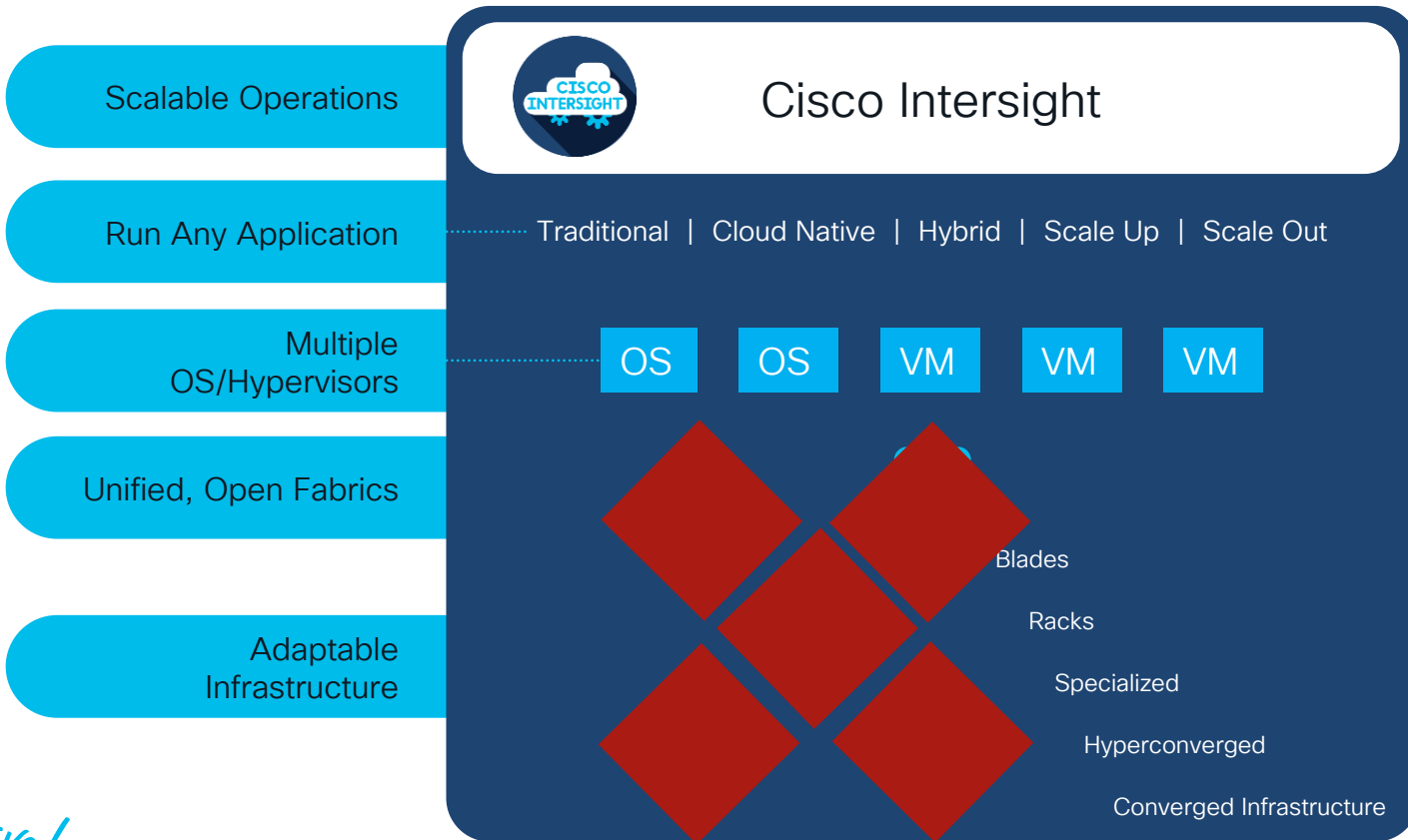


Scalability



Cloud like experience

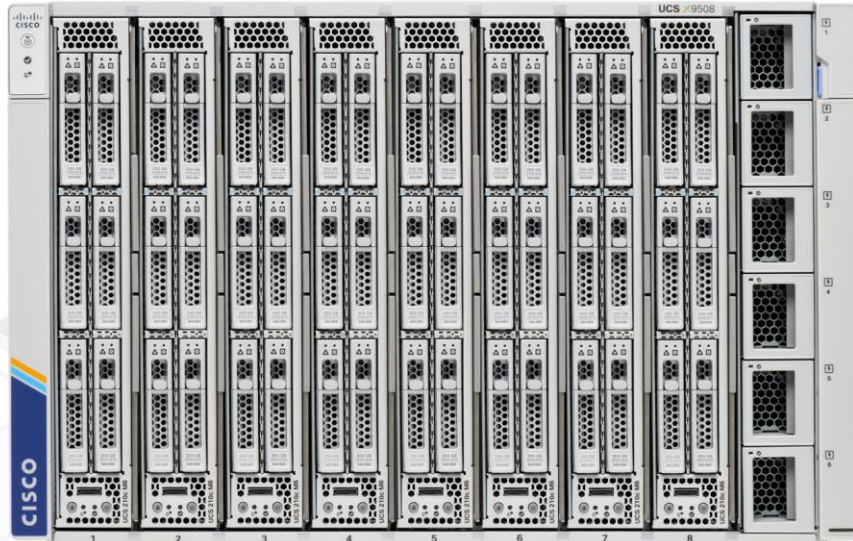
Simplify to scale, automate, and operate



UCS X-Series



Cisco UCS X-Series Computing for the next decade...



2030+

Liquid-cooling

Silicon photonics

Future fabrics ready

Power-hungry processing

2021

600+
Cores

~100 TB
Memory

48M
IOPS

1 PB
Storage

Modern Hybrid Cloud Infrastructure

Simplify to scale, automate, and operate

Scalable Operations



Cisco Intersight

Run Any Application

Traditional | Cloud Native | Hybrid | Scale Up | Scale Out

Multiple OS/Hypervisors

OS

OS

VM

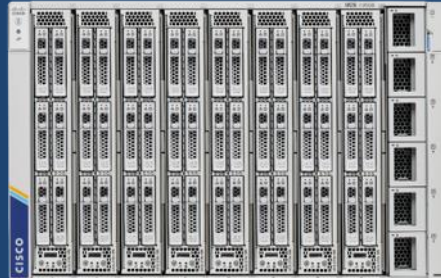
VM

VM

Unified, Open Fabrics



Adaptable Infrastructure



Blades

Racks

Specialized

Hyperconverged

Converged Infrastructure

X-Series

All Benefits of 5108

Unified Fabric
Profiles, Policies
Stateless Servers – SW Defined

Simpler Management

Intersight Managed
IMM Fabric Interconnect

New Chassis – 7RU

Power & Cooling Innovations
Energy Efficient, High Watt CPUs/GPUs
Future Ready – Next Decade

New Compute Node

Dual CPU, More DIMMs
More Drives (6xSFF, 2xM.2), 2x VICs
More Real Estate (For GPUs)

New Unified Fabric

Choices (U/D): 400G/1600G, 1600/1600G
Evolve as you go
Backplane less design

New UCS X Fabric

For Low Latency Traffic (PCIe, CXL)
Invisible, Within Chassis
Backplane less design

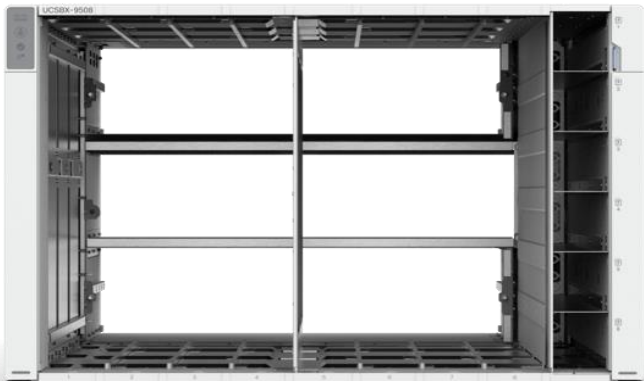
New Node Types

PCIe Nodes (For GPUs, FPGAs)
Drive Nodes*
Memory Nodes *

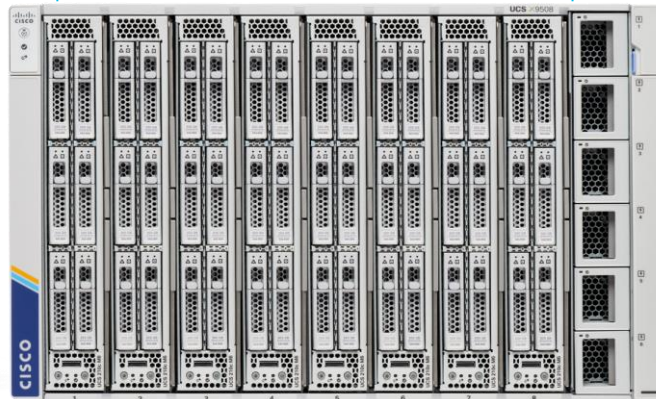


X-Series

Chassis



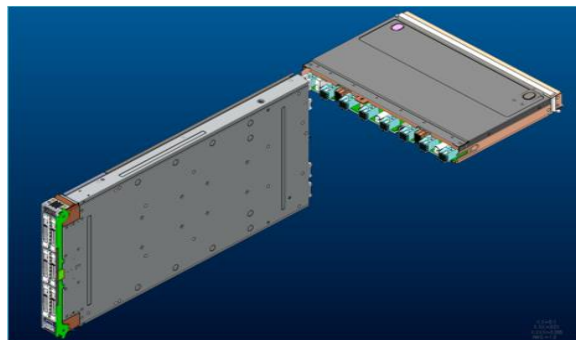
8 Nodes



@FCS (in 7U)
600+ Cores, ~100TB Mem,
>1PB Drives, >35M IOPs

PCIe Nodes
Drive Nodes*
Memory Nodes*

Backplane less design For Fabric



Intelligent Fabric Modules
Fabric for Converged Traffic
(Ethernet, Mgmt, FC, NVMeOF etc)

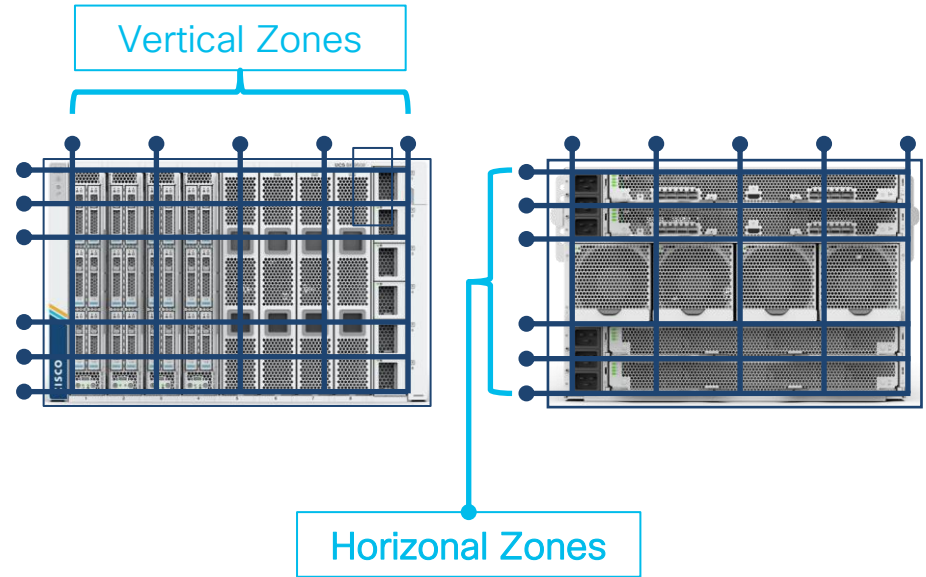
UCS X Fabric
(Fabric for PCIe, CXL Traffic)

Power and Cooling Innovation!
Power Distribution, Fan Speed Sensors,
Fan Control Policy, Air Flow, Others
High Energy Efficiency and
Power Envelope For Future



Zoned Based Cooling: Chassis

- Vertical and horizontal zones
- Independent fan speed control based on sensors participating in each zone
- Reduces fan power consumption by right-sizing air flow on a per-zone basis, and increases overall power efficiency

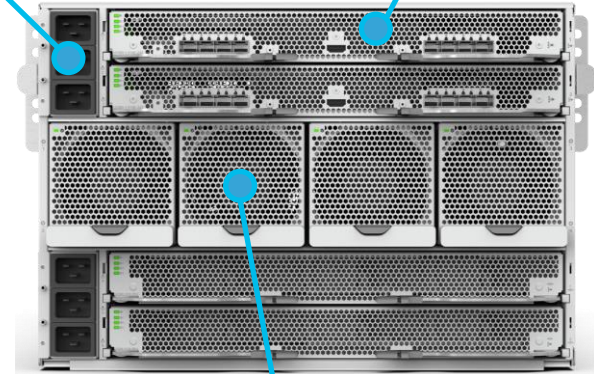


System and Module Fan Configuration

- Maximum chassis airflow is approximately 1100 CFM
- Approximately 110 CFM per node, 40 CFM per fabric module and 15 CFM per PSU
- Hot-swappable N+1 redundant
- Large higher voltage system fans provide more airflow at lower speeds, that lowers fan noise and reduces power consumption

1X 40-mm x 56-mm
12Vdc Fan per PSU

3X 40-mm x 56-mm 54Vdc Fans per
IFM/XFM/Blank



4X 100-mm x 90-mm 54Vdc
Fans per Chassis

Compute Module

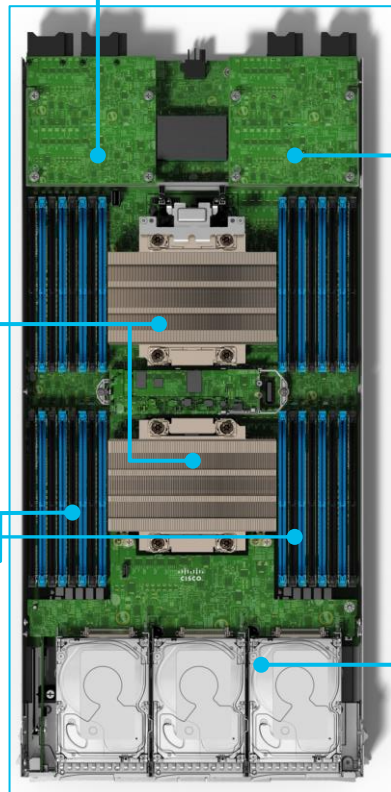


CPU

Up to 2 Intel 3rd Gen CPUs

Memory

Up to 32 DDR4 3200 DIMMs



X-Fabric Mezz

Connect to PCIe Node

In future, to Memory Module

VIC

Up to 2 VICs

25G/100G Cisco mLoM

25G/100G Cisco VIC Mezz

Agg NW 100G / 200G per blade

Drives

2 x M.2 Drives

Up to 6 x SAS/SATA/NVMe

- RAID Controller for SAS/SATA

30TB* NVMe drives (800K IOPs, 6GB/s)

Up to 180TB (30TB x 6) per Blade



Fabric Interconnect- 25G and 100G



	6454	64108	6536
Total Ports	54	108	36
Ethernet only Ports	28x 10/25G, 4x 1/10/25G and 6x 40G	72x 10/25G, 8x 1/10/25G and 12x 40G	32(10*/25/40/100G)
Unified Ports	16x 10/25G Ethernet or 4/8/16G FC	16x 10/25G Ethernet or 4/8/16G FC	4x100G (10*/25/40/100G) Ethernet or 16x 8/16/32G FC with breakout
1G Ports	Port 45-48	Port 89-96	Port 9 and 10
IFM	25G	25G	25G and 100G

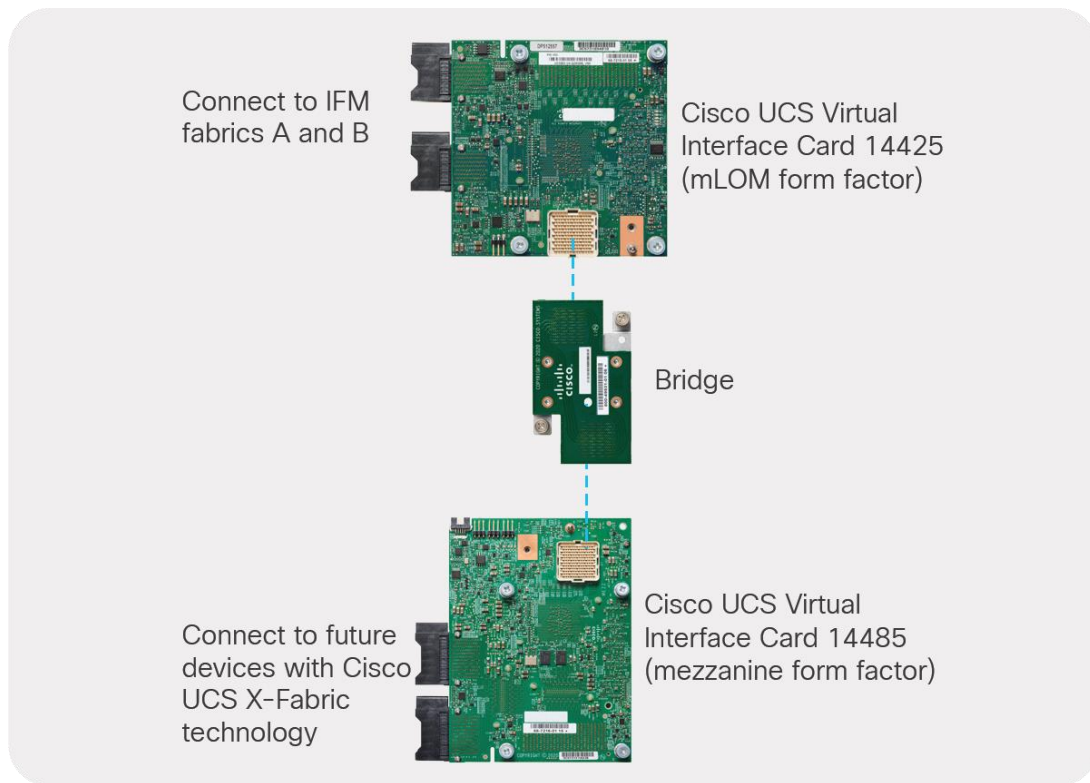
Intelligent Fabric Module (IFM) – 25G and 100G



	IFM 9108-25G	IFM 9108-100G
Fabric Interconnect	6454, 64108, 6536	6536
VIC	15231, 14425, +14825	15231, 14425, +14825
Network Interface (NIF) Ports	8 x 25G (port-channel)	8 x 100G (port-channel)
Host Interface (HIF) Ports	32 x 25G	8 x 100G or 32 x 25G
Oversubscription	4 : 1	1 : 1

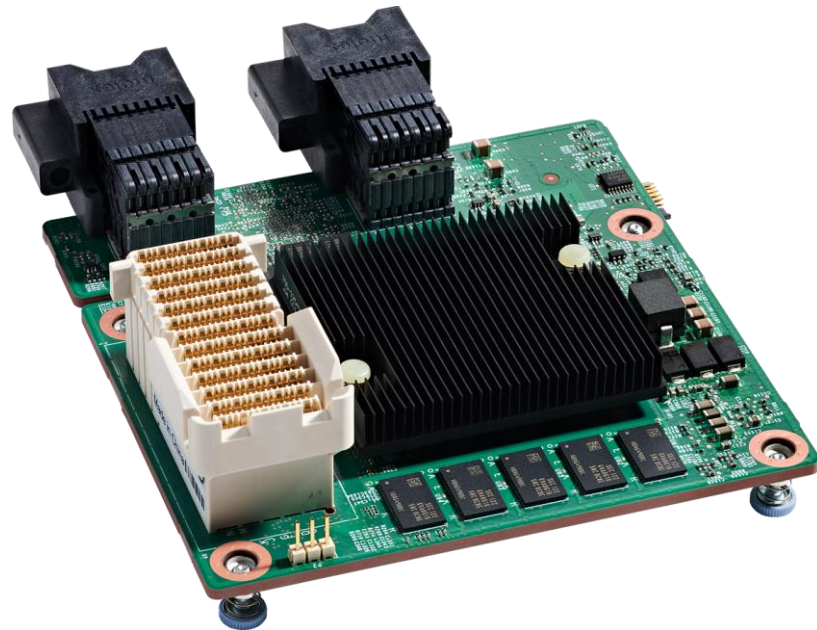
VIC 14425 (mLOM) and VIC 14825 (Mezz)

- 4th Gen VIC card for X210c compute node
- 4x 25G bandwidth with mLom and 8x25G with Mezz
- X16 PCIe Gen 3
- Features
 - NVMeoF over RDMA (ROCEv2)
 - FC-NVMe, VxLAN, NVGRE, Geneve Offload
 - Hardware RSS
 - Windows VMQ/VMMQ
 - VMware NetQueue
 - DPDK



VIC 15231 mLOM

- 5th Gen VIC card
- Converged Network Adapter
- **2 x 100G** with 5th Gen FI
- x16, PCIe Gen 4
- 512 virtual PCIe Devices
 - FC and Ethernet
- NVMeoF: FC-NVMe, RoCEv2
- Overlays: NVGRE, VXLAN, Geneve
- RSS, NetQueue, VMQ, VMMQ, RSSv2*
- SR-IOV*, SIOV*, usNIC, DPDK
- PTPv2, L3ECN*, 16K Rx Ring Size



X-Fabric



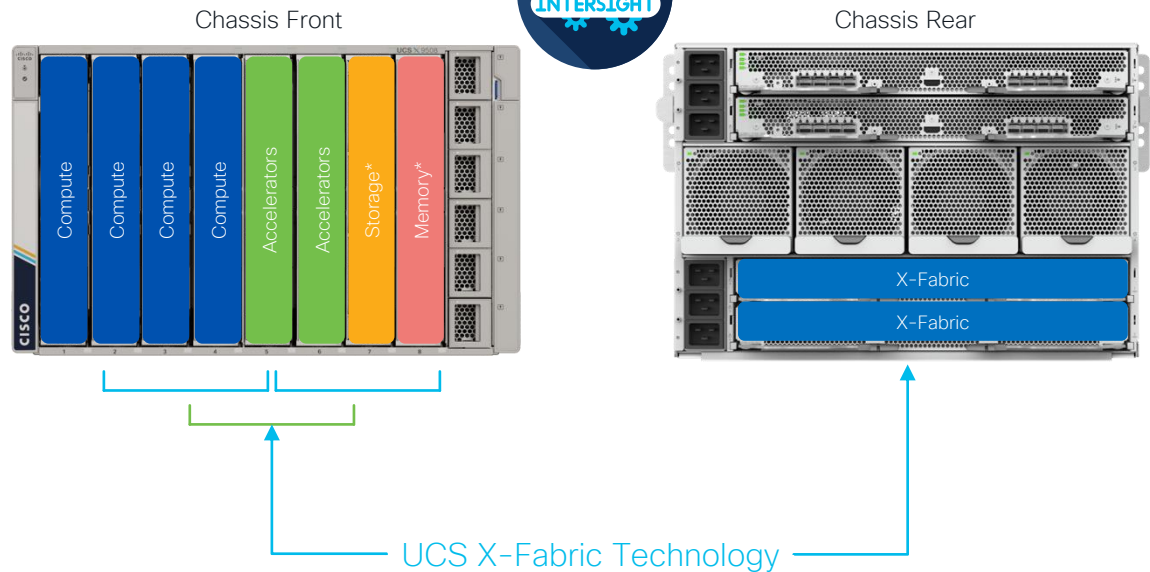
UCS X-Fabric Technology

Open, modular design shapes resources to applications

Run modern apps by assembling modules into systems

Simple policy-based definition of resources from Intersight

Engineered to accommodate future technologies



Fabric interconnects nodes

Industry standard PCIe, CXL Traffic*

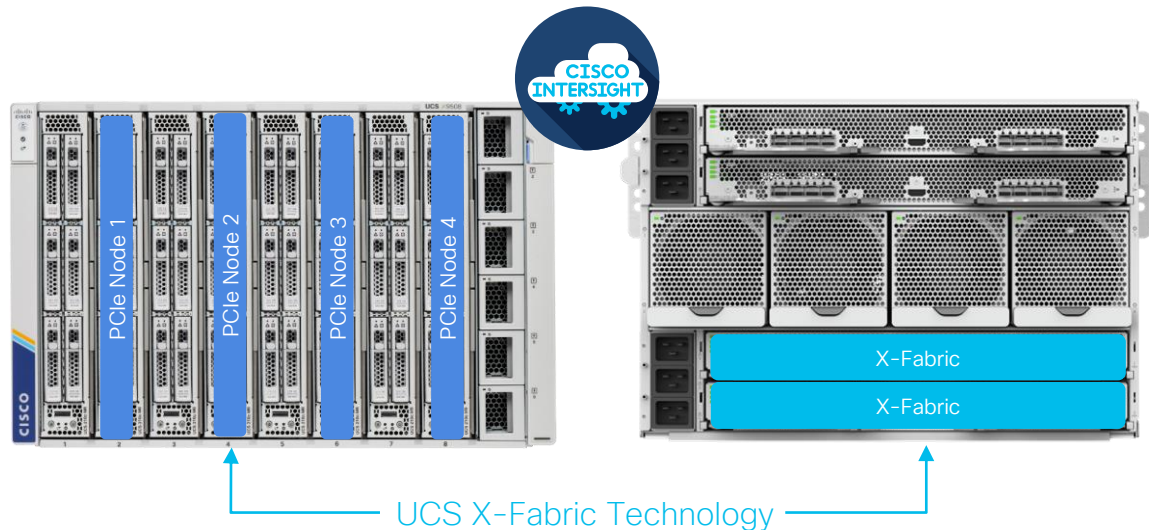
No backplane or cables = Easily upgrades

* Roadmap items – subject to change

UCS X-Fabric Technology and PCIe Nodes with GPU

PCIe node supports Nvidia GPUs:

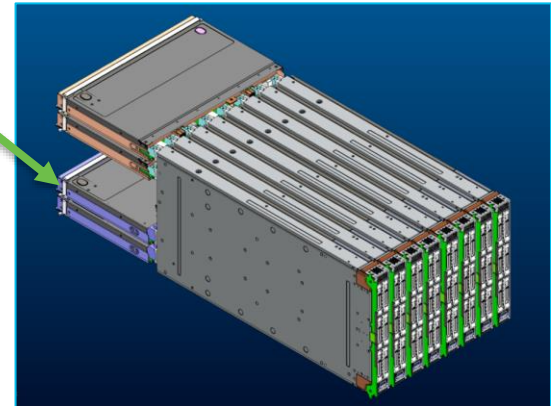
- 2 x A16
- 2 x A40
- 4 x T4
- 2 x A100-80G



- ✓ Based on native PCIe Gen. 4
- ✓ Provides GPU acceleration to enterprise application
- ✓ No backplane or cables = Easily upgrades

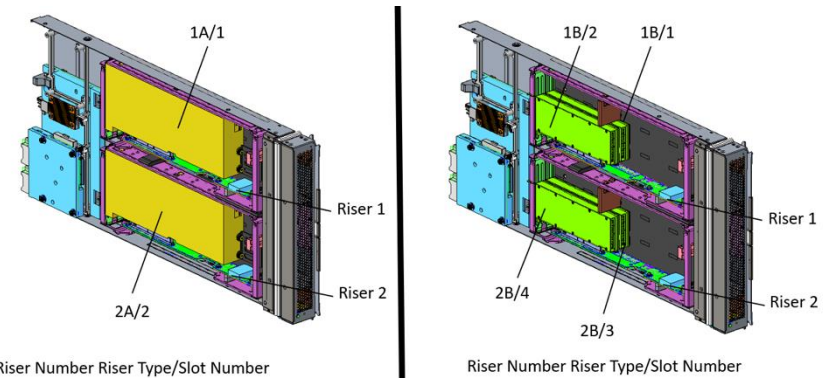
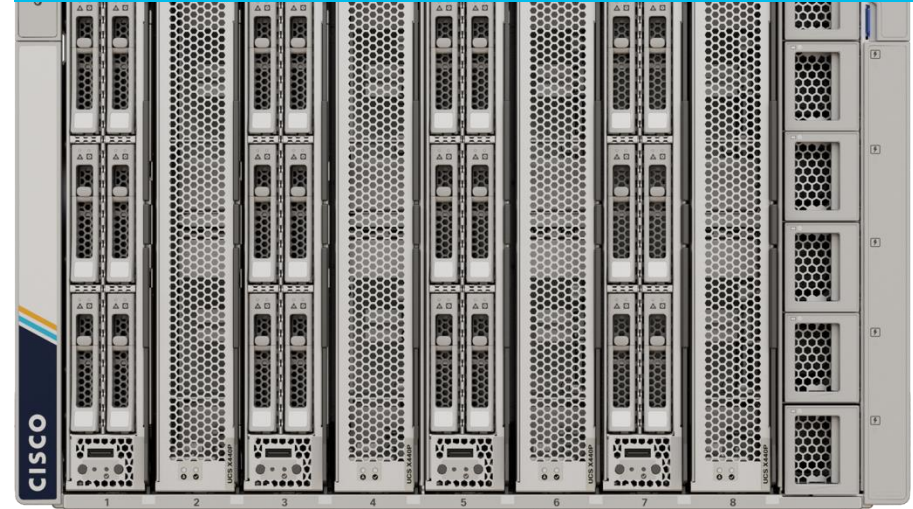
X9416 X-Fabric XFM Modules

- Replaces lower fabric module pair
- Connects to all chassis slots
- The X9416 XFM provides fixed PCIe Gen4 x16 links between each pair of odd (N) and even (N+1) slots
- No configuration required



X440p PCIe Node

- The X440p PCIe node provides 2 or 4 PCIe slots connected to an adjacent compute node
- Includes two riser cards, type A or B
- Riser A – Up to two dual width GPUs
 - A16, A40, or A100
- Riser B – Up to four single width GPUs
 - T4

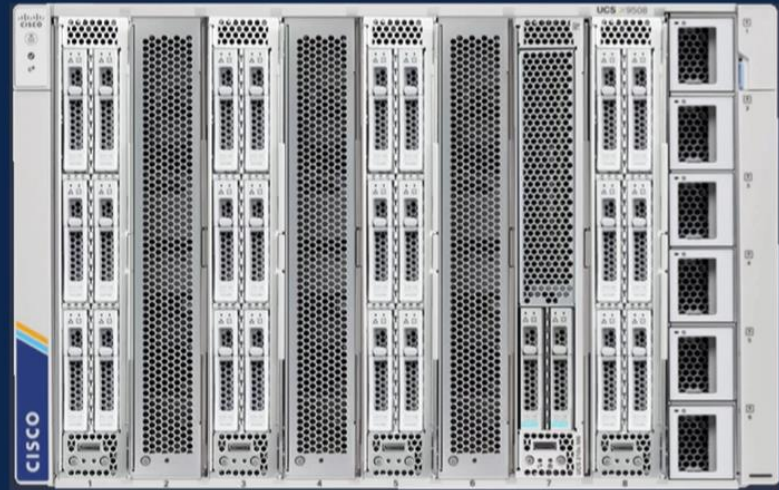


Demo



UCS X-Series Modularity & X-Fabric - Demo

1. Display Compute Node Inventory
 - Slot 1 with out GPU support
2. Insert the PCIe Node with one A40 GPU
 - Insert PCIe Node in Slot2
3. Rediscover Compute Node
 - Run rediscovery operation
4. Display Compute Node Inventory with GPU presented from the PCIe Node
 - GPU available on Compute Node



GPU Front Mezz



UCS X210c M6 Compute Node - GPU



Run more apps in less space

- High-density form factor supports a wide range of workloads
- Two Nvidia T4 GPUs for AI inferencing, data analytics, and graphics

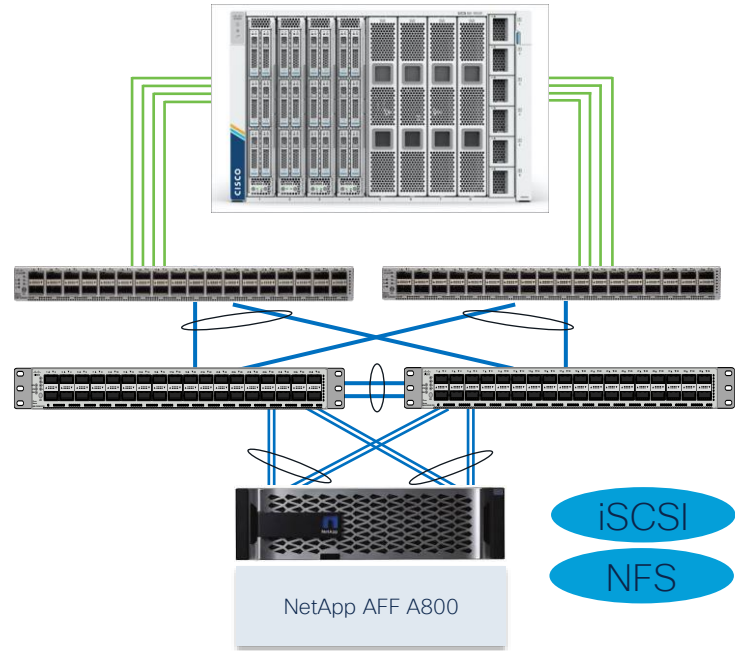
Cloud operated with Cisco Intersight

Cisco UCS X-Series with FlexPod and FlashStack



Converged Infrastructure with X-Series- IP Design

FlexPod



Cisco UCSX-9508 Chassis

- Cisco UCSX 9108-100G
- Cisco UCS X210c M6 with Cisco UCS VIC 15231

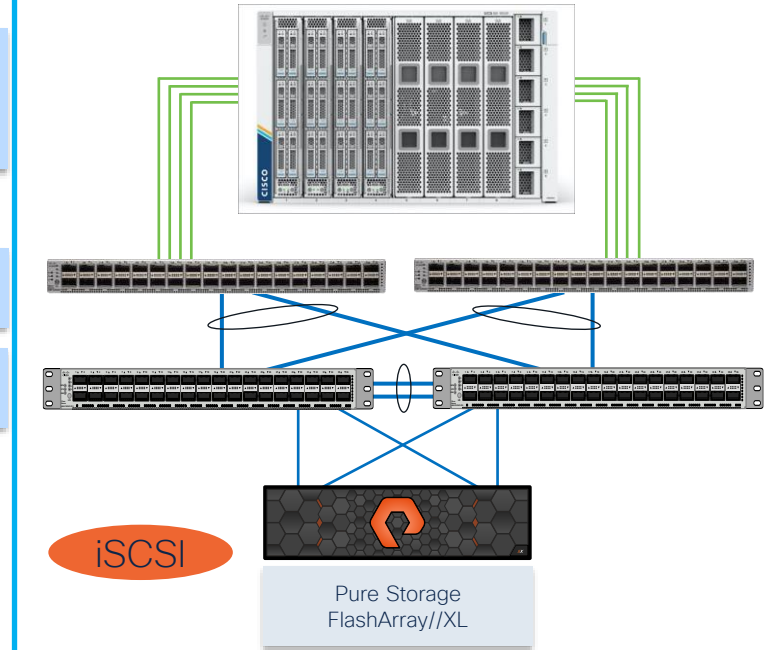
Cisco UCS 6536 Fabric Interconnect

Cisco Nexus 9336C-FX2

— 100 GE

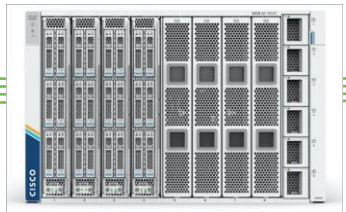
— 100 GE

FlashStack

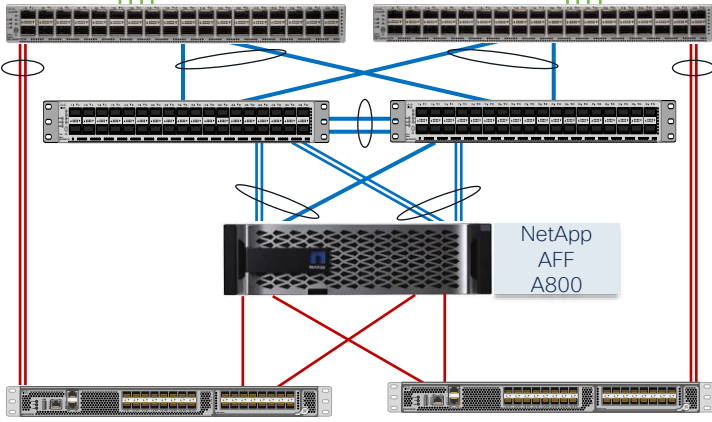


Converged Infrastructure with X-Series – FC Design

FlexPod



- Cisco UCSX-9508 Chassis
- Cisco UCS 9108-100G
- Cisco UCS X210c M6 with Cisco UCS VIC 15231

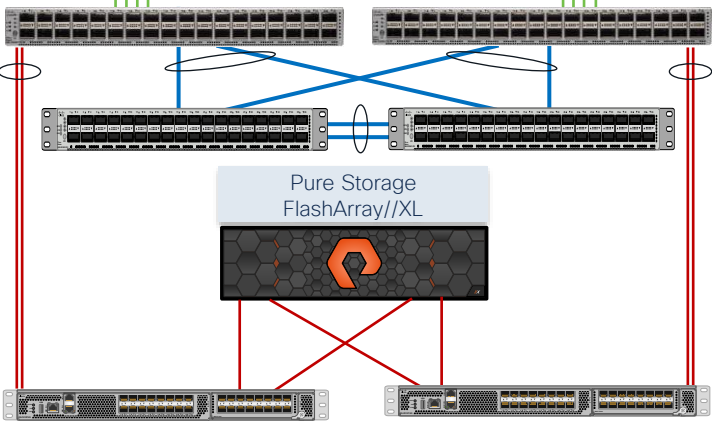
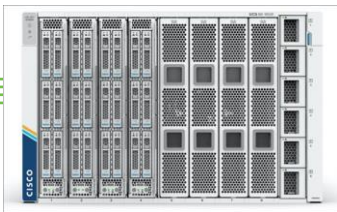


Cisco UCS 6536 Fabric Interconnect

Cisco Nexus 9336C-FX2

- 100 GE
- 100 GE
- 32Gbps FC

FlashStack



Pure Storage FlashArray//XL

FC

Data Protection - Cohesity



Modern Data Protection at the Speed of Flash

Fast Backup, Operational Recoveries and More across Hybrid Cloud



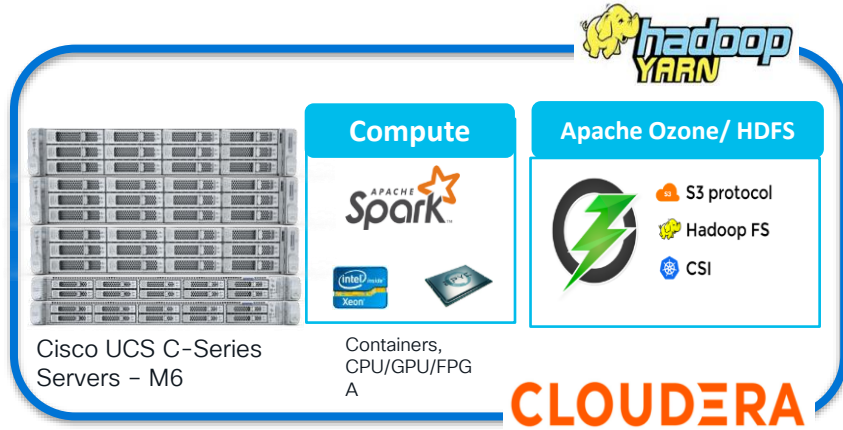
Cisco Data Intelligence Platform

Journey to Hybrid Cloud



Cisco Data Intelligence Platform

Data Lake (Hadoop)



Data Intensive Workloads

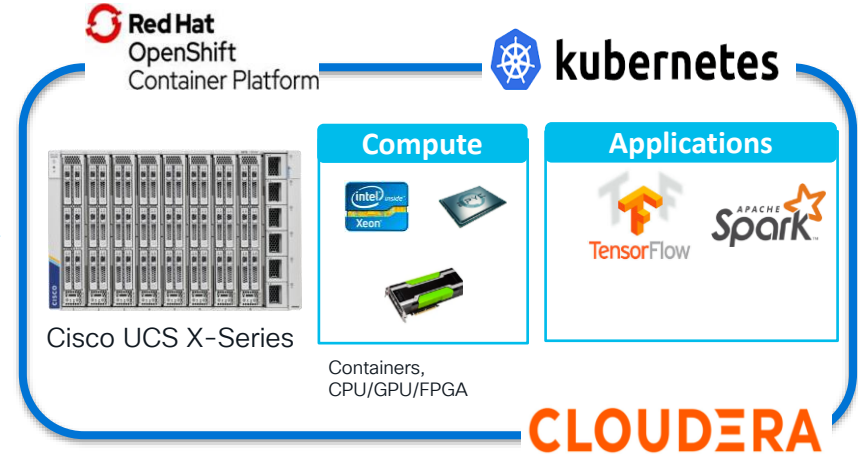
Pre-validated

- Fully supported
- Architectural innovations with Partners

intel CLouDERA

NVIDIA AMD EPYC Red Hat OpenShift Container Platform

Private Cloud



Compute Intensive Workloads

Centralized Management

- Infrastructure management

Scaling

- Independently scale storage and compute

World record performance

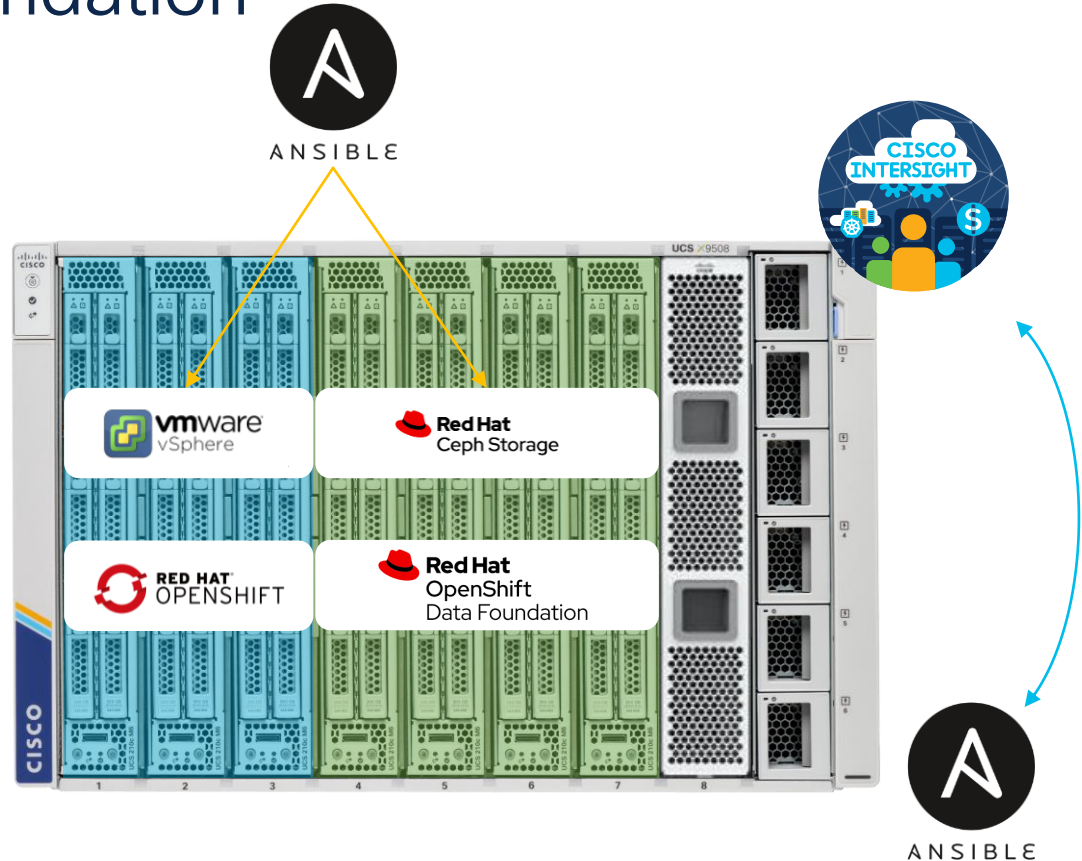
- TPCx-HS (20 plus)
- Proven linear scaling
- Only to publish 300 TB test

UCS X-Series with Red Hat OpenShift and OpenShift Data Foundation



UCS X-Series with Red Hat OpenShift and OpenShift Data Foundation

- Cisco UCS X-Series connected to FI-6454 and managed by Intersight through IMM
- Configuration and deployment through Intersight Ansible
- Automated vSphere 7 and RHEL 8 install
- Preparation of all nodes through Ansible
- Install of OCP, Ceph, and ODF
- Performance tests





Consolidate Rack Workloads

AI AI/ML

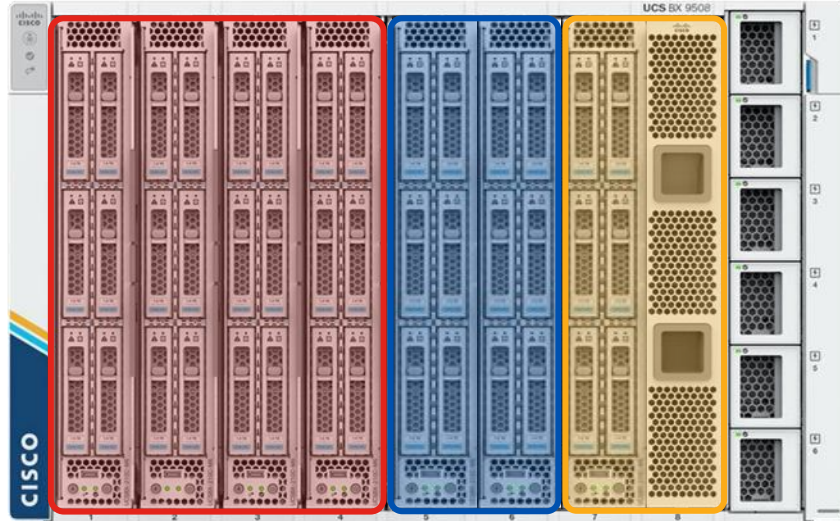
Accelerated VDI

Big Data, SDS, Containers

+

Traditional Blade Workloads

UCS X-Series with X-Fabric



NEW

~1600G

Aggregate bandwidth

NEW

200G

Bandwidth to compute node

NEW

24

GPUs per Chassis



Special Guest



Matthew Taylor

Director of Service
NterOne Corporation



Establishing Infrastructure-as-Code

NterOne Corporation is a global IT training, software, consulting, and solutions provider that serves customers in more than 35 countries.



Challenges

- Improving operational speed, agility, and scale
- Deploying a wide variety of virtual resources for students and clients around the world
- Enhancing infrastructure visibility and orchestration

Results

- Accelerated VM deployments from hours to minutes
- Consolidated toolsets and optimized data center resources
- Improved network visibility, troubleshooting, and mean time to resolution (MTTR)
- Established a tightly integrated, software-defined foundation for infrastructure-as-code

Solutions

Full-stack data center infrastructure with cloud-based management

Cisco UCS X-Series

Cisco HyperFlex

Cisco Application Centric Infrastructure (Cisco ACI)

Cisco Intersight

Cisco Intersight Workload Optimizer (IWO)

Cisco Intersight Service for HashiCorp Terraform

Cisco Nexus 9000 Series switches

Cisco Nexus Dashboard

Cisco Nexus Dashboard Fabric Controller

“Full-scale integration and infrastructure-as-code will dramatically improve the speed, efficiency, and agility of our operations.”

Matthew Taylor
Director of Engineering
NterOne

Continue your education

- [BRKCLD-2028](#) - Build Your Hybrid Cloud with Cisco
- [BRKCLD-2807](#) - Real Life Deployment of Hybrid Cloud Infrastructure using Intersight
- [BRKCLD-3010](#) - UCS X-Series: Blurring the Line Between Rack and Blade for Modern Applications
- [BRKCLD-3011](#) - Learn Why Cisco UCS Builds the Best AMD Servers in the Market
- [BRKDCN-2310](#) - Unleash the Power of Converged Infrastructure Using Cisco Intersight and UCS X-Series
- [BRKDCN-2587](#) - Best Practices for Cloud and Compute Connectivity with the 5th Gen UCS Fabric and Intersight
- [BRKDCN-2794](#) - How Will the UCS X-Series Hardware Bring Your Applications Together?
- [CCP-1210](#) - Roadmap: Hyperflex, Intersight, and Unified Computing Systems Update
- [DEVNET-3018](#) - Provision Infrastructure at Cloud scale with Terraform Provider for Cisco Intersight
- [DEVNET-3026](#) - Simplify IAC for On Premises Environment using Cisco Intersight and Hashicorp Terraform Cloud
- [DEVWKS-2060](#) - Automating Cisco UCS Server Provisioning with Terraform and Intersight
- [DEVWKS-2942](#) - DevNet Workshop - Programmability with Intersight Managed Mode
- [IBODCN-1551](#) - An Interactive Conversation on the Evolution of Compute Hardware in the Cloud-First Era
- [IBODCN-2301](#) - An interactive conversations on IMM Transition - How do I get there?
- [LABDCN-1115](#) - Cisco Intersight Cloud-based Infrastructure management
- [TSCDCN-2012](#) - Troubleshooting New Installation of UCS X-Series System in Intersight Managed Mode

World of Solutions

X-SERIES &
FABRIC DEMOS

Product Innovation On Display

On Demo

X-Series

EXPERIENCE

Simplicity with
X-Series

X-Fabric

EXPERIENCE

Innovative X-Fabric:
Blurring line between
Rack and Blade

5th Gen Fabric
Interconnect

Deploy X-Series Live with just
a few clicks (Power of Intersight)

Simplicity of adding GPUs to
Compute nodes...in few minutes!

EXPERIENCE

Amazing Performances
on X-Series

Performance out of the box

Oracle Swing bench
Performance

EXPERIENCE

New 5th Gen Unified Fabric:
Simplify, Accelerate and
Reduce Components

100G/200G Ethernet and NFS
with a single VIC 15231

5th Gen VIC

Flexpod: Define FlexPod with
X-Series in Intersight

100G FC aggregate and 32G
E2E FC per vHBA on a single
VIC 15231

GPU Node

FlashStack: Pervasive visibility
across X-Series FlashStack
with Intersight

Deploy Red Hat OpenShift
Container Platform with
confidence (Ceph)

Automation with X-Series
leveraging Intersight Ansible

X-Series white papers

- [Cisco UCS X-Series Quick Start Guide](#)
- [Cisco UCS X210c M6 Compute Node Disk I/O Characterization](#)
- [Deploy Cisco UCS X210c Compute Node with Cisco Intersight Management Mode for VDI](#)
- [FlashStack with Cisco UCS X-Series and Cisco Intersight](#)
- [FlexPod Datacenter with Cisco UCS X-Series and Cisco Intersight](#)
- [Power SAP HANA with the Cisco UCS X-Series Certified by SAP](#)
- [Deploy SAP HANA Scale-Up Appliance with UCS X-Series](#)
- [Cisco UCS and Intel SGX with Fortanix Confidential Computing Manager](#)
- [Deploy a High-Performance Standalone Oracle Database Solution: Oracle 19c on Cisco UCS X-Series](#)
- [FlexPod Datacenter with Citrix VDI and VMware vSphere 7 for up to 2500 Seats](#)
- [FlexPod XCS Solution with Cisco Intersight Platform Tech Preview](#)
- [Red Hat OpenShift Container Platform with OpenShift Data Foundation on Cisco UCS X-Series](#)
- [Cisco UCS X-Series Servers with Intel Optane Persistent Memory for Virtual Desktop Infrastructure White Paper](#)
- [Get Answers from Your Data with Cisco UCS Integrated Infrastructure for Splunk Enterprise](#)

Technical Session Surveys

- Attendees who fill out a minimum of four session surveys and the overall event survey will get Cisco Live branded socks!
- Attendees will also earn 100 points in the Cisco Live Game for every survey completed.
- These points help you get on the leaderboard and increase your chances of winning daily and grand prizes.



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Cisco U.

IT learning hub that guides teams and learners toward their goals

Cisco Digital Learning

Subscription-based product, technology, and certification training

Cisco Modeling Labs

Network simulation platform for design, testing, and troubleshooting

Cisco Learning Network

Resource community portal for certifications and learning



Train

Cisco Training Bootcamps

Intensive team & individual automation and technology training programs

Cisco Learning Partner Program

Authorized training partners supporting Cisco technology and career certifications

Cisco Instructor-led and Virtual Instructor-led training

Accelerated curriculum of product, technology, and certification courses



Certify

Cisco Certifications and Specialist Certifications

Award-winning certification program empowers students and IT Professionals to advance their technical careers

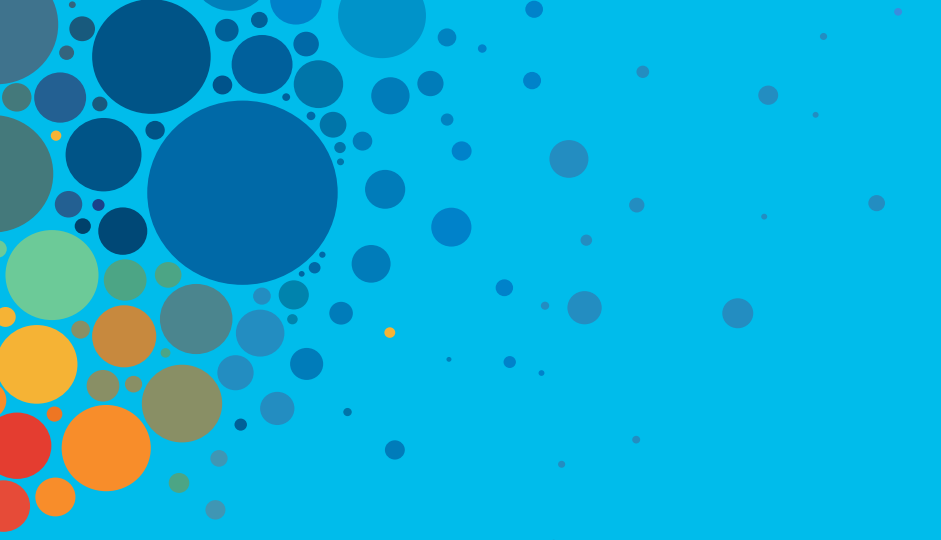
Cisco Guided Study Groups

180-day certification prep program with learning and support

Cisco Continuing Education Program

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Here at the event? Visit us at **The Learning and Certifications lounge at the World of Solutions**



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- Book your one-on-one Meet the Engineer meeting
- Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs
- Visit the On-Demand Library for more sessions at www.CiscoLive.com/on-demand



The bridge to possible

Thank you

CISCO *Live!*

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ALL IN

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