Introduction to Catalyst 6800 and Instant Access

Cisco Connect, Riyadh
April 2014

Amer Atout,
Product Manager,
Enterprise Networking Group

Agenda

- 6800 for Campus Backbone
- 6800 Hardware Update
- 6800 Software Update
- Key Takeaways

Switching Requirements
Differ Between Campus and Data Center

Campus
Catalyst Family: IOS 15.x

User Access Control/Segmentation
802.1X / Easy Virtual Networks

Video Intelligence
Medianet

Wired/Wireless Convergence
Wireless Controller Integration

Application Visibility
Flexible NetFlow, Network Analysis Module

Power over Ethernet
UPOE, EnergyWise

Data Center/Cloud
Nexus Family: NX-OS

Cloud Security and VM Awareness
Nexus 1000v, VSG, ASA

VM Mobility
LISP, VXLAN, OTV

LAN/SAN Convergence
Unified Ports, FCoE

Fabric Scale and Resilience
FabricPath, vPC, Wire Speed 10/40/100G

Data Center Consolidation
VDC, FEX, DCNM

FOUNDATION: HA, TrustSec, IP SLA, QoS, MPLS, VPLS

Unified Access Value Proposition and Reference Design
Differentiating Characteristics of One Network

Cisco Prime Infrastructure

Identity Services Engine

Cisco Catalyst 6800/6500 for Campus Core/Dist
Cisco Catalyst 4500E and 3850 for Campus Wired Access
Cisco Unified Wireless Network

WISM2/ WLC
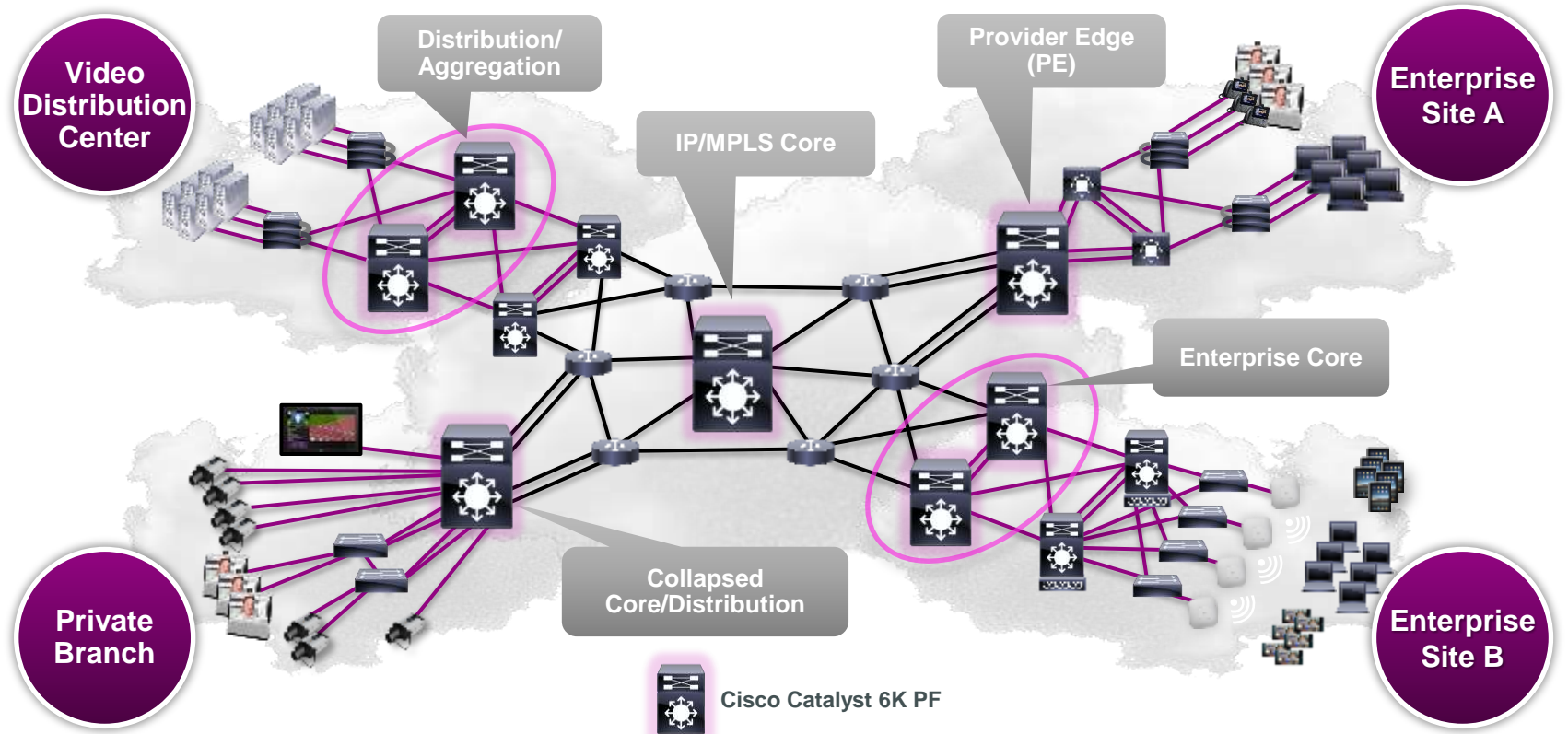
WLC

Cisco
Cisco

Catalyst

TrustSec	Secure Group Access to Simplify the Network and Enable Virtualized Data Center Services
Application Visibility and Control	Application-Aware Networking to Enable Collaboration, Video, and Other Apps
Resiliency	Maximized Network Availability with Virtual Switching and Stateful Switch Over
Smart Operations	Reduce Operating Expenses and Improve Network Application and Service Delivery

OS Consistency: IOS 15.x
Cisco Validated Designs for Campus Deployment

Wireless APs

C6K Technology to Build Comprehensive Enterprise Networks
6800 Platforms Delivers the Same Flexibility to Do It All

Video Distribution Center

Distribution/ Aggregation

Provider Edge (PE)

Enterprise Site A

IP/MPLS Core

Enterprise Core

Collapsed Core/Distribution

Private Branch

Enterprise Site B

Cisco Catalyst 6K PF

Introducing Cisco Catalyst 6800 Family

6807-XL

- 7 slots 10RU
- Up to 880G/slot capable
- Tremendous investment protection
- Optimized for 10/40/100G
- Built for scalability and performance

6800-X

- Up to 80x10G ports in 4.5RU
- Built-in sup with extensible slots
- Catalyst 6500 DNA
- Optimized for 10G density, price, and rich services

6800 IA

- Single touch point for entire campus network
- POE/POE+ & stacking
- Cat6K features at the access with feature consistency

Reinventing Your Campus Backbone Experience

The New Catalyst 6807-XL
Taking Catalyst 6K to 880G/Slot

7 Slots 10 RU

NG Supervisor Ready

N+1 power Supply Redundancy—
Add as You Grow
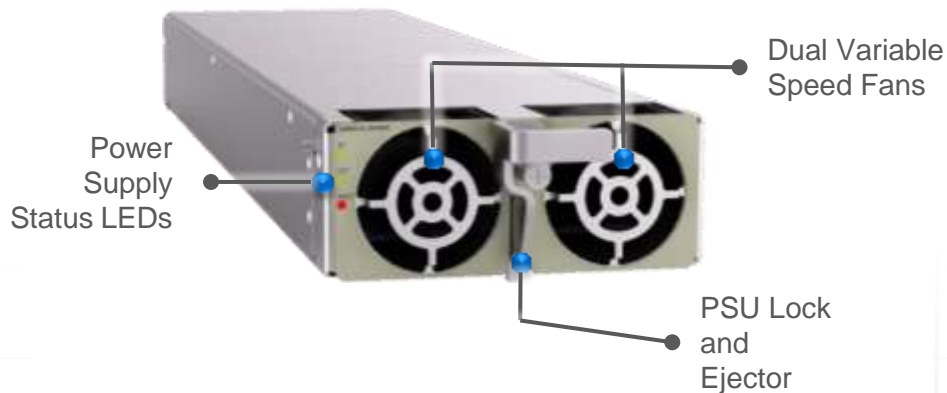
Backwards Compatible Connectors

Catalyst 6500 DNA

Investment Protection—Compatible
with Sup2T, 69xx, 68xx, 67xx
and Service Modules

880 G/Slot Capable

6807-XL
PSU Redundancy and Inputs

Dual Variable Speed Fans

Power Supply Status LEDs

PSU Lock and Ejector

Power Supply Highlights:

Up to 92% Power Efficiency at 50-100% of load

Max output is 3000W at 220V (or 1300W at 110V)

Dual "Front to Back" Variable-Speed Cooling Fans

Supports both Combined & Redundant (N+1) mode

AC ONLY

PSU 4

PSU 3

PSU 1

PSU 2

AC Input 3

AC Input 4

AC Input 2

AC Input 1
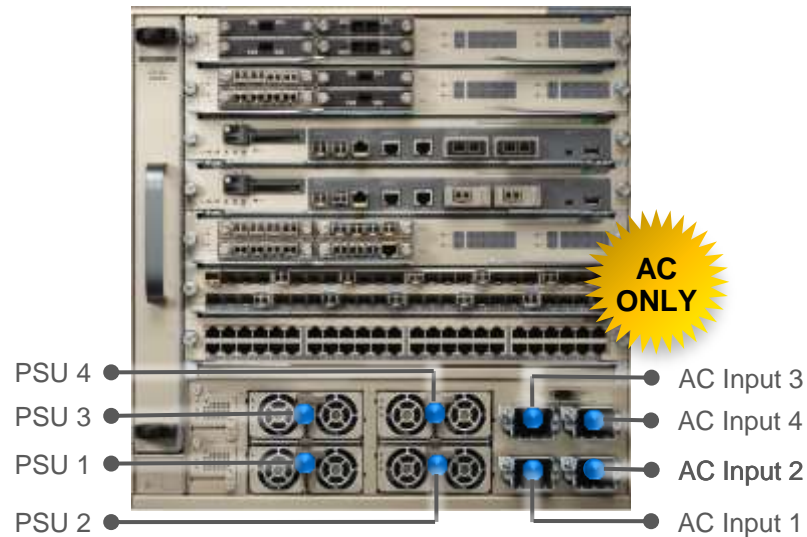
Supervisor 2T – 10G Portfolio
Providing Deployment Options

	WS-X6908-10G-2T	WS-X6904-40G-2T	WS-X6816-10G-2T
Ports:	**8-port 10G**	**16-port 10G / 4-port 40G**	**16-port 10G**
Throughput:	80 Gbps	80 Gbps	40 Gbps
Optics:	X2	CFP, SFP+	X2
Features:	Full-feature L2/L3 module with MPLS, VPLS. IPv4/IPv6 capabilities, 1M+ IPv4 Routes, 1M NetFlow	Full-feature L2/L3 module with MPLS, VPLS. IPv4/IPv6 capabilities, 1M+ IPv4 Routes, 1M NetFlow	Full-feature L2/L3 module with MPLS, VPLS. IPv4/IPv6 capabilities, 1M+ IPv4 Routes, 1M NetFlow
Additional Hardware Features:	Large Buffers, SGT, MACSec, LISP	10G flexibility, SGT, MACSec, LISP, Dual Priority Queues, Two Level Shaping, Instant Access	
Ideal for:	**Campus Aggregation and Core**	**Campus Aggregation and Core**	**Campus Aggregation**

6500-E → 6807-XL Portfolio
Investment Protection

Cisco Catalyst 6500-E

Optimized for 1G/10G

Sup2T, 69xx, 68xx, 67xx

Service Modules

Future 10G/40G/100G

Cisco Catalyst 6807-XL

Optimized for 10G/40G/100G

Catalyst 6807-XL Bundling Options

Chassis

+

Fan Tray

+

2 x Power Supply

+

Sup2T

+

IP Services

List Price: $38,000

36% savings over A-La-Carte

The New Catalyst 6880-X
Premier Features

Most Scalable L3 Routing tables (up to 2M IPv4) in Cisco Switching Portfolio

Highest 10G Density Switch with MPLS Support in Cisco Fixed Switching Portfolio

All 3000+ Cisco Catalyst 6500 Features Working DAY 1
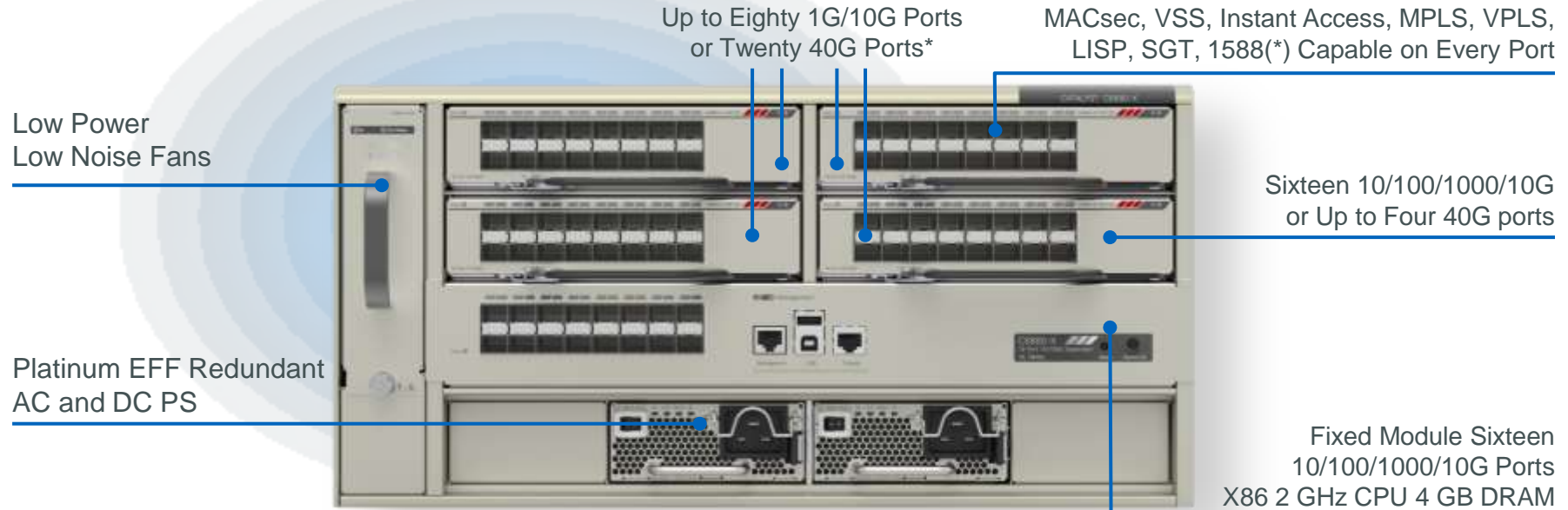
Mature, Proven Deployed @ Scale

Highest 10G Density Fixed Switch with Instant Access Support

Only Platform in Industry to Support from 10 Mbps to 40* Gbps Ethernet on Every Port

Premier Feature Set with Radically Improved 10G Economics in Fixed Form Factor

The New Catalyst 6880-X
CK6 Based "Extensible" Fixed Platform

Now Shipping

Up to Eighty 1G/10G Ports or Twenty 40G Ports*

MACsec, VSS, Instant Access, MPLS, VPLS, LISP, SGT, 1588(*) Capable on Every Port

Low Power Low Noise Fans

Sixteen 10/100/1000/10G or Up to Four 40G ports

Platinum EFF Redundant AC and DC PS

Fixed Module Sixteen 10/100/1000/10G Ports X86 2 GHz CPU 4 GB DRAM

Four 100G-Ready Port Slots, Front Serviceable Power Supplies, and Fan Tray
NEBS Level 3-Compliant Platform

Catalyst 6880-X Hardware Components

Base System

HW Scale	List $34,000	List $46,000
	Standard (LE)	Large Tables
IPv4/v6 Routing Capability	256K/128K	2M/1M
Multicast Routes (IPv6)	64K	256K
Number of Adjacencies	256K	1M
MAC	128K	128K
L3 Interfaces	128K	128K
Security and QoS ACL	64K	256K
Flexible NetFlow (per 16 ports)	512K	1M
Microflow Policers	512	512
Aggregate Policers	8K	8K

Multi-rate SFP+ Port Card

Two Versions	List $19,000	List $25,000
	Standard (LE)	Large Tables
FIB Table IPv4/v6	256K/128K	2M/1M
Flexible NetFlow	512K	1M
Security ACL Table	64K	256K

Port Type	Ports
10/100/1000 Mb/s Copper	16 (via GLC-T SFP)
1 Gb/s Fiber	16
10 Gb/s Fiber	16
40 Gb/s Fiber (w/ Adapter)	4

Enhanced Scalability with X86 CPU, 2 GHz Dual Core

6880-X
Supporting Physical Infrastructure
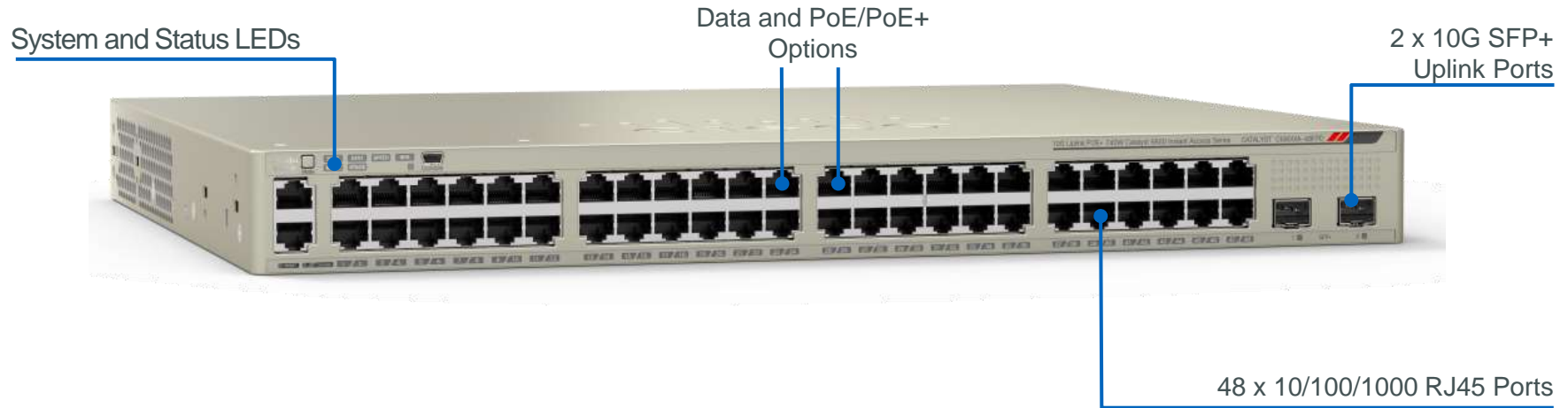

Four High-Efficiency Green Fans

**Platinum Efficiency AC and
DC Power Supply (3KW)**

Selectable
In-Reach Depth
21.4" to 11.7"

Two-Post Rack
Custom Mount Kit

The New Catalyst 6800 Instant Access
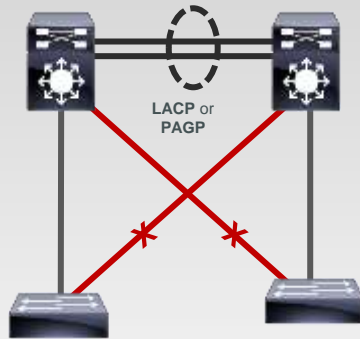## Catalyst Instant Access Client 6800ia

Now Shipping

System and Status LEDs

Data and PoE/PoE+ Options

2 x 10G SFP+ Uplink Ports

48 x 10/100/1000 RJ45 Ports

Simple Install and Connect
No More Repetitive Operations

Cisco Catalyst Instant Access
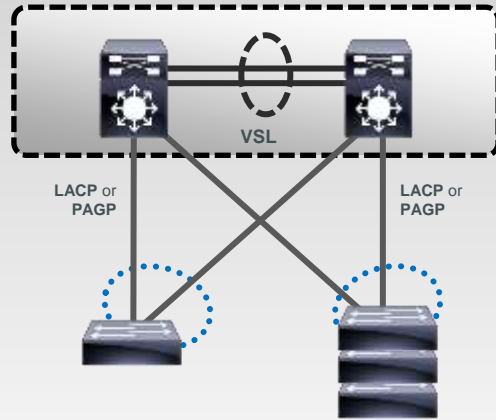
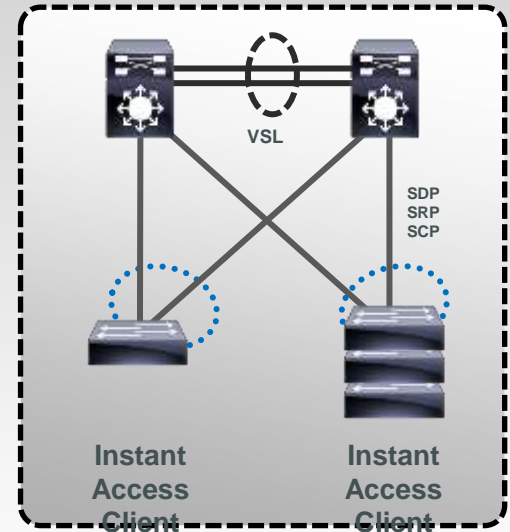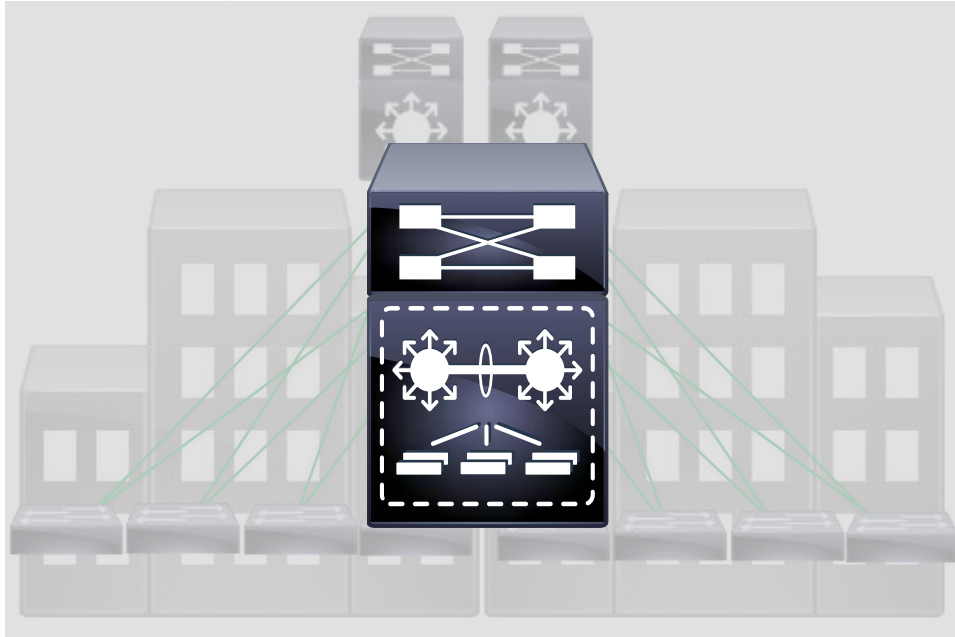| STANDALONE	VSS	INSTANT ACCESS
LACP or PAGP	LACP or PAGP / VSL / LACP or PAGP	VSL / SDP SRP SCP
Access Switch Access Switch	Access Switch Access Switch	Instant Access Client Instant Access Client

Cisco Catalyst Instant Access

ISE   **Cisco Prime**

Managed Devices = 20+

1000 Port Campus Distribution Block

Benefits

Client capable of **Stacking, POE+**

Single Point of **Management, Configuration and Troubleshooting**

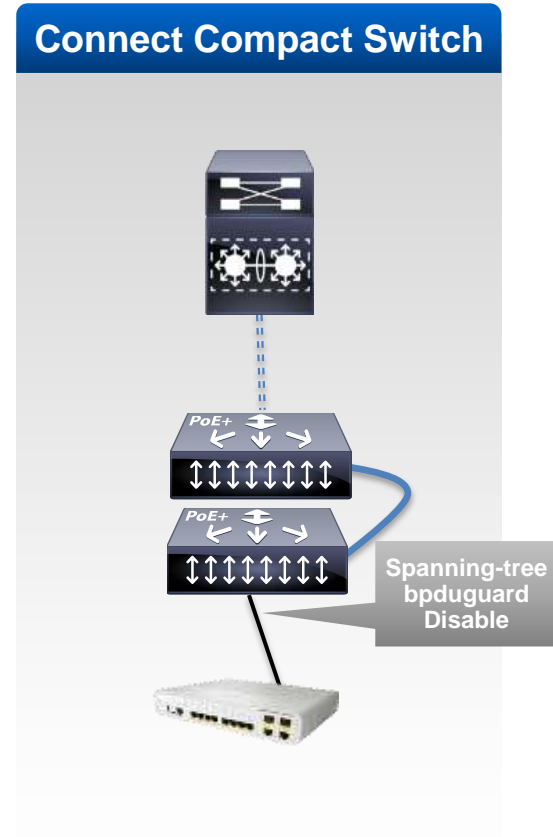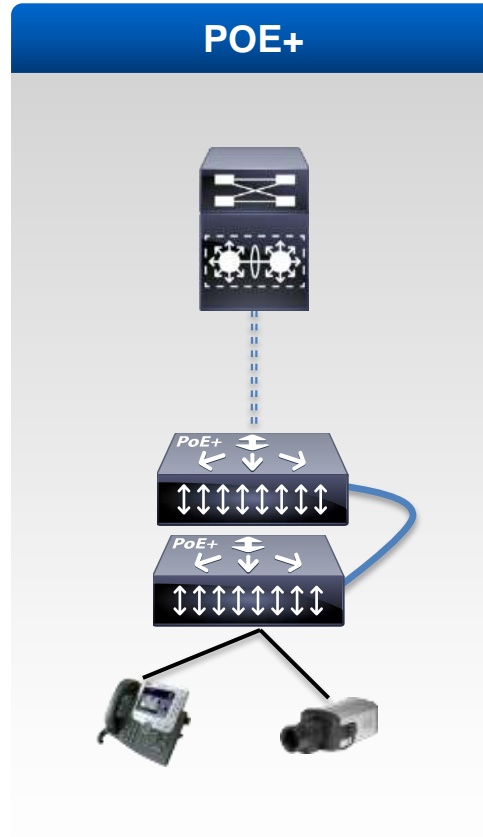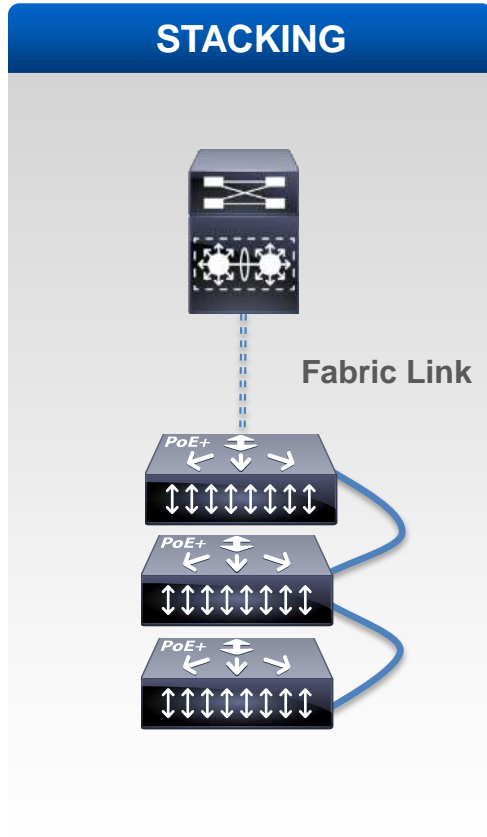**Simplified Network design** for VLANs and port channels

Agile Infrastructure to add **new features** uniformly across **Access Layer**

A Single Image to deploy and manage across Distribution Block

REDUCED TCO

Instant Access Satellite Capabilities
Differences From Nexus FEX

STACKING

POE+

Connect Compact Switch

Fabric Link

Spanning-tree
bpduguard
Disable

Hardware Components
Instant Access

Parent

Catalyst 6800/6500 Series | Catalyst 6800/6500 Series

Virtual Switching System (VSS)

Supervisor 2T

WS-X6904-40G

Client

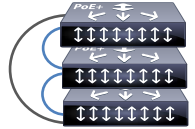**6800IA Satellite Device**

48x1G, 2x10G, 740W POE+ (List: $9,000)
48x1G, 2x10G, Data Only (List: $7,000)

10 Things to know about Instant Access

Description	15.1(2)SY Support
Scalability	Support up to 1,008 ports (21x 6800ia switches)
VSS Support	VSS Mode Required, (work with a single chassis VSS)
POE Support	15W on 48 ports, 30W on 24 ports
Stacking Support	Stacks of 3 IA supported
Maximum FEX-ID	12
Optics Supported	Twin-AX/SR/LRM/LR/ER
6880-X IA Parent Support	Available starting 15.1(2)SY2
IA Client with Redundant Power Supply	External RPS Supported
In Chassis SSO	*Not Available*
VSS Quad Sup SSO	Available starting 15.1(2)SY2

Deployment Examples
Instant Access

7 Nodes of 144 ports each = 1008

Fabric Links Used = 7

FEX 101   FEX 102   FEX 103   FEX 104   FEX 105   FEX 106   FEX 107

10 Nodes of 96 ports each + 1 Node of 48 port = 1008

Fabric Links Used = 11

FEX 101   FEX 102   FEX 103   FEX 104   FEX 105   FEX 106   FEX 107   FEX 108   FEX 109   FEX 110   FEX 111
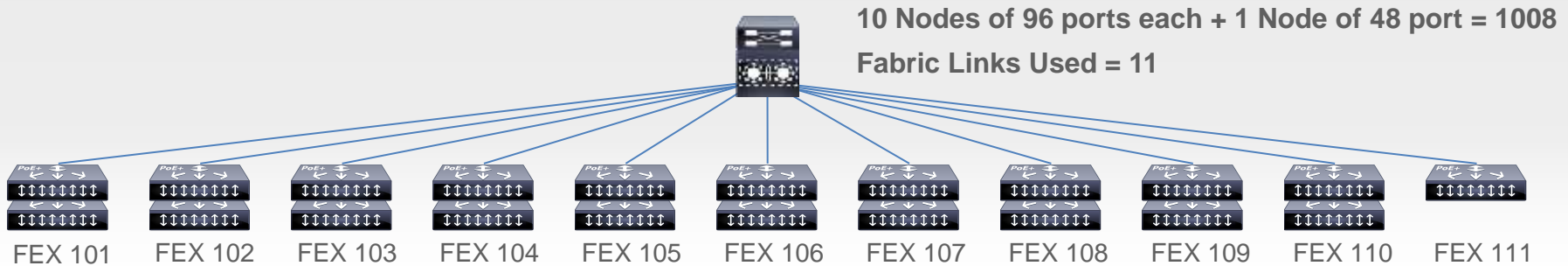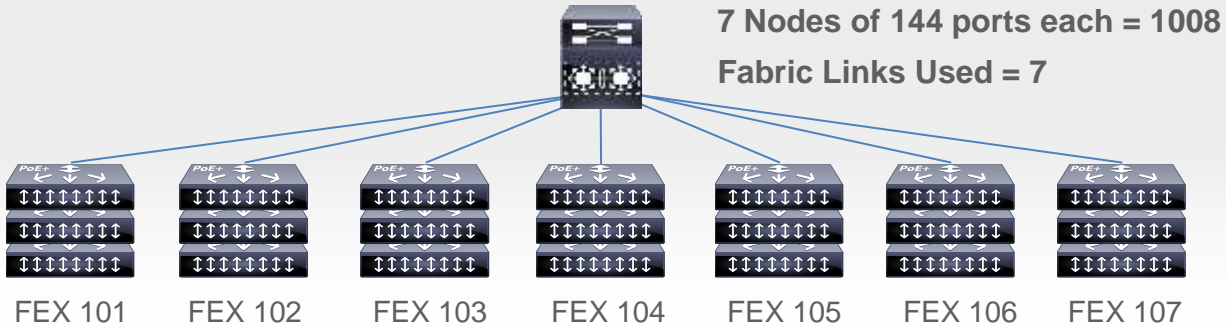
C6K Enterprise Backbone Technology Pillars
Cisco IOS Software Release 15.1(2)SY

Cisco Catalyst 6800 for Campus Backbone

Smart Operations	• Smart Install Director	• Instant Access, 6800ia • IA 1008 access ports, stacking of 3
Security and Virtualization	• TrustSec Per Policy CoA • L3SGT For TrustSec • SGACL Monitor Mode (Dry Run)	• SGT Name export in NetFlow • TrustSec Diagnostic Tool Kits - Packet Trace • TrustSec SGA SYSLOG Messages
Application Visibility and Control	• WCCPv2 - IPv6 Support • Egress Microflow Destination-Only Policing • QoS Policer Rate Increase to 256G	• NAM3 • Global QoS Policy • Interfaces MIB: SNMP context based access
Resiliency	• VSS Quad Sup SSO (VS4O)	• BGP PIC
Routing and Switching	• LISP Locator/ID Separation Protocol • High Quality Video • Multicast Service Reflection	• VPLS PIM and IGMP Snooping (LAN Interfaces) • MPLS TE - Bundled Interface Support (EtherChannel and MLP)

OS Consistency: IOS 15.0 for End-to-End Campus Feature Deployment

*Future Release

Smart Operations
Small Install Director

LAN

TFTP/DHCP Server

Smart Install Database

Image File: Image-1
Config File: Conf-1

Image File: Image-2
Config File: Conf-2

Smart Install Director

Client Group 1

Client Group 2

15.1(1)SY	Support
Sup2T	YES
Sup720	NO

Plug-and-Play Domain

Smart Install Clients
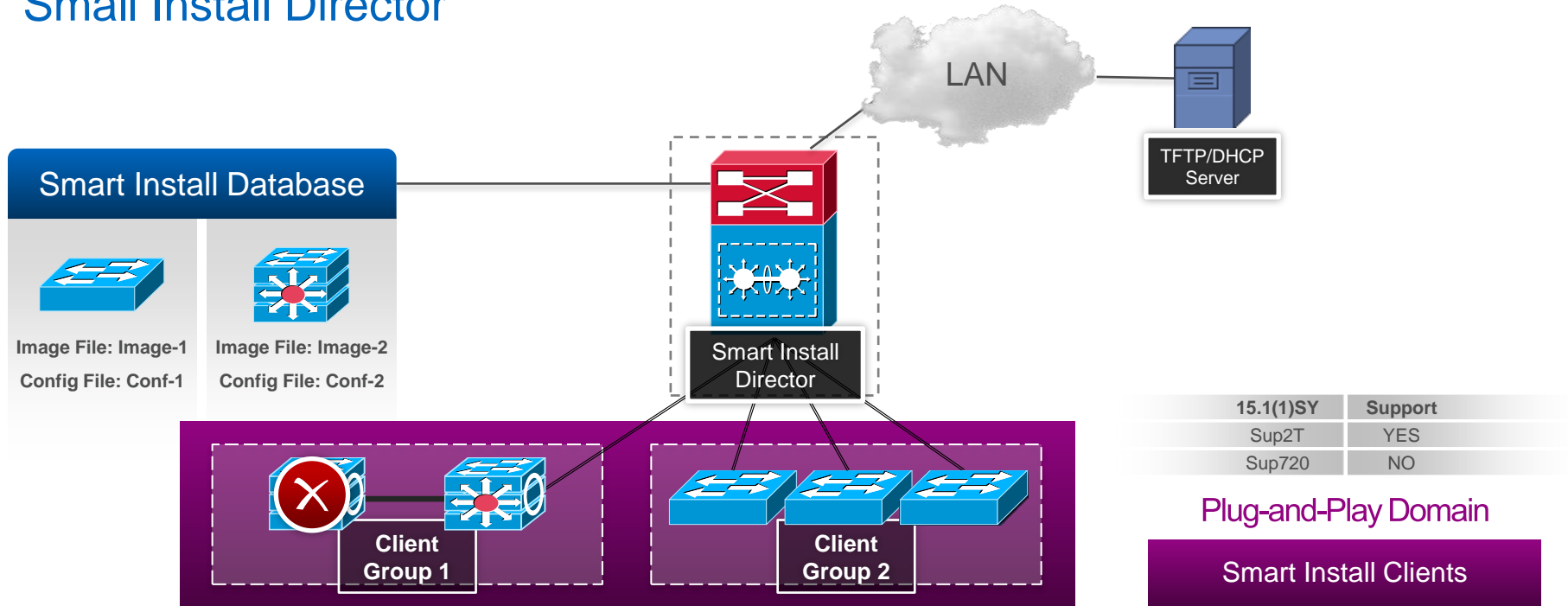
Smart Install Benefits	Centralized Management	Zero-Touch Installation	Minimize Downtime

Supported with Cisco Prime

Catalyst for End-to-End Campus Security
TrustSec: The Right Resources for the Right User at the Right Time
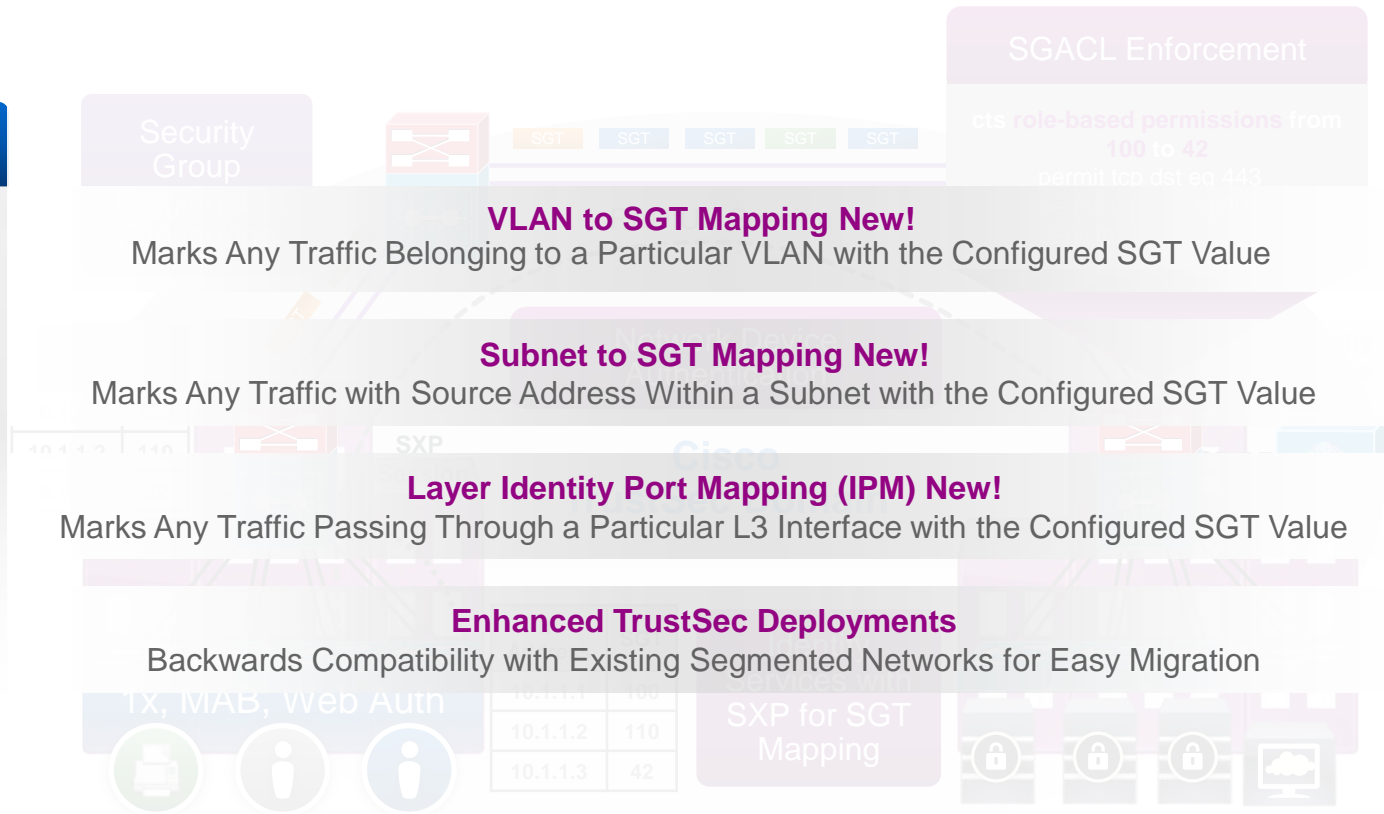
Customer Challenges

Providing **Right Level of Access** to Multiple User Groups and Devices

Meeting **Security Compliance** Requirements Such as PCI 2.0, Sox, HIPAA

Easily Maintain Security Policies While Ensuring Business Continuity

VLAN to SGT Mapping New!
Marks Any Traffic Belonging to a Particular VLAN with the Configured SGT Value

Subnet to SGT Mapping New!
Marks Any Traffic with Source Address Within a Subnet with the Configured SGT Value

Layer Identity Port Mapping (IPM) New!
Marks Any Traffic Passing Through a Particular L3 Interface with the Configured SGT Value

Enhanced TrustSec Deployments
Backwards Compatibility with Existing Segmented Networks for Easy Migration

Campus Architecture
Network Virtualization
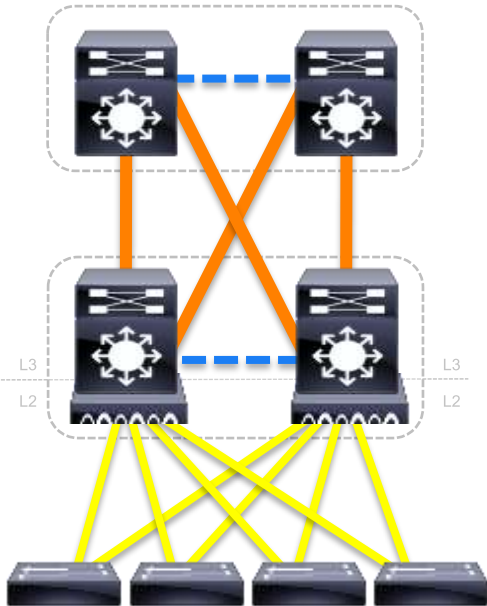
Network Virtualization

VRF-Lite, EVN, L3VPN, MPLSoGRE L3VPNomGRE, Inter-AS, CSC, 6PE, 6VPE, MVPN, LSM, LISP, **EoMPLS, VPLS, A-VPLS, Layer 2 MPLS VPNs overGRE, L2omGRE,** QOS, TE, VRF-Aware Services

VRF-Lite, EVN, L3VPN, MPLSoGRE L3VPNomGRE, Inter-AS, CSC, 6PE, 6VPE, MVPN, LSM, LISP, **EoMPLS, VPLS, A-VPLS, Layer 2 MPLS VPNs overGRE, L2omGRE,** QOS, TE, VRF-Aware Services
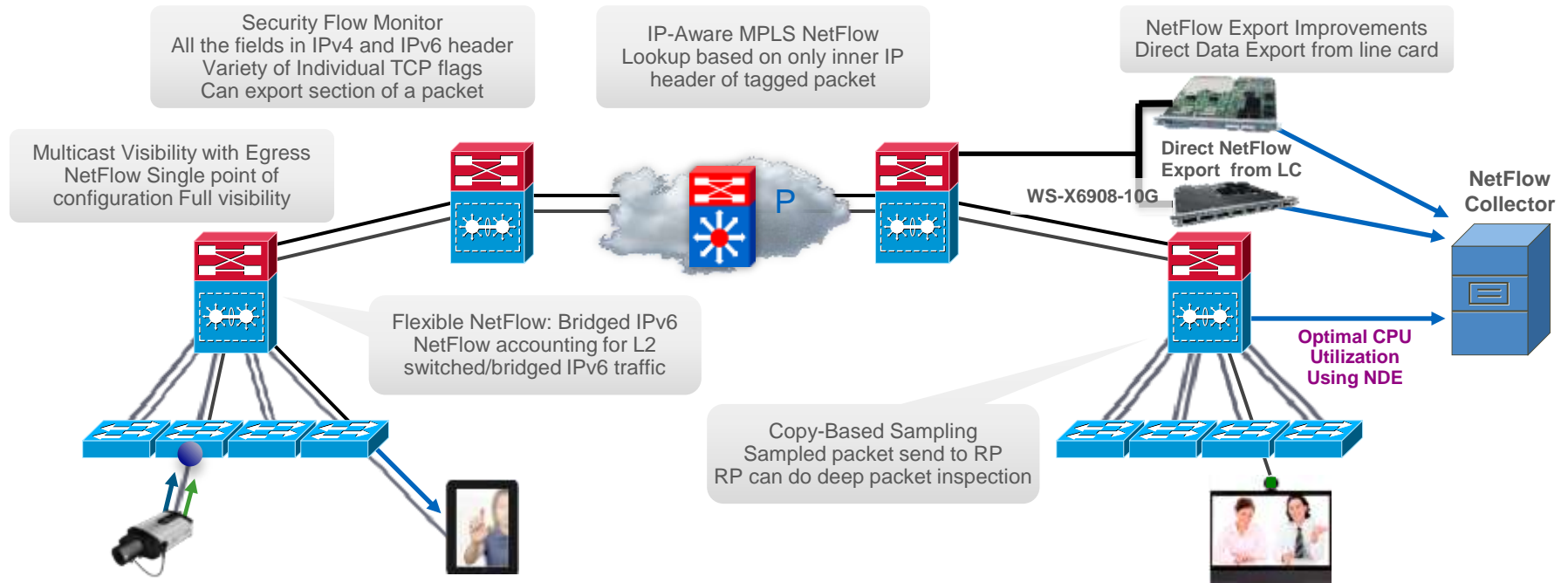
VLANs, VRF-Lite

Example Challenges

- Segment users for security
- Compliance with regulation
- Legacy applications?
- Reduce Capital and Operation expense
- Will I be able to limit the amount of traffic?

Network Virtualization Solutions

- GRE, VRF-Lite, EVN
- MPLS VPNs, L3VPNomGRE, MVPN, LSM, 6VPE
- EoMPLS
- VPLS, H-VPLS
- L2omGRE, VPLSoGRE, A-VPLSoGRE, LISP

L3

L3

L2

L2

Application Visibility and Control (AVC)
BYOD Requires Enhanced Monitoring With Untrusted Devices

Security Flow Monitor
All the fields in IPv4 and IPv6 header
Variety of Individual TCP flags
Can export section of a packet

IP-Aware MPLS NetFlow
Lookup based on only inner IP
header of tagged packet

NetFlow Export Improvements
Direct Data Export from line card

Multicast Visibility with Egress
NetFlow Single point of
configuration Full visibility

Direct NetFlow
Export from LC

WS-X6908-10G

NetFlow
Collector

Flexible NetFlow: Bridged IPv6
NetFlow accounting for L2
switched/bridged IPv6 traffic

Optimal CPU
Utilization
Using NDE

Copy-Based Sampling
Sampled packet send to RP
RP can do deep packet inspection
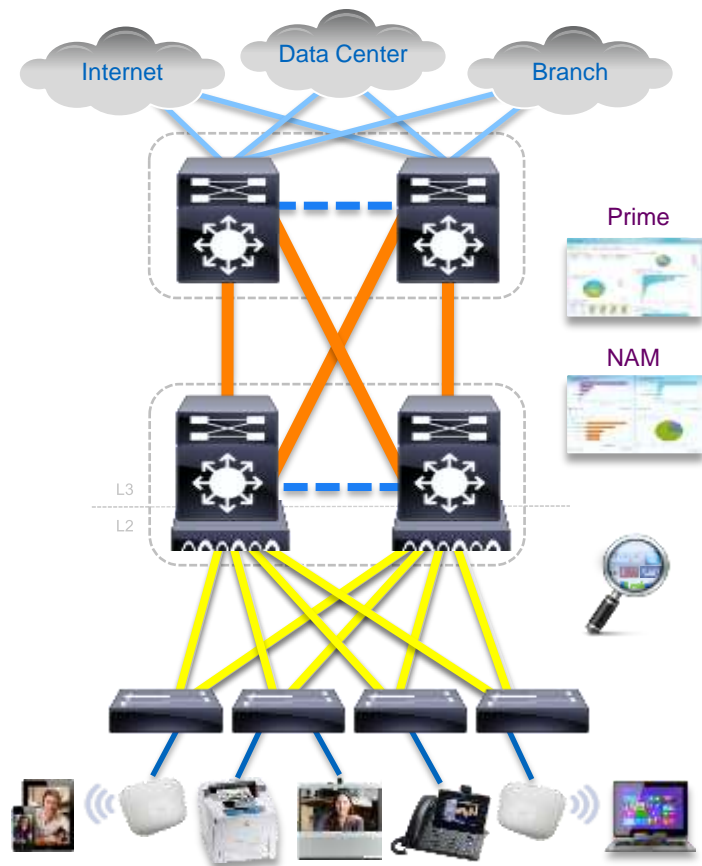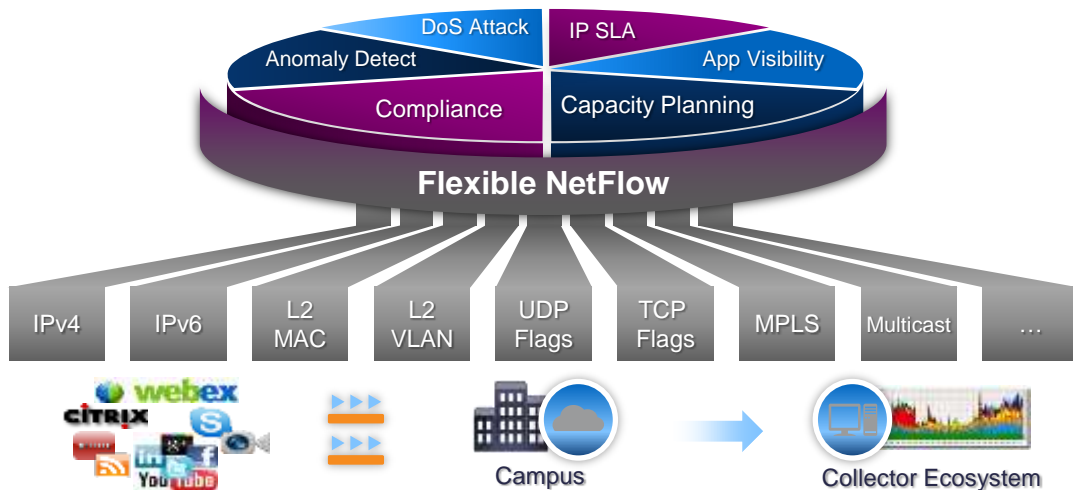
P

The Solution

Flexible NetFlow

Highly Scalable Full Visibility
Solution with Flexible
NetFlow in Hardware

Multicast Traffic Visibility
and Simpler Deployment
with Egress NetFlow

Full NetFlow as Well as Sampled
NetFlow in Hardware to Scale
Beyond 13 Million Flows

Flexible NetFlow (FnF)
How can it really help me?

DoS Attack
Anomaly Detect
Compliance
IP SLA
App Visibility
Capacity Planning

Flexible NetFlow

| IPv4 | IPv6 | L2 MAC | L2 VLAN | UDP Flags | TCP Flags | MPLS | Multicast | … |

Campus

Collector Ecosystem

FnF Benefits

- **Lower CapEx**
  Better insight for capacity planning, network upgrades and compliance

- **Lower OpEx**
  Better service and user experience, Increased IT staff productivity
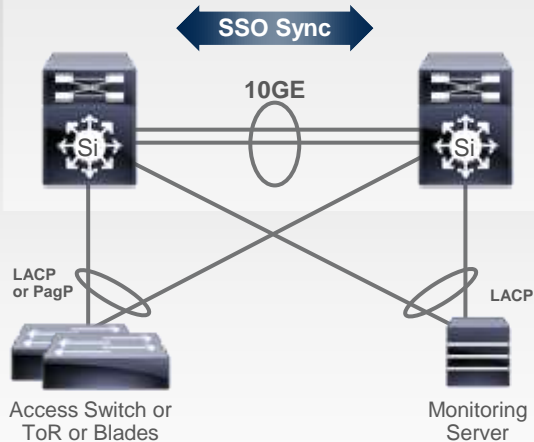
FnF Capabilities

- Deep app visibility with L2 - L7 fields
- Flexible flow Monitors & Records
- Scalable flow Collection & Export
- Customizable policy action with EEM
- Simple to deploy with NAM3 & Prime

Internet   Data Center   Branch

Prime

NAM

L3
L2

VSS Quad Sup SSO
Provides Optimal Business Continuity for BYOD/Collaboration

15.1(1)SY	Support
Sup2T	YES
Sup720	NO

Traditional VSS

SSO Sync

10GE

Si — Si

LACP or PagP

LACP

Access Switch or ToR or Blades

Monitoring Server

Available Bandwidth
100%
50%
50ms – 200ms
Time

Available Bandwidth
100%
50%
Time

VSS Quad SUP SSO
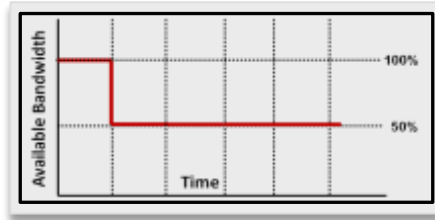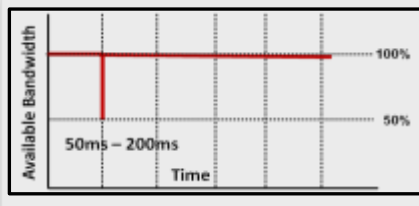
SSO Sync

SSO Sync

SSO Sync

10GE

Si — Si

LACP or PagP

LACP

Simplified Network Design

- Spanning Tree and first-hop redundancy protocols eliminated

- Single touchpoint manageability

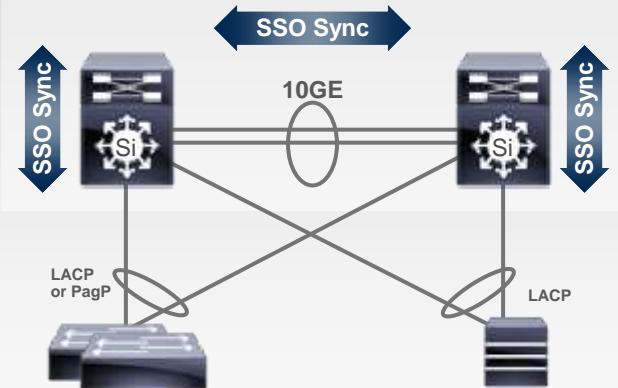### Double Bandwidth Utilization

- With active-active multichasis EtherChannel (LACP/ PagP)

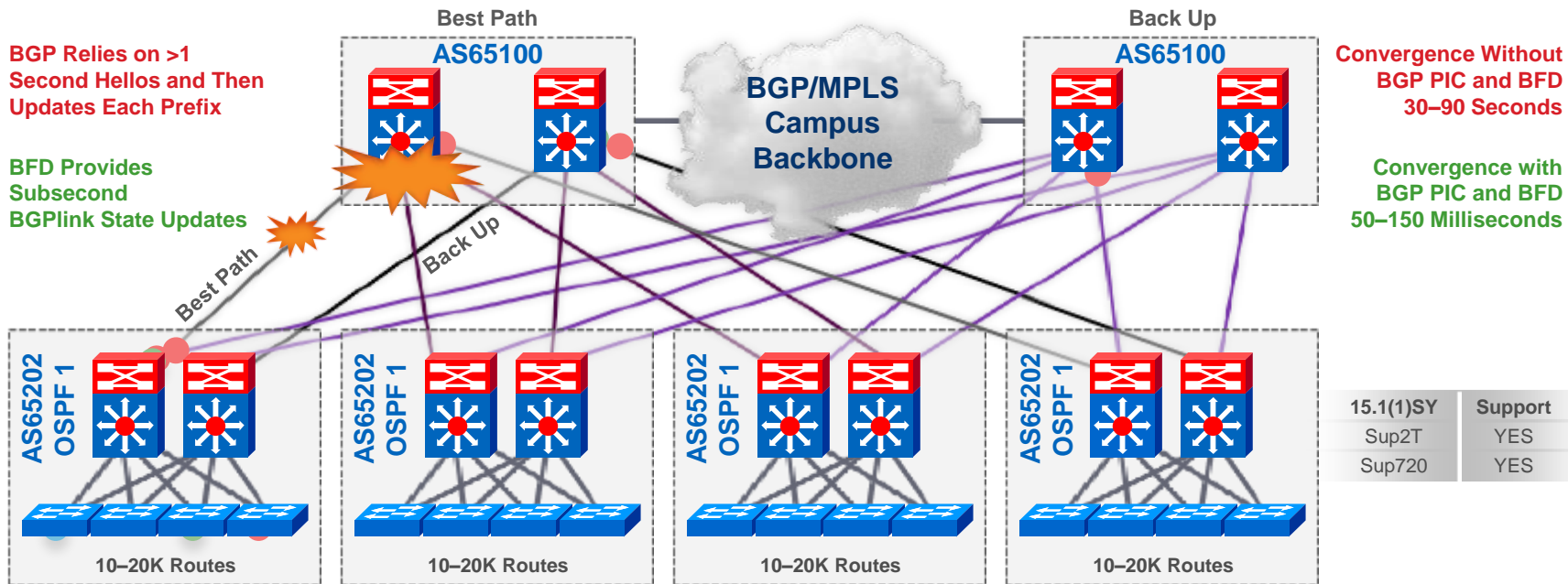- 1+1 Supervisor redundancy for dual-attached devices

Deterministic and Automated Recovery

- Maximize network throughput with VSS quad Sup SSO

- 1:1 (active/standby) supervisor redundancy for single and dual attached devices

BGP Prefix Independent Convergence (PIC)
Providing Predictable Subsecond Convergence < 1 Second

BGP Relies on >1 Second Hellos and Then Updates Each Prefix

BFD Provides Subsecond BGPlink State Updates

Best Path
AS65100

BGP/MPLS Campus Backbone

Back Up
AS65100

Convergence Without BGP PIC and BFD 30–90 Seconds

Convergence with BGP PIC and BFD 50–150 Milliseconds

Best Path

Back Up

AS65202 OSPF 1

AS65202 OSPF 1

AS65202 OSPF 1

AS65202 OSPF 1

10–20K Routes

10–20K Routes

10–20K Routes

10–20K Routes

15.1(1)SY	Support
Sup2T	YES
Sup720	YES

Campus Backbones May Not Scale and/or Converge Well with Just OSPF or EIGRP
Many Large Enterprises Use BGP (and MPLS) for Simple Core Routing and Traffic
EngineeringPIC Allows a Predefined "Backup" BGP Path

High-Quality Video

Customer Challenges

Keep up with **explosive growth in video endpoints**

Video Quality	1080p
Bandwidth	15 Mbps
Jitter/Latency/Drop	High Sensitivity

Business videoconferencing will grow **six-fold** over the forecast period. Business videoconferencing traffic is growing significantly faster than overall business IP traffic, at a CAGR of **48 percent** from 2011–2016.

Cisco VNI Global Forecast

Business IP Traffic

Petabytes per Months

66%
18%
18%

- Mobile Data
- Managed IP
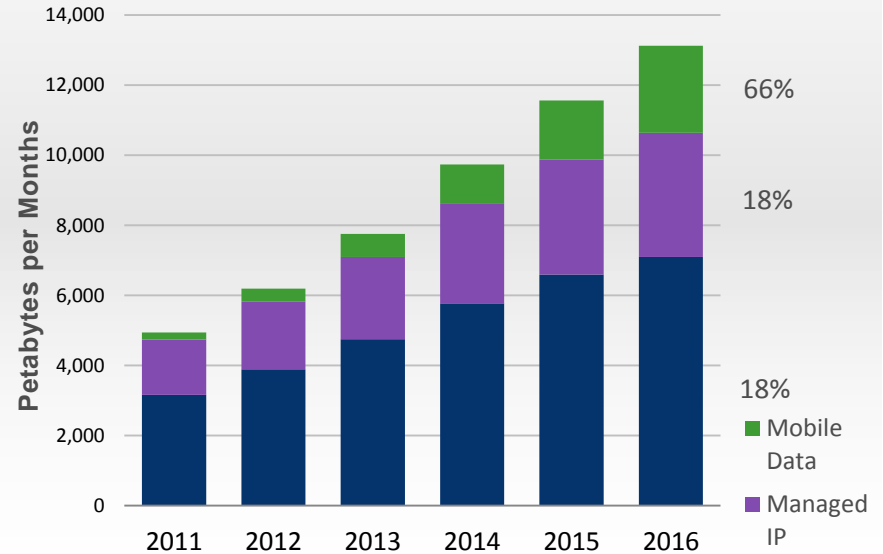
Source: Cisco VNI Global Forecast, 2011–2016

Deep Buffers | Two Priority Queues | 40 Gigabit Interfaces

Cisco Connect, Riyadh, Saudi Arabia, April 29-30, 2014

High-Quality Video
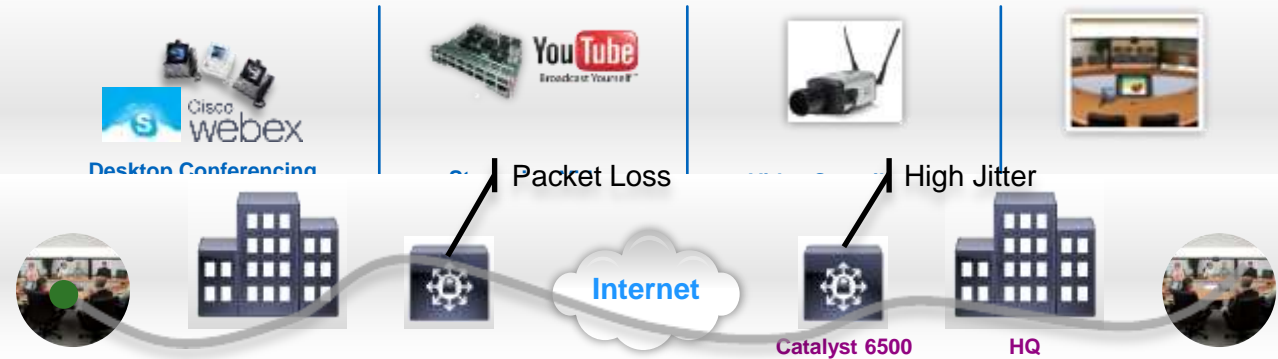
Campus Leadership in IPv6

	Optimized IPv6 Delivery	Visibility & Control	Special Technologies
Edge	• EIGRPv6, OSPFv3, IS-IS • BGPv6 • IPv6 PBR • IPv6 SSO / NSF, NSR • Dual-Stack IPv4 / IPv6	• IPv6 IPsec • IPv6 Firewall Security • IPv6 IDS • IPv6 ASA-SM	• IPv6 GRE, DMVPNv6 • WCCPv6 • L3 LISP • 6to4 Tunnels, 6PE/6VPE • NAT64 with ASA-SM
Core	• EIGRPv6, OSPFv3, IS-IS • IPv6 SSO / NSF, NSR • Dual-Stack IPv4 / IPv6 • IPv6 PIM, Embedded RP • IPv6 support for VSS	• IPv6 RACL • ACL Hitless Commit / Dry Run • IPv6 CoPP • IPv6 uRPF • IPv6 Flexible Netflow	• IPv6 ECMP • L3 LISP • BFDv6 • Traffic Shaping • IPv6 NAM3
Distribution	• EIGRPv6, OSPFv3, IS-IS • IPv6 SSO / NSF, NSR • Dual-Stack IPv4 / IPv6 • IPv6 PIM, BSR • DHCPv6, Relay Agent • HSRPv6, VRRPv6, GLBPv6 • IPv6 support for VSS	• IPv6 RACL, VACL • ACL Hitless Commit / Dry Run • IPv6 CoPP • IPv6 uRPF • L2 / L3 Flexible Netflow	• IPv6 ECMP • L2 / L3 LISP* • BFDv6 • Traffic Policing • IPv6 HQoS, PQ & LLQ • IPv6 WISM2
Access	• Auto Smart Ports, PnP • RPSVT, MST • 802.1Q Trunking • VTP, VTPv3 • MLD, PIM Snooping	• IPv6 First Hop Security • IPv6 PACL, RA Guard • Port-Security, Storm-Control • L2 Flexible Netflow	• FlexLinks • IPv6 HQoS, PQ • Vlan Translation • QinQ Trunking

Internet · Data Center · Branch

L3 · L2
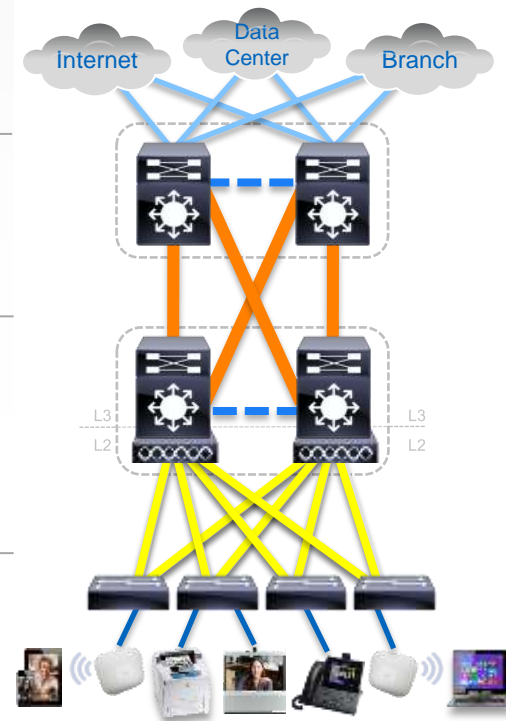
L3 LISP
Extend VRF Services Over Existing Core
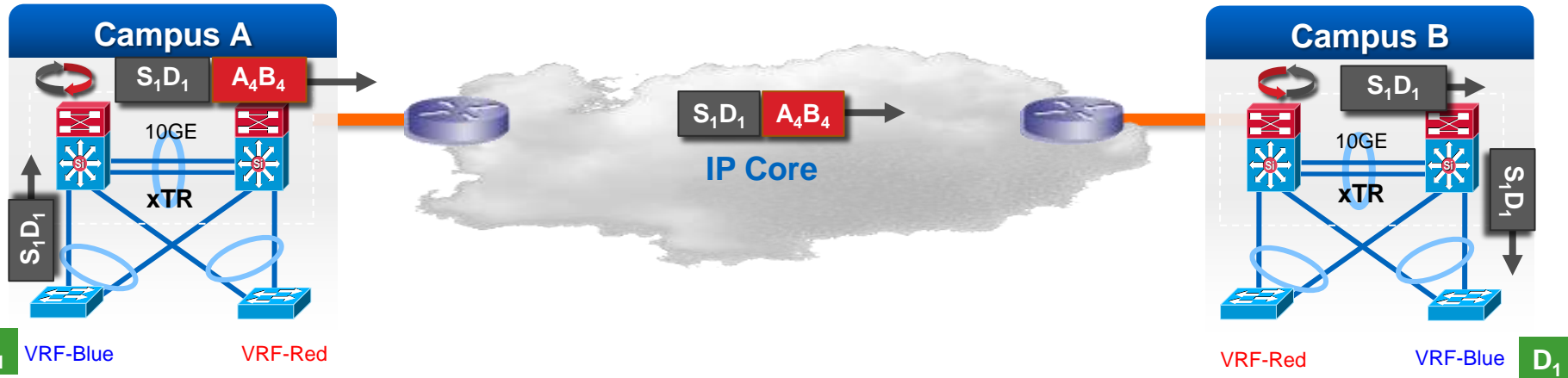
Cisco Catalyst 6800
All 3000+ Cisco Catalyst 6500 Features Working DAY 1

MPLS/VPLS

Feature	
10-Year MPLS Maturity	✓
L2 VPN	✓
L3 VPN	✓
L2/L3 VPN over mGRE	✓
MPLS TE	✓
VPLS/A-VPLS/H-VPLS	✓
Label Switch Multicast	✓
mVPN over mGRE	✓
MPLS to Access with Sat	✓
MACsec over EoMPLS	✓
VRF-Aware Multicast	✓
VRF-Aware NetFlow	✓
MPLS-Aware NetFlow	✓

Next-Gen Campus Solutions

Feature	
Instant Access	✓
L2 Campus LISP*	✓
L3 Campus LISP	✓
SDN*	✓
Smart Install Director	

VSS/Virtualization/HA

Feature	
5+ Year VSS Success	✓
VSS Standalone Parity	
MACsec on VSL	
1G VSL	✓
BFD	
EVN	✓

Catalyst 6800 Series

QoS and Security

Feature		Feature	
MACsec/SGT	✓	DHCP Snooping	✓
SGACL and L3 SGT	✓	Dynamic ARP Inspection	✓
Ingress/Egress ACL	✓	Span with ACL	✓
Time-Based ACL	✓	Identity	✓
ACL Statistics	✓	ACL-Based QoS Classification	✓
Port Security	✓	Marking (DSCP/COS)	✓
IPv6 FH Security	✓	Microflow Policing	✓
ACL Atomic Commit/Dry Run		Advanced CoPP	✓
IPv6 uRPF	✓	IPv6 VACL	✓

IPV4 Unicast

Feature	
OSPFv2/v3	✓
OSPFv3 VRF-Lite	✓
VRF-Aware Unicast	✓
IP Tunnel HA	✓
BFD SVI-GRE	✓
BGP PIC	✓

IPV4 Multicast

Feature	
IGMPv3 and MLDv2 Snooping in HW	✓
PIM-SM "Dual-RPF" in HW	✓
PIM-DM, PIM-Bidir	✓
PIM-Bidir, PIM Snooping	✓
PIM Register in HW	✓
mVPN, MSR, mcast BFD	✓

IPV6 Features

Feature		Feature	
IPv6–IPv4 HW Parity	✓	IPv6 in IPv4 Tunnels, VRF-Aware IPv6 Tunnels	✓
OSPFv3 VRF PE-CE	✓	BGPv6, IS-ISv6	✓
MLD, MLD Snooping	✓	6VPE and 6PE	✓
IPv6 Mcast HA	✓	PIM Sparse Mode (PIM-SM)	✓
IPv6 SLA, TCL, LLDP	✓	IPv6 QoS, PACL, RACL	✓

Large Tables and Scalability

Feature	
IPv4 Routing Capability	**64K-2M**
Multicast Routes (IPv4)	64K-256K
Number of Adjacencies	256K-1M
MAC	128K
ECMP (v4 and v6)	16
Security and QoS ACL	64K-256K
Flexible Netflow	128K-5M
MPLS Label Push/Pop in 1pass	5/3
Aggregate Policers	8K
VPN	16K

Rich Media

Feature	
Flexible NetFlow	✓
Egress NetFlow	✓
Sampled NetFlow	✓
NDE	✓
Video Monitoring	✓
Mediatrace	✓
Metadata QoS	✓
Multicast Service Reflection (MSR)	✓

Management/Services

Feature	
WCCPv3	✓
PBR IPv4/IPv6	✓
NAT	✓
GRE	✓
ERSPAN	✓
GOLD	✓
ISE	✓
Cisco Prime	✓
Mini Protocol Analyzer	✓

Reinventing the Backbone Experience
Catalyst 6800 is here!
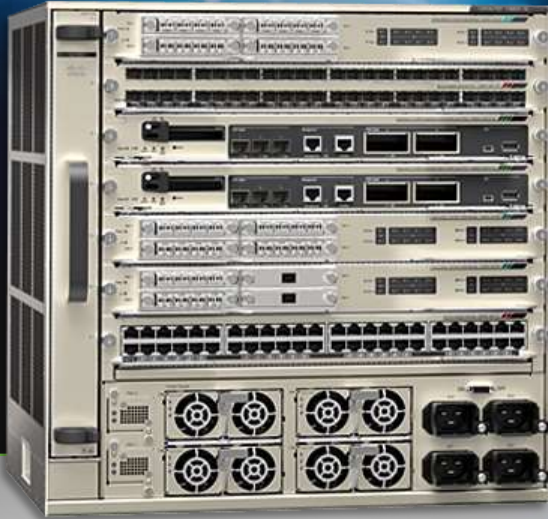
Nonstop Innovation
Strong hardware and software roadmap with a lot more still to come

Day One Maturity
Inheriting 15 years of technology depth and breadth

Investment Protection
Connecting the past, present and future of the Cat6K