TOMORROW starts here.

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Cisco Catalyst 6500 Instant Access Solution - Design and Migration Case Studies
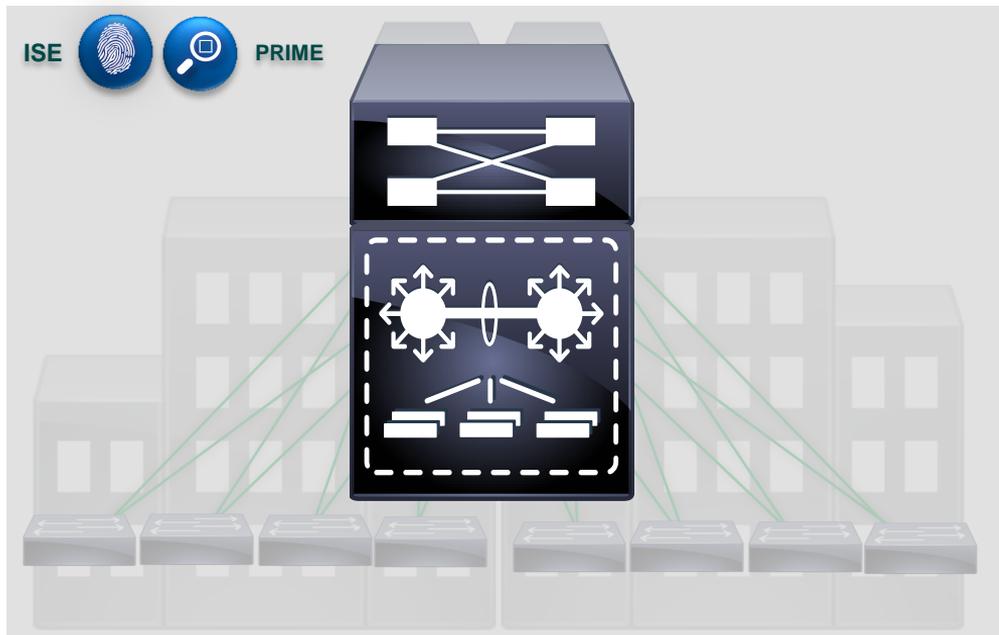
BRKARC-3465

Roland Salinas

Technical Marketing Engineer

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Catalyst Instant Access
Key Benefits

Managed Devices = ~~10~~ 20+

ISE   PRIME

1000 Port Campus Distribution Block

Benefits

Satellite Device capable of **Stacking & POE+**

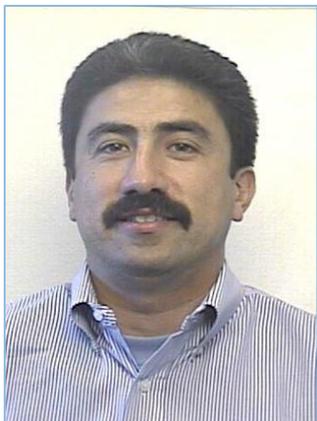Single Point of **Management, Configuration** and **Troubleshooting**

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!

Introductions

Roland Salinas

Technical Marketing Engineer

salinasr@cisco.com

Cisco Public

Agenda

- What is Instant Access?
  - Components
  - Control Plane and Data Plane
  - Operations
- Case Studies for Deployment
  - Case Study #1
  - Case Study #2
  - Case Study #3

- High Availability Performance
  - Link failure
  - Parent linecard failures
  - Client switch failure in a stack
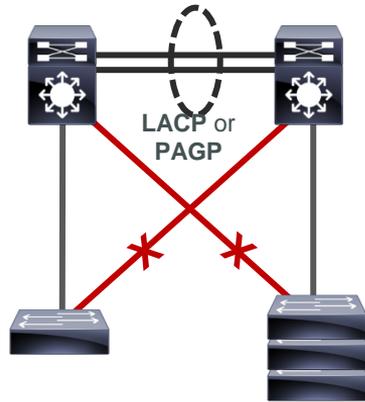 - Parent chassis failure
  - Planned software upgrade procedure

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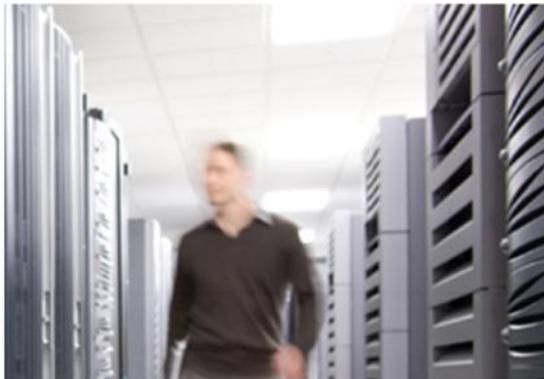
What is Instant Access?

Catalyst Instant Access

Evolution of the Campus
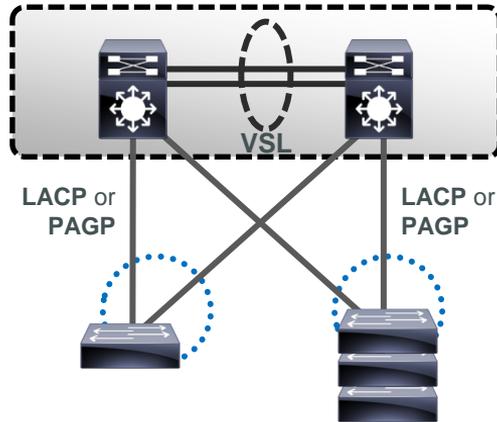

STANDALONE

LACP or PAGP

Access Switch
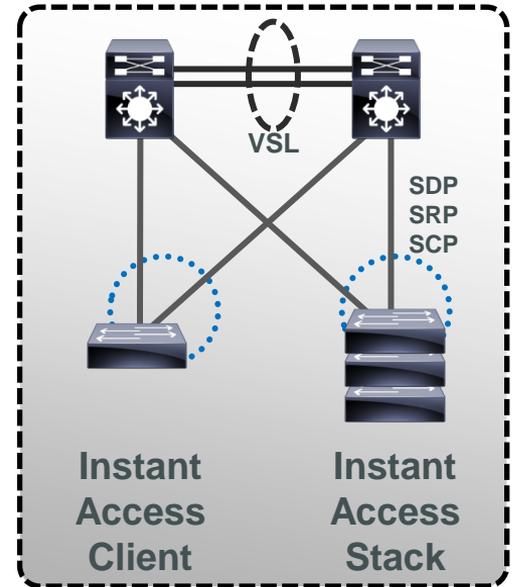
Access Stack

VSS

VSL

LACP or PAGP

LACP or PAGP

Access Switch

Access Stack

INSTANT ACCESS

VSL

SDP
SRP
SCP

Instant Access Client

Instant Access Stack

Deployment Models

ISE   PRIME

6500/6800

6500/6800

WiSM2 / 5760 / 5508

L2/L3 Links

L2/L3 Links

Fabric Links

CAPWAP Tunnel

Sup7E/3750-X

MA   MA   Sup8E/3850-X

6800IA
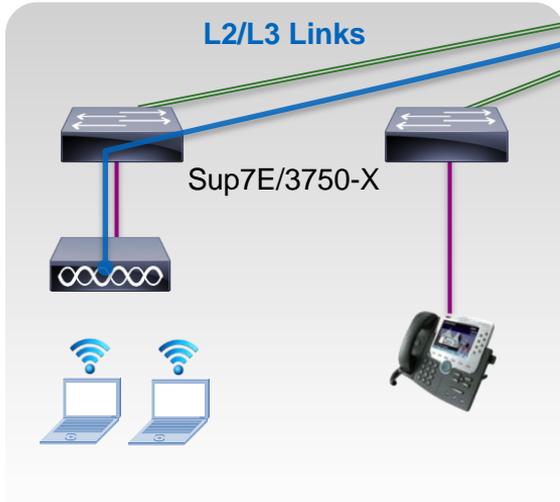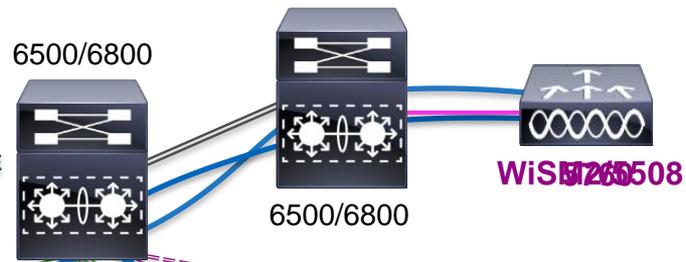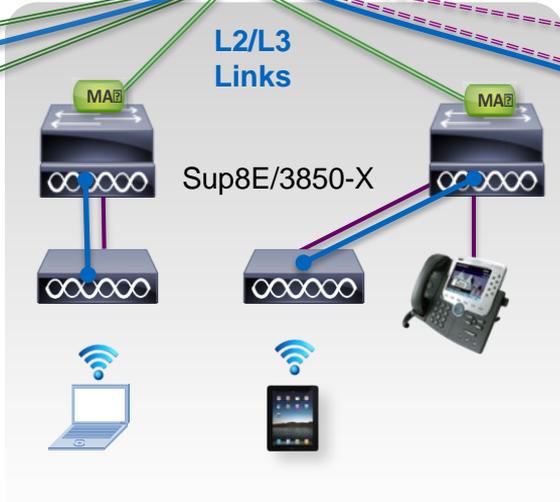
TRADITIONAL ACCESS   **CONVERGED ACCESS**   **INSTANT ACCESS**
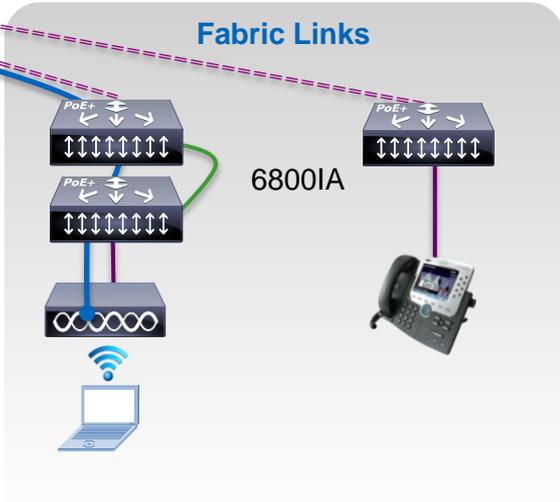
Wireless	Centralised	Distributed	Centralised
Wired	Distributed	Distributed	Centralised

Instant Access Parent Switch and Client Switch
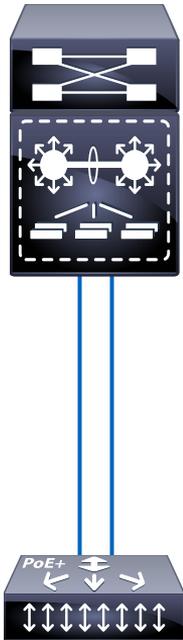
Parent Switch
In VSS Mode **=**
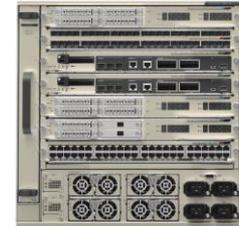
C6500-E   or   C6807-XL   or   C6880-X

IEEE 802.3ae
10Gbps Interfaces
or
IEEE802.3z
1Gbps Interfaces

Client Switch **=**

C6800IA
Data Only   or   C6800IA
PoE+

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Instant Access Key Components

WS-6904-40G
+ CVR-4SFP

Supervisor 2T

IA Parent

Virtual Switching System (VSS)

WS-6904-40G
+ CVR-4SFP

Supervisor 2T

Port-Channel

FEX-Fabric

IA Client

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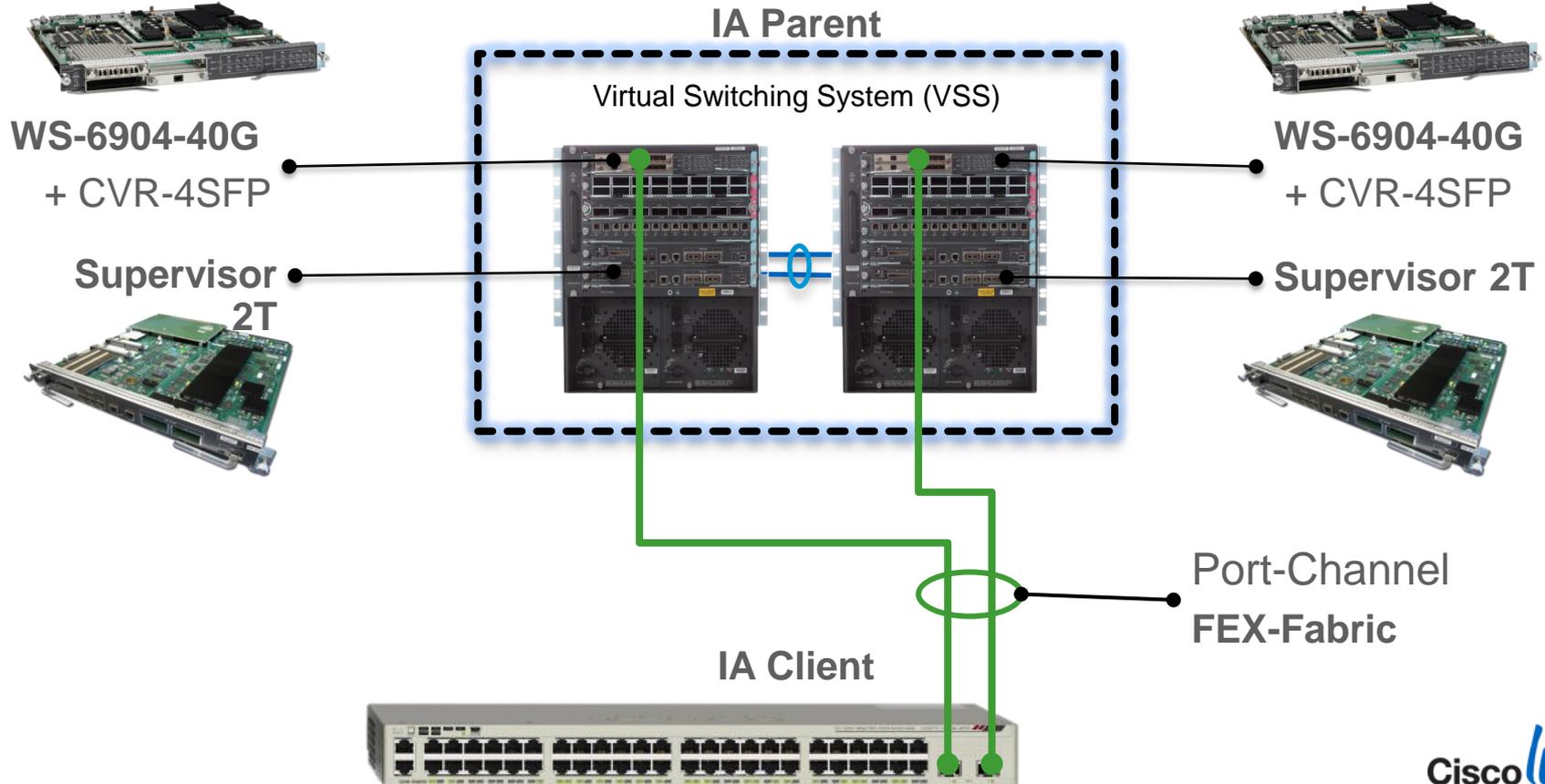
Instant Access Key Components

IA Parent

Catalyst 6500-E

Catalyst 6807-XL

WS-6904-40G

+ CVR-4SFP

WS-6904-40G

+ CVR-4SFP

Supervisor 2T

Catalyst 6880-X

Supervisor 2T

Port-Channel

FEX-Fabric

IA Client

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Catalyst Instant Access Client
Introducing Catalyst 6800IA

System & Status LEDs

Stackable up to 3 members @ FCS

48 x 1G RJ45 Ports

Data & PoE/PoE+ Options

2 x 10G SFP+ Uplink Ports

740W POE Budget

15W on 48 ports or 30W on 24 ports

Catalyst 6500 features @ the Access-layer

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WS-X6904-40G Flexible 40GE & 1/10GE

- Supports integrated DFC4 / DFC4XL
- 4 ports CFP 40GE (SR4 & LR4)
- **16 ports SFP+ 10GE (with FourX)**
- 16 ports SFP 1GE (with FourX)
- **Supports VSL on all ports**
- **Supports VNTAG on all ports**

Port 5,6, 7,8   Port 13,14, 15,16

Port 9,10, 11,12   Port 17,18, 19,20

- **16 x 10G SFP+ Adapter**

CVR-4SFP10G (FourX)
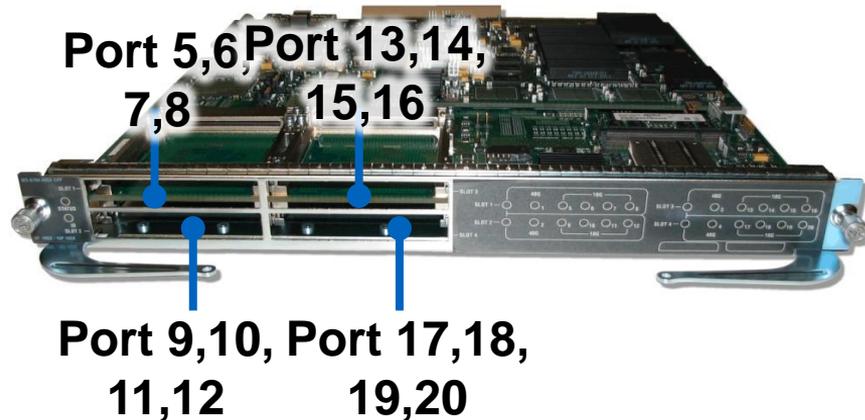
- **10G SFP+**
- **SR, LRM, LR & ER Fibre**
- **Twinax Copper**

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Parent to Client Span Distances

Copper Twin-Ax for internal rack connectivity

1m, 3m, 5m, 7m

220m – 300m
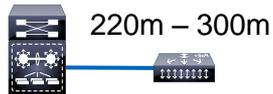
10GBASE-LRM MMF & SMF for intra building connectivity using legacy fibre

26m – 400m

10GBASE-SR MMF for rack to rack and intra-building connectivity

Up to 10Km

10GBASE-LR SMF, for inter-building, campus and metro connectivity

Up to 30Km 40Km

10GBASE-ER SMF, for inter-site connectivity

DWDM transport network 80Km and greater

DWDM, for inter-site and long-haul connectivity

SFP+ Transceiver Types Supported on C6800-Series

Cisco SFP+	Wavelength	Cable Type	Core Size (microns)	Modal Bandwidth	Cable Distance
Cisco SFP-10G-SR	850	MMF	62.5 62.5 50.0 50.0 50.0 50.0	160 (FDDI) 200 (OM1) 400 500 (OM2) 2000 (OM3) 4700 (OM4)	26m 33m 66m 82m 300m 400m
SFP-10G-LR	1310	SMF	G.652	-	10km
SFP-10G-LRM	1310	MMF SMF	62.5 50.0 50.0 G.652	500 400 500 -	220m 100m 220m 300m
SFP-10G-ER	1550	SMF	G.652	-	30Km, 40Km**
SFP-H10GB-CU1M **SFP-H10GB-CU3M** **SFP-H10GB-CU5M**	-	Twinax cable, passive, 30AWG cable assembly	-	-	1, 3m, 5M respectively
DWDM-SFP10G-xx.xx	40 non-tunable ITU 100-GHz wavelengths.	SMF			80Km+ , DWDM transport network dependent

Always Check the The Release Notes for the Latest Hardware and Software Compatibility

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SFP Transceiver Types Supported on C6800-Series

| Cisco SFP+	Wavelength	Cable Type	Core Size (microns)	Modal Bandwidth	Cable Distance
1000BASE-SX	850	MMF	62.5	160 (FDDI-grade)	220m
			62.5	200 (OM1)	275m
			50	400 (400/400)	500m
			50	500 (OM2)	550m
			50	2000 (OM3)	1Km
1000BASE-LX/LH	1310	MMF*	62.5	500	550m
			50	400	550m
			50	500	550m
		SMF	-	-	10Km

Always Check the The Release Notes for the Latest Hardware and Software Compatibility

SFP Transceiver Types Supported on C6800-Series

Cisco SFP	Wavelength	Cable Type	Core Size (microns)	Modal Bandwidth	Cable Distance
1000BASE-ZX	1550	SMF	-	-	Approximately 70 km depending on link loss
1000BASE-EX	1310	SMF	-**	-	40Km
1000BASE-BX-U	1310	SMF	-**	-	10Km
1000BASE-BX-D	1490	SMF	-**	-	10Km
GLC-T=		Cat5 copper			100m

Using 10GbE interfaces between IA Parent and Client switch is the recommended design. However 1Gbe interfaces are supported and provide an option for specific use cases where anticipated traffic bandwidth will not exceed the 1Gbs uplinks.
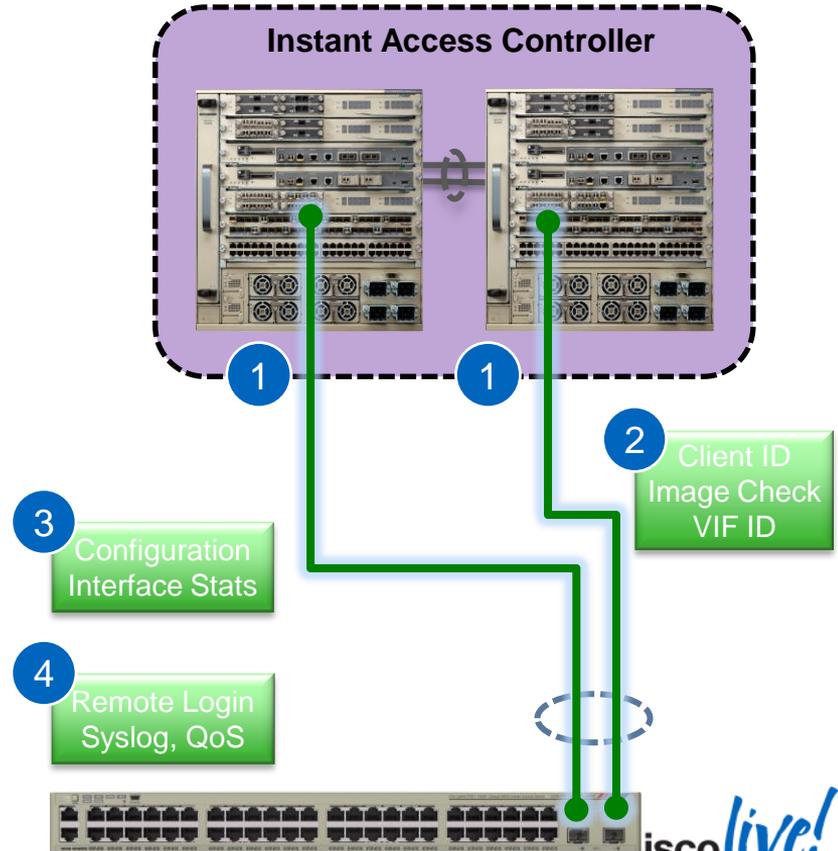
Always Check the The Release Notes for the Latest Hardware and Software Compatibility

Cisco live!
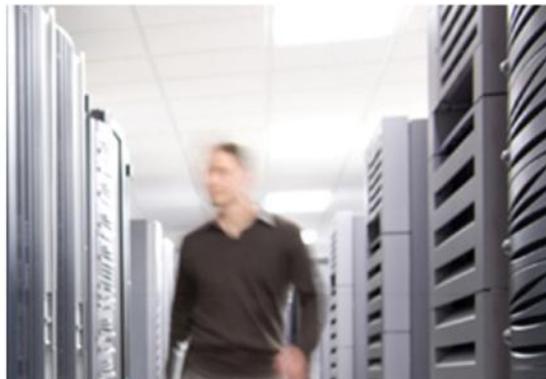
Instant Access Control Plane and Data Plane

Catalyst Instant Access Control Plane

1. **Switch Discovery Protocol (SDP)** ①
   - Fabric Link Discovery
     - *switchport mode fex-fabric*
   - IA Client Discovery
     - *fex associate <fex ID>*

2. **Switch Registration Protocol (SRP)** ②
   - Compatibility Info
   - Client Registration
     - Image Management
     - Client ROIR

3. **Switch Configuration Protocol (SCP)** ③
   - Configuration, Status, Statistics

4. **Inter Card Communication (ICC)** ④
   - Syslog, QoS, Remote Login, etc.

Instant Access Controller

① ①

② Client ID Image Check VIF ID

③ Configuration Interface Stats

④ Remote Login Syslog, QoS

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Catalyst Instant Access
Control Protocols

- **SDP** : Switch Discovery Protocol
  - ✓ The first protocol to send Hello's (keep-alive)
  - ✓ Establishes communication between IA Parent and Client Switch
  - ✓ Link based protocol, runs on every link between IA Parent and Client.
  - ✓ Communicates all attributes to / from each IA Client (Client ID, VIFs, SKU…)

- **SRP** : Switch Registration Protocol
  - ✓ Completes the OIR and Registration of IA Client on the IA Parent Switch.

- **SCP** : Switch Configuration Protocol
  - ✓ Configuration and Management protocol established between Parent and Client.
  - ✓ Lightweight Layer 2 based protocol.

- **ICC** : Inter Card Communication
  - ✓ Protocol for heavyweight features running over Cisco IPC.

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Catalyst Instant Access

❖ Solution Overview

❖ **Architecture**
   - ❖ Components
   - ❖ Control Plane
   - ❖ Data Plane

❖ Features

❖ Recommended Topologies

❖ Configuration & Verification

❖ Key Take-Aways
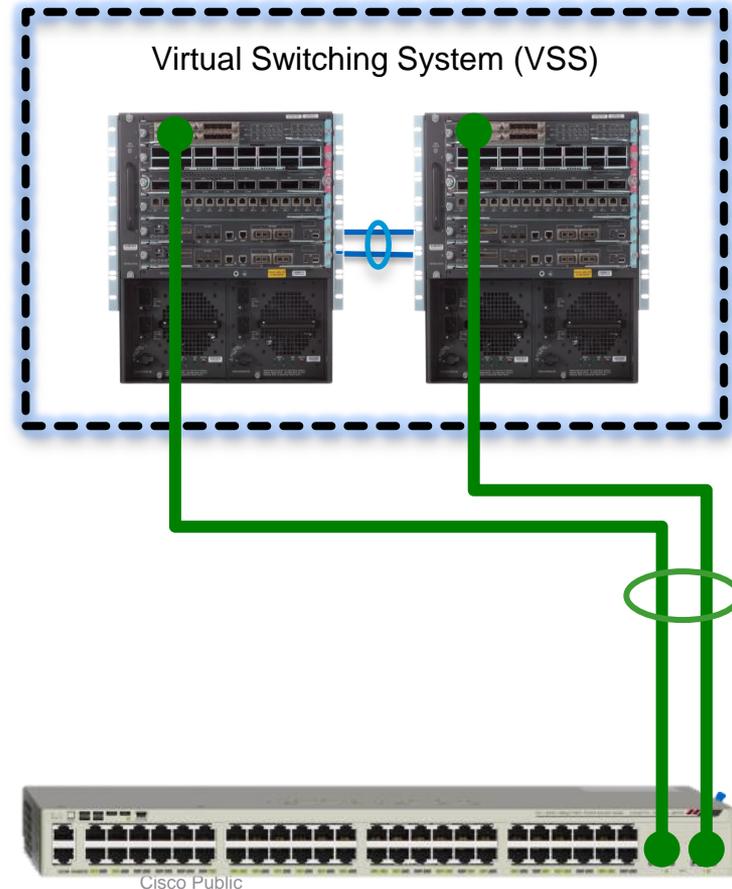

DISTRIBUTION

ACCESS

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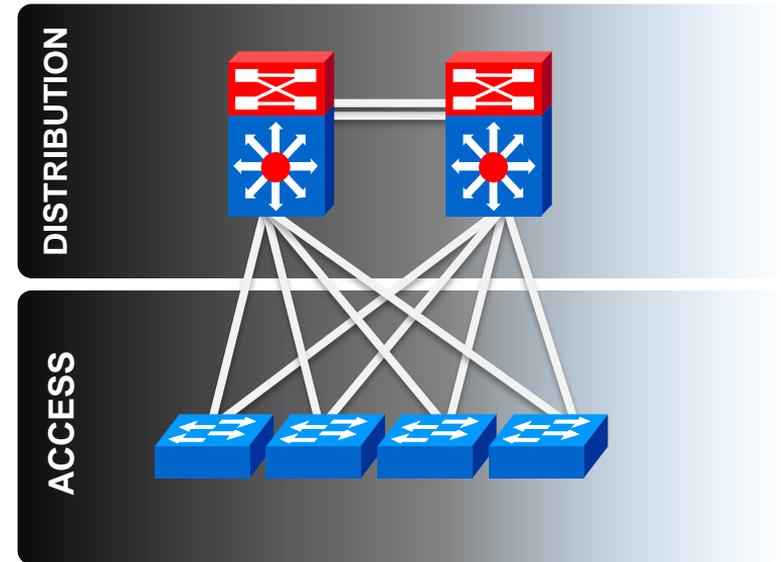
Catalyst Instant Access
Data Plane Components

IA Parent

- IA Control Plane
  - VIF Association
  - VNTAG Assignment
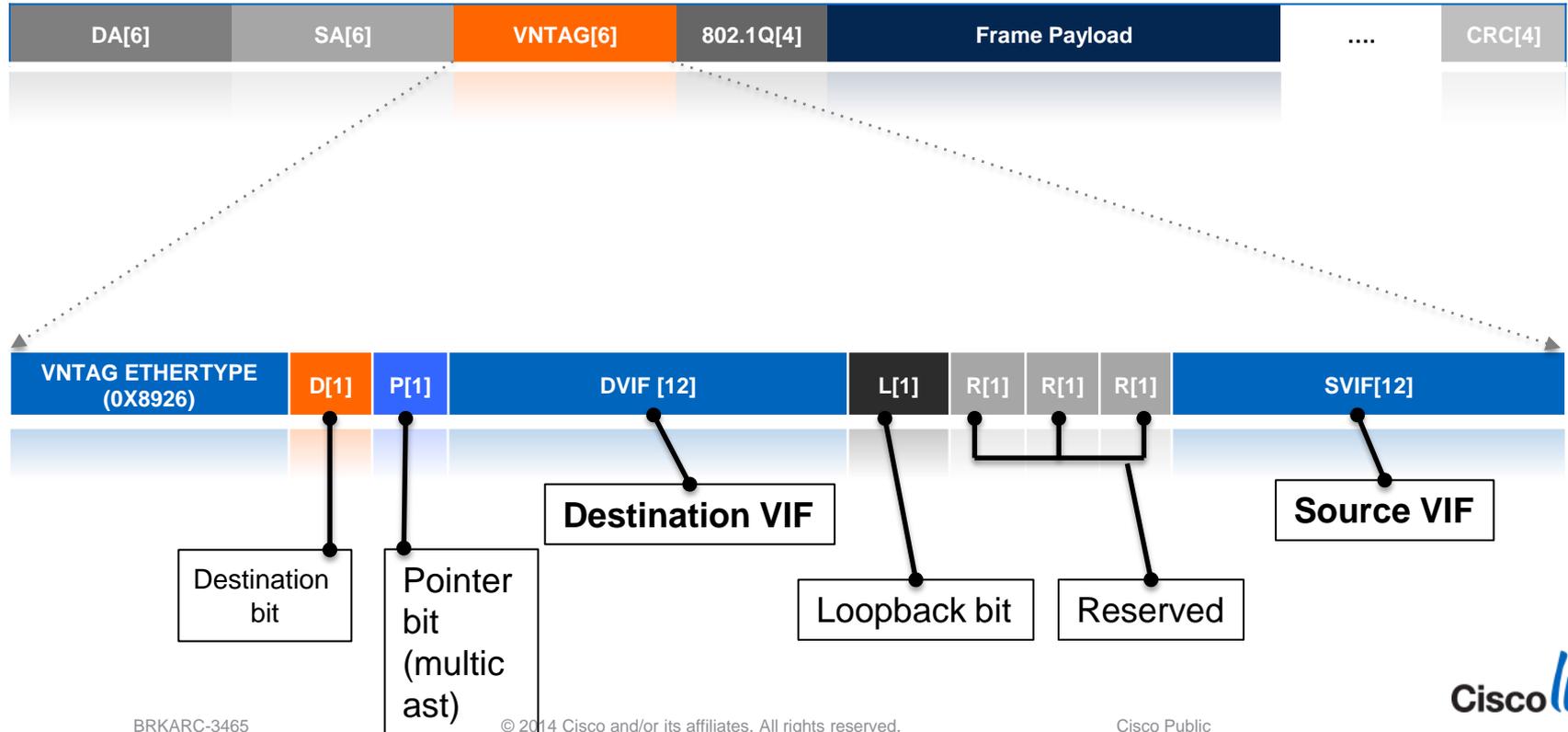- IA Data Plane
  - MAC Learning
  - L2 & L3 Features

Virtual Switching System (VSS)

IA Client

- VNTAG Encapsulation
- Quality of Service (QoS)

VNTAG Frame Format + 802.1Q

Unicast	D=1	Unicast to FEX Host Port
Multicast	P=1	Pointer to Multicast Table on FEX Client

DA[6]	SA[6]	VNTAG[6]	802.1Q[4]	Frame Payload	....	CRC[4]

VNTAG ETHERTYPE (0X8926)	D[1]	P[1]	DVIF [12]	L[1]	R[1]	R[1]	R[1]	SVIF[12]

Destination VIF

Source VIF

Destination bit

Pointer bit (multicast)

Loopback bit

Reserved

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Virtual Interfaces (VIFs)

Ingress Mapping

VNTAG	IA Client Interface
VIF_1	IF_1
VIF_2	IF_2

- **Automatically Assigned**
- IA Parent VIF = 0
- One VIF to each Host Port
- One VIF to each Ether Channel
- One VIF to FEX CPU for Control Channel
- Multicast/Broadcast: Pointer to Replication Table in IA Client

(VIF_1) (VIF_2)

IA **Parent**

F101

IA **Client**

IF_1 IF_2

Hosts

Host 1   Host 2

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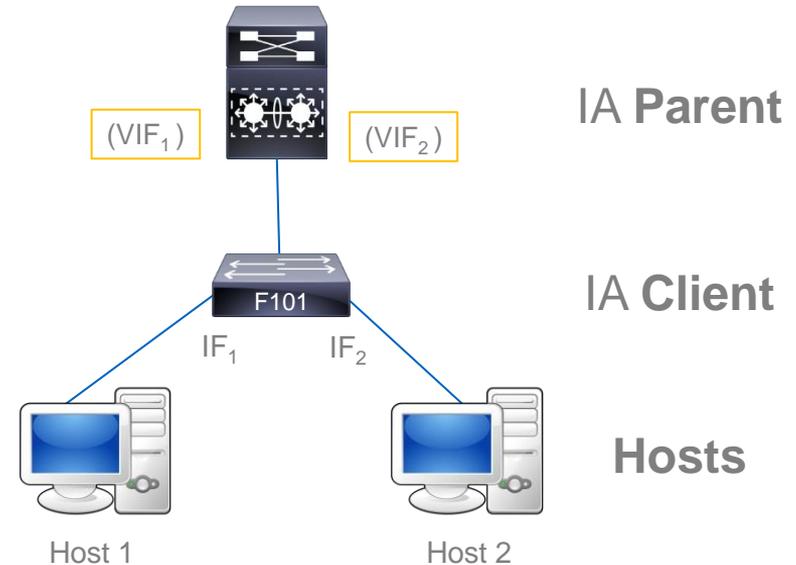
Packet Flow
Unicast Forwarding

SA=MAC1, DA=MAC2+ Payload

VNTAG
SVIF = VIF_1 DVIF = 0

SA=MAC1, DA=MAC2+ Payload

VNTAG
SVIF = VIF_1 DVIF = 0

SA=MAC1, DA=MAC2+ Payload

SA=MAC1, DA=MAC2+ Payload

SA=MAC1, DA=MAC2+ Payload

VNTAG
SVIF = 0 DVIF = $VIF2$

SA=MAC1, DA=MAC2+ Payload

VNTAG
SVIF = 0 DVIF = VIF_2

SA=MAC1, DA=MAC2+ Payload

SA=MAC1, DA=MAC2+ Payload

F101

IF_1
(VIF_1)

IF_2
(VIF_2)

Host 1
MAC 1

Host 2
MAC 2

VNTAG: Virtual NIC Tag

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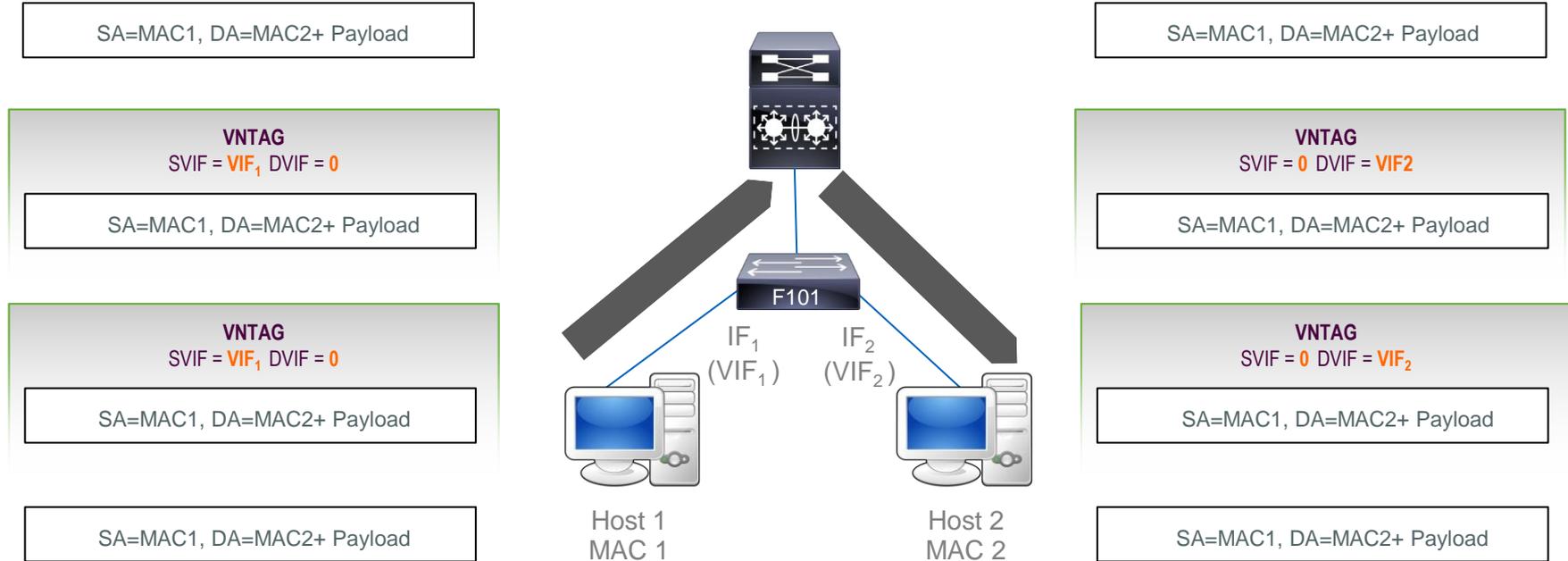
Packet Flow
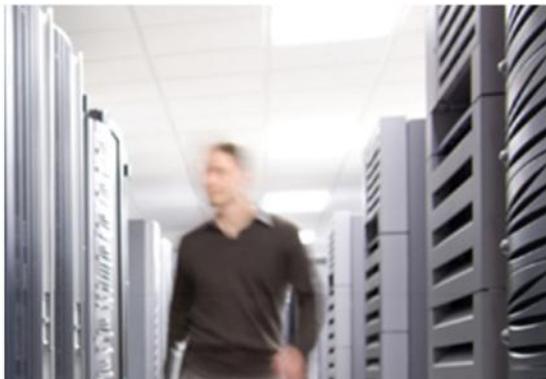# Multicast & Broadcast

192.168.1.100, 224.0.255.1
Incoming Interface: FortyGig 5/1 RPF Neighbor 210.20.37.33
Outgoing interface list:
   Gigabitethernet 101/1/0/1, Forward/Dense, 0:57:31/0:02:52
   Gigabitethernet 101/1/0/2, Forward/Dense, 0:56:55/0:01:28

IA **Parent**

MAC + Payload

VNTAG
SVIF = VIF_1 DVIF = **0**

MAC + Payload

MAC + Payload

F101

IF_1
(VIF_1)

IF_2
(VIF_2)

Outgoing Interface
VIF_1
VIF_2

Hosts

Host 1

Host 2

MAC + Payload

VNTAG: Virtual NIC Tag   VIF – Virtual Interface

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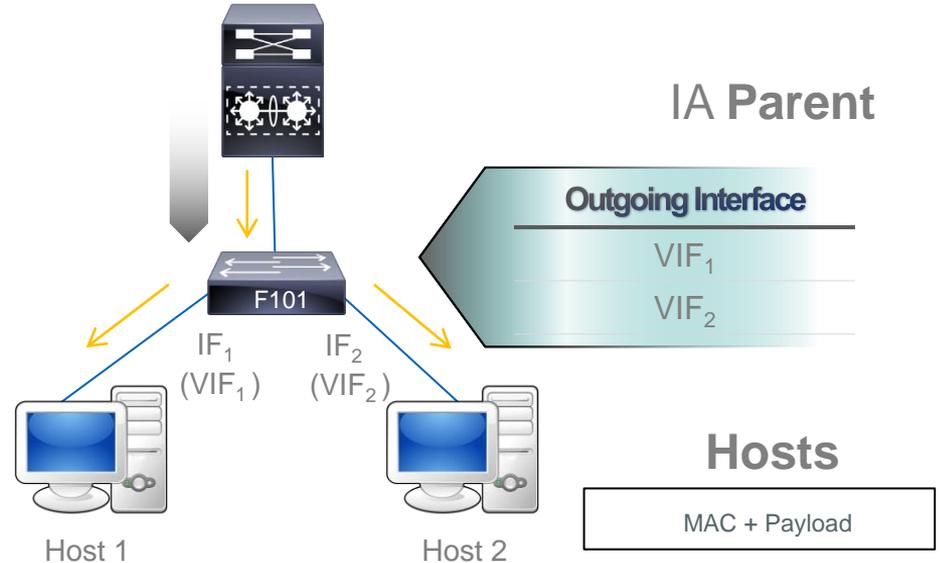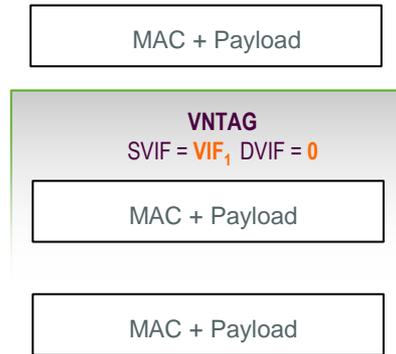
Operations

Catalyst Instant Access
Phase 1 Scalability

Maximum Client Node User Ports	1008
Maximum FEX ID's	**12**
Maximum Client Switches	21
Maximum Clients in Stack	3
Maximum User Ports in Stack	144

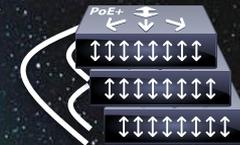Client Node ID is a single client or a stack. If using individual clients max of 12 switches supported.

Most optimum where IDF has 96 or greater
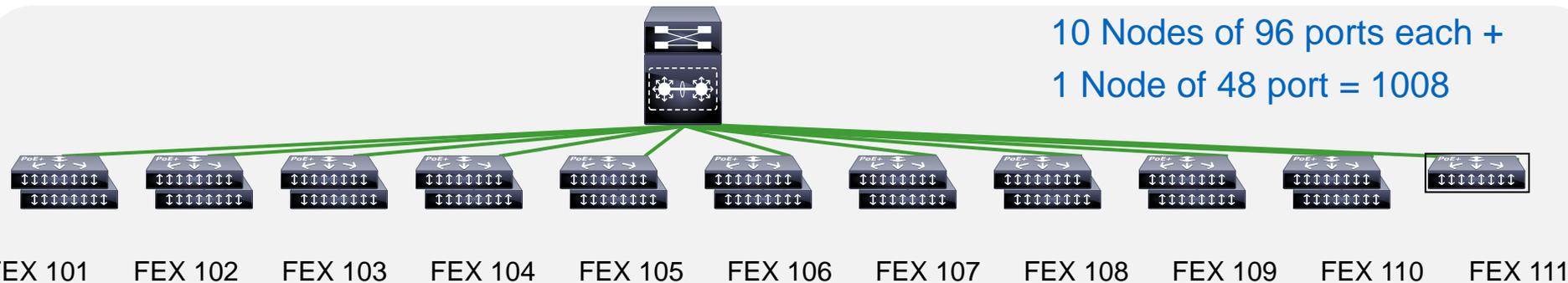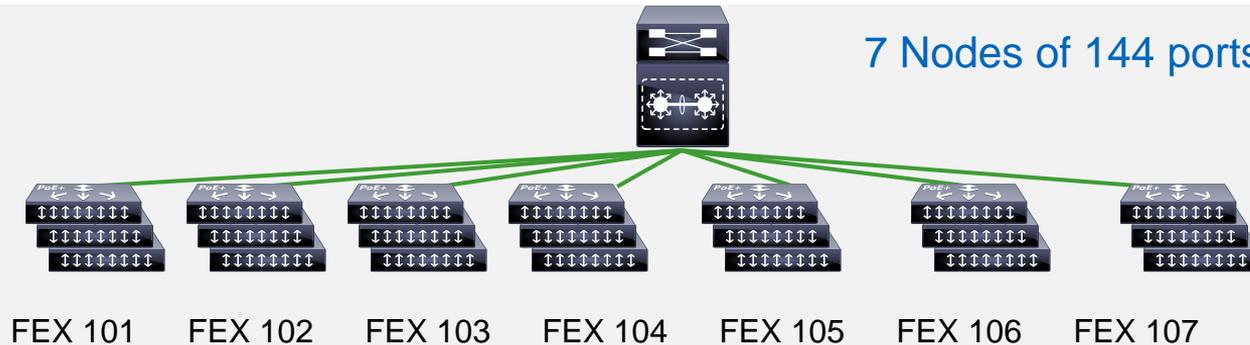
Single Client IDF's support fewer overall ports

# of IDFs	# of Ports/IDF	# of Clients in a Stack	# of Access Ports
7	144	3	1008
10	96	2	960
5	192	2	960
3	288	3	864
12	48	0	576

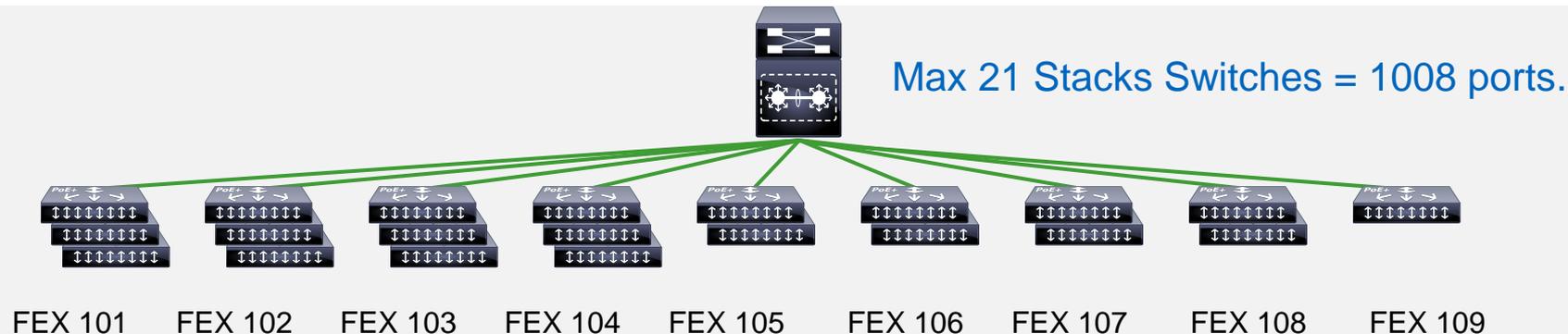Cisco live!

Catalyst Instant Access (Phase 1)
Stacking Scenario's

Stack of 3 (Phase 1) Max FEX-ID 12

7 Nodes of 144 ports each = 1008

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

FEX 101   FEX 102   FEX 103   FEX 104   FEX 105   FEX 106   FEX 107   FEX 108   FEX 109   FEX 110   FEX 111

Catalyst Instant Access (Phase 1)
Stacking Scenario's

12 Nodes of 48 ports each = 576 ports

FEX 101   FEX 102   FEX 103   FEX 104   FEX 105   FEX 106   FEX 107   FEX 108   FEX 109   FEX 110   FEX 111   FEX 112

Max 21 Stacks Switches = 1008 ports.

FEX 101   FEX 102   FEX 103   FEX 104   FEX 105   FEX 106   FEX 107   FEX 108   FEX 109

New Deployment of Instant Access
Traditional L2 Design with Instant Access


```
Interface range Gig110/1/0/1-20
Switchport access vlan 10
…
interface Gig110/1/0/21-40
 switchport access vlan 110
…
interface Gig110/1/0/41-48
Switchport access vlan 100
…
Interface range Gig111/1/0/1-20
Switchport access vlan 20
…
```
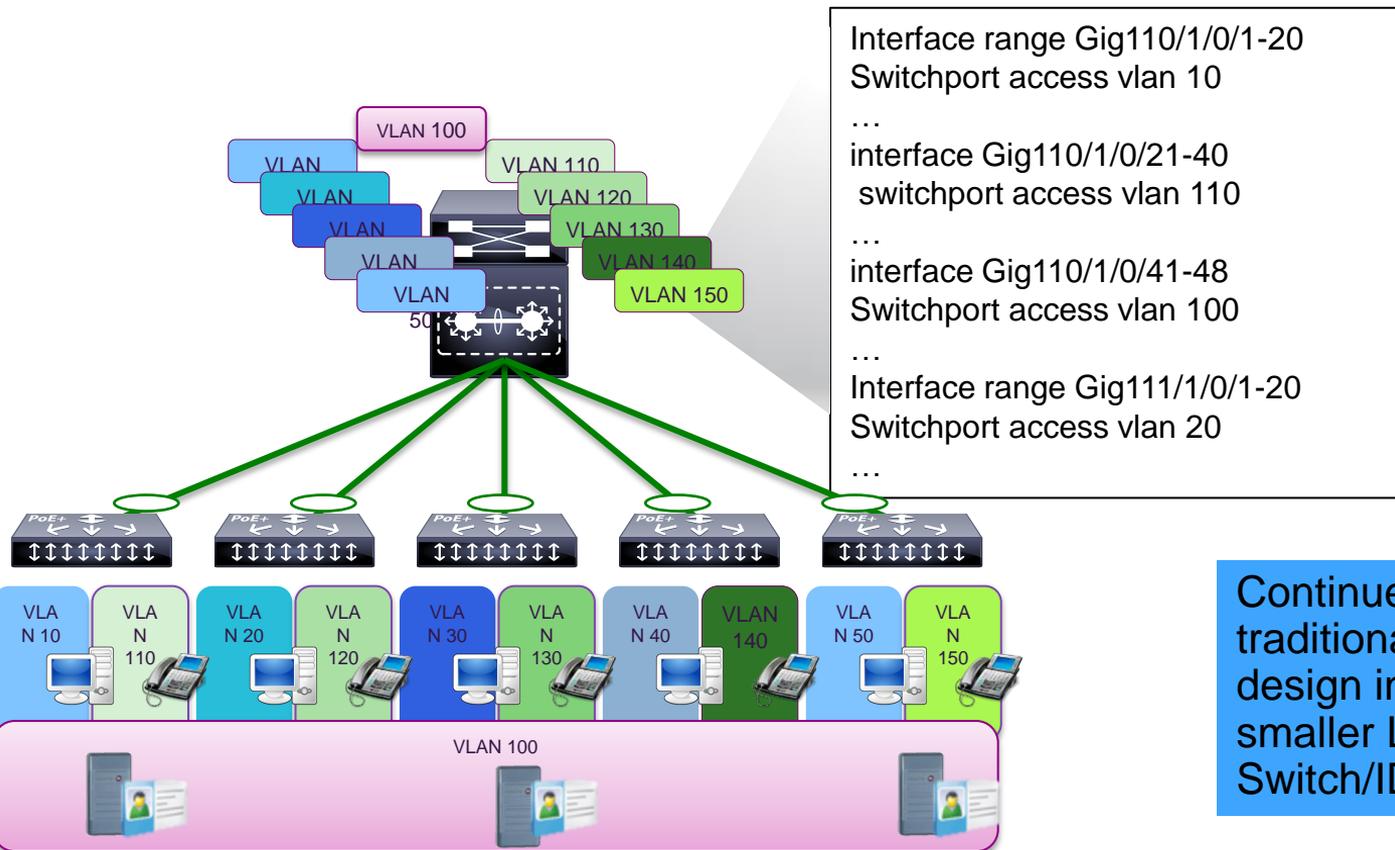
Continue to maintain traditional L2 deployment design in IA Architecture with smaller L2 domain per Switch/IDF

Catalyst Instant Access
QoS Design & Operation

IA Client   **Fabric Link**   **IA Parent**
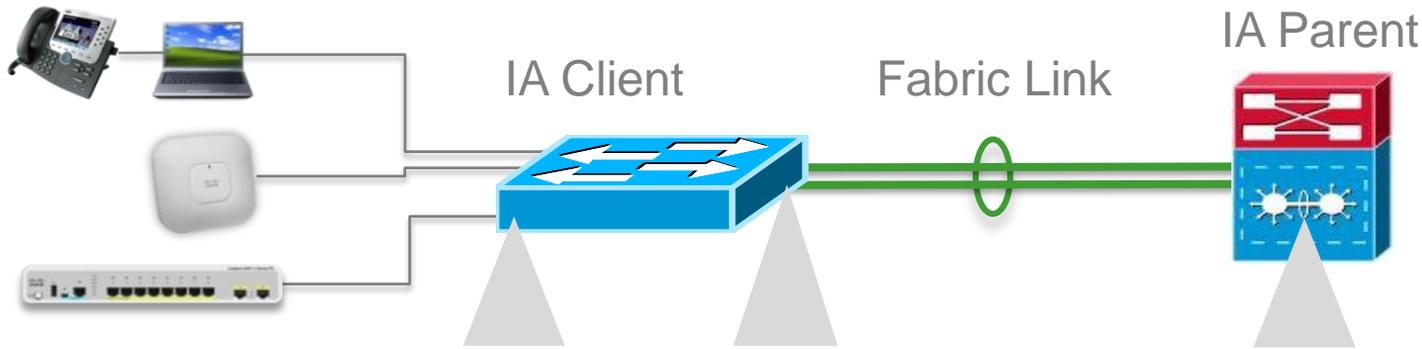
- ☑ Port Trust DSCP / COS
- ☑ 4 Queues on Host Ports (Downstream)

- ☑ DSCP / COS to Queue Map
- ☑ 4 Queues on Fabric Ports (Upstream)

- ☑ Classification
- ☑ Marking / Remarking
- ☑ Policing
  - ☑ Aggregate
  - ☑ Microflow
- ☑ 8 Queues on Fabric Link
- ☑ Shaping & Queuing on Fabric Link not supported

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Case Studies for Deployment

Case Study #1 – Medium Enterprise – Lower Operations Costs

Large School District in United States

- **Business and Technology Drivers**
  - Small operations staff and needs to scale services
  - Spend less time managing the network
  - Many legacy applications requiring L2 connectivity still in use
  - No Cisco certified IT staff onsite

- **New building deployment, future growth planned**
  - Instant Access domain size less than 800 ports

- **Already using Catalyst 6500 in core, distribution and access in many existing locations**

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Case Study #1 – IA Topology – New Building
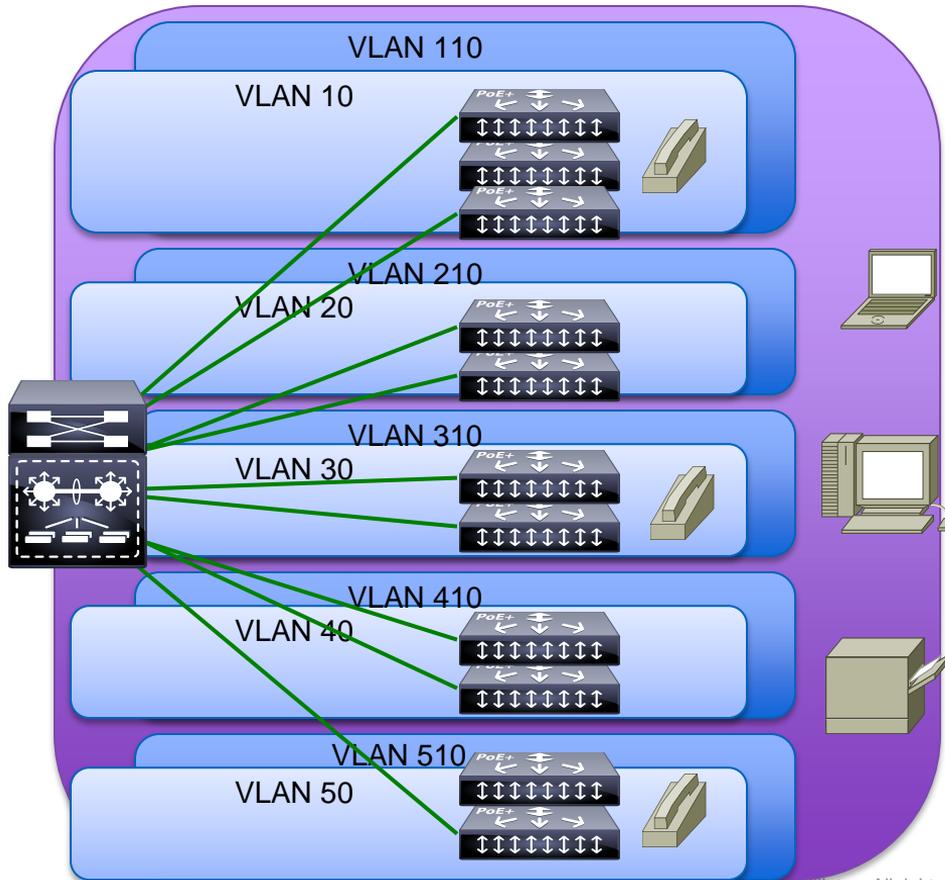
- Five floors with 96 – 144 wired ports per floor
  - 2 X10GbE uplinks per fex

- Instant Access domain size
  - 720 total access ports with PoE
  - RPS2300 for redundant power

- Key applications
  - Third party VoIP
  - Appletalk print services

- Key functionality enabled
  - VLAN bridging for Appletalk
  - Carefully consider L2 domain size whenever extending VLANs across multiple switches

Case Study #2 – Medium Campus Enterprise – Deploying Segmentation

Manufacturing Company – Northern Europe

- **Business and Technology Drivers**
  - Extending network segmentation to the access layer with minimal complexity
  - Option to extend MPLS further down to the distribution/access layer

- **Instant Access domain size**
  - 5 Instant Access Domains
  - 100 total Instant Access client switches

- **Key applications**
  - Data Collection for factories
  - Traditional Enterprise, email and collaboration

- **Key functionality enabled**
  - Multi-VRF
  - IP multicast

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Case Study #2 – IA Topology
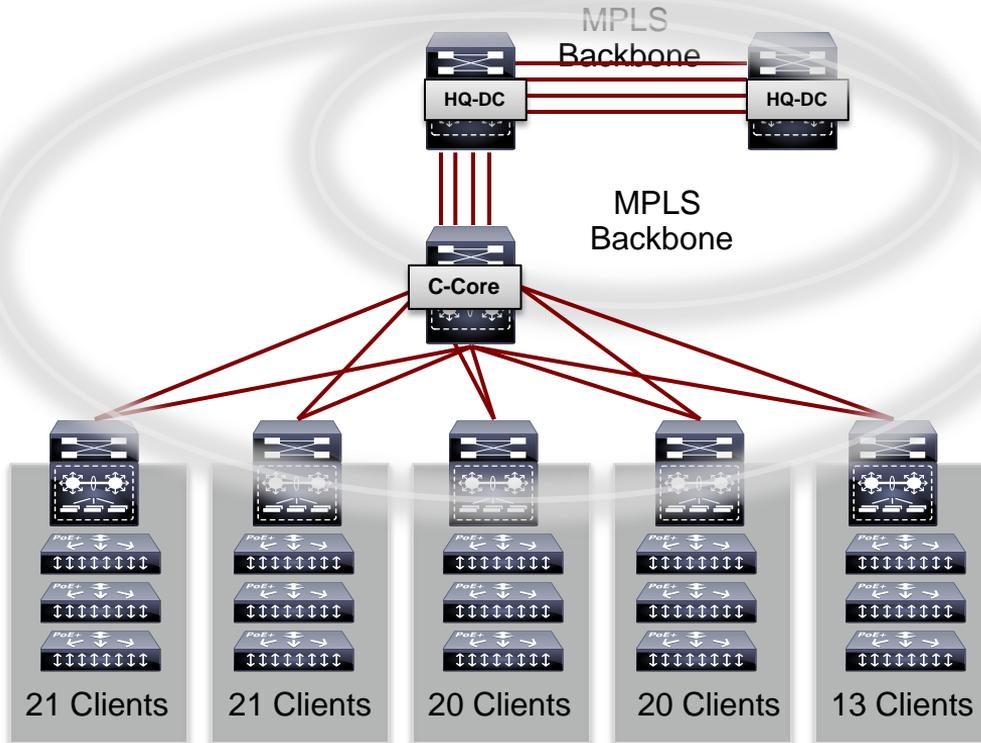
MPLS Backbone

HQ-DC   HQ-DC

MPLS Backbone

C-Core

21 Clients   21 Clients   20 Clients   20 Clients   13 Clients

- Migrating to Instant Access in phases
  - Traditional multi-layer deployment today
  - 2 x10 GbE and 4 X 10GbE fex uplink configurations
  - Executed internal proof of concept testing
- MPLS L3 VPNs extended to the Data Centre and some remote locations
  - Provide network isolation for multiple customer resources and data
  - Allows flexibility and agility in deployments

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Case Study #3 – Medium Campus, Factory Floor – Simplified Operations

Global Corporation with Diversified Business Groups Including Aerospace and Others

- **Business and Technology Drivers**
  - High Availability network designs
  - Highly secure environment
  - Future network segmentation options including VRF-lite, MPLS

- **Instant Access domain size**
  - 8 Instant Access domains over two locations
  - Near 1000 ports in each Instant Access domain

- **Key applications**
  - Engineering
  - Traditional enterprise applications including email, collaboration

- **Key functionality enabled**
  - Wired and wireless user authentication with IEEE 802.1x

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Case Study #3 – IA Topology
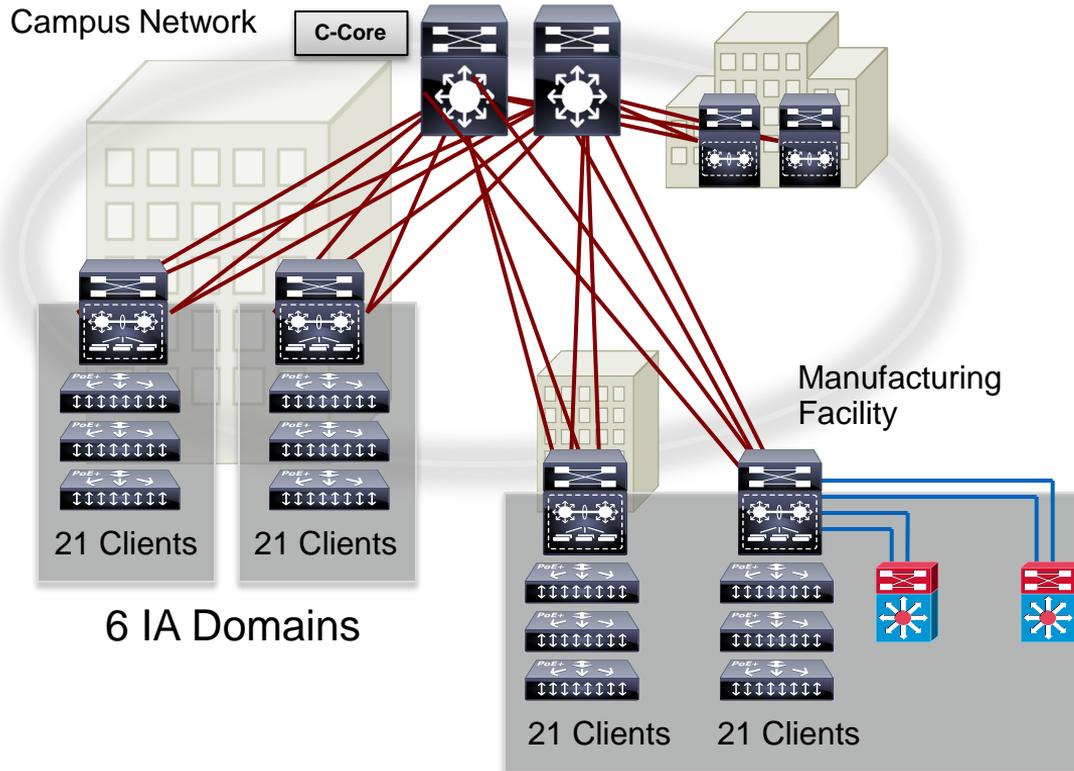
Campus Network

C-Core

21 Clients 21 Clients

6 IA Domains

Manufacturing Facility

21 Clients 21 Clients

- Migrating to Instant Access in phases
  - Traditional multi-layer deployment today
  - 2 x 10GbE and 4 X 10GbE fex uplink configurations

- Considering 1GbE uplinks in future manufacturing floor deployments

- Considering VRF-lite extensions to the Instant Access domains

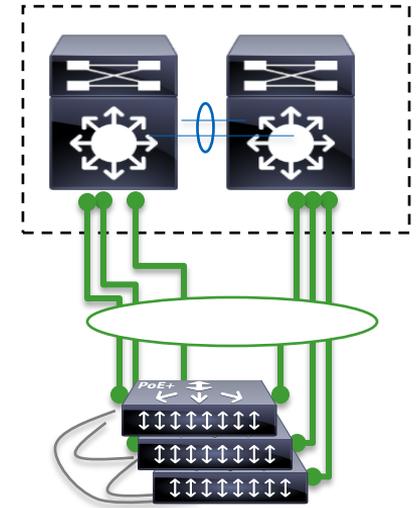# Catalyst Instant Access
Fabric Link Connectivity Scenarios – Dual Homed to VSS Pair

Recommended Design
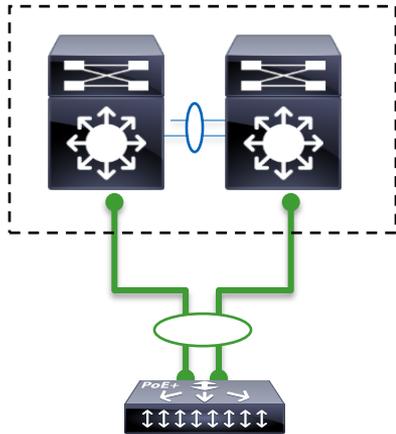
Dual Homed to

VSS Pair
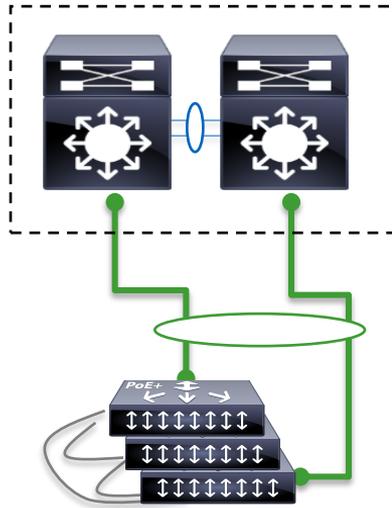
Dual Homed across

Stack Members

Up to 6 uplinks(60G)
MEC across Client to
Parent

Catalyst Instant Access

Fabric Link Connectivity Scenarios – Single Homed to VSS Pair

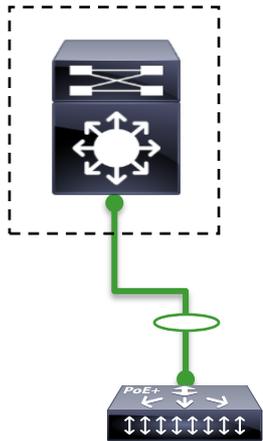**Possible but "Not Recommended"**
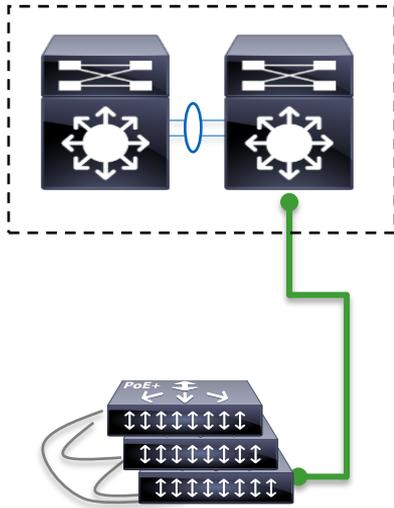
Single homed to
VSS pair
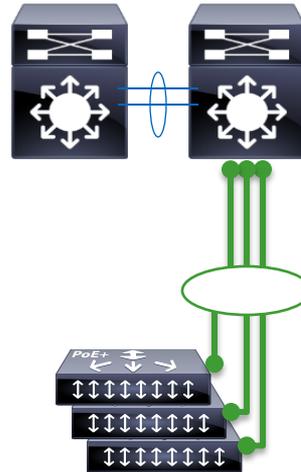
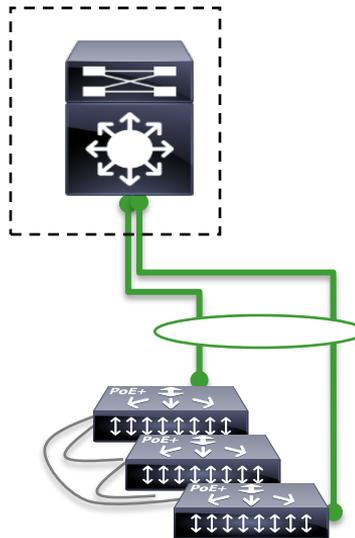Single Homed upto 6
links in MEC   Across
Stack members

Catalyst Instant Access
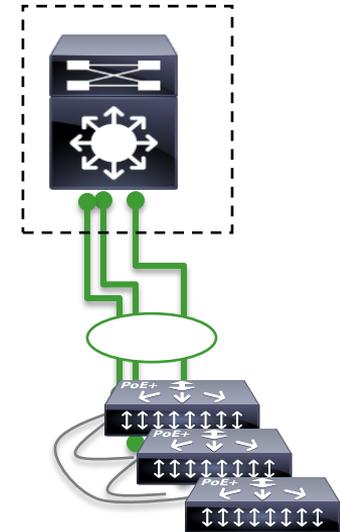Fabric Link Connectivity Scenarios – Single Switch VSS Mode

Possible but "Not Recommended"

Single Homed to Switch 1 in VSS mode

Dual Homed to Single Switch in VSS mode

Up to 6 links in MEC homed to Single Switch in VSS Mode

Cisco P

New Deployment of Instant Access
Simplicity of Provisioning


Automatic-Provisioning on Connection

- A Client gets automatically discovered and provisioned using IA Control Protocol when connected.
- Automatic Discovery and Stack Member by Parent via Stack Master

Pre-Provisioning

Provision IA Client and interface Configurations before even physically connecting the IA Client

mod provision create fex   111 type c6800IA-48fPD

mod provision create fex   111 type c6800IA-48fPD slot 2
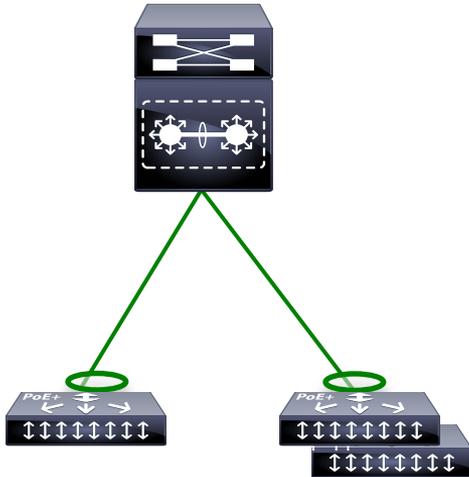
Provisioning Client Switches

```
C6500-VSS-2#module provision create fex 188 type c6800iA-48FPD
FEX 188 slot 1 module provisioning entry added.
```

```
C6500-VSS-2#show interface summary | begin 188
 GigabitEthernet188/1/0/1   0   0   0   0   0   0   0   0   0
 GigabitEthernet188/1/0/2   0   0   0   0   0   0   0   0   0
 GigabitEthernet188/1/0/3   0   0   0   0   0   0   0   0   0
 GigabitEthernet188/1/0/4   0   0   0   0   0   0   0   0   0
 GigabitEthernet188/1/0/5   0   0   0   0   0   0   0   0   0
 GigabitEthernet188/1/0/6   0   0   0   0   0   0   0   0   0
 GigabitEthernet188/1/0/7   0   0   0   0   0   0   0   0   0
```

1. Use module provision command to create the logical interface representation within the system configuration without even connecting the physical client switch

Apply Configuration to Provisioned FEX Clients

```
C6500-VSS-2#show run fex 188
Building configuration...

Current configuration : 5900 bytes
!
interface GigabitEthernet188/1/0/1
 switchport
 switchport trunk allowed vlan 1
 switchport mode dynamic auto
 shutdown
!
interface GigabitEthernet188/1/0/2
 switchport
 switchport trunk allowed vlan 1
 switchport mode dynamic auto
 shutdown
!
```
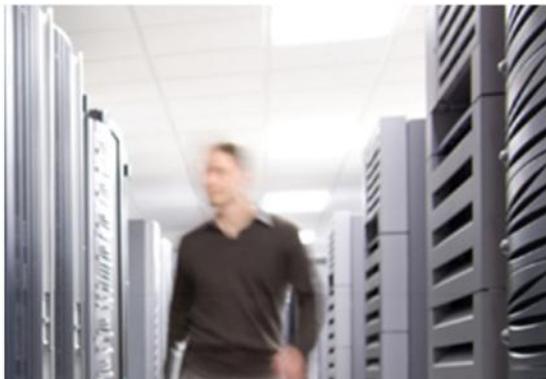
```
C6500-VSS-2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
C6500-VSS-2(config)#int gi 188/1/0/1
C6500-VSS-2(config-if)#switchport mode access
C6500-VSS-2(config-if)#switchport access vlan 100
C6500-VSS-2(config-if)#
```
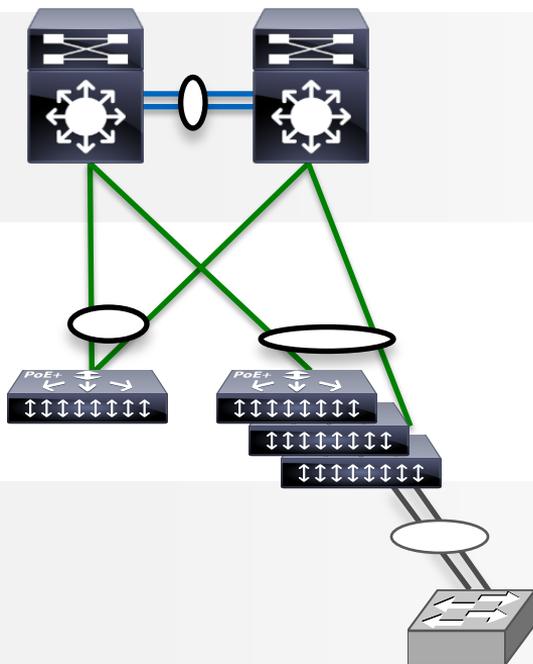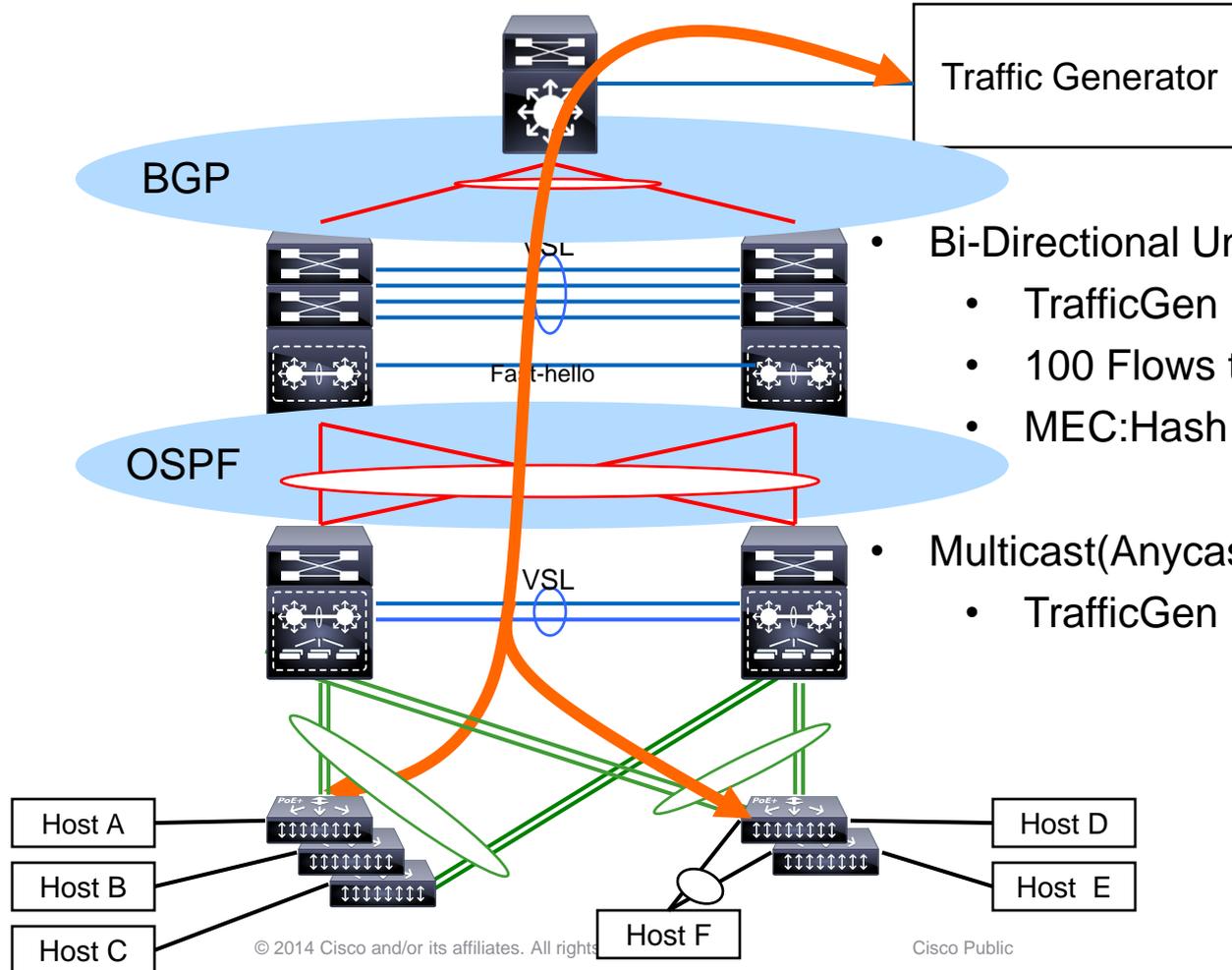
Performance Characteristics
High Availability

Catalyst Instant Access High Availability

- VSS / VSS Quad-Sup SSO
- EtherChannel Load Balancing
- Up to 6 10G in MEC Bundle
- Load Sharing Ca6k Hash Algorithms

- Up to 3 Stack Members
- 80G stack bandwidth between stack members
- EtherChannel Across Stack Members
- Up to 6 10G into One EtherChannels
- Dual Active detection on fabric links

- Upto 8 Host Port Etherchannels
- Host Port EtherChannel Across Stack Members (Next release)
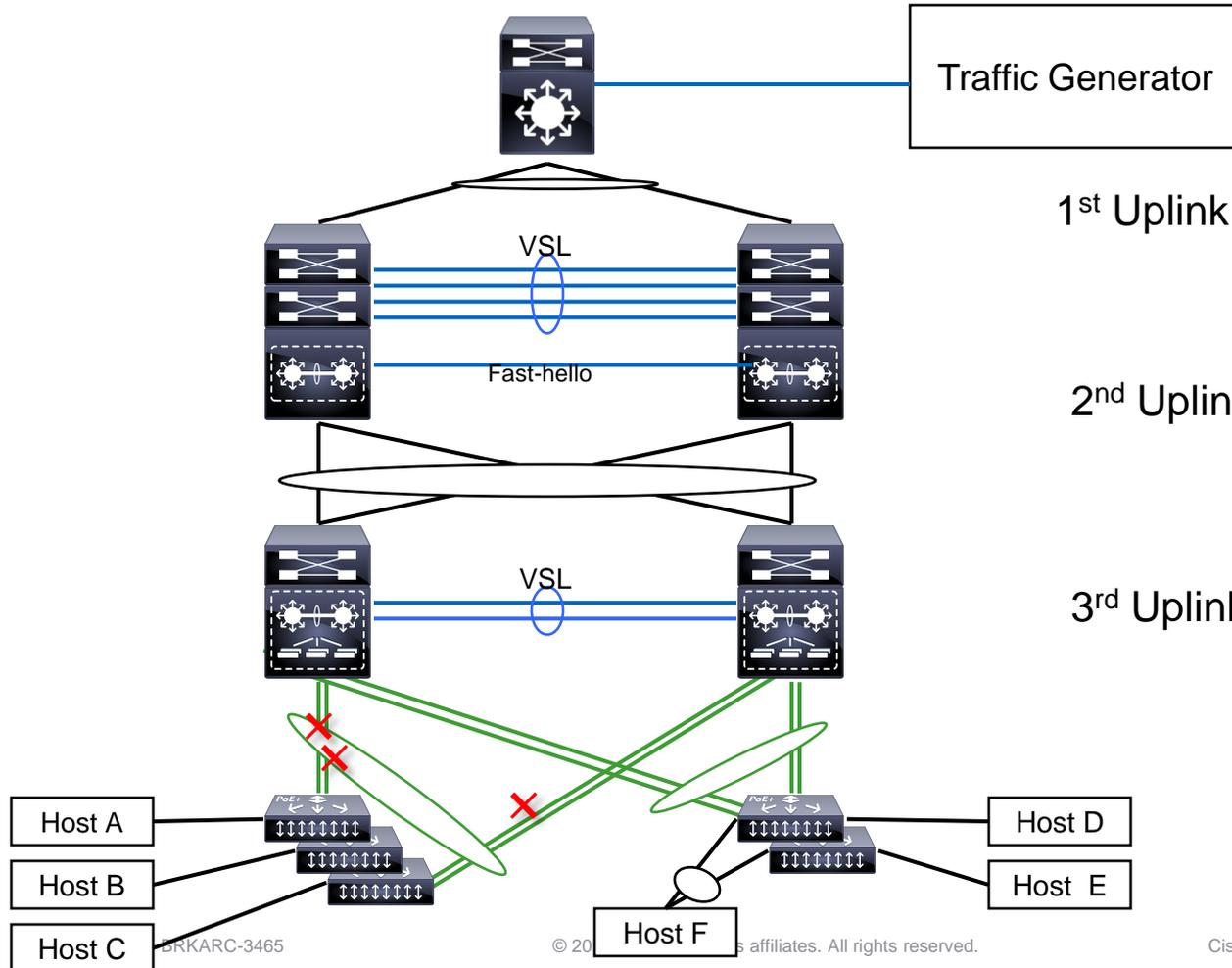- Master Failure will not reset Etherchannel

Cisco Public

Network Topology

- Bi-Directional Unicast Traffic
  - TrafficGen ←→ Hosts
  - 100 Flows to each Host
  - MEC:Hash – Src-Dst-Port

- Multicast(Anycast, Sparse)
  - TrafficGen → All Hosts

Traffic Generator

BGP

OSPF

VSL

Fast-hello

VSL

Host A

Host B

Host C

Host D

Host E

Host F

High Availability: Fabric-Link Failure

Traffic Generator

1st Uplink failure

　　Host A,B ~ 15ms

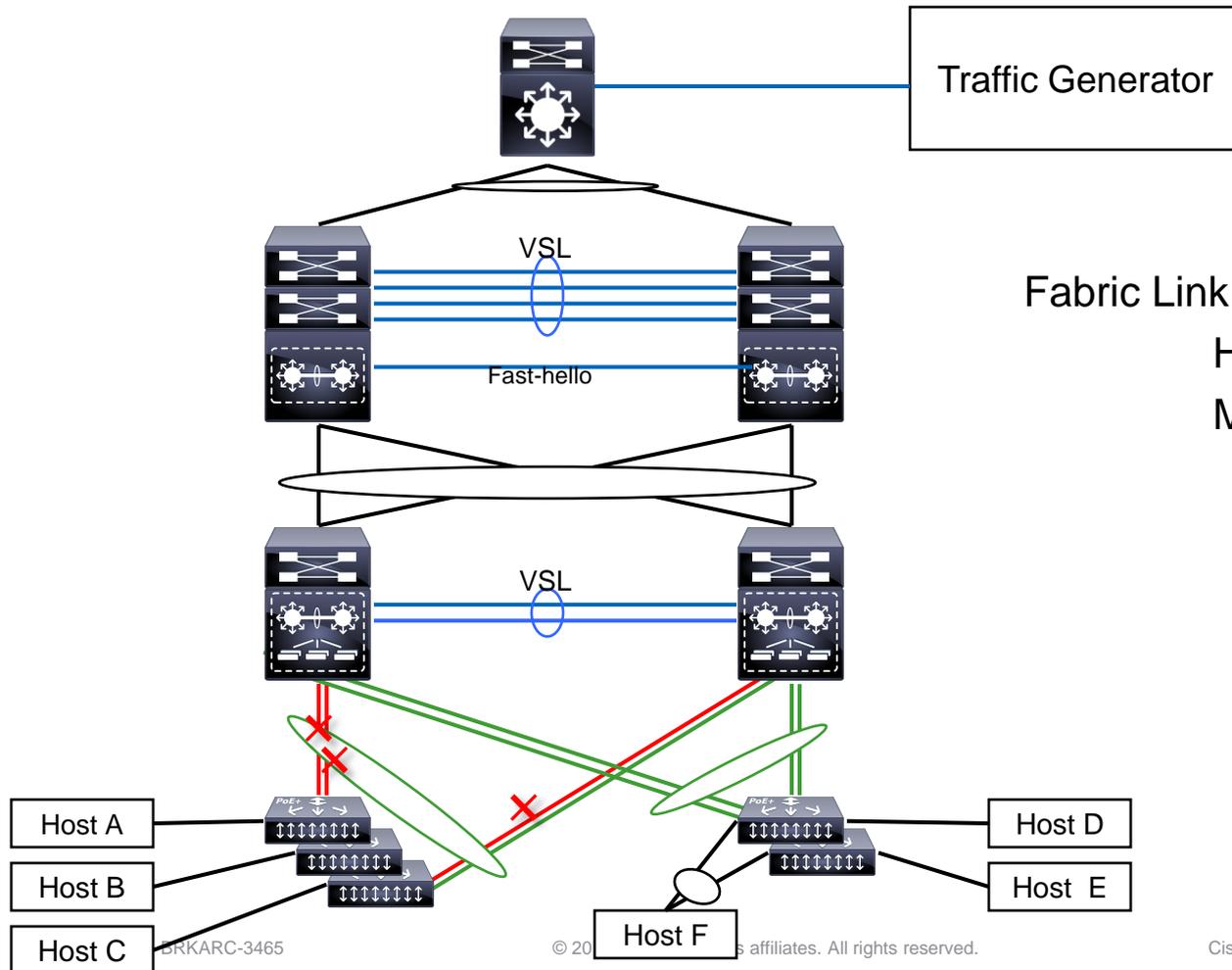　　Multicast - Hitless

2nd Uplink failure

　　Host A,B,C ~ 50ms

　　Multicast ~ 612ms

3rd Uplink failure
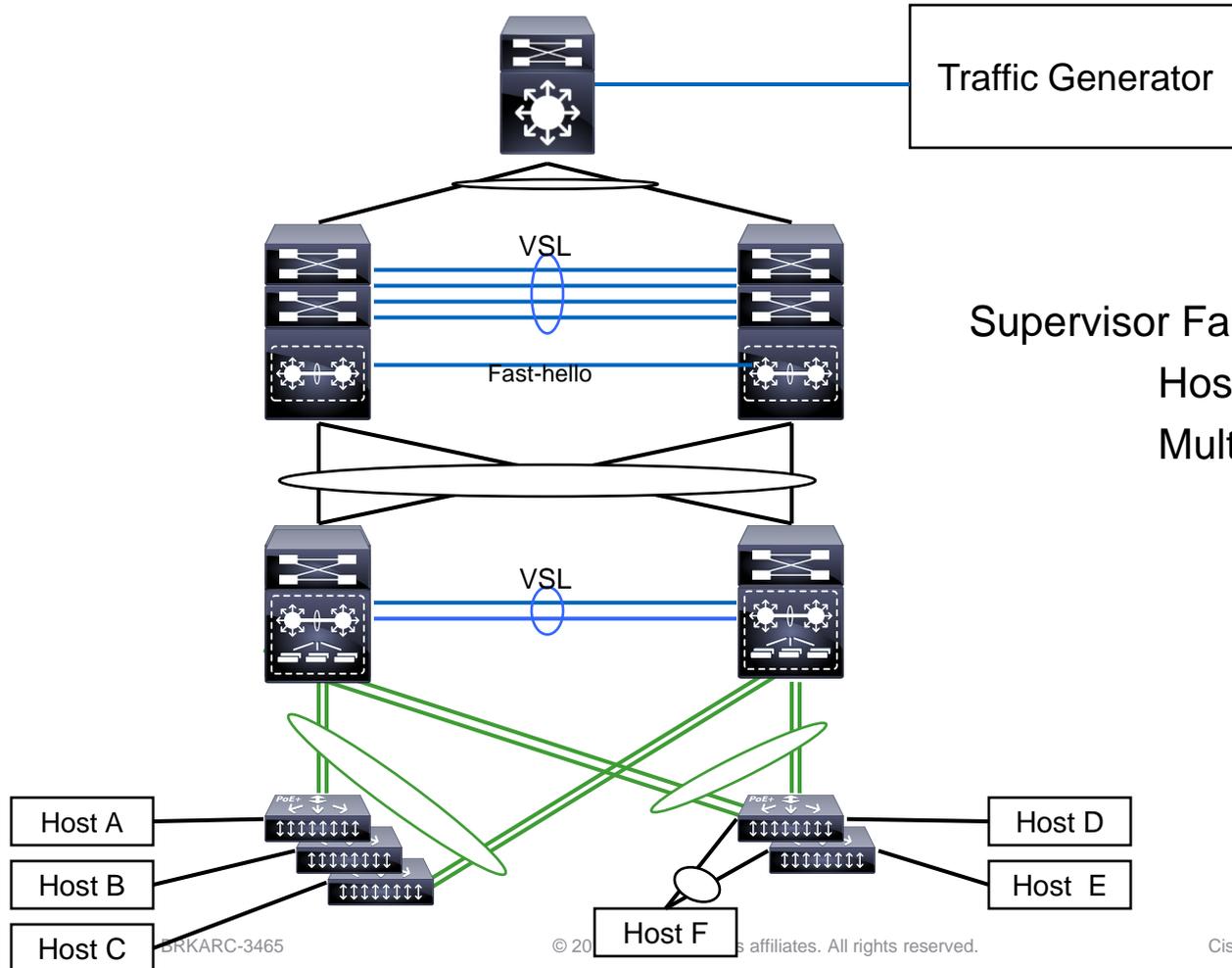
　　Host A,C ~ 25ms

　　Multicast - Hitless

VSL

Fast-hello

VSL

Host A

Host B

Host C

Host D

Host E

Host F

Cisco live!

High Availability: Fabric-Link Failure

Traffic Generator

VSL

Fast-hello

VSL

Fabric Link Recovery

    Host A,B, C ~ 25-50ms

    Multicast ~ 0 – 90ms

Host A

Host B

Host C

Host D

Host E

Host F

High Availability: Supervisor Failure

Traffic Generator

VSL

Fast-hello

VSL

Supervisor Failure

    Host A,B,C,D,E,F ~ 15ms - 60 ms

    Multicast ~ 800ms

Host A

Host B

Host C

Host D

Host E

Host F

Cisco live!

High Availability: Stacking - Uplink Failover
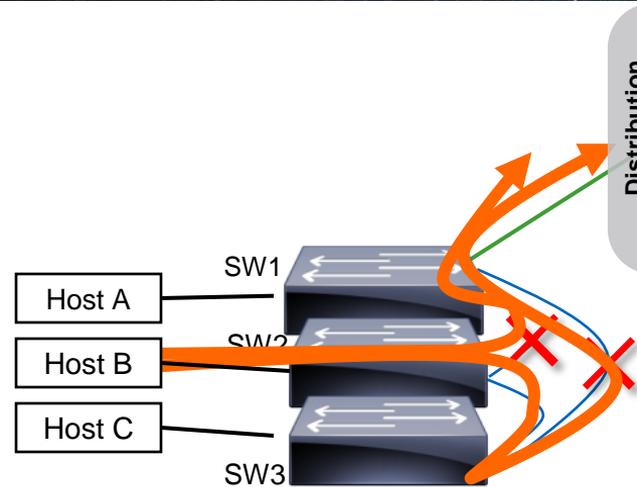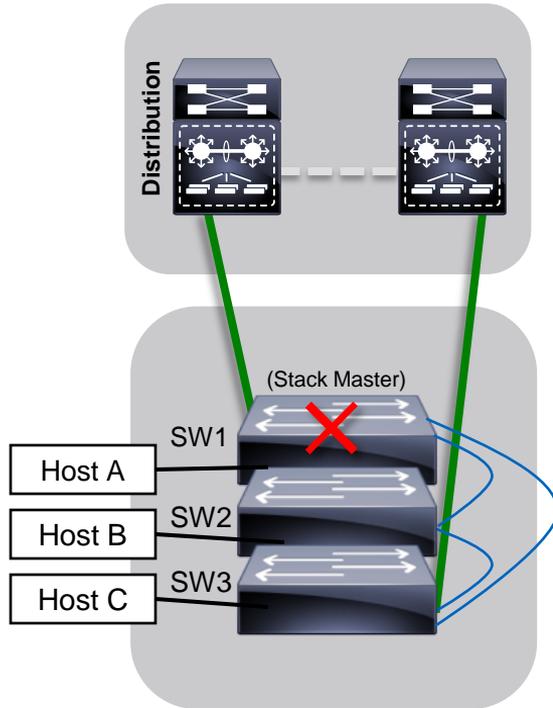

1) Pulled Stack cable between SW1 and SW3:
   Host A,B – Hitless,
    Host C ~ 30ms
   Mutlicast – Hitless

2) Pulled Stack cable between SW1 and SW2:
   Host B ~ 30ms Loss
   Multicast ~ 204 ms
   Host A, C – Hitless

Traffic Flow   **Fabric link**   **Stacking Cable**   Cisco *live!*

High Availability: Stackmaster Failure

(Stack Master)

SW1

Host A

SW2

Host B

SW3

Host C

Distribution

Power removed from Stack master (SW1)

Host B, C ~ 96ms Loss
Multicast - Hitless

Cisco live!

High Availability: VSL Link Failure

Traffic Generator

VSL

Fast-hello

VSL

Dual-Active Detection

Host A

Host B

Host C

Host D

Host E

Host F

VSL Link Failure

Host A,B,C,D,E,F ~ 23 - 45 ms

Multicast ~ 500ms

Cisco live!

Instant Access: VSS Dual Active Detection

Enhanced PAgP

Switch 1   Switch 2

Active   Hot Standby

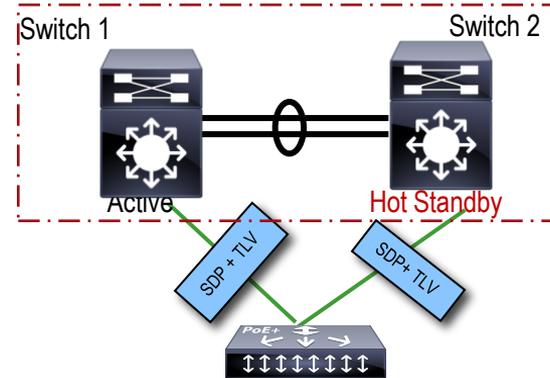PAGP+ TLV   PAGP+ TLV

PoE+
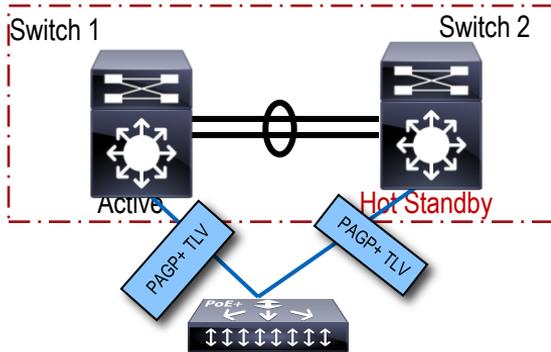
❖ **Requires ePagP capable neighbor :**
  ❖ 3750: 12.2(46)SE
  ❖ 4500: 12.2(44)SE
❖ 6500: 12.2(33)SXH1
❖ **Sub-second convergence**

Enhanced SDP (Fabric Link Discovery Protocol)

Switch 1   Switch 2

Active   Hot Standby

SDP + TLV   SDP + TLV

PoE+

Cat6500-VSS#show fex dual-active
FEX dual-active detection enabled: Yes

Channel Group 16 (FEX 132)
  Dual Active detection capable: Yes
    switch 1 member port state:
     Te1/2/5   - Interface Up.   state: bound
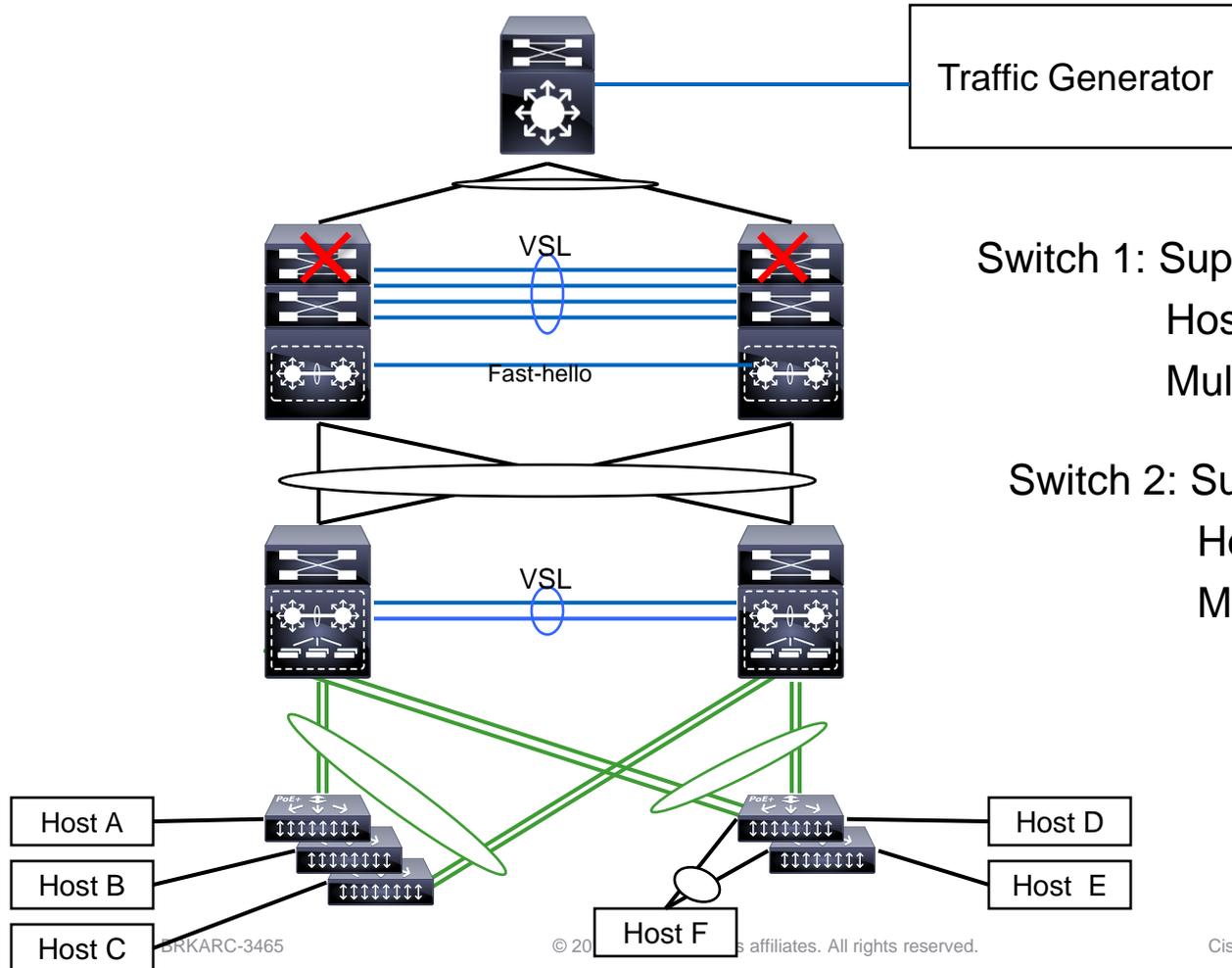   Te1/2/13   - Interface Up.   state: bound
    switch 2 member port state:
     Te2/2/5   - Interface Up.   state: bound
     Te2/2/13   - Interface Up.   state: bound

High Availability: VSL Link Failure

Traffic Generator
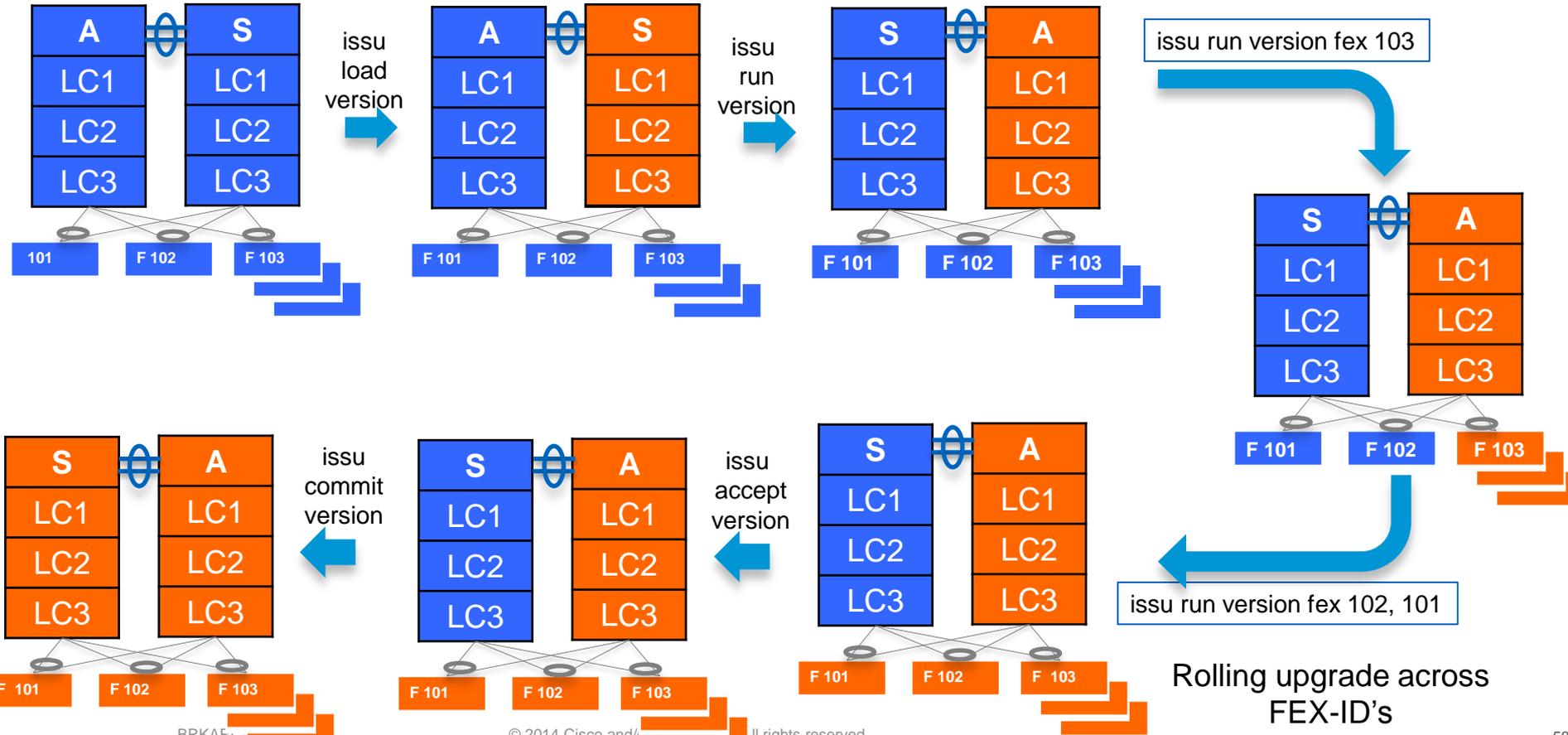
VSL

Fast-hello

VSL

Switch 1: Supervisor 1: Failure

    Host A,B,C,D,E,F - Hitless

    Multicast - Hitless

Switch 2: Supervisor 1: Failure

    Host A,B,C,D,E,F - Hitless

    Multicast - Hitless

Host A

Host B

Host C

Host D

Host E

Host F

Cisco live!
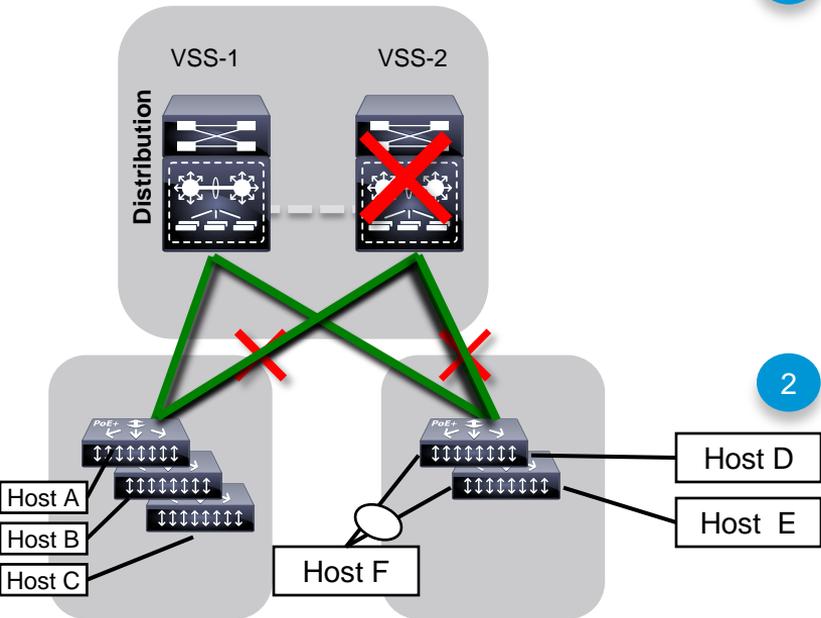
Catalyst Instant Access
EFSU

Rolling upgrade across FEX-ID's

High Availability: Software Upgrade
Upgrade of Distribution and Access

1 VSS-1# issu load version Version 1 → Version 2

```
Te2/2/15  - Interface Down.    state: idle
Te2/2/16  - Interface Down.    state: idle
Te1/2/15  - Interface Up.      state: bound
Te1/2/16  - Interface Up.      state: bound
```

Unicast ~25-50ms
Multicast ~ 300ms

2 VSS-1# issu runversion   [SSO VSS1←→ VSS2]
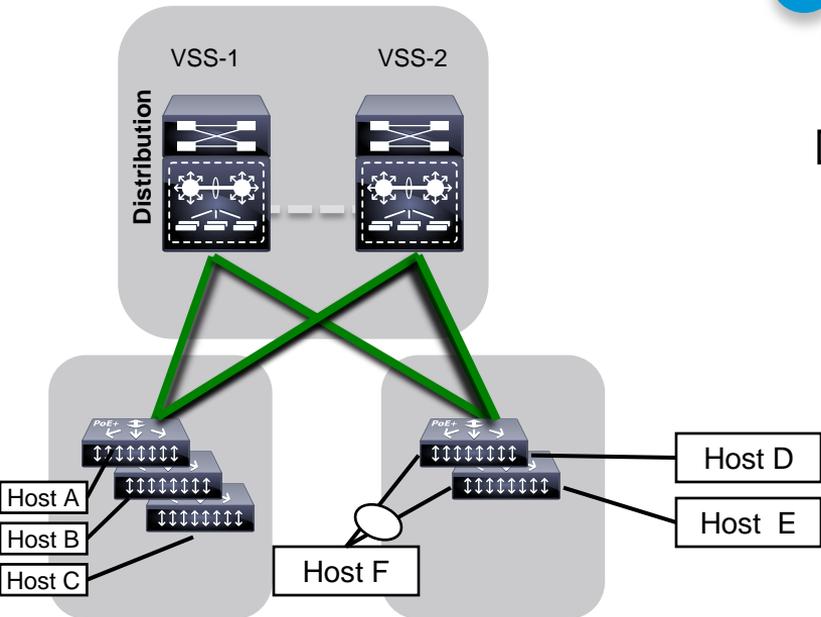
```
Te2/2/15  - Interface Up.      state: bound
Te2/2/16  - Interface Up.      state: bound
Te1/2/15  - Interface Up.      state: bound
Te1/2/16  - Interface Up.      state: bound
```

Unicast ~25-50ms
Multicast ~ 300ms

3 VSS-1# issu runversion fex 106

Cat6500-VSS#issu runversion fex 106

% Successfully initiated 'runversion fex' for Fex IDs: 106.

☑Image download w/ no disruption of traffic (4.5mts)

Te1/2/15	- Interface Up.	state: bound
Te1/2/16	- Interface Up.	state: bound
Te2/2/15	- Interface Up.	state: bound
Te2/2/16	- Interface Up.	state: bound

Unicast: No Loss
Multicast – No Loss

☑C6800IA reload's with new image

Traffic Loss during reboot of C6800IA ~ 5-6 mts

4 VSS-1# issu commitversion

Key Take Aways

- Instant Access is a deployment model with specific benefits
  - Simplified operations
    - Single point of management
    - Image management
    - Configuration management
    - Troubleshooting
  - Eliminates configuration complexity at the access uplink
    - VLAN trunks, VRF-Lite , MPLS and other segmentation protocols
  - Specific hardware and Software requirements
  - Centralised wired and wireless switching designs
  - Instant Access is shipping a d ready to deploy
    - scalability up to 1000 nodes and plans to scale higher up to 2000 nodes and more diverse client switches
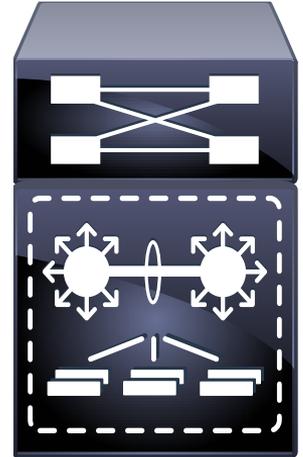
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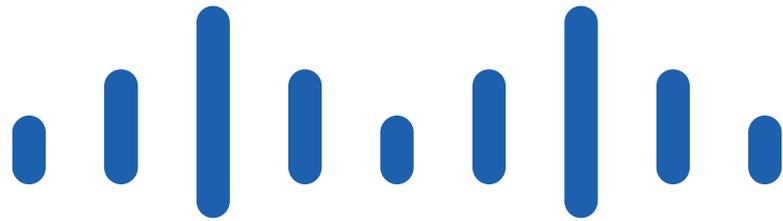
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