



The bridge to possible

# Catalyst 9000 Series Switching Family – Access

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BRKARC-2098

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# Agenda

- Introduction
- Catalyst 9200CX / 9200
- Catalyst 9300X / 9300
- Catalyst 9400X / 9400
- Summary

# Cloud, Mobility, & AI/ML are changing everything

## Industry Trends

### Artificial intelligence



Enable Advanced analytics, predictive maintenance and intelligent automation to proactively detect and resolve issues

### Cloud acceleration



Increasing demand for Cloud management, cloud security, & XaaS due to flexibility, scalability and simplified operations

### Mobility first



WiFi 6/6E/7, private 5G, high performance networks

### Sustainable, Smart buildings



Convergence of IT and OT systems, reduce carbon footprint

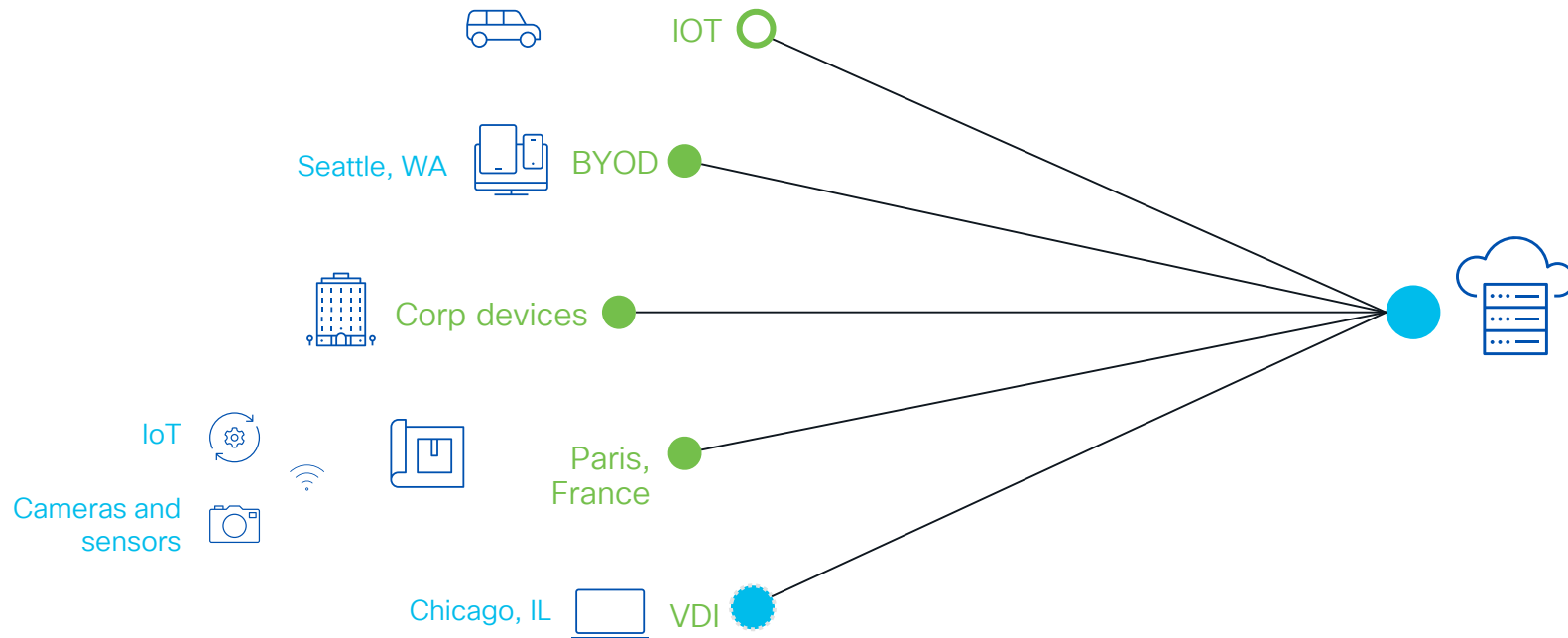
### Secure infrastructure



Digital transformation driving need for secure infrastructure with Zero trust architecture



# The experience you want

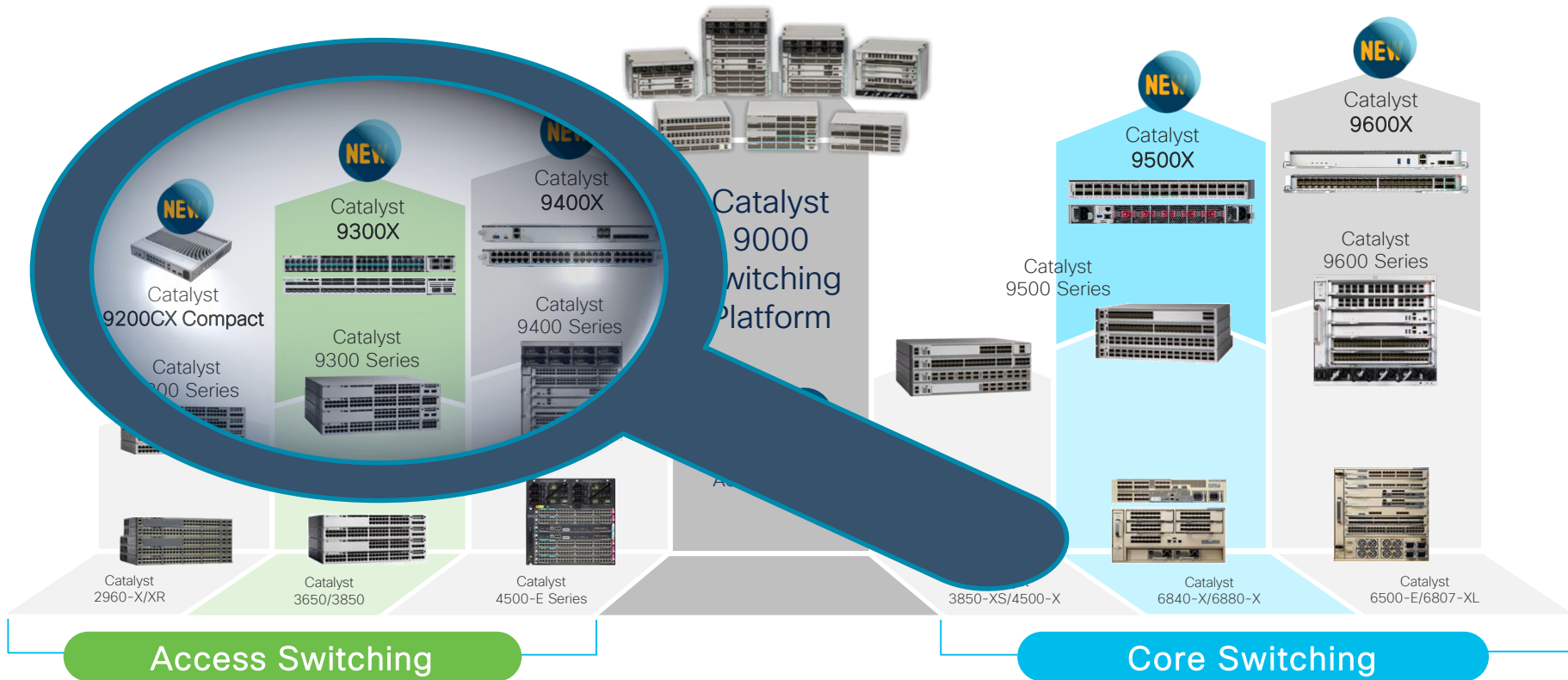


# The reality is ....

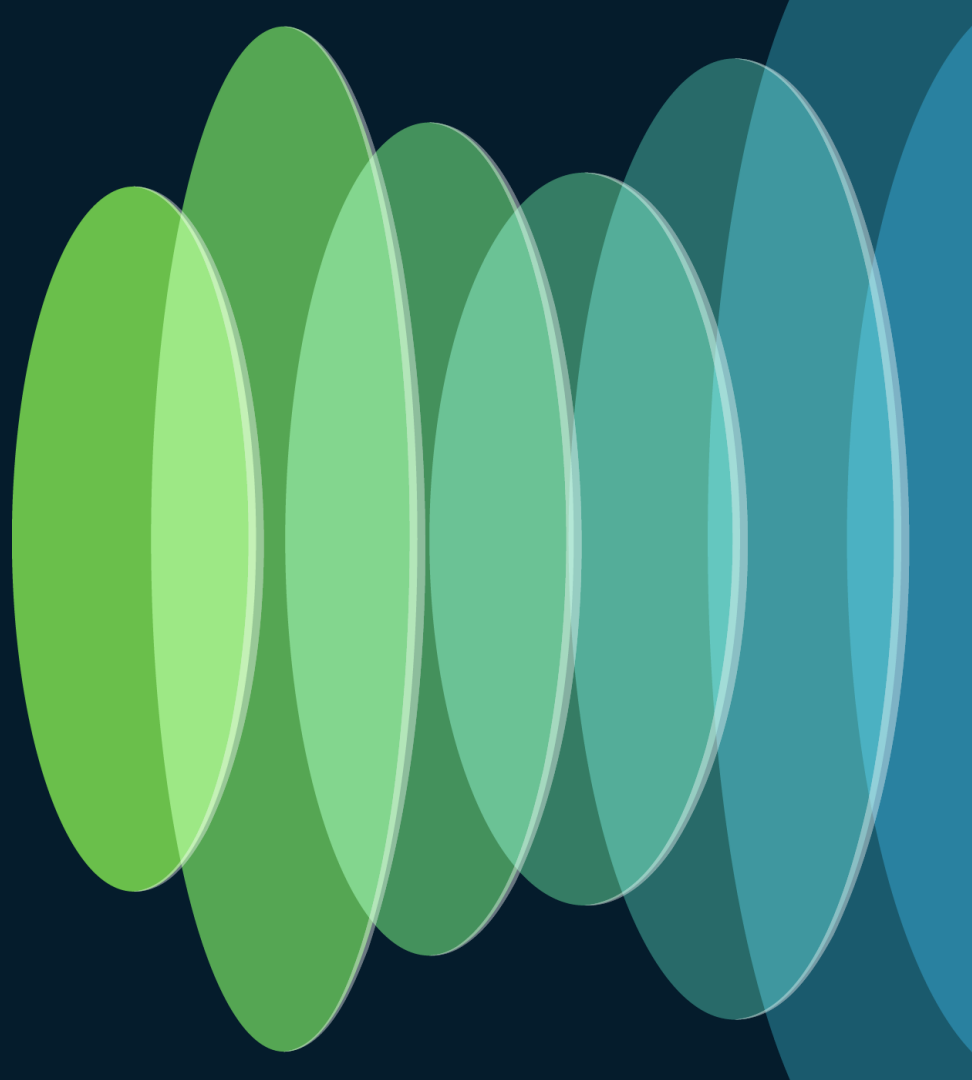


# Cisco Catalyst 9000 Switching Portfolio

Adding the “X factor” to the industry’s leading switching family



# Catalyst 9300



# Cisco Catalyst 9300 Series

## Complete, comprehensive portfolio, now expanding to cloud

### Catalyst 9300 models with modular uplinks

1G copper ports with PoE/Cisco UPOE®/UPOE+

48/24 ports Data 1G    48/24 ports UPOE 1G    48/24 ports PoE+ 1G    48/24 ports UPOE+ 1G

Multigigabit with UPOE

48/24 ports mGig    48/24 ports 1G

Catalyst 9300 Uplinks

4x Multigigabit    4x 1G    8x 1/10G    2x 40G

2x 1/10/25G

### Catalyst 9300X models with modular uplinks

1/10/25G fiber

24/12 ports 1G/10G/25G    24/48 mGig with UPOE+

mGig copper models

48 mGig port Data    48 mGig UPOE+

StackWise and StackPower cables

50CM-1M-3M    30CM-150CM

Catalyst 9300X Uplinks

4x 100/40G\*    2x 100/40G    8x 10G-mGig    8x 25/10/1G

### Platinum-rated power supplies

Common components

315W AC    715W AC/DC    1100W AC    1900W AC

### Modular fans



### External Storage

USB 3.0  
120/240GB

### Catalyst 9300 models with fixed uplinks

1G Copper Data and PoE  
With 4 x1G or 4 x10G fixed uplinks

48/24 ports PoE+/data 1G    Multigigabit models with UPOE  
With 4 x1G or 4 x10G fixed uplinks

48/24 ports PoE+ 1G    Catalyst 9300LM models  
with 4 x 25G Fixed uplinks

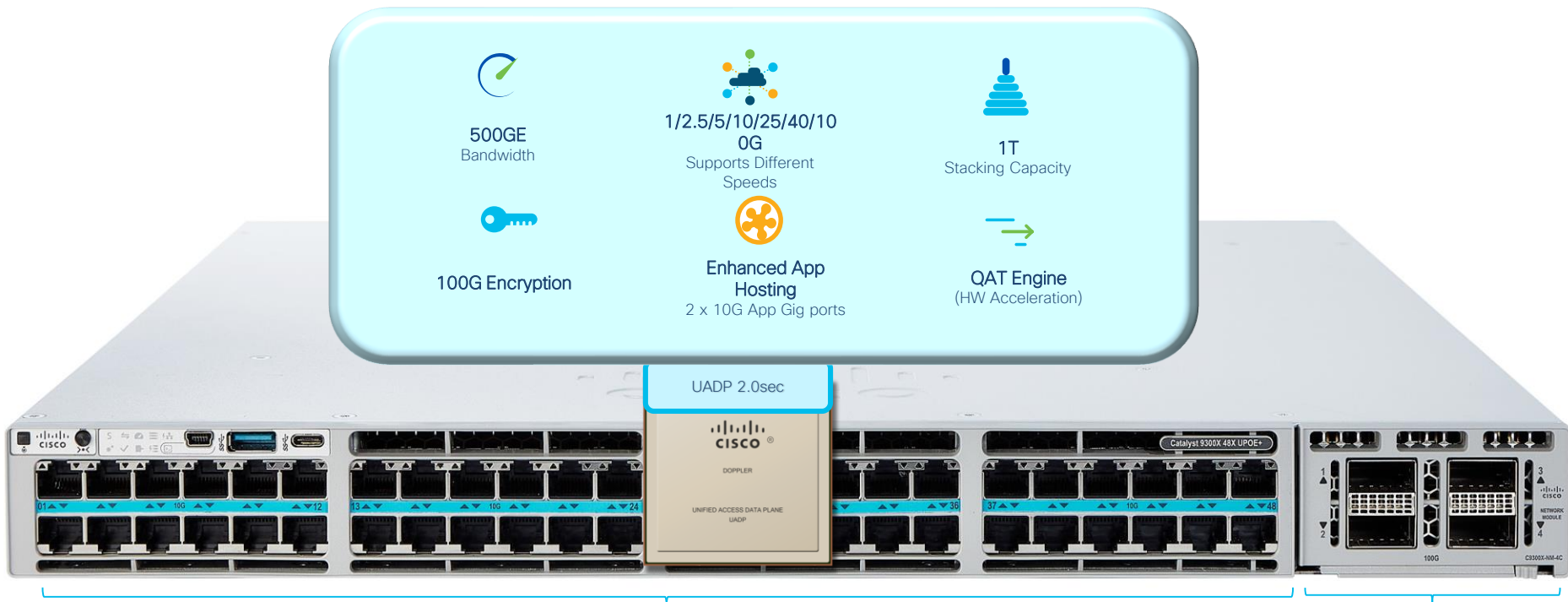
40x 1G + 8 x mGig/10G    24 x 1G UPOE

48 x 1G Data    48 x 1G UPOE

Optional Stack Kit

Stack Adapters    50CM-1M-3M

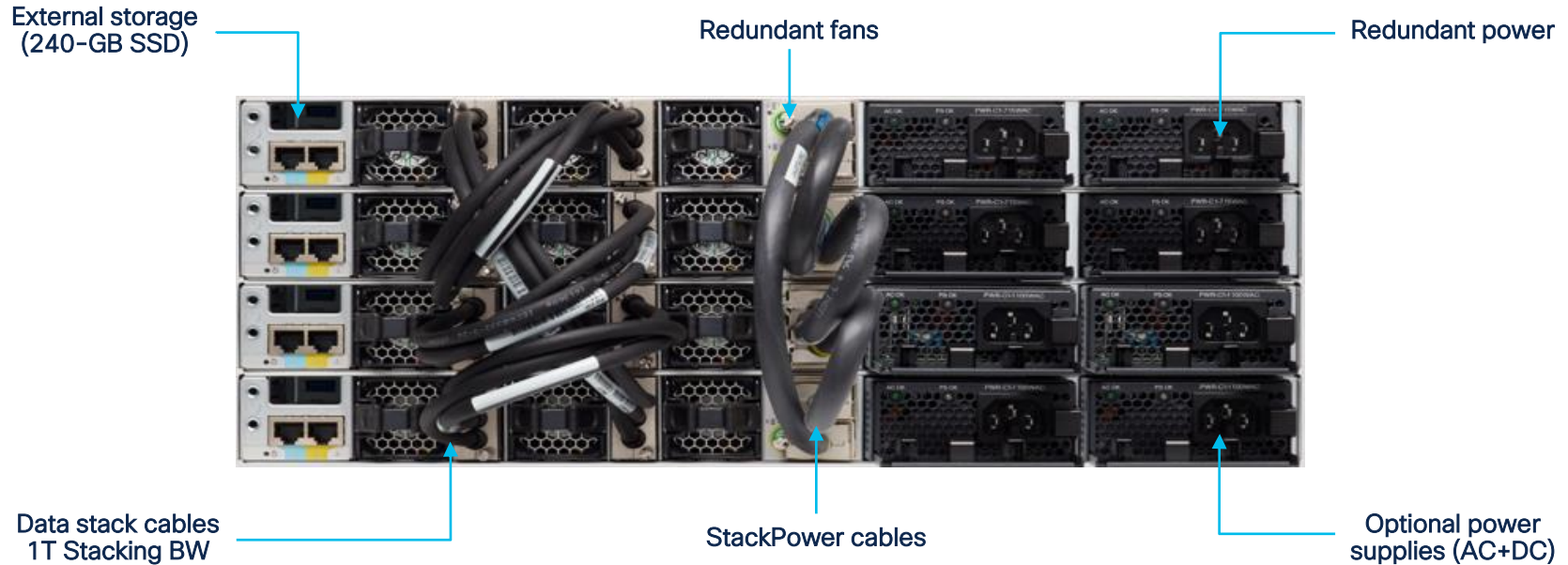
# Catalyst 9300X – New High Performance Access Switch



48 x mGig-10G + 90W UPOE+

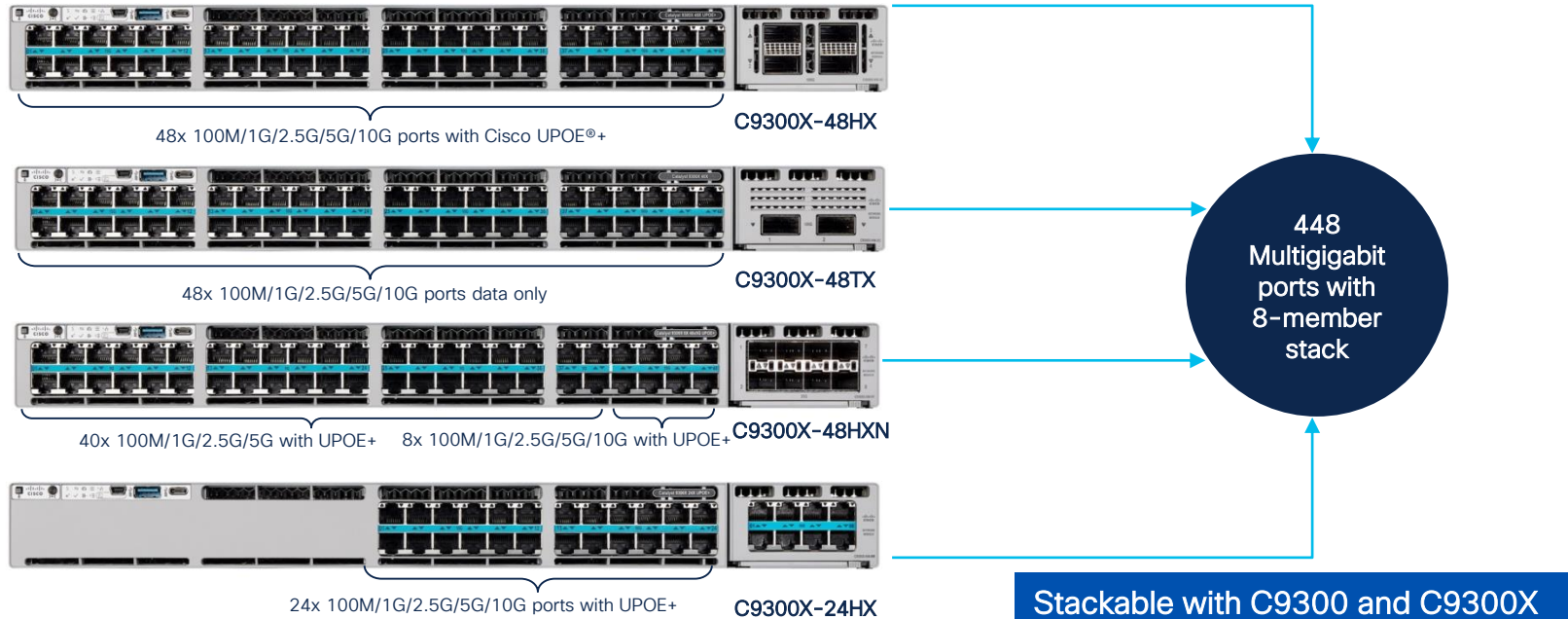
Flexible Uplink Options

# Investment protection with Catalyst 9300X



Common components and stacking backward compatible with Catalyst®  
9300 Series

# Catalyst 9300X Multigigabit models



Highest Multigigabit ports in the industry with Standalone and StackWise®-1T



# What speeds are supported on Multigigabit ports?

Multigigabit PHYs are different from 1-Gbps PHYs

Multigigabit ports are capable of the following speeds:



















- 100 Mbps, 1 Gbps, 2.5 Gbps, 5 Gbps, 10 Gbps
- No 10 Mbps on Multigigabit ports

2.5 Gbps and 5 Gbps are now standard

The non-Multigigabit ports are the same as previous line cards and products; they support 10-Mbps, 100-Mbps, and 1-Gbps speeds

Multigigabit PHYs are same across our Cisco® Catalyst® Multigigabit switch models

Half duplex on Multigigabit ports is not supported

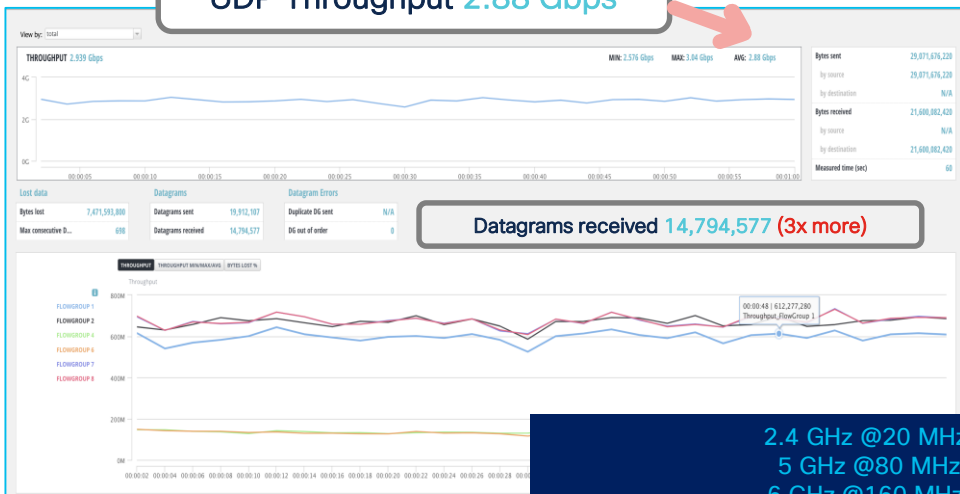
		10 Mbps	
		100 Mbps	
		1 Gbps	
		2.5 Gbps	
		5 Gbps	
		10 Gbps	

# Yes, you will need an mGig Switch

## 5 Gig (mGig) AP Uplink vs. 1 Gig AP Uplink

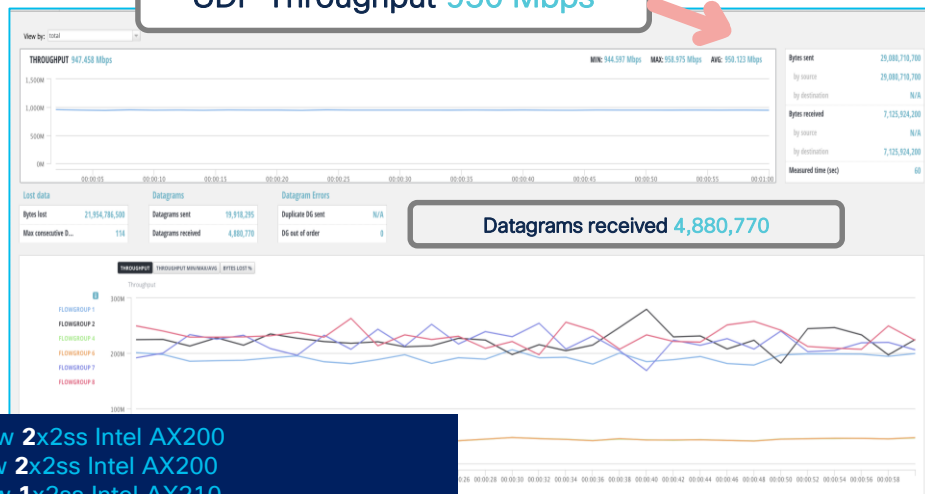
Wi-Fi 6E Performance with **mGig (5 Gig) Switch**

UDP Throughput **2.88 Gbps**



Wi-Fi 6E Performance with **Gigabit Switch**

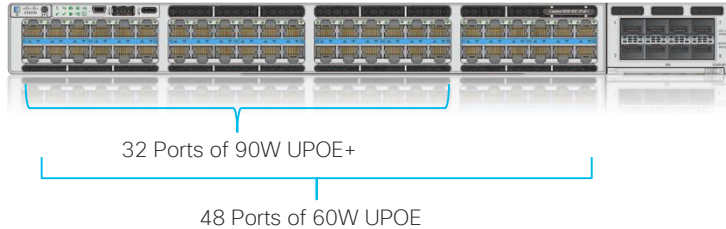
UDP Throughput **950 Mbps**



2.4 GHz @20 MHz w 2x2ss Intel AX200  
5 GHz @80 MHz w 2x2ss Intel AX200  
6 GHz @160 MHz w 1x2ss Intel AX210

# Highest 90W UPOE+ Density in the Industry

## Standalone

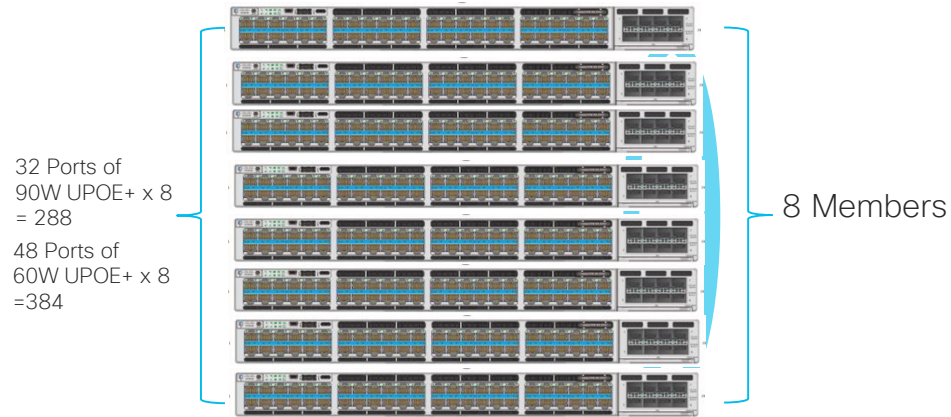


32 Ports of 90W UPOE+

48 Ports of 60W UPOE

32 ports of 90W or 48 ports of 60W  
with 2 x 1900W AC PS/Switch

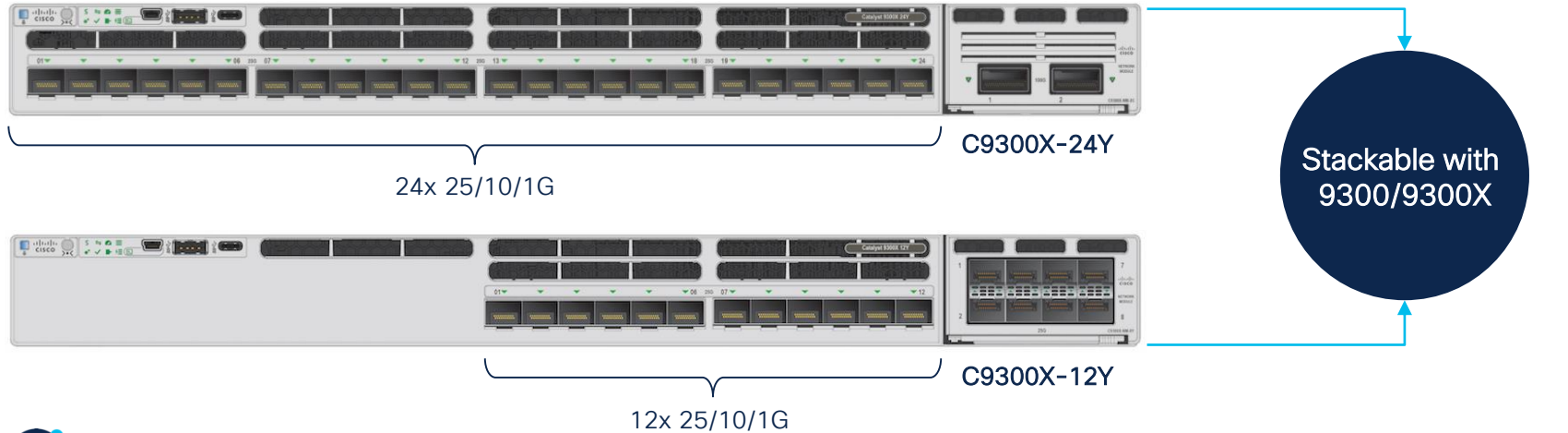
## StackWise



\* With Stackpower, configure 4 x 2 members for getting desired PoE Port Density

256 ports of 90W or 384 Ports of 60W  
with 2 x 1900W AC PS/Switch

# Catalyst 9300X high-speed fiber models



Collapsed access



Fiber To The  
Desktop (FTTD)



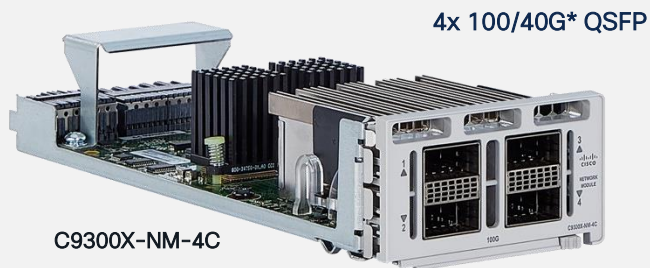
Servers

Bringing stackable high-speed fiber to access

# Highest and Flexible speed uplink options in the industry

## Catalyst 9300X-only modular uplinks

### 100/40G modular uplinks



### 10/25G modular uplinks

8x 25/10/1G\*\*



### Multigigabit uplinks

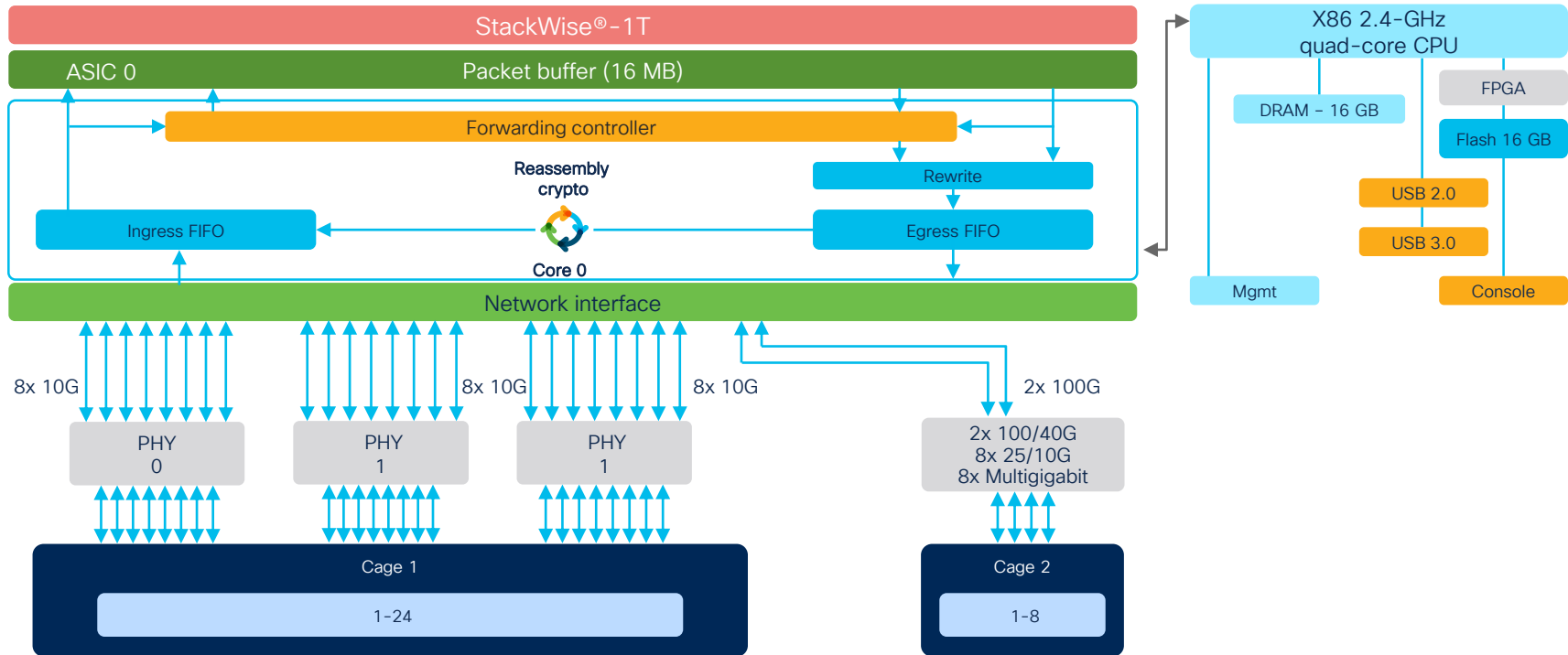
8x 10G-Multigigabit



# Cisco Catalyst 9300X models

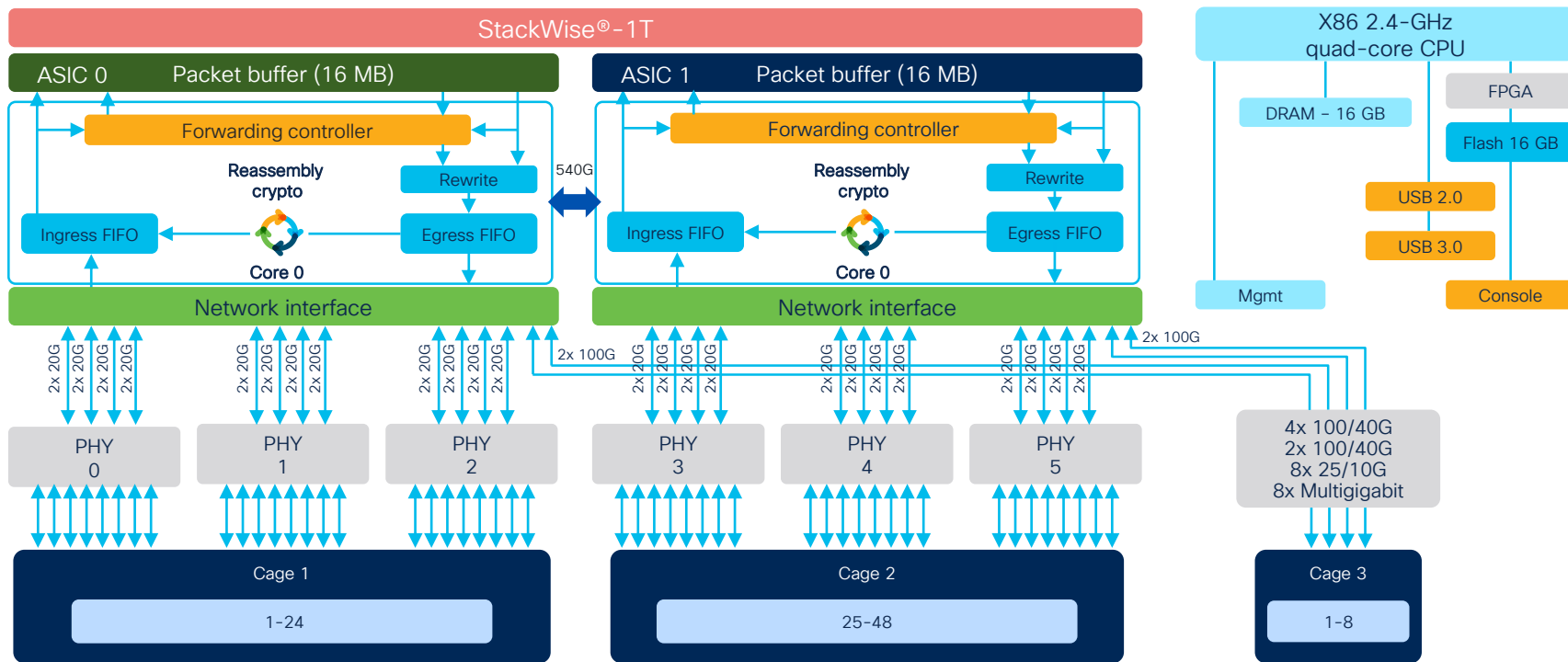
24 port 1/2.5/5/10G copper

C9300X-24HX SKUs



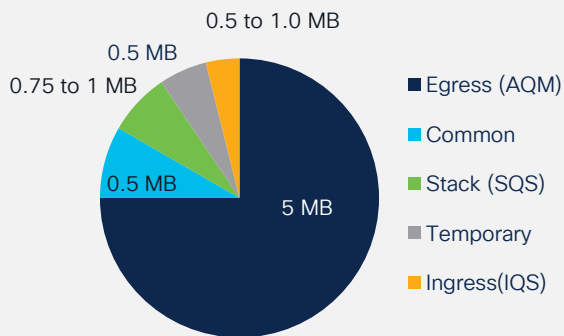
# Cisco Catalyst 9300X models

C9300X-48HX - 48 port 1/2.5/5/10G copper

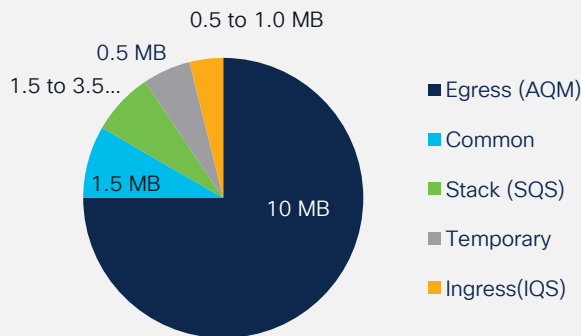


# Cisco Catalyst 9300 – buffer complex composition

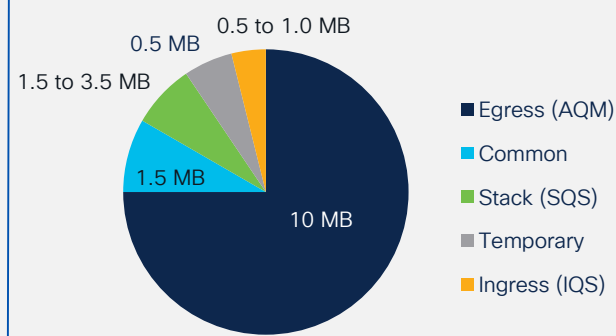
## UADP 2.0



## UADP 2.0 XL



## UADP 2.0sec



### Catalyst 9300/L models

- Total of 16 MB buffer on switch
- 8 MB packet buffer per core is shared by ingress and egress data paths

### Catalyst 9300B models

- Total of 32 MB buffer on switch
- 16 MB packet buffer per core is shared by ingress and egress data paths

### Catalyst 9300X models

- Total of 16 or 32 MB buffer on switch depending on Single or Dual Asic switch
- 16 MB packet buffer is shared by ingress and egress data paths



# Lookup tables

## Forwarding resources

	Cisco Catalyst™ 9300X Series	Cisco Catalyst 9300 Series	Cisco Catalyst 9300B Series
MAC addresses	32,000	32,000	64,000
Host/direct routes	24,000	24,000	48,000
IGMP groups	8,000	8,000	16,000
LPM/indirect routes	15,000	8,000	64,000
Multicast routes	8,000	8,000	16,000
SGTs	8,000	8,000	8000

## Feature resources

	Cisco Catalyst 9300X Series	Cisco Catalyst 9300 Series	Cisco Catalyst 9300B Series
Security ACL entries	8,000	5,000	18000
<ul style="list-style-type: none"> <li>Port ACL (PACL)</li> <li>VLAN ACL (VACL)</li> <li>Router ACL (RACL)</li> </ul>			
QoS ACL entries	4,000	5,000	18000

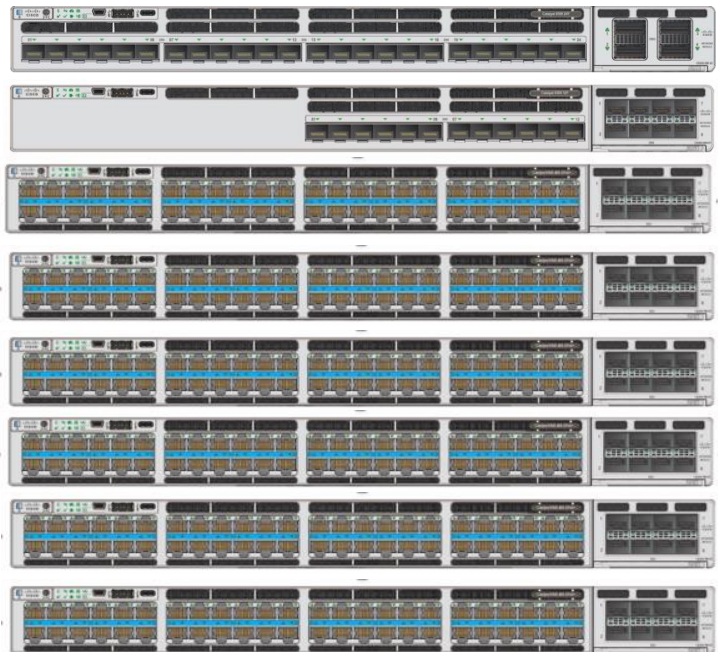
## NetFlow

NetFlow entries: 128,000/64,000/64,000 per UADP 2.0 XL/2.0/2.0sec ASIC

# StackWise- 1 Terabit: Highest in the Industry

## C9300X-Only Stack

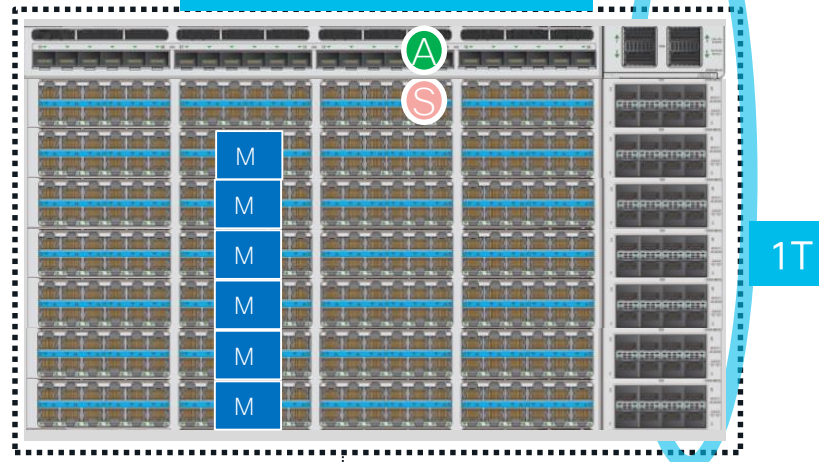
8 Individual Switches



Combined  
→

C9300X

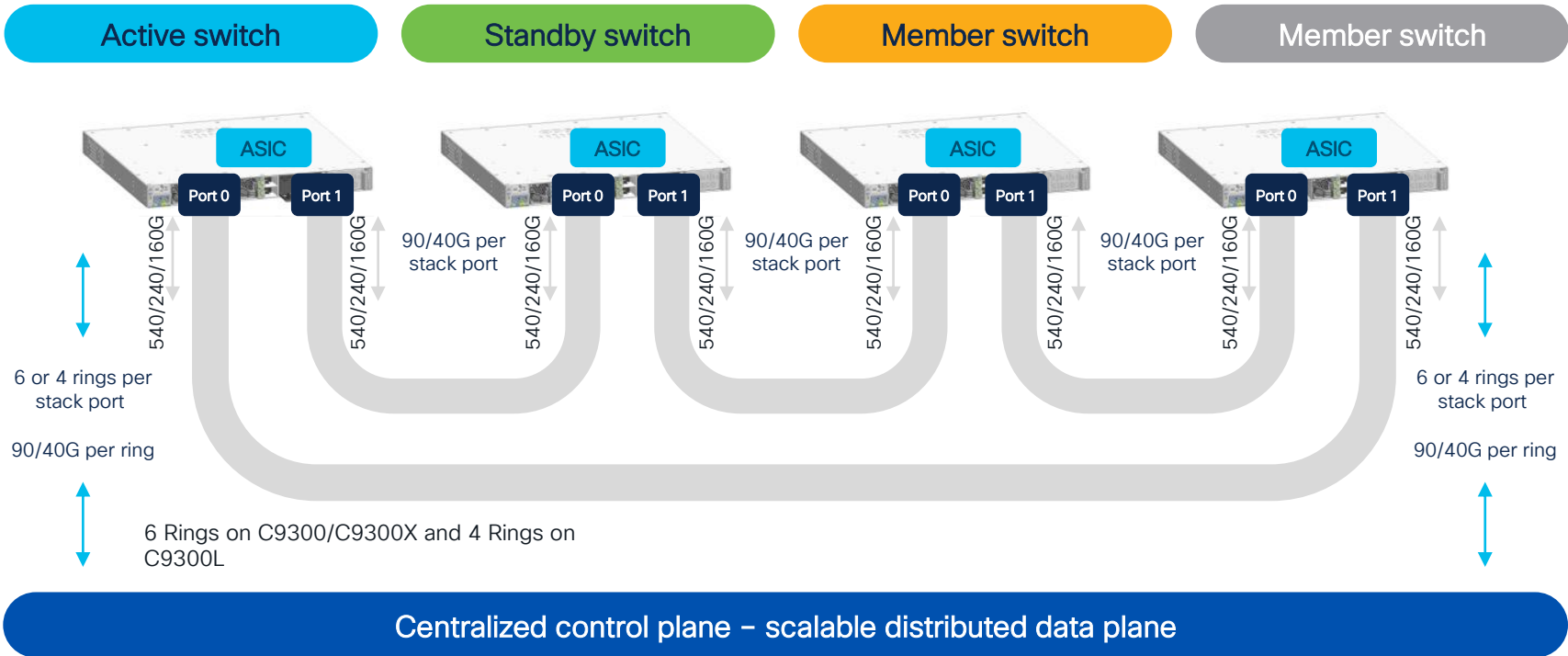
One Logical Switch



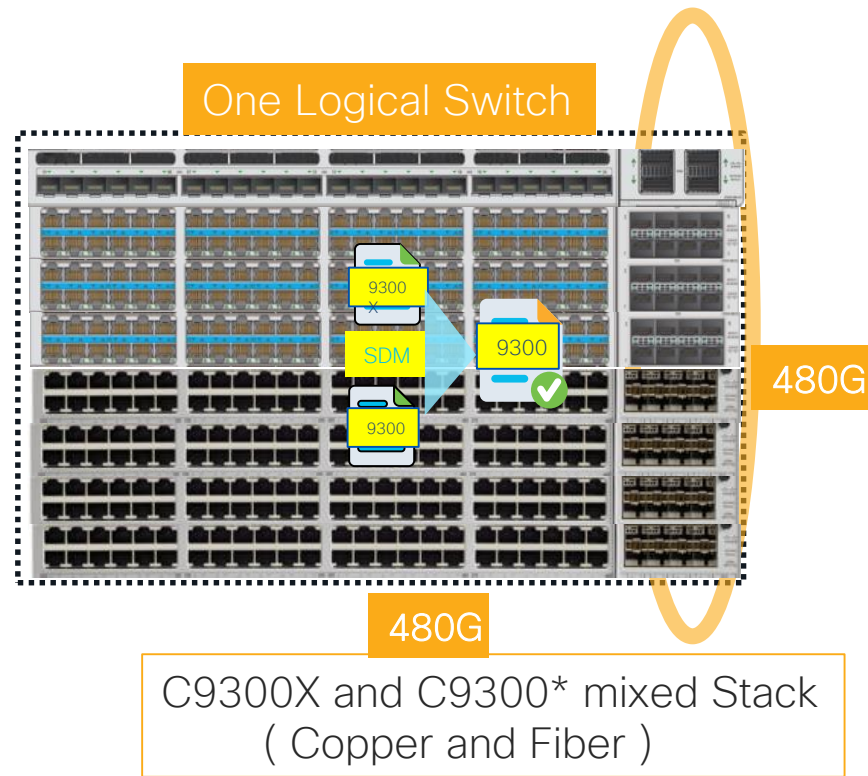
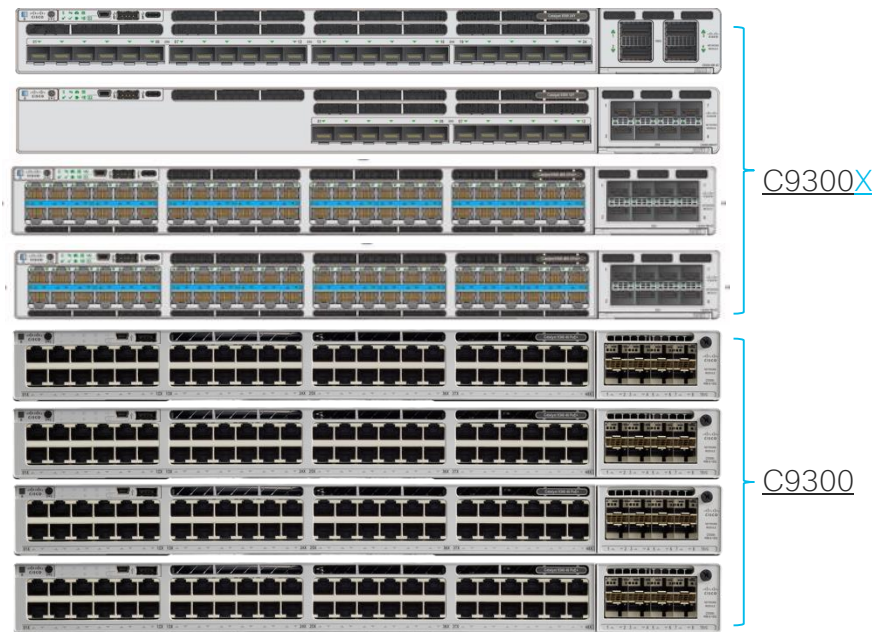
```
Switch#sh switch stack-bandwidth
Switch#  Role    Stack Bandwidth  Current
-----
*1       Active   1000G      Ready
2        Standby 1000G      Ready
3        Member  1000G      Ready
```

# Cisco Catalyst 9300 Series Switches

## StackWise-1T/480/320



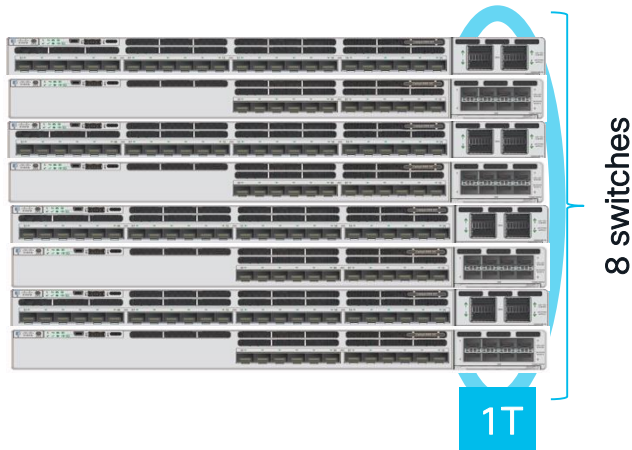
# C9300X and C9300 Stack: Investment Protection



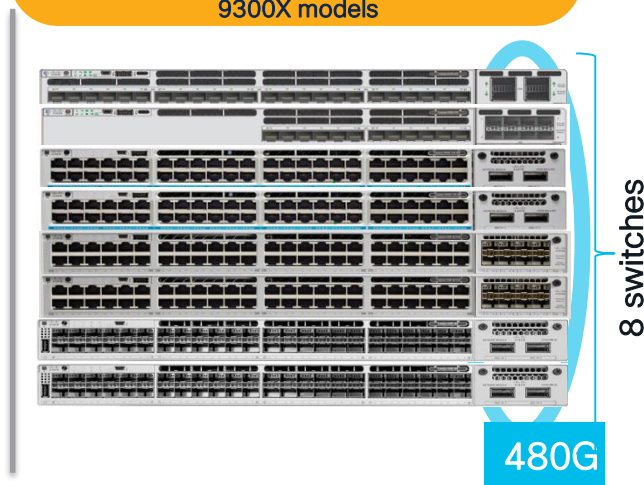
\* C9300 B/L Models is not supported in mixed stack

# Catalyst 9300 Stacking Support

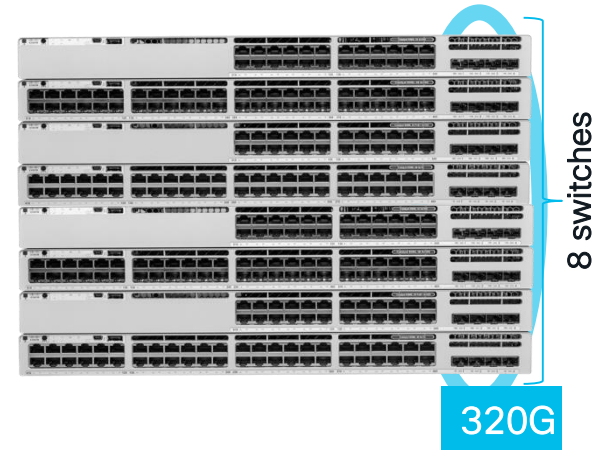
Modular Uplink  
Catalyst 9300X models (10/25G Fiber)



Modular Uplink  
Catalyst 9300 (non -B) and Catalyst 9300X models



Fixed Uplink  
Catalyst 9300L models



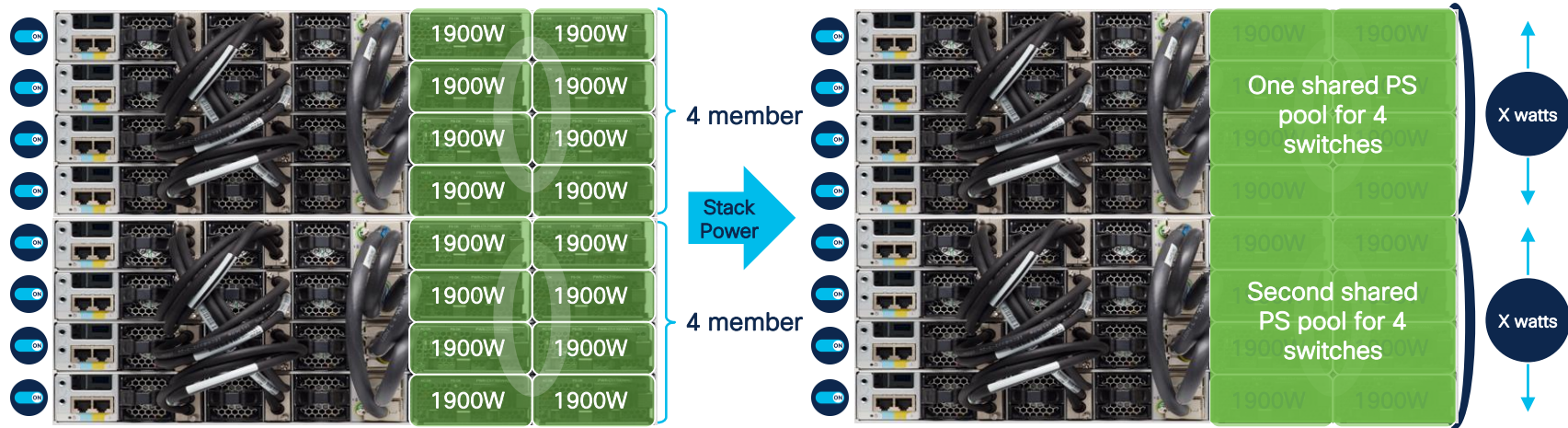
Stacking supported among Catalyst 9300X models and mixed stacking between Catalyst 9300 and Catalyst 9300X models

Stacking supported among Catalyst 9300L models only

Mixed stacking is not supported between Catalyst 9300, 9300X, and 9300L models



# Highly available StackPower



- Pools power from all Power Supplies (PS)
- All switches in StackPower share the available power in the pool
- Each switch is given its minimum power budget

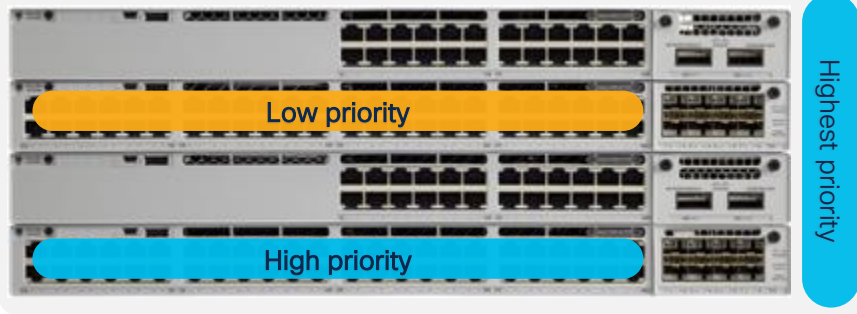
# Power priority

## Load shedding

### Standalone mode



### Stack mode



### Load shedding based on configured priority

1. Low-priority ports
2. High-priority ports
3. Switch priority – Highest priority

```
9300-GIR-Access-144#show stack-power load-shedding switch 1
```

Power Stack Name	Stack Mode	Stack Topolgy	Total Pwr(W)	Rsvd Pwr(W)	Alloc Pwr(W)	Unused Pwr(W)	Num SW	Num PS
Powerstack-1	SP-PS	Stdln	1100	30	240	830	1	1

SW	Power Stack Name	Priority Sw-Hi-Lo	Consumd Sw(W)	Consumd Hi(W)	Consumd Lo(W)	Alloc Hi(W)	Alloc Lo(W)
1	Powerstack-1	4-13-22	153	0	0	0	0

Switch 1 High Priority Active (powered) Ports:

Switch 1 High Priority Inactive (unused) Ports:

Switch 1 Low Priority Active (powered) Ports:

Switch 1 Low Priority Inactive (unused) Ports:

Gi1/0/1, Gi1/0/2, Gi1/0/3, Gi1/0/4, Gi1/0/5, Gi1/0/6, Gi1/0/7, Gi1/0/8, Gi1/0/9, Gi1/0/10, Gi1/0/11, Gi1/0/12, Gi1/0/13, Gi1/0/14, Gi1/0/15, Gi1/0/16, Gi1/0/17, Gi1/0/18, Gi1/0/19, Gi1/0/20, Gi1/0/21, Gi1/0/22, Gi1/0/23, Gi1/0/24,

# Extended Fast Software Upgrade

## Catalyst® 9300/9300X standalone



#Install add file image activate reloadfast commit

Control plane

Data plane

< 30  
seconds of  
traffic  
impact

## Catalyst 9300/9300X stack



#Install add file image activate reloadfast commit

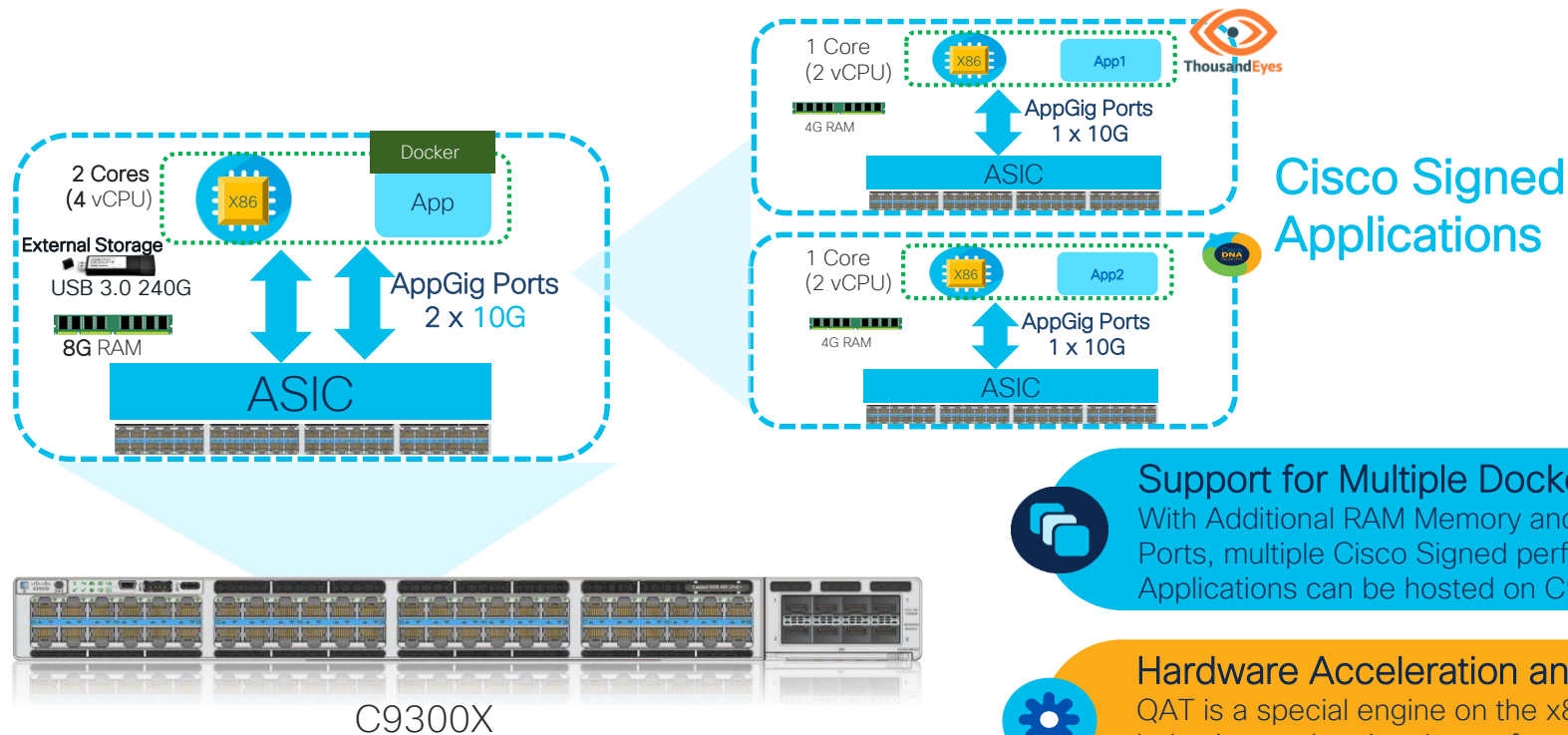
Active control plane

Data plane

< 30 seconds  
of traffic impact  
for all ports in  
the stack



# Enhanced Application Hosting Infrastructure on C9300X



## Support for Multiple Docker applications

With Additional RAM Memory and 2 x AppGigabit Ports, multiple Cisco Signed performance savvy Applications can be hosted on C9300X



## Hardware Acceleration and Security

QAT is a special engine on the x86 CPU which helps in accelerating the performance of Applications

# Cisco ASAc Hosted on Catalyst 9300/L(LM)/X

## Seamless Firewall Service Insertion in the Network

### Use Cases

- ❖ Stateful inspection of traffic flowing across IT/OT domains for security compliance
- ❖ Reduces the attack surface by logically **segmenting** the network
- ❖ Enforce **granular access controls** across the network
- ❖ Connect isolated OT/IoT clusters securely using **IPsec tunnels**
- ❖ **Secure remote management** of internal resources with SSL/TLS VPN
- ❖ Avoid network bottlenecks by replacing the physical firewall appliances



### Technical Specifications

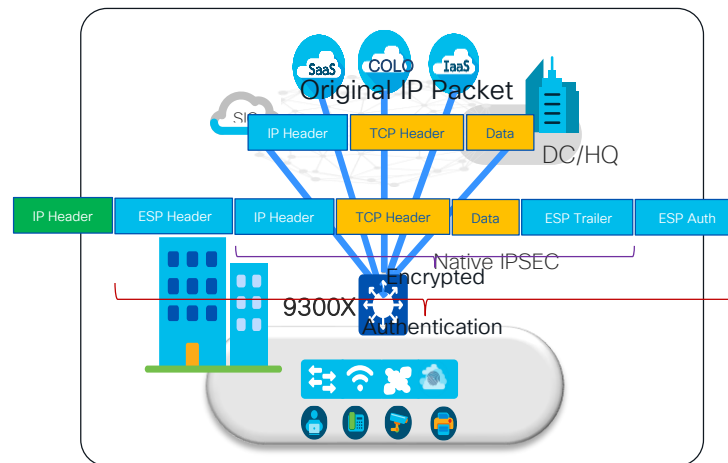
- ★ ASAv Feature parity
- ⚙️ Reuse ASAv license
- Throughput
  - 589 Mbps (450 Byte) C9300
  - 913 Mbps (450 Bytes) C9300X
- 👤 ~8K Max connections per sec
- 📍 10 logical interfaces
- 📍 Routed Mode Firewall
- 🕒 App Hosting HA (Cold)

# Catalyst 9300X – Hardware based IPsec

Software  
IOS-XE 17.6.2  
With DNA-A license  
( HSEC Key for Export Control )



Cisco Catalyst 9300X



Encryption	Authentication
AES-128-CBC	HMAC/SHA1
AES-128/256-GCM	GMAC
Tunnel Mode	
Encapsulation - ESP	
IKEv2	

Static Virtual Tunnel Interface

NAT Traversal

IPv4/IPv6

Multicast Routing

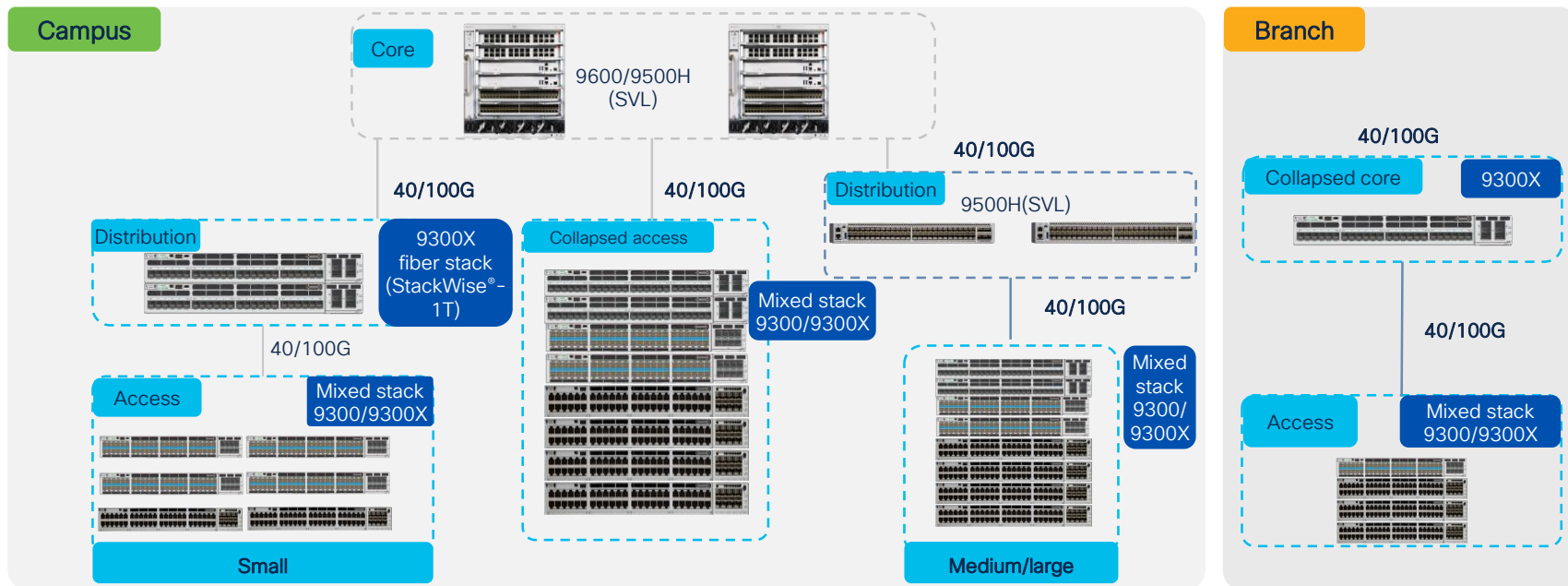
OSPF/BGP

L3 segmentation over IPSEC

PBR + Set Interface

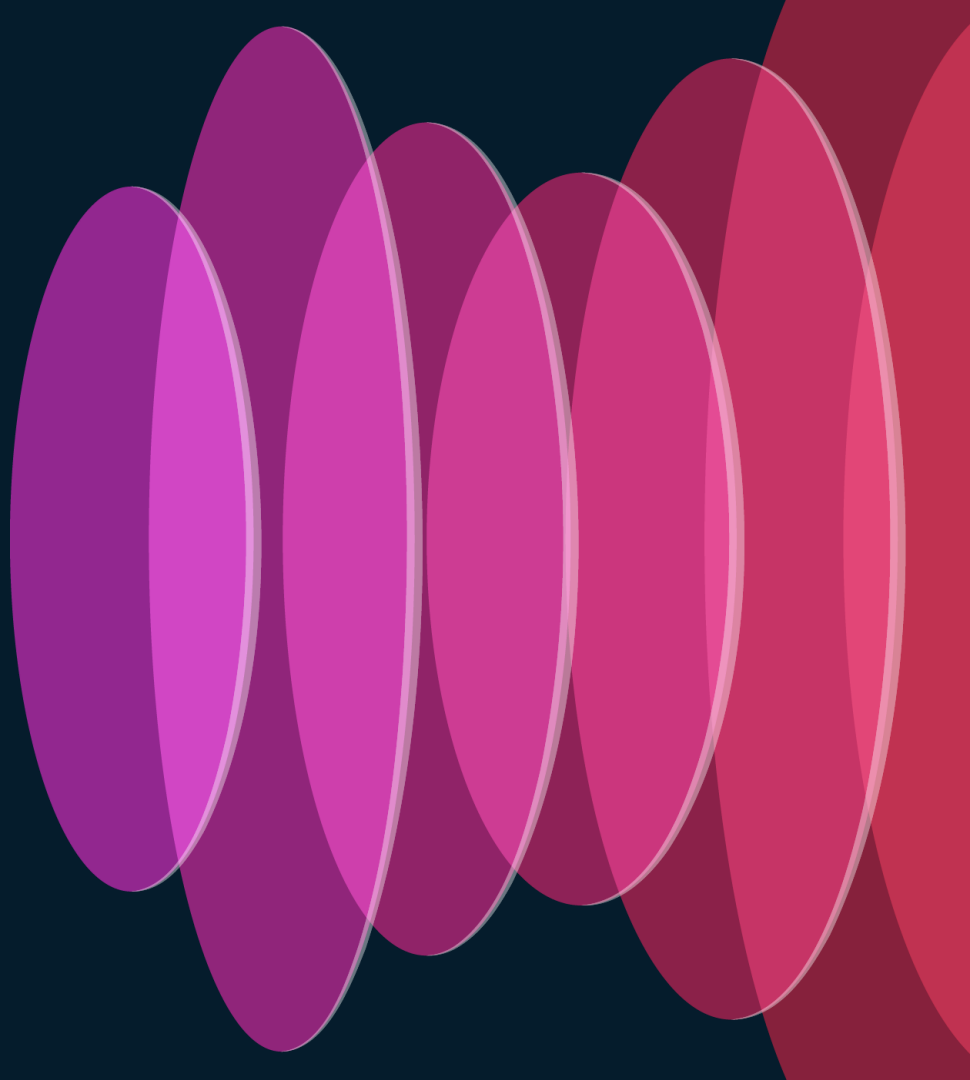
L2 Extension over IPSEC

# Flexible design options with the Catalyst 9300X in 2- or 3-tier architecture



Bringing 10/25/40/100G with StackWise-1 Terabit to access

# Catalyst 9300 Mini Switch



# Introducing 9300LM(mini) Series Switches in C9300L Family

## Fixed Uplink replacement for Catalyst 3650-mini



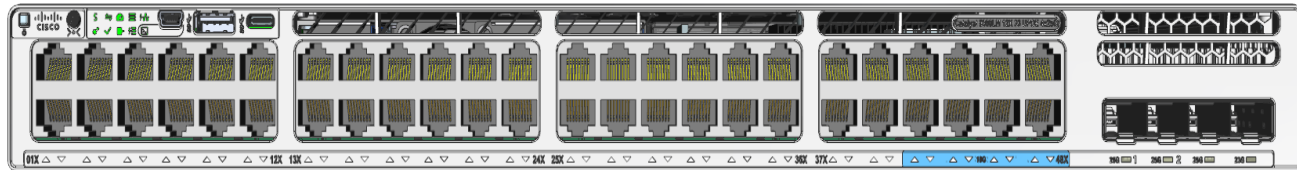
UADP 2.0



X86 CPU



Cisco Open IOS-XE



40 X 1G + 8 x mGig-10G

Fixed 25G Uplinks



**UPOE**  
Next-gen IT/OT  
Workspaces



**Cisco StackWise 320**  
Stackable with  
C9300L



**mGig**  
Wifi 6E deployments



**USB type-A front Panel  
SSD\***  
Application hosting

\*Roadmap

### IBN Innovations



HA, Hot Patching,  
UPOE



MACsec 256,  
ETA



On-box  
App hosting



SD-Access, BGP  
EVPN AVC, FNF



Catalyst C9300L

19.2  
inches



Catalyst C9300LM

12-13.2  
inches

Platform Depth <14 inches		
	AC PSU	DC PSU
UPOE	13.2 in	12.8 in
Data	12.4 in	12.0 in

## Catalyst 9000 Innovations in Shallow depth Form Factor

# Cisco Catalyst 9300LM Series

## Fixed Uplinks ( C9300LM Models )

### Multigigabit model



C9300LM-48UX-4Y 40 x 1 G +8 x 100/1/2.5/5/10G UPOE Ports

4 x10/25G  
Uplinks

### UPOE models



C9300LM-24U-4Y 24 x 1G UPOE Ports

4 x10/25G  
Uplinks

### 1G Data model



C9300LM-48T-4Y 48 x 1G Ports

4 x10/25G  
Uplinks



C9300LM-48U-4Y 48 x 1G UPOE Ports

4 x10/25G  
Uplinks

### Modular Stacking



Stack Adapters



Stack Cables

### Newer Higher-Efficiency C9300LM only Power supplies



600W AC



715W DC



1000W AC



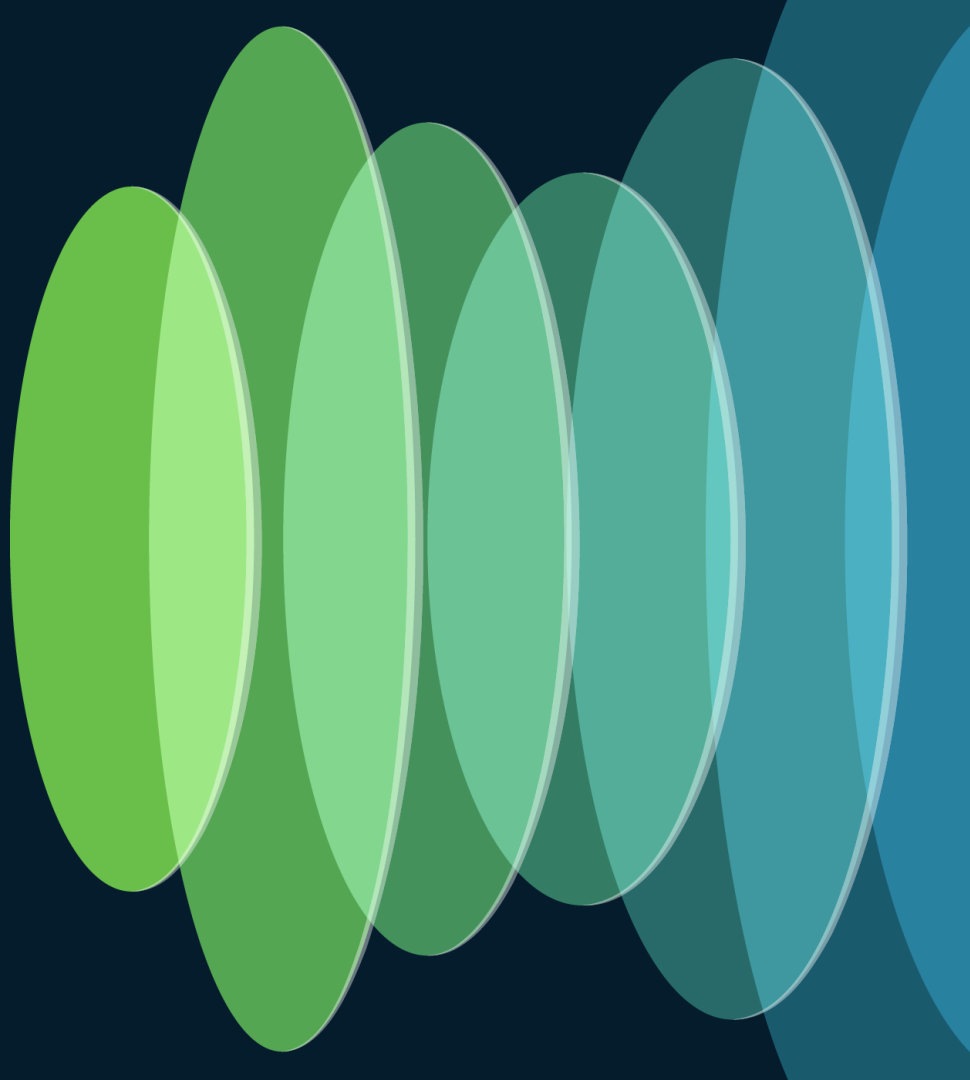
FAN Module

### Modular Fans\*

\* Data SKU utilize Fixed Fan



# Catalyst 9200



# Catalyst 9200 Series



UADP 2.0 Mini



Cisco IOS-XE Lite



6MB  
Packet Buffer



Up to 100GE  
Bandwidth



Cisco  
StackWise  
160/80



Enhanced Security  
MACsec 128



Smart building ready  
Green builds, 802.3bt  
PoE

## Cisco Catalyst 9200 Series highlights

UADP 2.0 mini

Cisco IOS XE Software

Limited-scale SD-Access

MACsec-128 link encryption

Trustworthy solutions

Perpetual/Fast PoE

Programmability

Cold patching

Full Flexible NetFlow  
streaming telemetry

## Right Sized Switching for simple Branch Deployments

# Cisco Catalyst 9200 Series

Lead with Catalyst 9200/L for simple branch deployments

Cisco IOS®  
XE Lite



Multicore  
X86 CPU



UADP 2.0  
Mini



## Fixed Uplinks



C9200L-48T/ C9200L-48P/ C9200L-48PL



C9200L-24P/ C9200L-24T

**POE+ & mGig models**



C9200L-48PXG-4X/2Y



C9200L-24PXG-4X/2Y

## Modular Uplinks

*Recommended for small scale SDA deployments*



C9200-48T/ C9200-48P/ C9200-48PL  
C9200-48PB <sup>2</sup>



C9200-24T/ C9200-24P  
C9200-24PB <sup>2</sup>

**POE+ & mGig models**



C9200-48PXG



C9200-24PXG

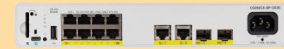
## Compact Switches



C9200CX-8UXG-2X



C9200CX-12P-2X2G



C9200CX-8P-2X2G



C9200CX-12T-2X2G

Modular  
fans

FRU Fan



Higher Efficiency AC FRU Power Supplies

FRU PSU

Silver  
Rated



125WAC

Platinum  
Rated



600WAC

Platinum  
Rated



1000WAC

Platinum  
Rated



715WDC <sup>4</sup>

Modular Uplinks

FRU Uplinks <sup>1</sup>



4x 1G



4x 10G



2x 25G



2x 40G

## Catalyst 9200 Family Highlights

SD-Access

Programmability

MACsec-128 <sup>3</sup>

Cold Patching

Trustworthy  
Solutions

Full Flexible NetFlow

Perpetual/Fast PoE

Cloud Monitoring

NEW

<sup>1</sup> C9200 1G SKUs support 1/10G uplinks while C9200 mGig will support 10/25/40G uplinks

<sup>3</sup> 9200CX Supports MACsec-256

<sup>2</sup> C9200 32 VN SKUs only support 1/10G uplinks and these SKUs cannot be stacked with other C9200 SKUs

# Lookup tables

## Forwarding Resources

	9200	9200L
MAC	32k	16k
Host Route	10k	8k
IGMP Groups	1k	1k
Indirect Route	4k	3k
Multicast Route	1k	1k
SGT	2k	2k

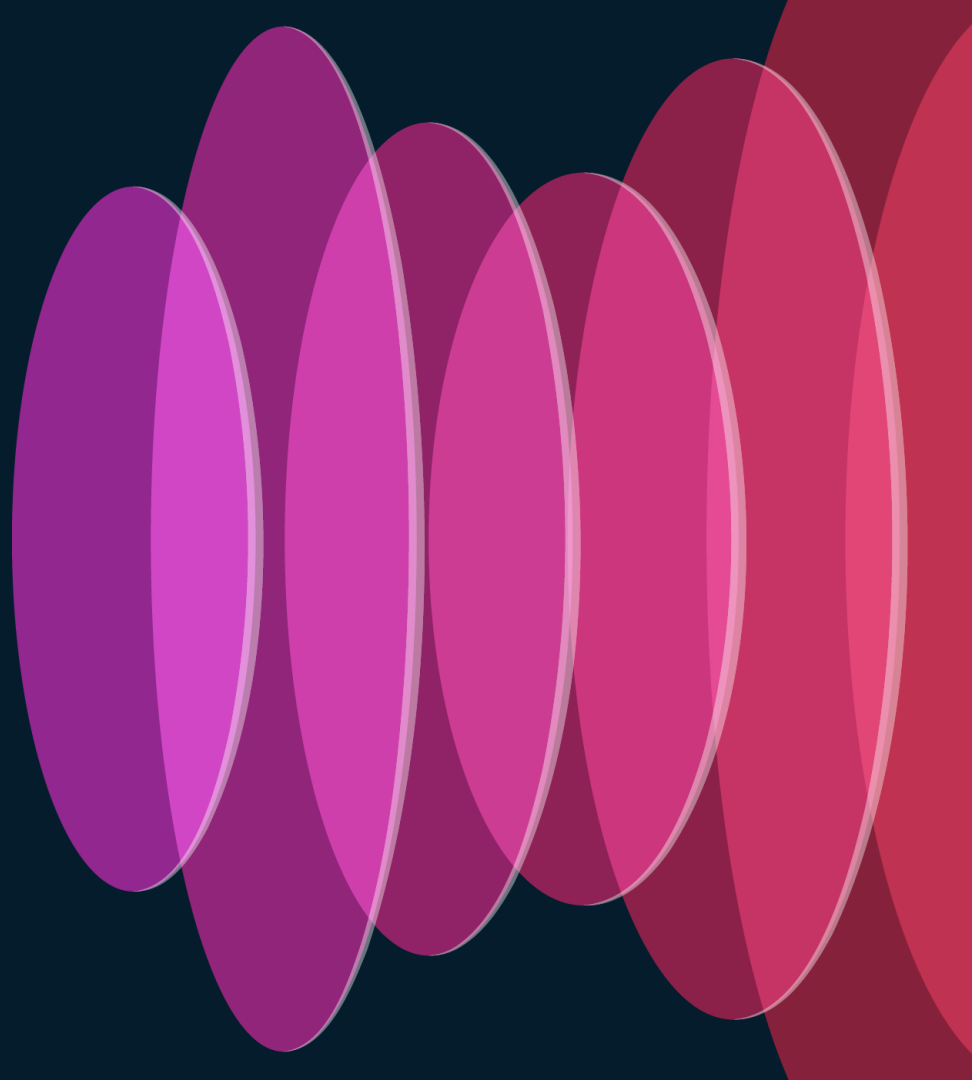
## Feature Resources

	9200	9200L
Security ACL <ul style="list-style-type: none"><li>• PACL</li><li>• VACL</li><li>• RACL</li></ul>	1k	1k
QoS ACL	1k	1k
Netflow ACEs	128	128

Netflow

Netflow Entries: 16k per ASIC

# Catalyst 9000 Compact Switch



# The New Catalyst 9200CX Series Switches

## Next Generation of Compact Catalyst Switches

Powered by  
Cisco IOS-XE Lite

SD-Access

MACsec-256

Programmability

Full Flexible NetFlow

Trustworthy solutions

Cold patching

Perpetual/Fast PoE

Bonjour Service Peering



UADP 2.0 Mini



Cisco IOS-XE Lite



6MB  
Packet Buffer



Up to 60GE  
Bandwidth



Enhanced Security  
MACsec 256



Smart building ready  
Green builds, 802.3bt  
PoE

Flexible Deployment Option



Architecture options  
Fabric or Traditional 2-Tier



Flexible powering  
Traditional Outlet, UPOE+



Deployment flexibility  
Any space, mount or enclosure



Fiber to the edge  
Shorter copper runs



Small branches  
Zero touch provisioning

Catalyst 9000 Feature Richness Packed in a Compact Form Factor

# Catalyst 9200CX Compact Family AC Power Supply Units

## 12 and 8 Port PoE+ Models

### C9200CX-12P-2X2G



- 12 x 1G PoE+
- 2 x 1G copper and 2 x SFP+ uplinks
- Internal AC power supply
- 240W PoE power budget

### C9200CX-8P-2X2G



- 8 x 1G PoE+
- 2 x 1G copper and 2 x SFP+ uplinks
- Internal AC power supply
- 240W PoE power budget

## 12 Port Data-Only Model

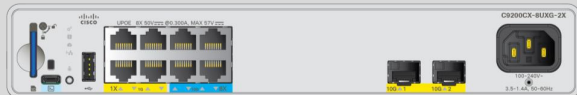
### C9200CX-12T-2X2G



- 12 x 1G data
- 3 x 1G copper and 2 x SFP+ uplinks
- Fully Powered by 802.3bt Class 6 60W Uplink
- OR External 80W Power Supply

## mGig/UPOE Model

### C9200CX-8UXG-2X



- 4x mGig/10G + 4x 1G
- 8x 802.3bt Type 3 Class 6 60W (all ports)
- 2x 1/10G SFP+
- Internal AC power supply
- 240W PoE power budget

## Wi-Fi 6/6E with Catalyst 9100 Series APs

AP	PoE power consumption	Link speed	Link Layer Discovery Protocol (LLDP)
C9136I	802.3bt (UPOE)	5G	47.3W
C9162I	802.3bt (UPOE)	2.5G	25.5W
C9164I	802.3bt (UPOE)	2.5G	30W
C9166	802.3bt (UPOE)	5G	30.5W

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Cold patching

Perpetual/Fast PoE

Bonjour Service Peering

UADP 2.0  
Mini

Multicore  
X86 CPU

Cisco IOS®  
XE Lite





# Catalyst 9200CX Compact Family

## HVDC Power Supply Units

NEW

HVDC 1G/PoE+

Orderable

### C9200CX-8P-2X2GH



- 8 x 1G PoE+
- 2 x 1G copper and 2 x SFP+ uplinks
- Internal HVDC power supply
- 240W PoE power budget

### C9200CX-12P-2X2GH



- 12 x 1G PoE+
- 2 x 1G copper and 2 x SFP+ uplinks
- Internal HVDC power supply
- 240W PoE power budget

NEW

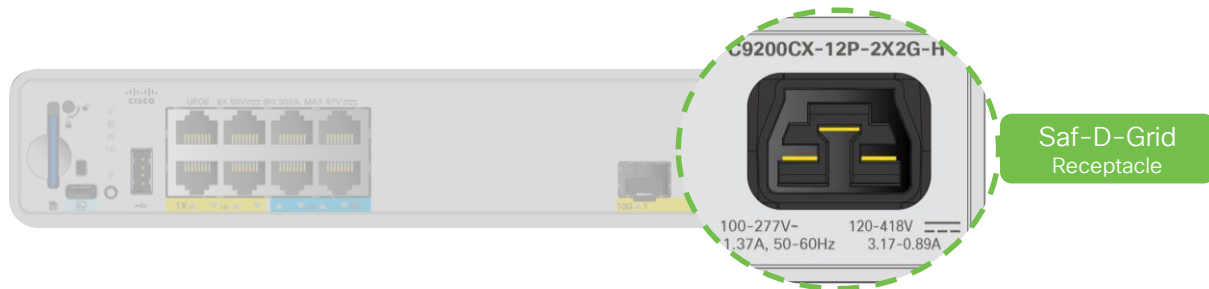
HVDC mGig/UPOE

Q3  
CY23

### C9200CX-8UXG-2XH



- 4x mGig/10G + 4 x 1G (802.3bt Type 3 Class 6 60W all ports)
- 2x 1/10G SFP+
- Internal HVDC power supply
- 240W PoE power budget



Saf-D-Grid  
Receptacle

Powered  
by AC or  
hVDC

### Powering Options

AC (110-240VAC)

Plenum Voltage (277VAC)<sup>1</sup>

HVDC (120V-418VDC), 380VDC<sup>2</sup>

### Cabling Options<sup>3</sup>

Ring terminal to SAF-D-GRID

C14 to SAF-D-GRID

C20 to SAF-D-GRID



Investment protection  
with MAX flexibility!

<sup>1</sup> Need a plenum rated enclosure

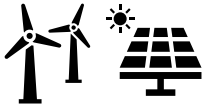
<sup>2</sup> 380VDC, commonly used in DC micro grids and Class 4 deployments

<sup>3</sup> Cables not provided with switch

# Why High Voltage DC?



## Benefits



### Avoids double conversion. From DC → AC, then AC → DC:

- Production of Wind/Solar power is in DC
- Electrical devices with transistors use DC power



### Higher voltage helps reduce conductor material (less copper) or improve transition efficiency:

- Controllability
- Better voltage regulation

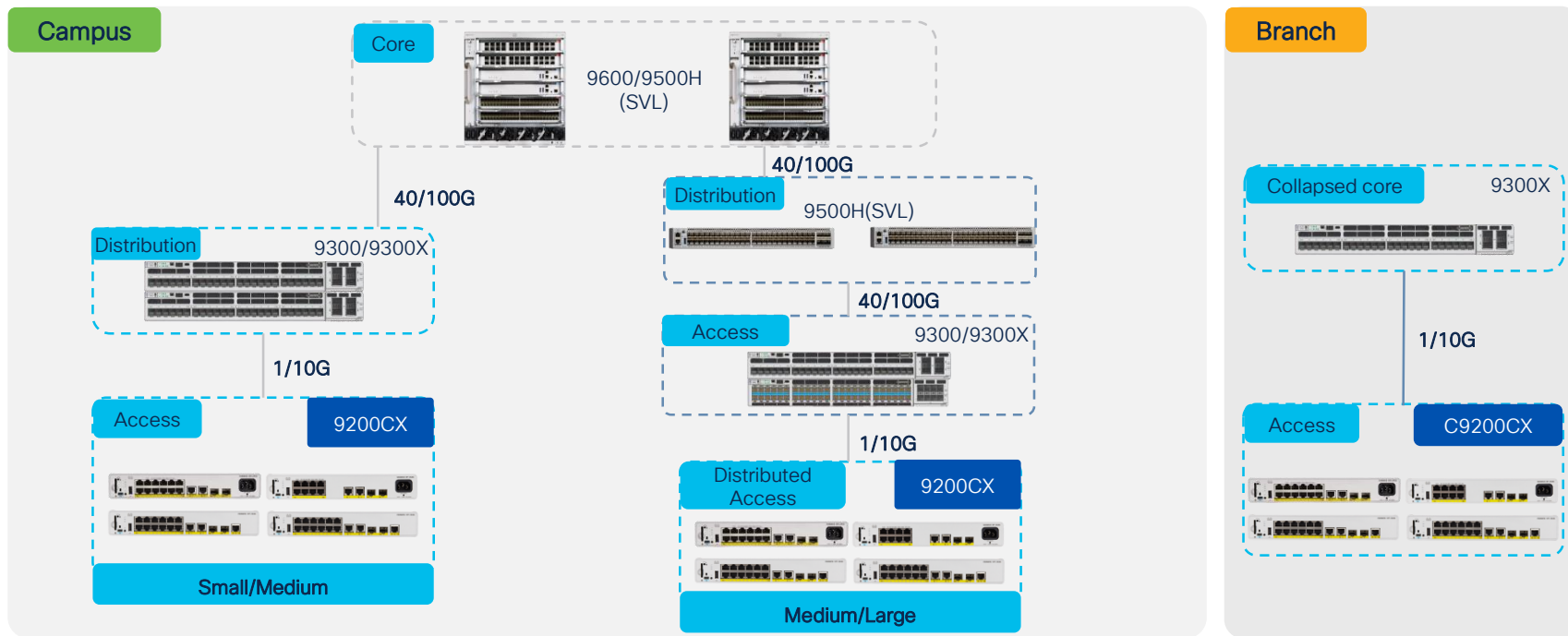


### Considerably lower power losses compared to 120VAC when transporting over long distances:

- Offshore power needs/Undersea power lines
- Power transmission for longer distances

# Flexible Design Options with the Catalyst 9200CX

## 3 or 4-tier Architecture



Bringing Flexible and Compact Access Switching to the Enterprise Campus

# Catalyst 9200CX – Next Generation Compact Switches



	Catalyst® 3560CX models		Catalyst® 9200CX models
Market-Leading Encryption	AES 128-Bit MACsec	+	AES 256-Bit MACsec
Network Visibility	Limited Flexible NetFlow	+	Full Flexible NetFlow
SD Bonjour Services	Not Available	+	Bonjour Service Peering
Programmability	Basic Scripting with Python	+	YANG Models (RESTCONF, NETCONF, gNMI), ZTP
Application Visibility	Smart Logging, Limited Flexible Net Flow, and AVC	+	Streaming Telemetry (NETCONF Dial-In and gRPC Dial-Out) SD-AVC w/ NBAR2
SDA Fabric	SDA Extended Node Capability	+	SDA Edge Node Capability (16VNs)



IBN innovations



Assurance w/ Cisco DNAC



Wired assurance,  
SD-Access, AVC, FNF



ETA,  
MACsec-256

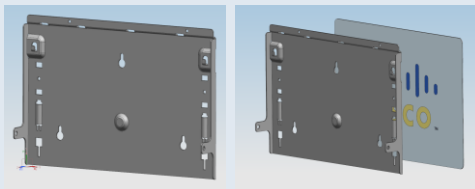


Cisco  
TrustSec

cisco *Live!*

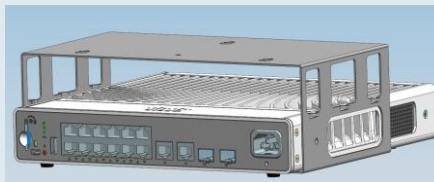
# Catalyst 9200CX Mounting Options

## Wall Mount



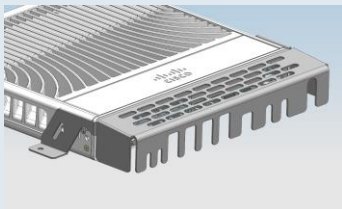
- With mounting tray and screws
- With mounting tray and magnet (in case of metal wall)

## Table-Top/Bottom/Shelf Mount



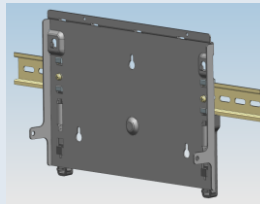
- With mounting tray and screws
- With mounting tray with magnet (in case of metal desk or shelf)

## Rack Mount



- With mounting screws

## Din Rail Mount



- With a mounting tray and rail mount

Flexible mounting options for all mounting use-cases

# Catalyst 9200CX Scale Enhancements

## Forwarding Resources

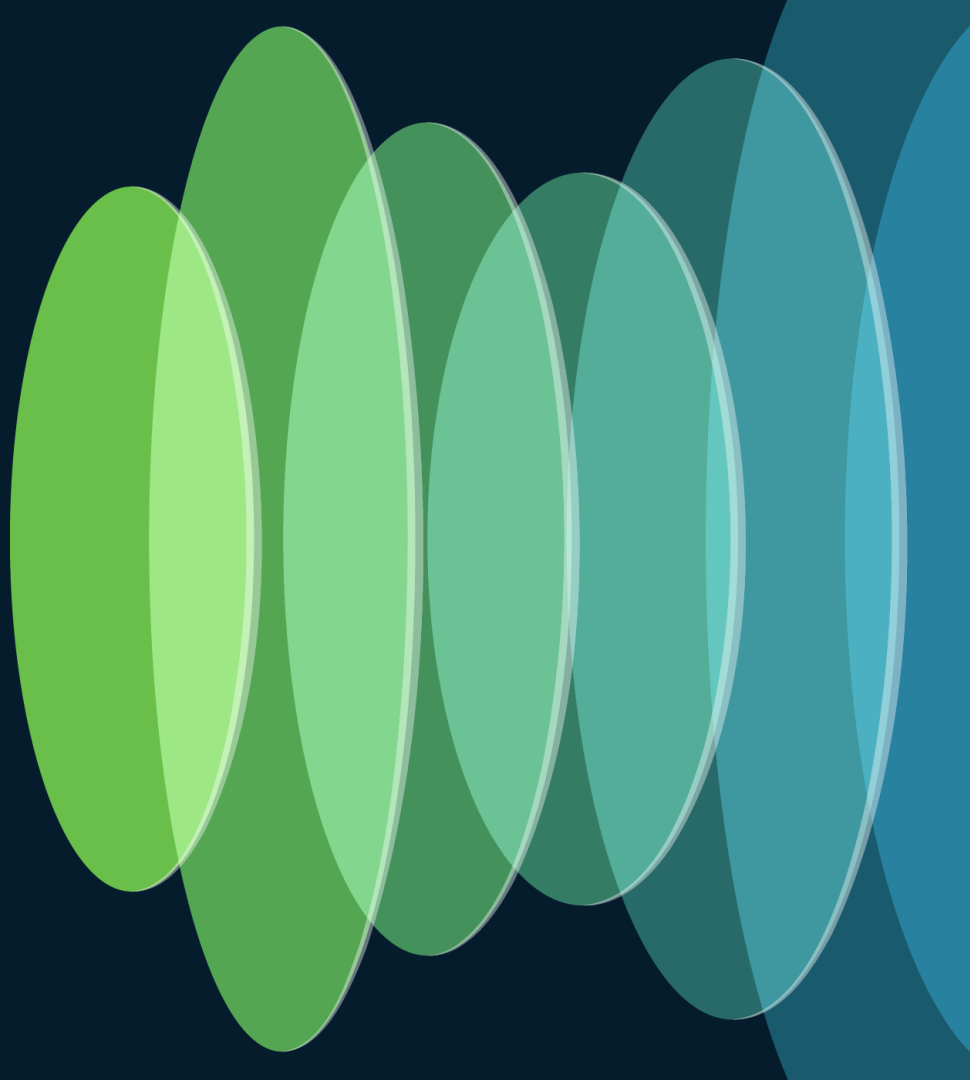
	C9200/CX	C3560CX
MAC	32k	16k
Host Route	10k	4k
IGMP Groups	1k	1k
Indirect Route	4k	1k
Multicast Route	1k	1k
SGT	2k	2k

## Feature Resources

	C9200/CX	C3560CX
Security ACL <ul style="list-style-type: none"><li>• PACL</li><li>• VACL</li><li>• RACL</li></ul>	1k	375
QoS ACL	1k	375
Netflow Entries	16k	8k

Higher Scale in the Same Form Factor

# Catalyst 9400X/9400





# Cisco Catalyst 9400 Series

Industry Leading Modular Access



IEEE 802.3bt  
90W PoE  
compliant

4-slot



Redundancy  
is now  
table stakes

7-slot



480G BW  
per slot with  
Sup2XL

10-slot

## Supervisors

- Sup-1: Access
- Sup-1XL: Access
- SUP-1XL-Y: Access
- SUP-2: Access/Distribution
- SUP-2XL: Access/Distribution

## Copper Line Cards

- 48x 10G mGig UPOE+
- 48x 5G mGig UPOE+
- 24x mGig + 24x UPOE
- 48x 10/100/1000 UPOE+
- 48x 10/100/1000 UPOE
- 48x 10/100/1000 POE+
- 48x 10/100/1000 Data

## Fiber Line Cards

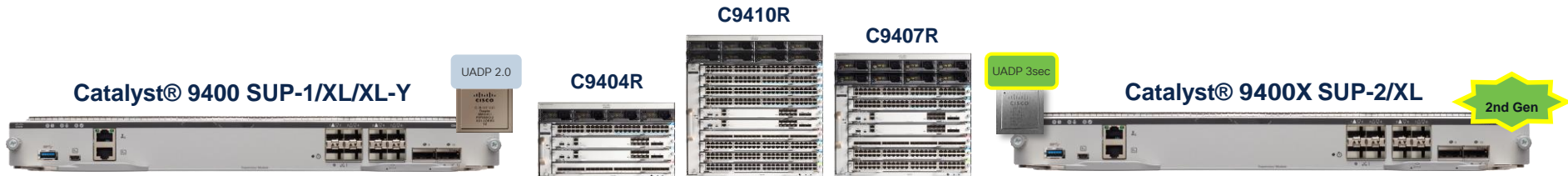
- 48x 10G SFP+
- 24x 10G SFP+
- 48x 1G SFP
- 24x 1G SFP

## Power Supplies

- 3200W AC
- 2100W AC
- 3200W DC

# Cisco Catalyst 9400 Series

High Performance, Flexibility and Investment protection with C9400X



Up to 240G/slot



1/2.5/5/10/25/40G



Up to 96,000 MACs  
Up to 64,000 routes



Up to 32 MB  
packet buffer/ASIC



Up to 480G/slot  
No Oversubscription\*



Up to 128,000 MACs  
Up to 256,000 routes



1/2.5/5/10/25/40G  
+ 100G



Up to 36 MB  
packet buffer/ASIC



Flexible ASIC  
Templates



100G IPsec  
Encryption

## DATA



C9400-LC-48T

## 1G SFP



C9400-LC-24S



C9400-LC-48S

## POE+/UPOE



C9400-LC-48P



C9400-LC-48U

## UPOE +



C9400-LC-48HX



C9400-LC-48H

## MultiGigabit



C9400-LC-48UX



C9400-LC-48HN

## 10G SFP+



C9400-LC-48XS



C9400-LC-24XS

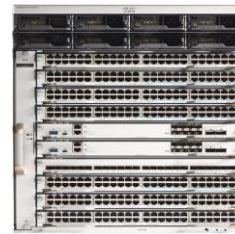
Unmatched flexibility

Maximum investment protection

100G leadership in access

# Cisco Catalyst 9400 Series

## Chassis Options



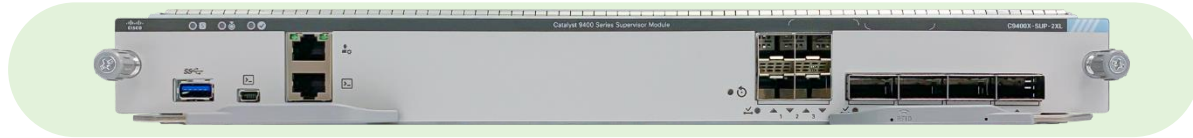
		4-slot	7-slot	10-slot
Supervisor		2 (redundant)		
Line Cards		2	5	8
Max LC ports by speed	10/100/100M	96	240	384
	1/2/5/10G	96	240	384
	1/10G SFP	96	240	384
Max SUP ports by speed	10G SFP	8 (SUP1) – 4 (SUP2)		
	25G SFP	2 (SUP1-XL) – 4 (SUP2)		
	40G QSFP	2 (SUP1-XL) – 4 (SUP2)		
	100G QSFP	4 (SUP2)		
BW per LC slot (SUP1/1XL/2/2XL)		80/240/240/480G	80/120/240/480G	80/80/240/480G
Dimensions (W/D/H)		W:17.5 in. / D:16.25 in. / H: 6RU	W:17.5 in. / D:16.25 in. / H: 10RU	W: 17.5 in. / D:16.25 in. / H: 13RU
Power supply		4 PS (N+1 and N+N)	8 PS (N+1 and N+N)	8 PS (N+1 and N+N)
PoE per slot		4800W		
Cooling		Side to Side (Front to Back for PS)		

# Catalyst 9400 Supervisor Modules

Supported on all Chassis Types

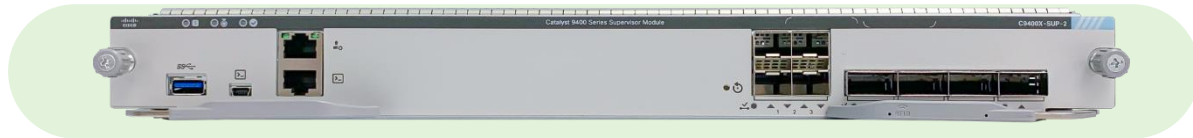
## C9400X-SUP-2XL

480G/slot High-end Access



## C9400X-SUP-2

240G/slot Extended Access



## C9400-SUP-1XL-Y

80-240G/slot Access



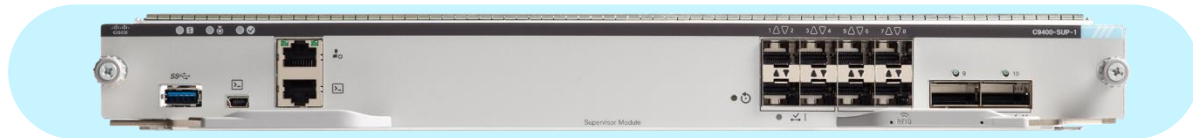
## C9400-SUP-1XL

80-240G/slot Access



## C9400-SUP-1

80G/slot Access



**CISCO** *Live!*

Note: Same supervisor model required in dual SUP/SSO configuration.

#CiscoLive

BRKARC-2098

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# C9400X-SUP-2/2XL

## Gen 2 supervisor modules with UADP 3.0sec

4.8 Tbps Sup2XL/  
2.4 Tbps Sup2  
(full duplex)

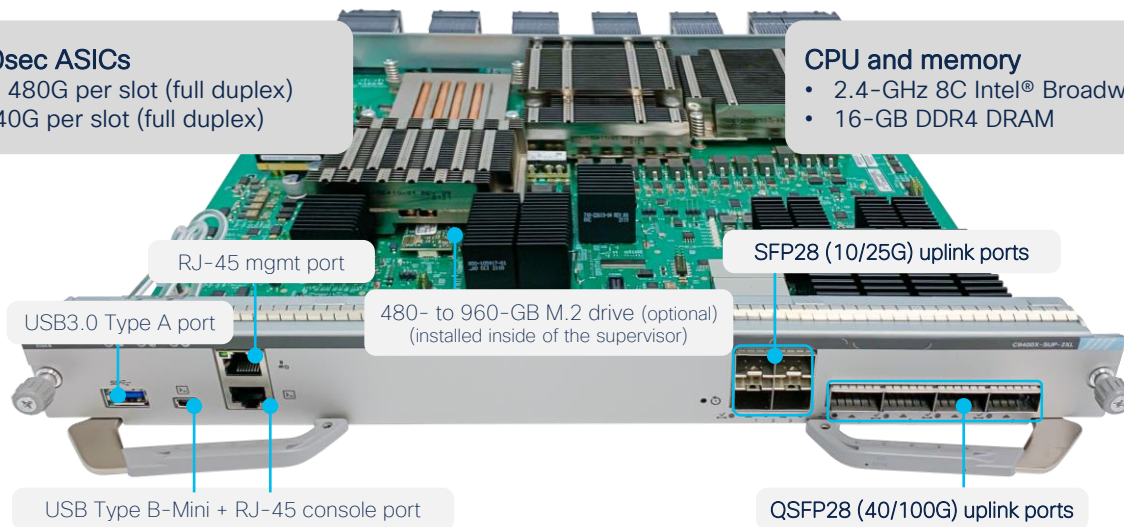
Cisco IOS® XE  
17.11.1

### 3x UADP 3.0sec ASICs

- SUP-2XL – 480G per slot (full duplex)
- SUP-2 – 240G per slot (full duplex)

### CPU and memory

- 2.4-GHz 8C Intel® Broadwell DE-NS CPU
- 16-GB DDR4 DRAM

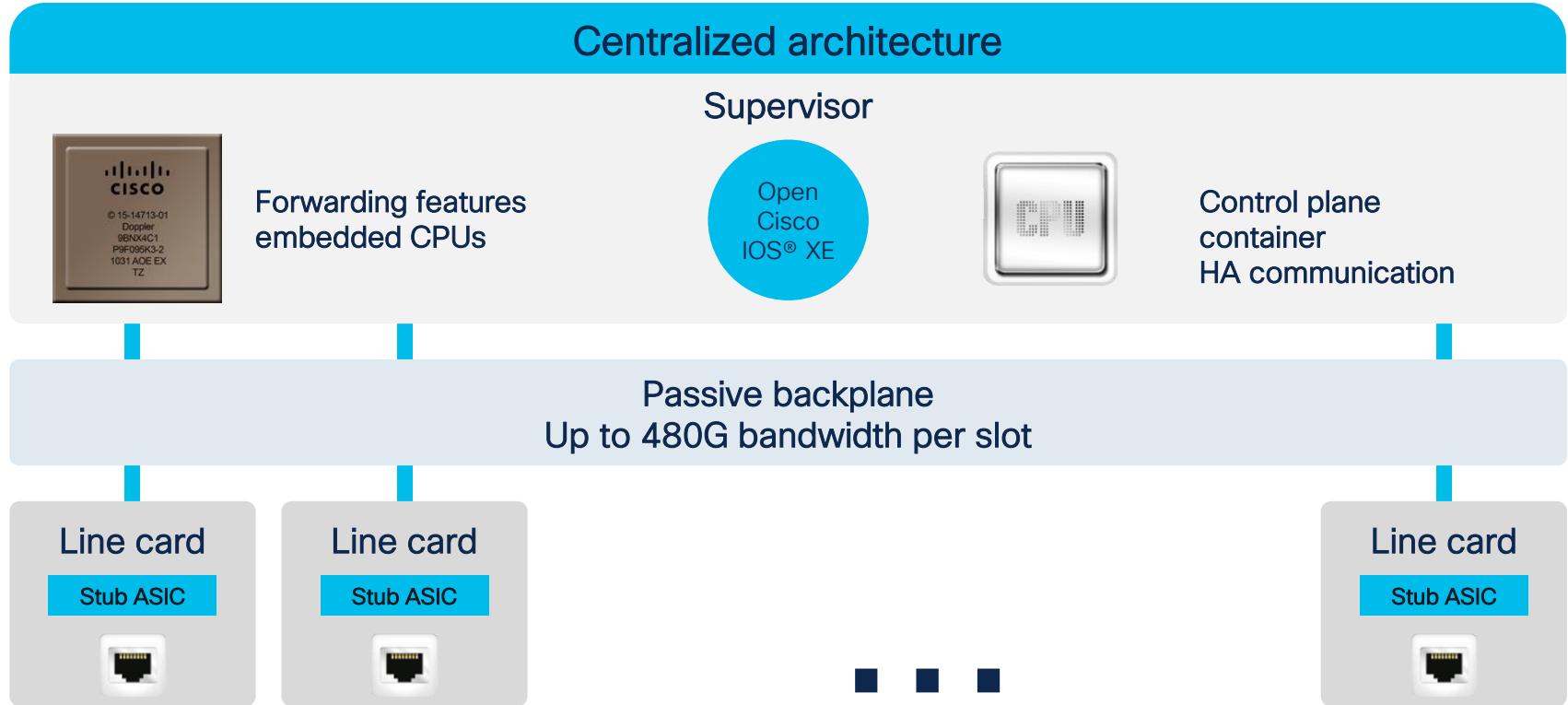


SUP-1XL feature parity at FCS

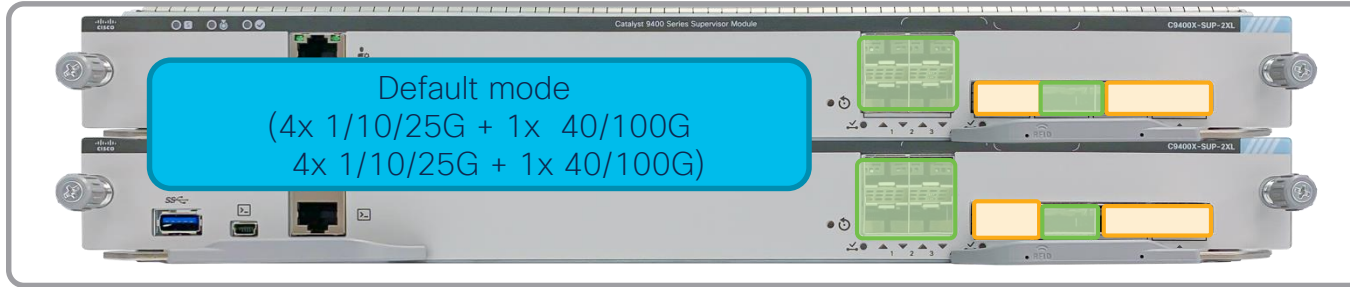
New in  
17.11.1

- Custom SDM template.
- IPSEC NAT-T
- MCAST Support on AppGig

# Architecture



# Sup 2 / 2XL Uplinks – Dual Supervisors





Active

Disabled

# Sup-1/Sup-1XL/Sup-1XL-Y Uplink - Dual Sup

Default Mode (8x 10GE)

25G Mode (2x 25GE)

40G Mode (2x 40GE)

# New Line Cards for Sup2/2XL – Gen 2 Line Cards



C9400X-SUP-2XL

IOS XE 17.7.1

C9400X-SUP-2

IOS XE 17.7.1

C9400-LC-48HX

IOS XE 17.8.1

C9400-LC-48XS

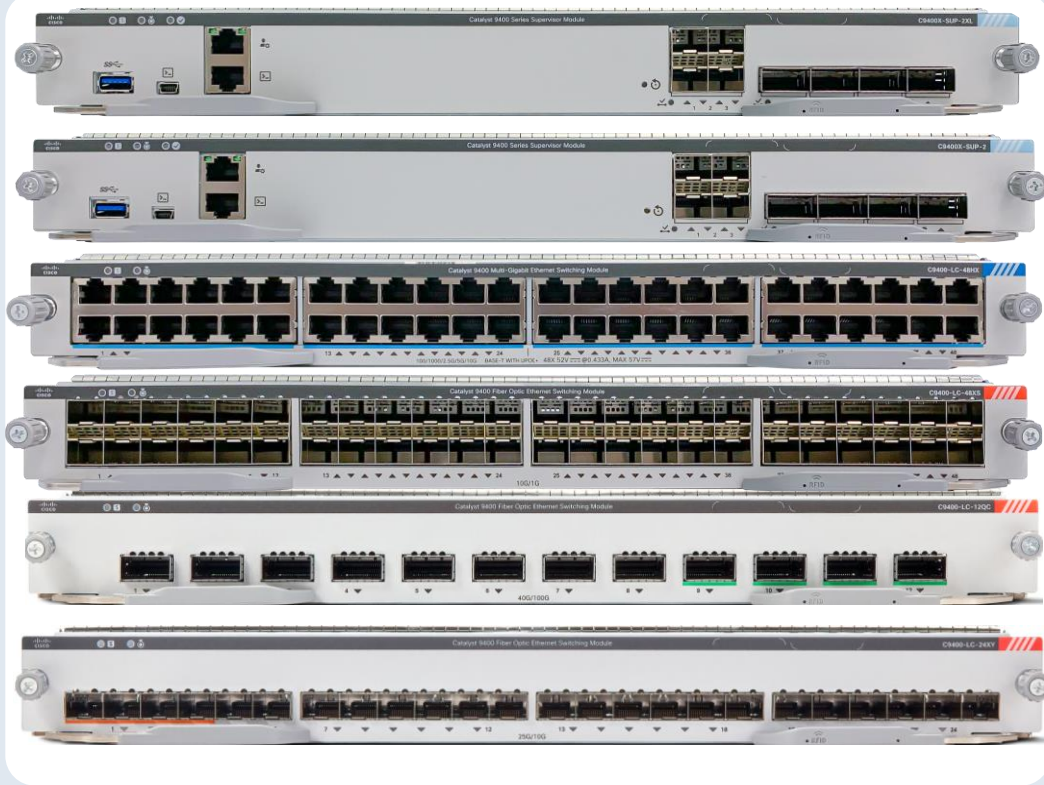
IOS XE 17.8.1

C9400-LC-12QC

IOS XE 17.12.1

C9400-LC-24XY

IOS XE 17.12.1

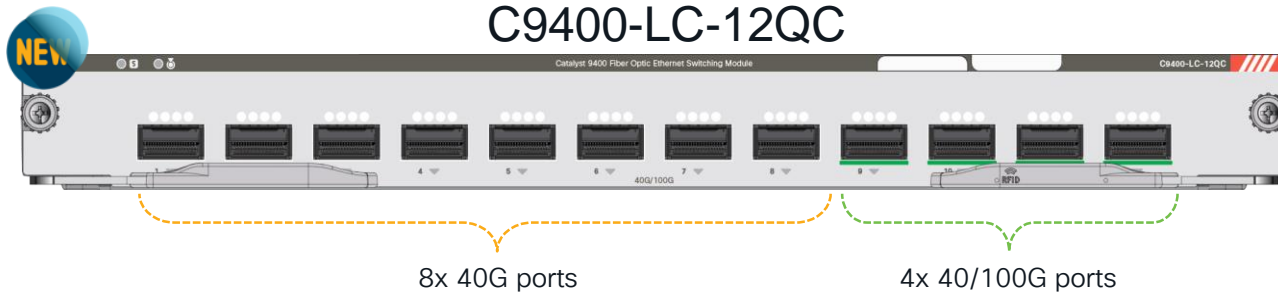


# Introducing 25G & 40G/100G Line Cards on C9400X



IOS XE 17.12.1

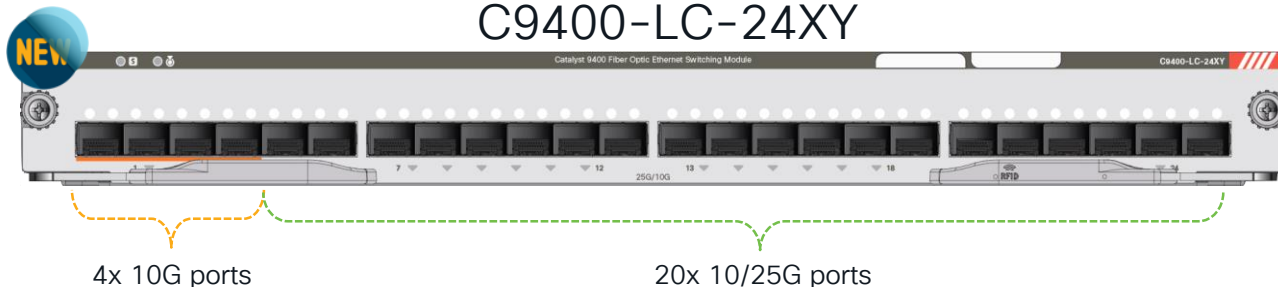
## C9400-LC-12QC



Enabling Collapsed Access & Distribution Transition with SUP2

Higher speed downlinks for High-end Access expanded designs

## C9400-LC-24XY



Supported with SUP-2 & SUP-2XL Only

# Bandwidth Boost with Gen2 Supervisors



Cisco C9400 SUP 1/1XL

Cisco C9400X  
SUP2

Cisco C9400X  
SUP2XL

	Type	C9404R	C9407R	C9410R	C9404R/C9407R/C9410R	C9404R/C9407R/C9410R
C9400-LC-48HX	UPOE+	-	-	-	240	480
C9400-LC-48XS	Fiber	-	-	-	240	480
C9400-LC-48UX	UPOE	80 / 240	80 / 120	80	240	240
C9400-LC-24XS	Fiber	80 / <b>240</b>	80 / 120	80	<b>240</b>	240
C9400-LC-48HN	UPOE+	80 / 120	80 / 120	80	<b>240</b>	240

Not Supported

Bandwidth in Gbps

**Bold** indicates Line Rate

**3x** Bandwidth Uplift for Gen1 LCs (**80G -> 240G**) on **10 Slot Chassis w/ SUP2XL**

**2x** Bandwidth Uplift for Gen1 LCs (**120G -> 240G**) on **7 Slot Chassis w/ SUP2XL**

# Concurrent 60W/90W POE Port Density with C9400-LC-48HX

With 3200W Power Supply in Combined Mode(Fully loaded PSUs):

C9404



C9407



C9410



Total Ports	96 ports	240 ports	384 ports
UPOE + 90W	96 ports (Fully loaded chassis)	226 ports (Up to 4 fully loaded LCs + 34 Ports)	224 ports (Up to 4 fully loaded LCs + 32 Ports)
UPOE 60W	96 ports (Fully loaded chassis)	240 ports (Fully loaded chassis)	336 ports (Up to 7 fully loaded LCs)

# Catalyst 9400X – Custom SDM Templates

## SDM templates and scale numbers

Feature (ACL) TCAM

Forwarding (FIB) Hash

IOS-XE 17.11.1

NEW

### FIB

Double width fields ensures IPv4 and IPv6 have the same scale

L2 and L3 Multicast can have a total of 48K FIB Resources

Space for Some features can be disabled completely by setting scale to 0

ACL ingress and egress are split between two cores

Due to space reserved for IPSec SA table, max ACL on core 1 is 25K

Maximum Security ACL size possible is  $25 + 27 = 52K$

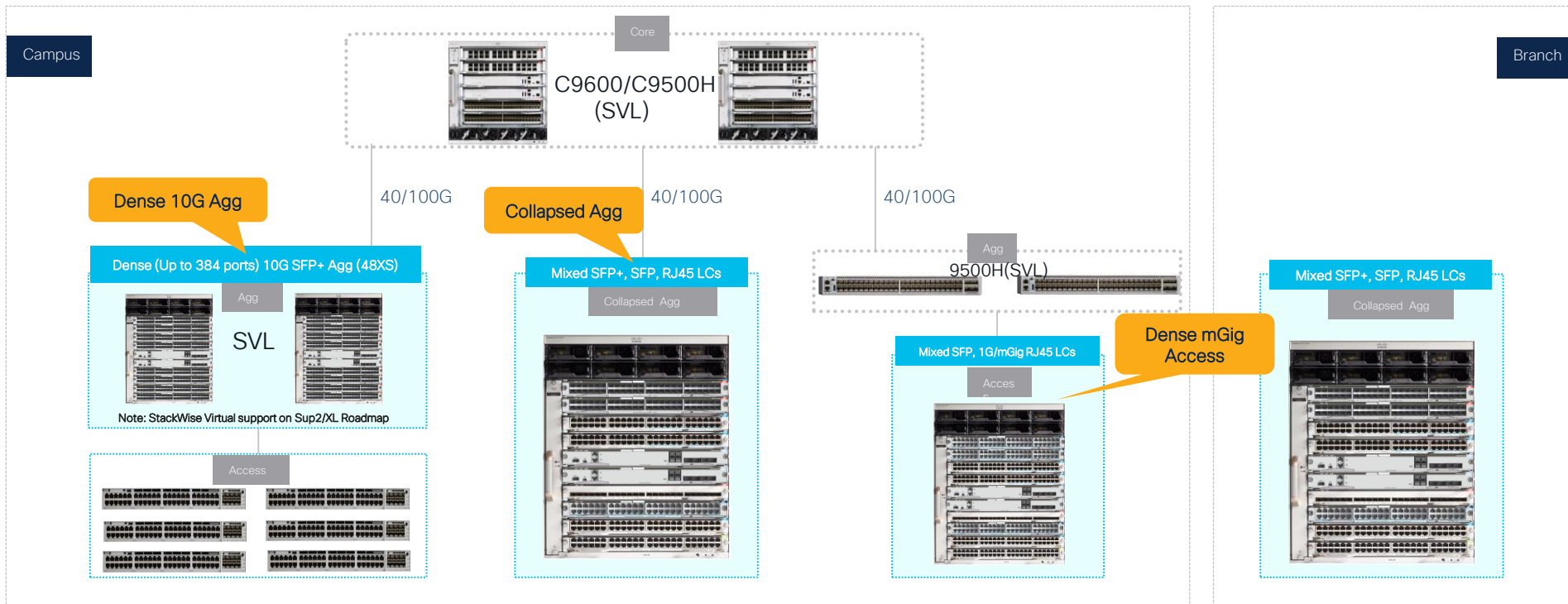
All features need dedicated space. 0 setting is not allowed

### ACL TCAM

Features			Range	Access (default)	Step-Size	
Unicast routes <sup>(LPM &amp; Host, IPv4/IPv6)</sup>			✂	64K-256K	112K	16K
MAC address entries			✂	32K-128K	64K	16K
L2 Multicast groups			✂	0-32K	16K	16K
L3 Multicast routes <sup>(IPv4/IPv6)</sup>			✂	0-32K	16K	16K
Flexible NetFlow	Ingress	✂	0-64K	32K	32K	
	Egress	✂	0-64K	0	32K	
SGT, MPLS			✂	0-64K total	32K SGT, 16K MPLS	32K
Total FIB Resources - 416K						
Security ACL	Ingress	✂	4K-27K	10K	2K	
	Egress	✂	4K-27K	16K	2K	
NetFlow ACL	Ingress	✂	1K-2K	1K	1K	
	Egress	✂	1K-2K	1K	1K	
LISP			✂	1K-2K	2K	1K
PBR/NAT <sup>(per direction)</sup>			✂	1K, 2K-16K	2K	2K
Tunnels <sup>(Termination)</sup>			✂	1K-3K	1K	1K
SPAN	Ingress		0.5K		Not Customizable	
	Egress		0.5K		Not Customizable	
CPP				0.5K	Not Customizable	
IPsec				1K	Not Customizable	
MACsec SPD				0.25K	Not Customizable	
Total ACL Resources - 54K						

# Catalyst 9400 Deployment Flexibility

C9400X enables dense 10G SFP+ aggregation and multigigabit access use cases

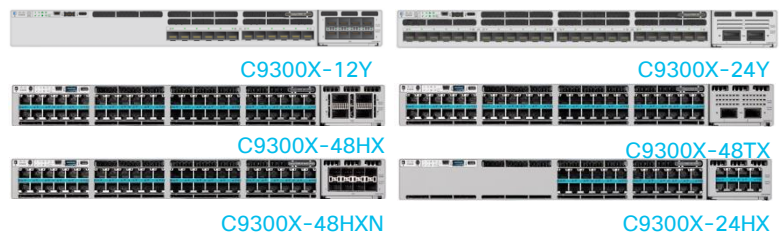




# Expanding IPsec Capabilities to Modular C9400X

Catalyst 9300X

IOS-XE 17.6.2



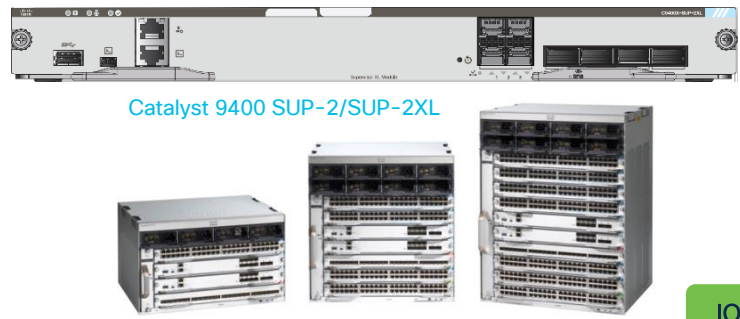
100G L3 Encryption

Encryption	Authentication
AES-128-CBC	HMAC/SHA1
AES-128/256-GCM	GMAC
Tunnel Mode	
ESP Encapsulation	
Internet Key Exchange Version 2 (IKEv2)	

Site to Cloud

Catalyst 9400X

Site to Site



100G L3 Encryption

IOS-XE 17.10.1

- Static virtual tunnel interface
- IPv4/IPv6
- OSPF/BGP
- Policy Based Routing
- Multicast Routing
- NAT Traversal\*\*
- L3 segmentation over IPsec
- L2 segmentation over IPsec

128 Tunnels / 384 SA's

\* C9400X support with 17.11

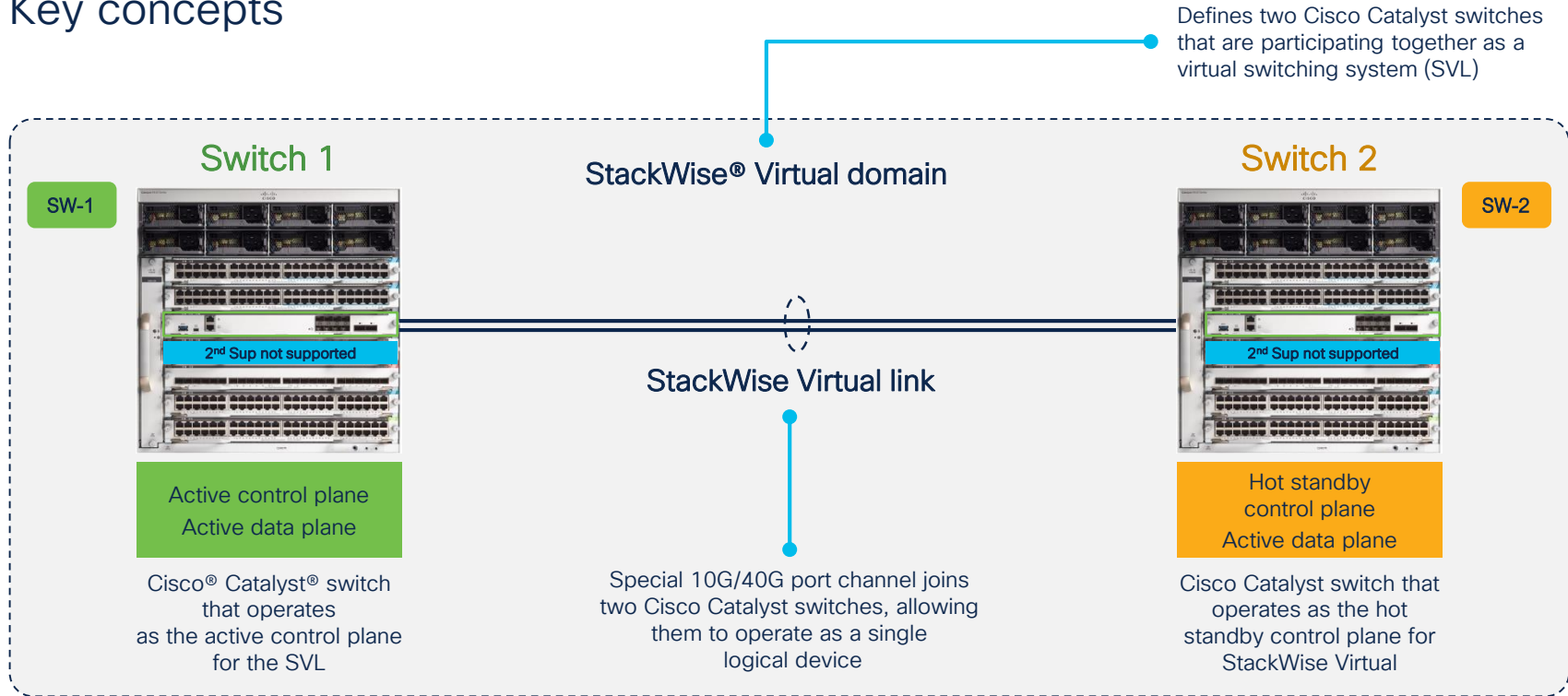
HSEC License required for IPsec





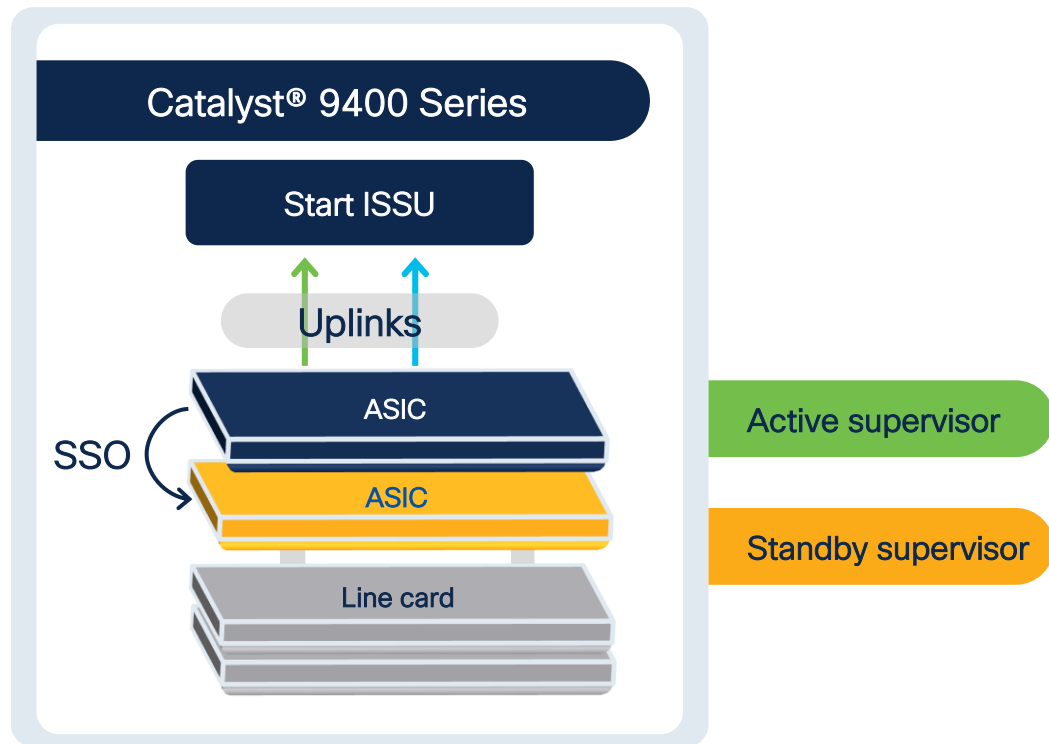
# StackWise Virtual architecture

## Key concepts



# Software Upgrades with ISSU

Dual supervisors (Required)



- Uplinks on both Active and Standby supervisors are forwarding traffic
- Convergence takes less than 200 ms during the switchover

# Power Redundancy

Normal

PS failure

Combined  
(default)



Load sharing on all PSs



Load sharing on functional PSs

Redundant



Load sharing on active PSs  
Standby PS in output disabled



Standby PS becomes active  
System enters alarm state

# Power redundancy: N+1 and N+N

- Default active is PS1 through 4, and standby is PS5 through 8
- Standby power slots are configurable



- Default active is PS1 through 7, and standby is PS8
- Standby power slot is configurable



```
SW(config)#power redundancy-mode redundant ?  
  N+N  Redundant N+N (N is active, N is standby)  
  N+1  Redundant N+N (N is active, 1 is standby)  
SW(config)#power redundancy-mode redundant N+1 ?  
  <1-8> standby slot in N+N mode  
SWR(config)#
```

```
SW(config)#power redundancy-mode redundant ?  
  N+N  Redundant N+N (N is active, N is standby)  
  N+1  Redundant N+N (N is active, 1 is standby)  
SW(config)#power redundancy-mode redundant N+1 ?  
  <1-8> standby slot in N+1 mode  
SWR(config)#
```

Active

Standby

# Cisco Catalyst Access Switching Positioning

## Secure, resilient campus



Catalyst® 9400

Catalyst 9300



SD-Access



SD-Access  
extended nodes

Choose Catalyst 9400 Series or Catalyst 9300 Series modular uplink models (C9300X and C9300) models

- Designed for security, mobility, IoT, and cloud
- High availability, ETA, application hosting

## Business-critical branch



Catalyst 9300X models

Branch-in-a-Box  
No router



Catalyst 9300L models

Fabric-in-a-Box  
External router



SD-Access

Choose: A) Catalyst 9300 Series fixed uplink models (C9300L models) with external router

- Full security with visibility
- High availability, ETA, application hosting

B) Catalyst 9300X models for complete branch solution

+ IPsec, firewall, additional app hosting

## Simple branch



Border + Control plane



Edge

Catalyst 9200 Series



SD-Access

Consider Catalyst 9200 Series (C9200 and C9200L models)

- Extend automation and policy
- Limited VRFs



Choose Catalyst 9400 or 9300/9300L for innovations in Intent-Based Networking (IBN)



Full SD-Access, fabric-in-a-box,  
Embedded Wireless Controller



Wired Assurance,  
SD-Access, AVC



ETA,  
MACsec-256



On-box  
app hosting



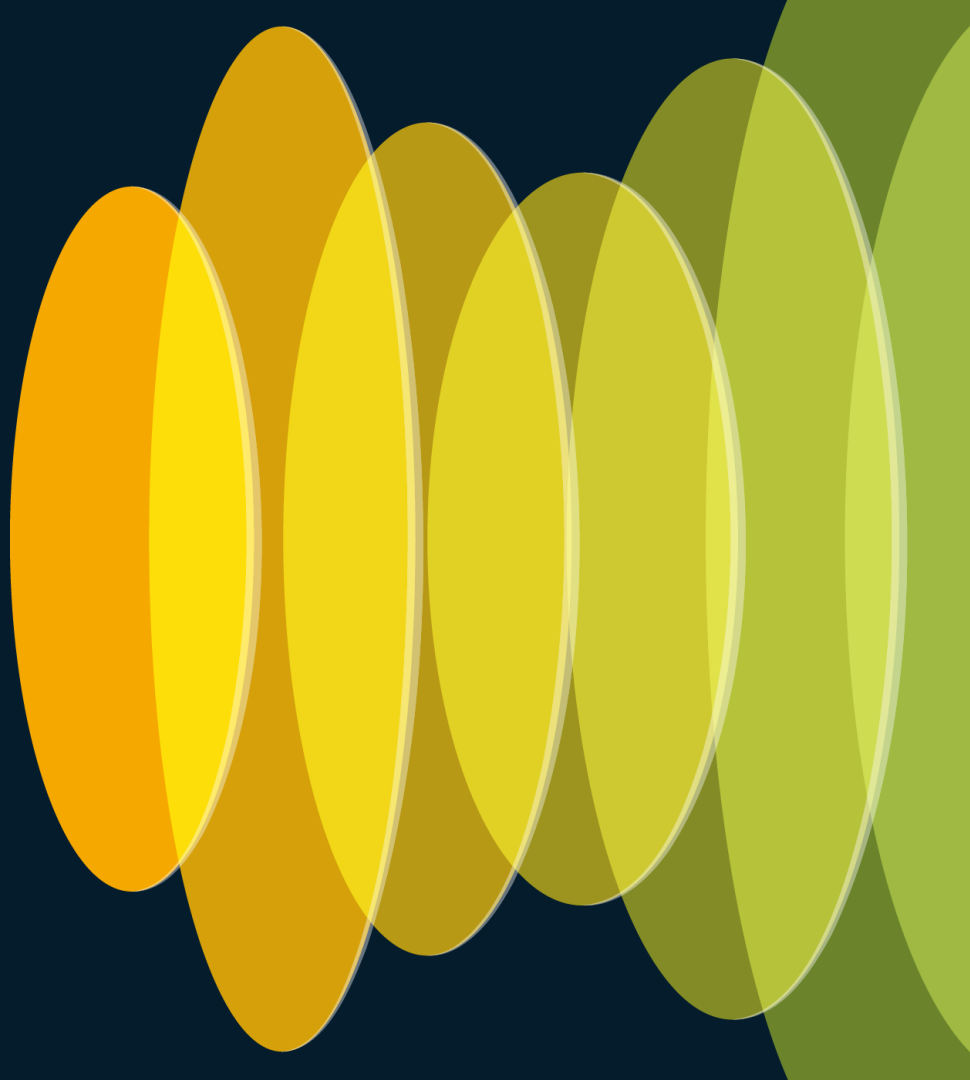
HA, hot patching,  
StackPower, Cisco UPOE+

Entry point for IBN

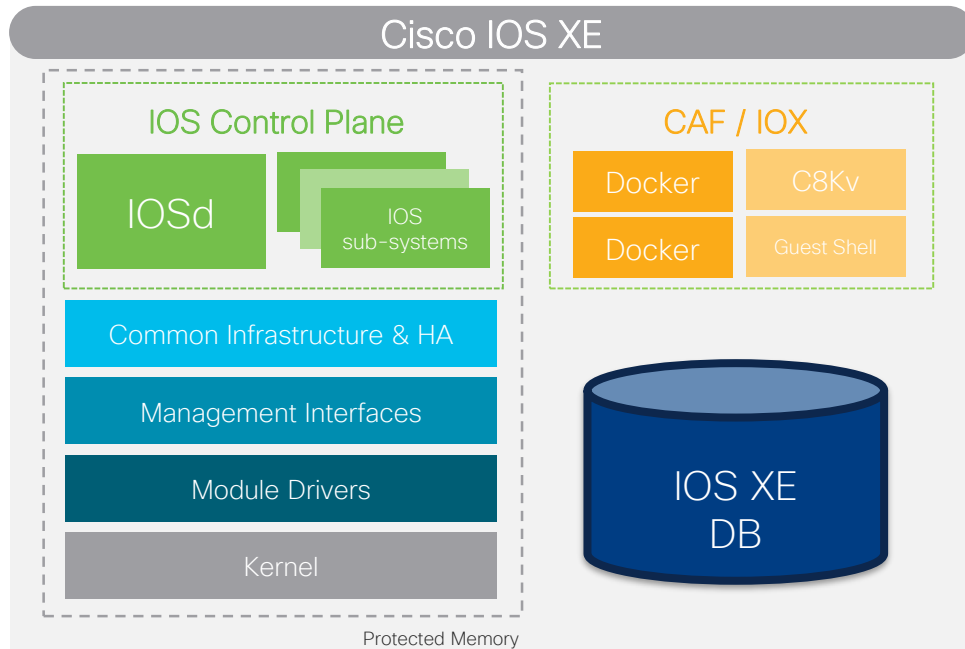


SD-Access, fabric edge, Full NetFlow

# IOS-XE Software & Innovations



# Cisco IOS XE – A Modern Operating System



## Cisco IOS subsystems

Resiliency and High Availability



## Cisco IOS XE database

Programmability and Open models

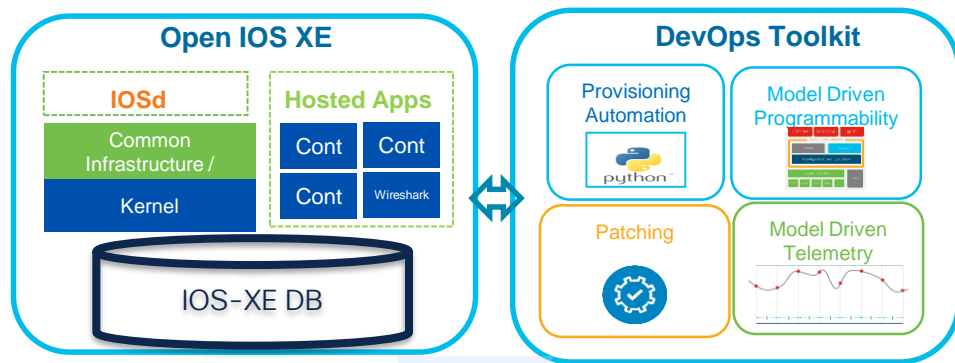


## IOX + Docker containers

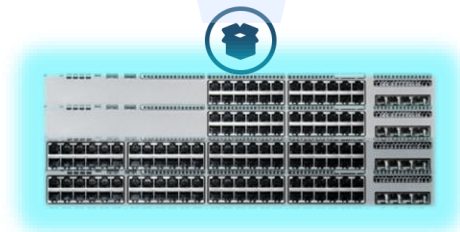
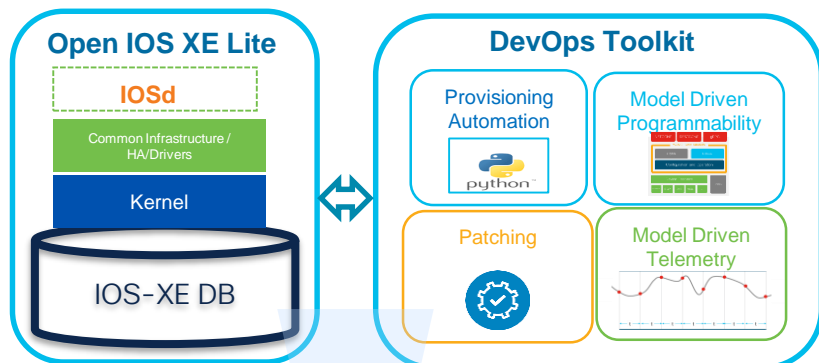
Cisco and 3rd-party App hosting

Open, Model Driven & Secure Operating System

# Open IOS-XE



Catalyst 9k Family – 9300/9400/9500/9600



Catalyst 9200/9200CX



# Software Maintenance Upgrade

SMU is a package that can be installed on a system to provide a fix or a security resolution to a released image.



- **Hot Patching** - does not require explicit reload after installation to get activated. *(not traffic-affecting)*
- **Cold Patching** - requires a system reload after installation to get activated. *(traffic-affecting)*. The 9200 family supports only this.

- **Bundle SMU** - One single SMU file containing and applying multiple SMU fixes on the backend.
- **Independent SMU** - One single SMU file tailored to address a specific bug or vulnerability.

NEW

Patching can also be performed using Cisco DNAC

C9300-Access.cisco.com (172.26.192.131) Image Update

Date: Mar 16, 2023 12:15 PM Duration: 4 minutes 20 seconds Status: ● Successfully Activated cat9k\_iosxe.17.03.04.SPA.bin cat9k\_iosxe.17.03.04.CSCwa53947.SPA.smu.bin

DNAC Version: Guardian 2.3.3  
License Level : DNA Advantage

Operations

Checks

> ● SMU Distribution

1 minute 51 seconds

✓ ● SMU Activation

2 minutes 27 seconds

SMU Activation of image: cat9k\_iosxe.17.03.04.CSCwa53947.SPA.smu.bin on device: 172.26.192.131 completed successfully

> ● Pre Activation Script Execution

1 second

> ● Activation

2 minutes 26 seconds



Reduces time and scope of testing



Self-sufficient and reliant bug fix solution for **PSIRT, CFD & IFD**



Hot Patching



EMR Releases with **371** SMU files available

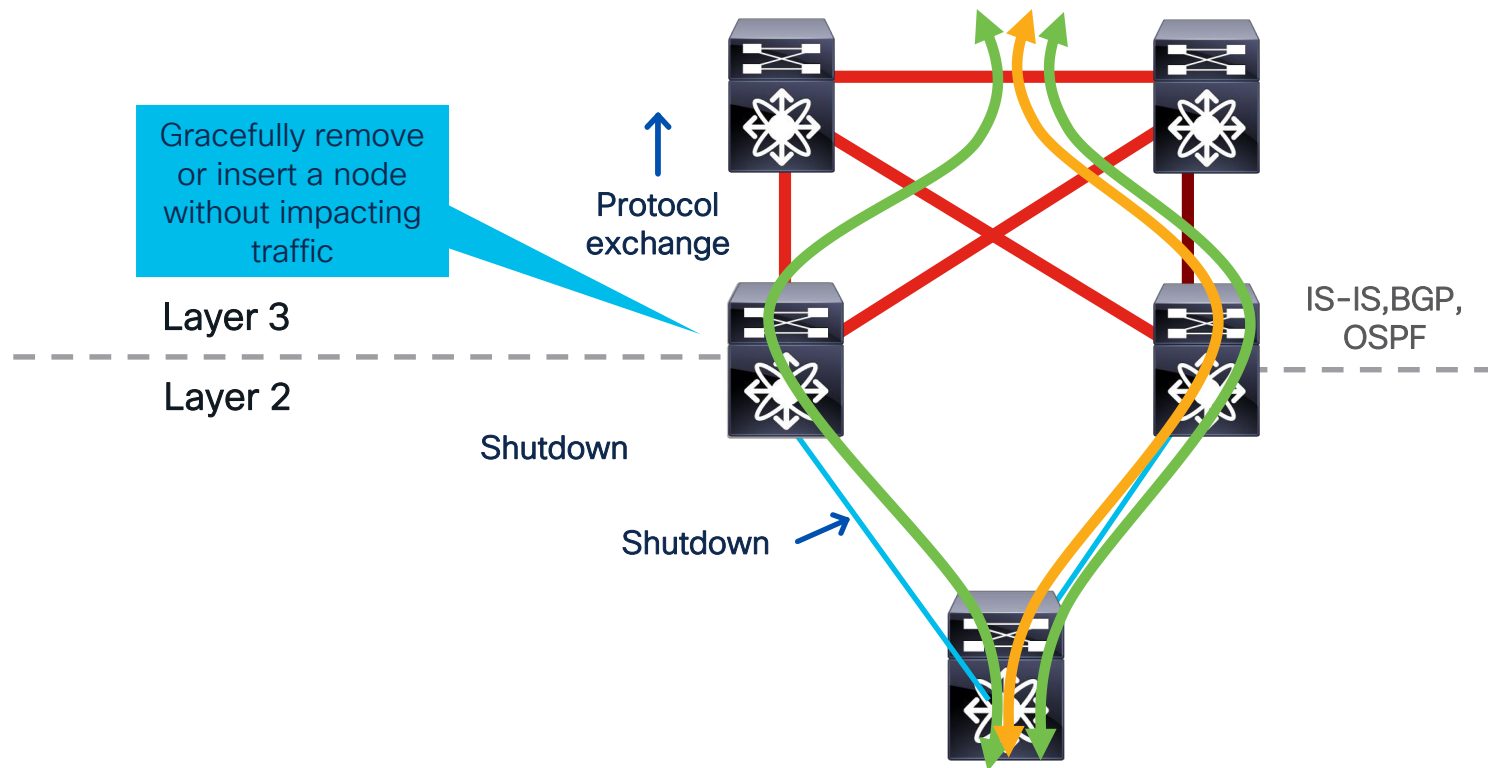
CISCO Live!

# Graceful Insertion and Removal (GIR)

Hardware  
replacement

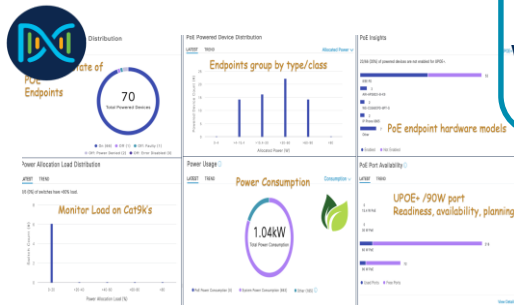
Software  
upgrades

Configuration  
changes



# Sustainable Smart Buildings with Catalyst 9000

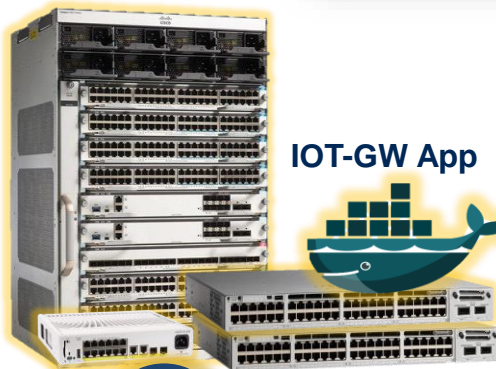
Cisco DNAC



Power Telemetry



Future of WorkSpaces



POE 90W

Sustainable

Energy Efficient



Building Standards Ready



LEED, Platinum & WELL Standards

\* Capex Savings Upto

20%



New

Energy Utilization

Get Energy Analytics, Trends & Insights for Network Devices in your Buildings.



IOT EcoSystem



cisco Live!



# Cisco innovations in Power over Ethernet (PoE) Deliver a robust low-voltage infrastructure

## 2-event classification

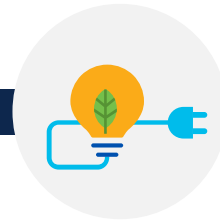
- Fast power negotiation without Link Layer Discovery Protocol (LLDP)
- Physical layer negotiation < 1 second

## Perpetual PoE\*

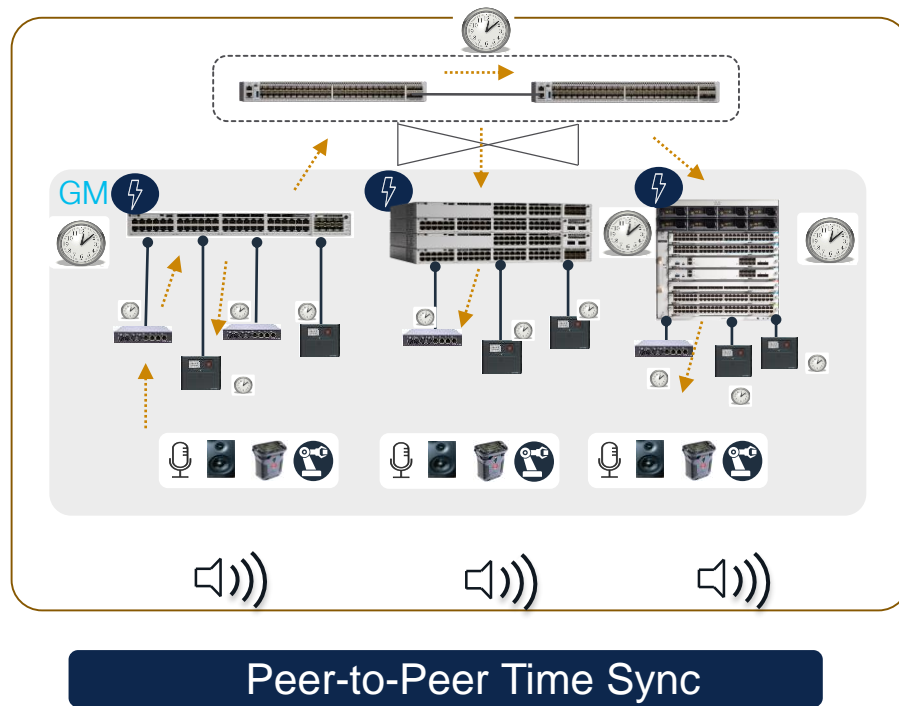
- Uninterrupted PoE power during control plane reboot

## Fast PoE\*

- Bypasses Cisco IOS® control plane boot
- Restores power to Powered Device (PD) within 30 seconds of power resumption



# Time Sensitive Networks with Catalyst 9k



Timing Protocol

Precision Time Protocol

Hardware Timestamping

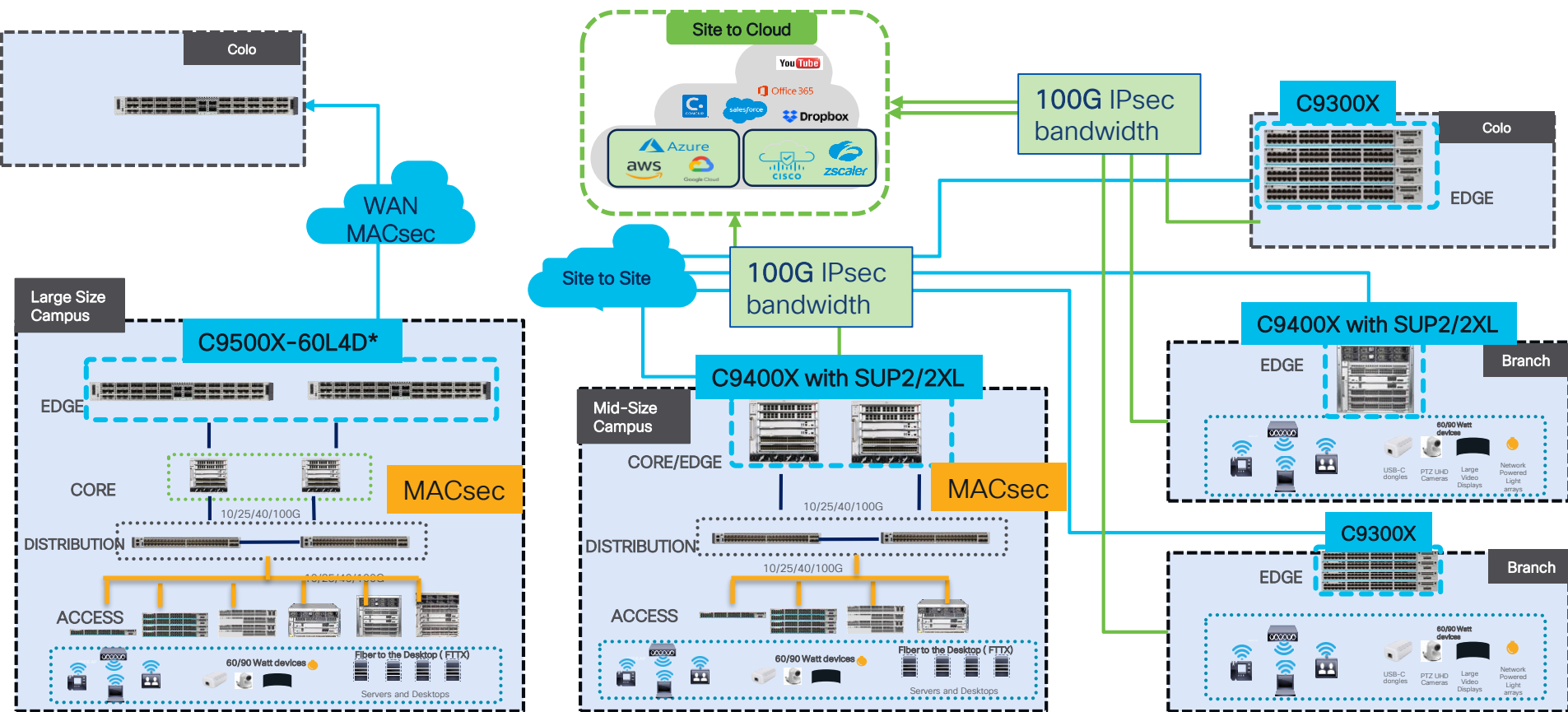
Transparent / Boundary Clock

Industry Standard – IEEE 1588v2

< 100ns Accuracy



# End-to-End Encryption with MACsec & IPsec



**cisco Live!**

\* Limited Availability

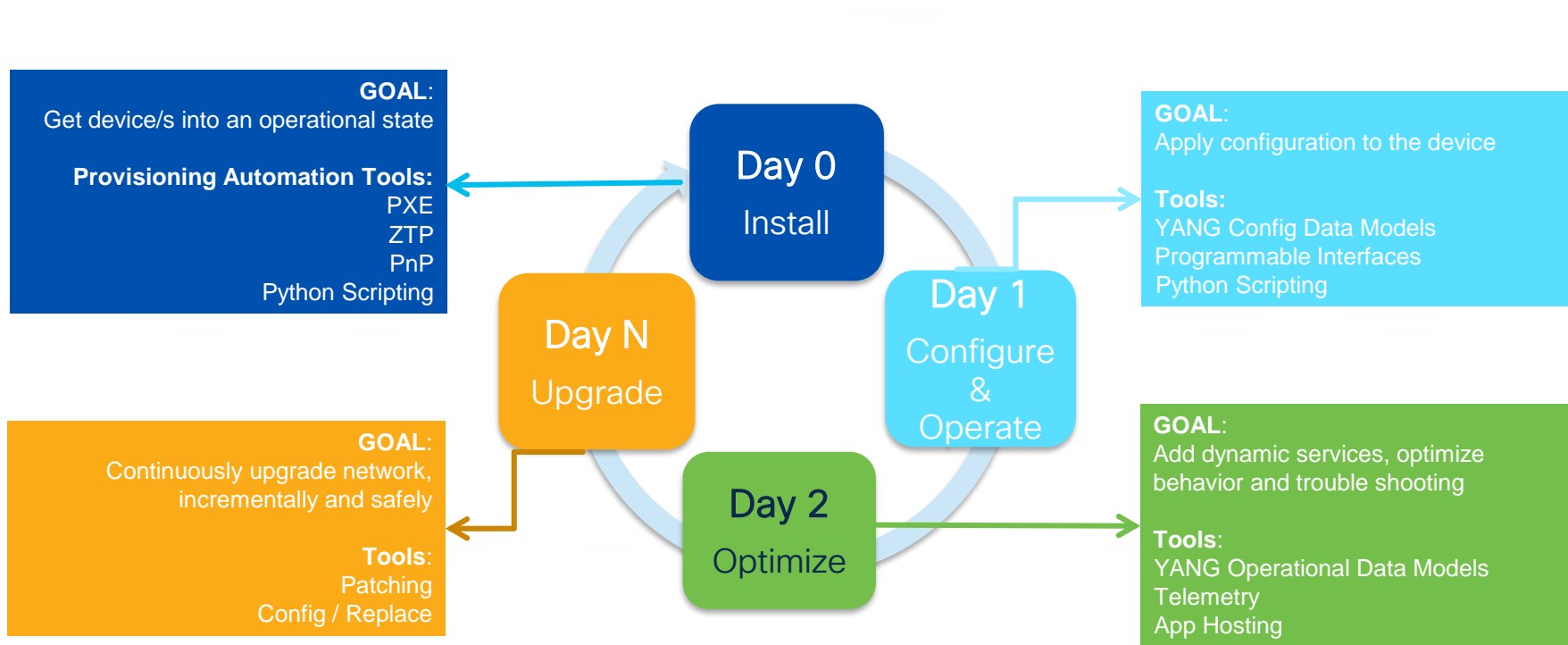
#CiscoLive

BRKARC-2098

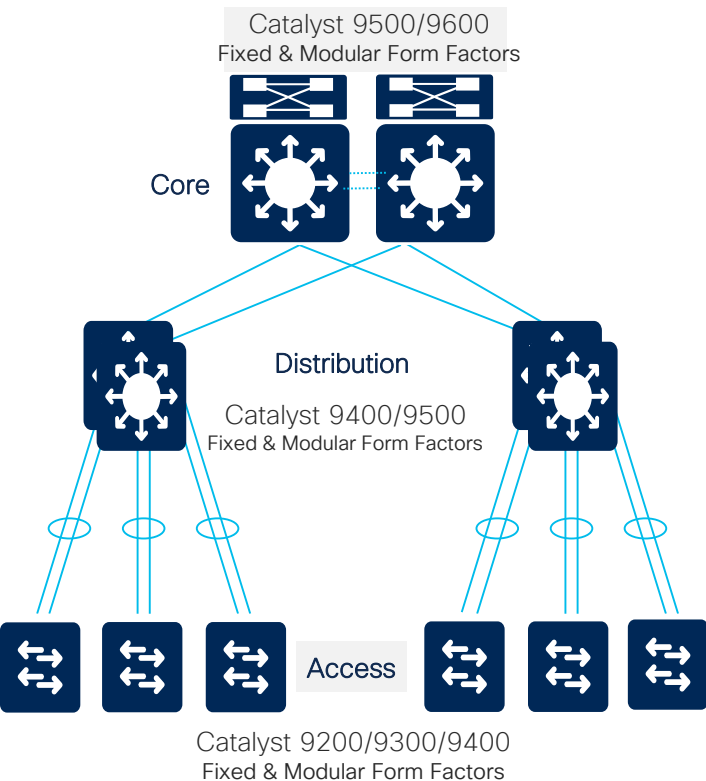
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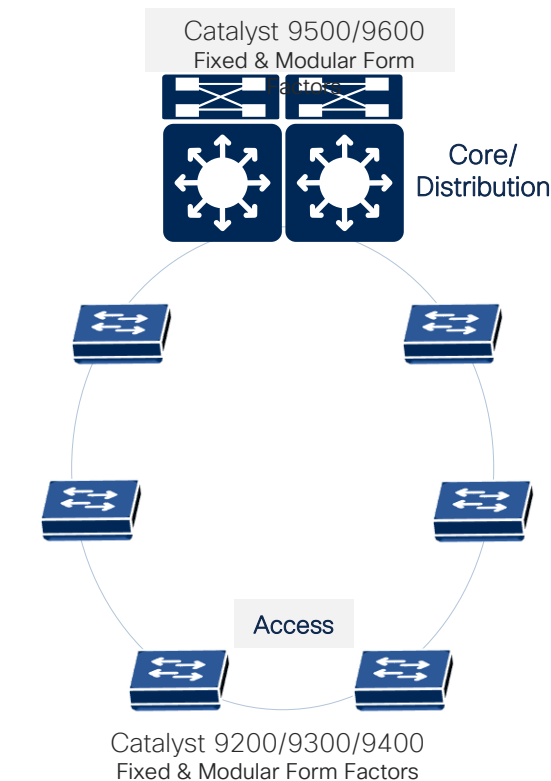
# Comprehensive Automation Lifecycle with Catalyst 9000



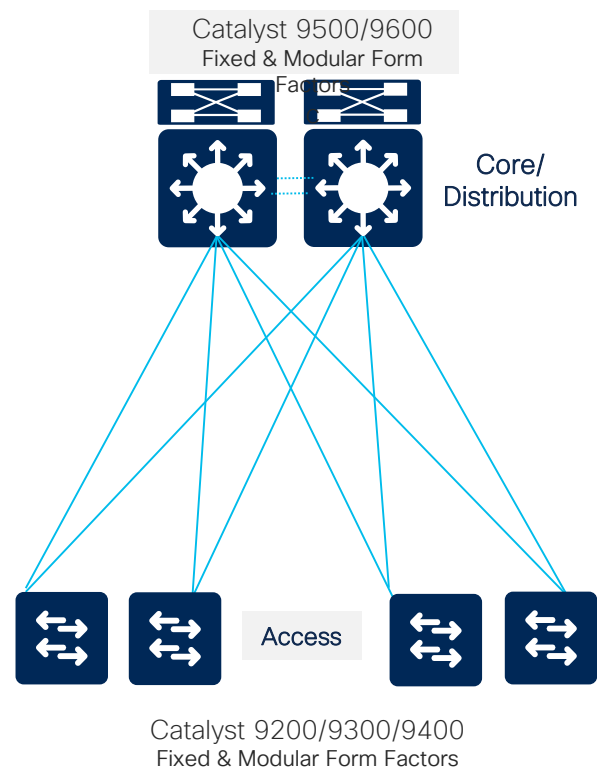
# End to End Catalyst 9000 for Traditional Campus Networks



3 Tier



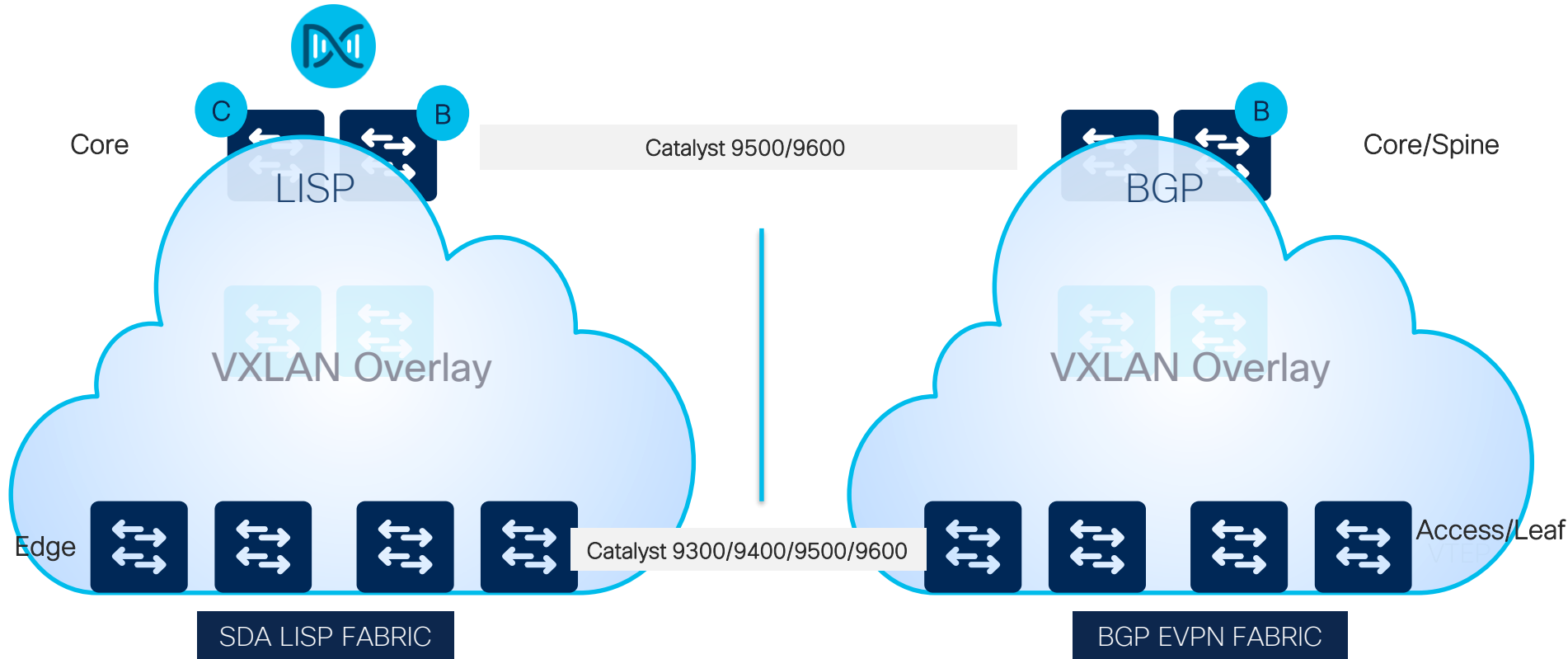
Ring



2-Tier / Collapsed Core



# End to End Catalyst 9000 for Fabric Based Networks



# Your IT operation mode, your way

Flexibility, choice, and simplicity

Catalyst Switches  
**SAME HARDWARE**

Manage it your way

Running **IOS-XE**

Running **IOS-XE**

Convert to **Meraki OS**



Cisco  
Catalyst  
Center

**On-Premises  
Management**

Full suite of capabilities  
Advanced switching features



Physical  
Appliance



Virtual  
Appliance

**NEW**



**Meraki  
Cloud  
Monitoring**



Meraki

**Cloud  
Management**

Operational Simplicity  
Rapid Onboarding



Cloud  
Management

Existing Catalyst 9300 Series

**NEW**

**Catalyst 9300-M**

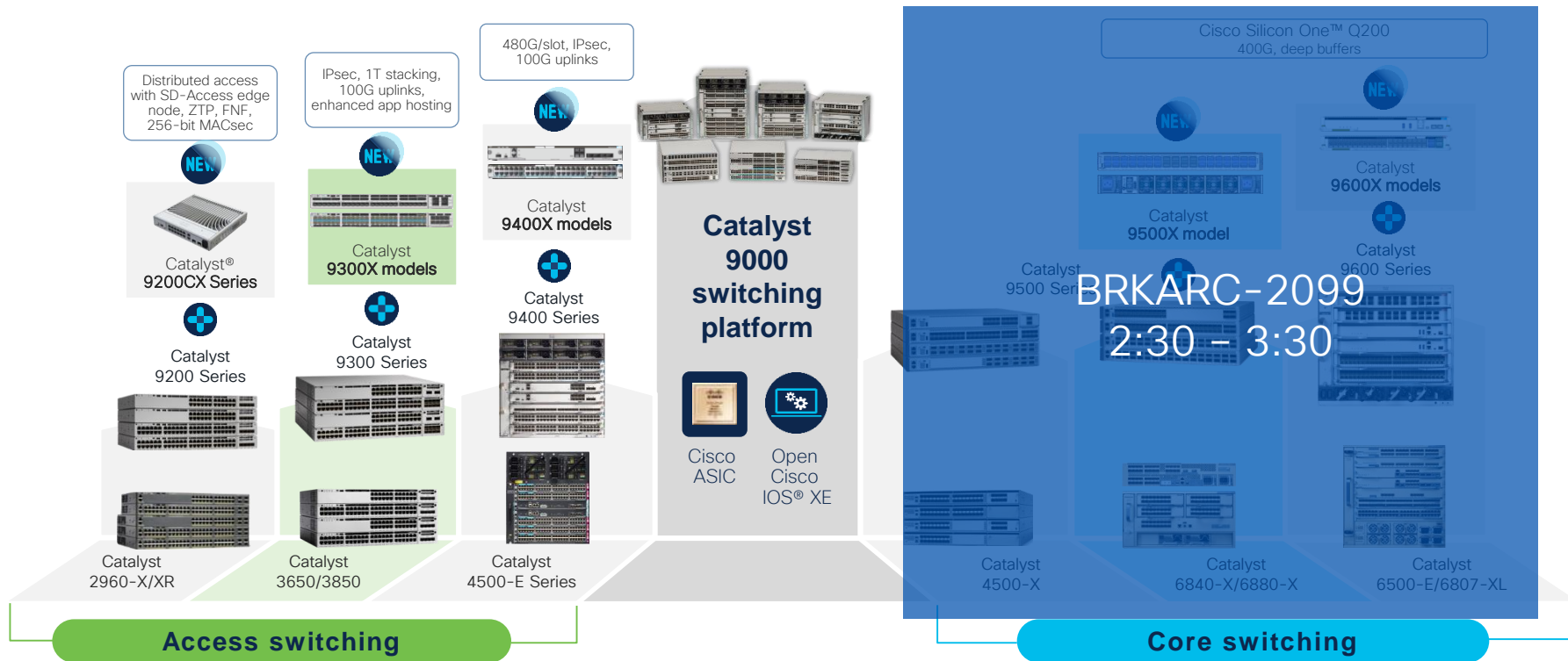
**cisco** *Live!*

#CiscoLive

Introducing **Catalyst 9300 Series on Meraki**

# Catalyst 9000X – Expanding industry leadership

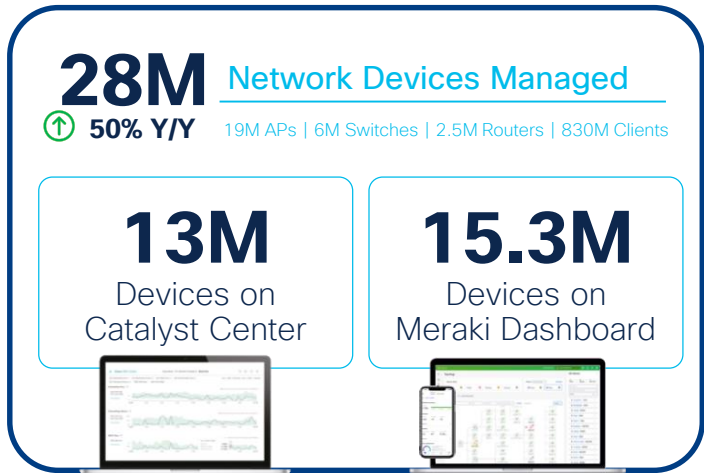
Adding the “X factor” to the industry’s leading switching family



# Catalyst Leadership in Enterprise Networks

## A Platform based Approach

### Catalyst Center and Meraki Dashboard



### Catalyst 9000 Family

100,000+ Customers, Millions of Switches

“Catalyst 9K continues to be the fastest ramping product in the company's history”

- Chuck Robbins, CEO Cisco Systems

**cisco** Live!

### Secure Networking

Common Policy

Secure Equipment Access

SD-Access (LISP & EVPN)

High-speed Encryption

### Digital Experience

Campus Automation

AI Endpoint Analytics

ThousandEyes Digital Experience

AI Ops & Assurance

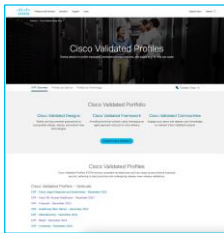
### Operational Simplicity

Cloud Managed Catalyst

Infrastructure as a Code

S3 & CloudWatch Integration

Visibility, Control & Rollback



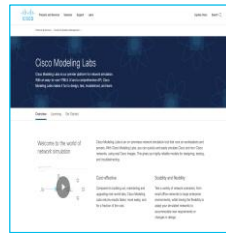
Cisco Validated Profiles (CVP)



Industry Validated Reports



Industry Certifications



Cisco Modeling Labs

# Complete Your Session Evaluations



Complete a minimum of 4 session surveys and the Overall Event Survey to be entered in a drawing to **win 1 of 5 full conference passes** to Cisco Live 2025.

---



**Earn 100 points** per survey completed and compete on the Cisco Live Challenge leaderboard.

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Level up and earn **exclusive prizes!**

---



Complete your surveys in the **Cisco Live mobile app**.

# Continue your education



- Visit the Cisco Showcase for related demos
- 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](https://www.CiscoLive.com/on-demand)



The bridge to possible

# Thank you

CISCO *Live!*

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