Catalyst 9000 Switching Update
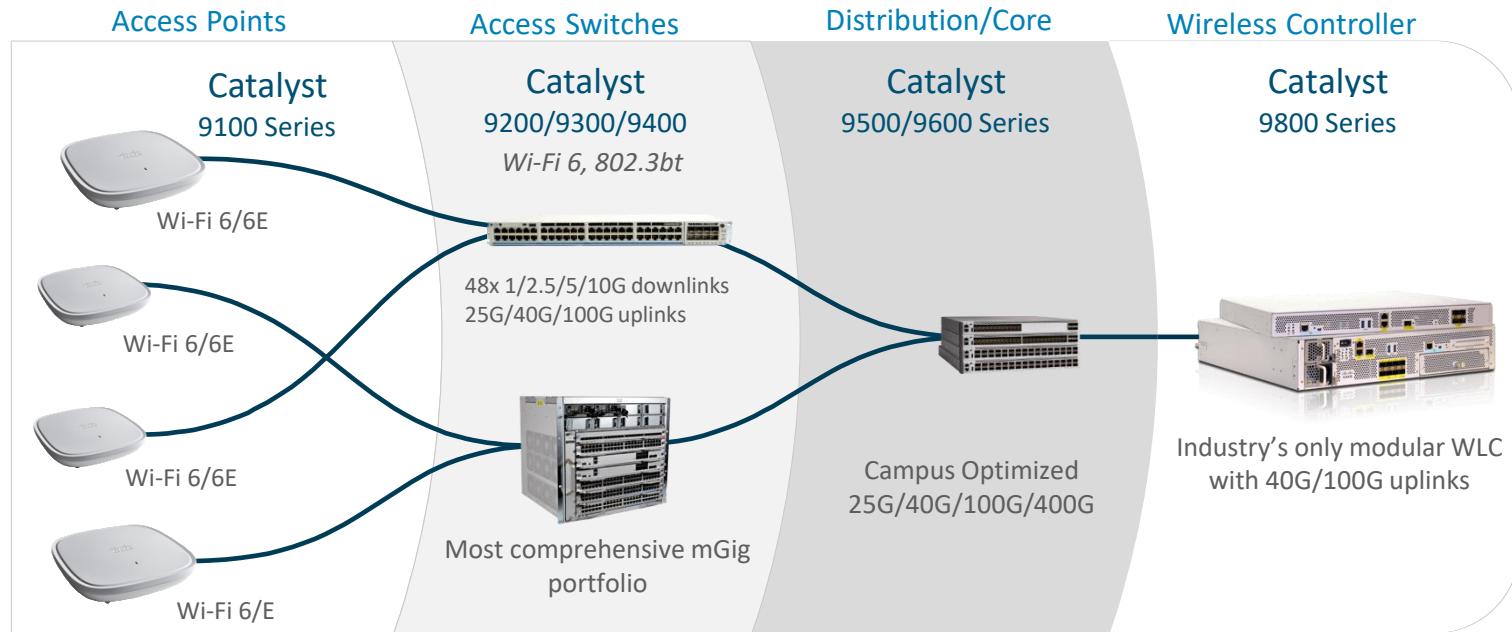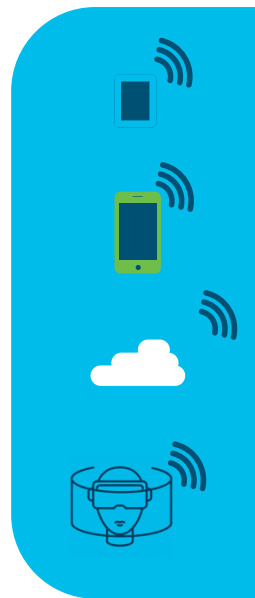
Jaromír Pilař

Technical Solutions Architect, CCIE #2910

9.5.2023

Cisco Catalyst Access Network
Best Access Experience for IT and IoT

Access Points

Access Switches

Distribution/Core

Wireless Controller

Catalyst
9100 Series

Catalyst
9200/9300/9400
Wi-Fi 6, 802.3bt

Catalyst
9500/9600 Series

Catalyst
9800 Series

Wi-Fi 6/6E

Wi-Fi 6/6E

Wi-Fi 6/6E

Wi-Fi 6/E

48x 1/2.5/5/10G downlinks
25G/40G/100G uplinks

Most comprehensive mGig
portfolio

Campus Optimized
25G/40G/100G/400G

Industry's only modular WLC
with 40G/100G uplinks

← Fully Integrated End to End →

Built for intent-based
networking

Automation

Security
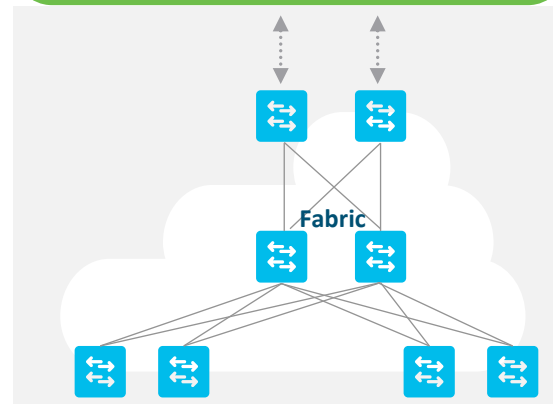
Analytics

Cisco Catalyst 9000 – flexibilita nasazení

Klasický vícevrstevný model

Core

Distribution

Access

25G/40G/100G

1G/2.5G/5G

Layer 3 Core, MPLS, VPLS,...

Distribution

Core

Distribution

Site 1

CE

MPLS

PE

PE

CE

Site 3

Site 2

CE

VRFs

Customer-managed MPLS backbone
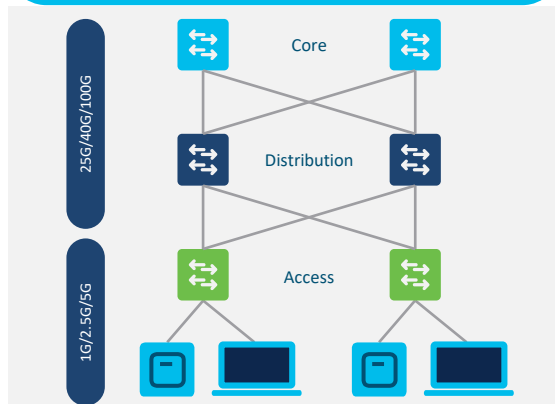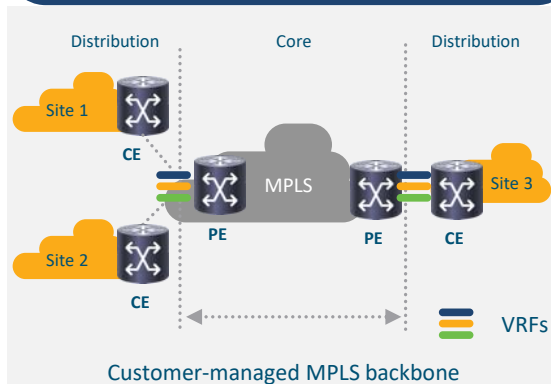
Fabric: SDA, BGP-EVPN

Fabric

Cisco řešení "na klíč"
- SD-Access
- Cisco DNA Assurance
- Cisco DNA Service for Bonjour
- Cisco DNA Application Visibility Service
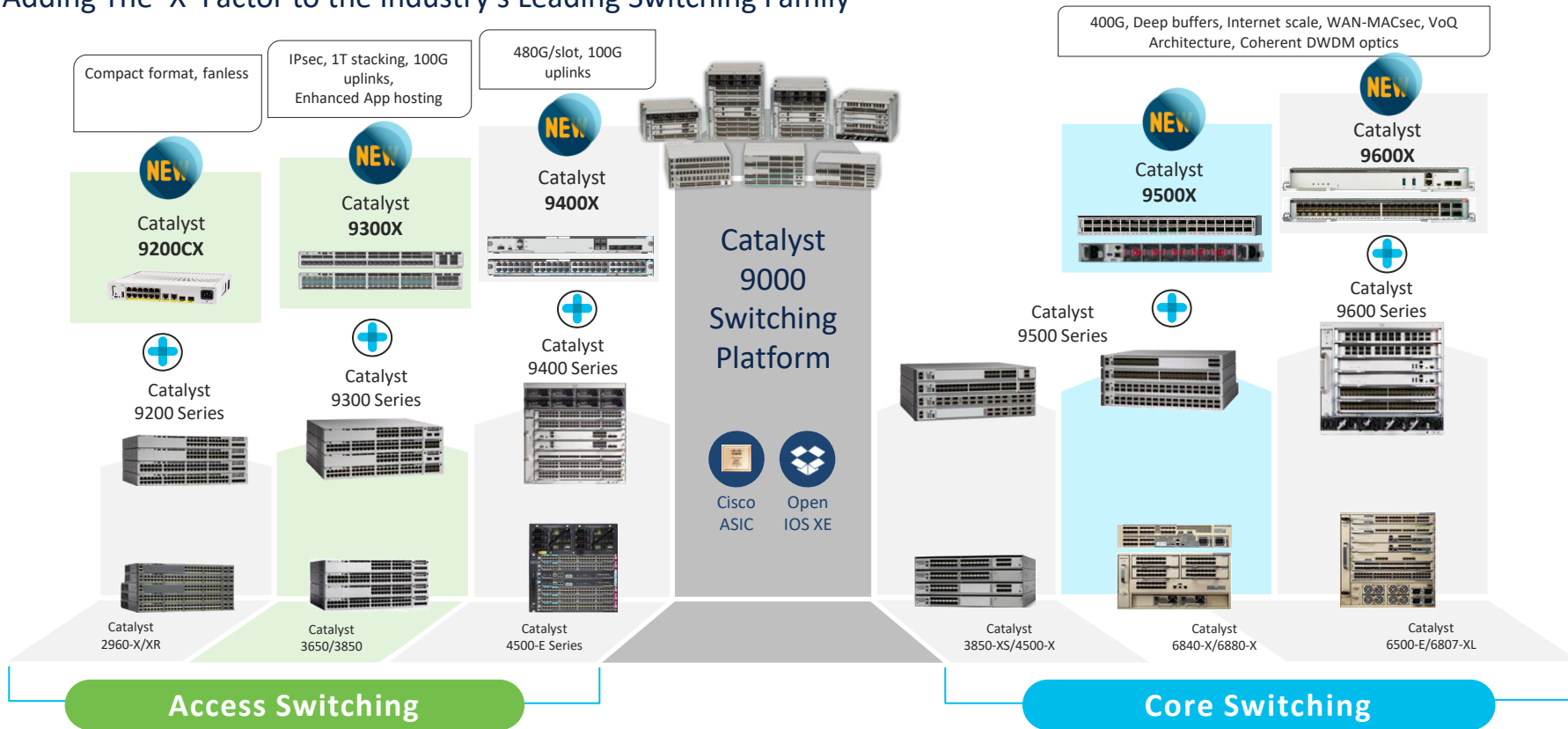- Encrypted Traffic Analytics

Do-It-Yourself (DIY) řešení
- BGP-EVPN
- MPLS/VPLS
- Tradiční 2/3-vrstvé topologie
- Programabilita – YANG modely s Netconf, Restconf, gNMI API

One platform. Any place. Any speed (10Mbps to 400Gbps)

Catalyst 9000 – Expanding Industry Leadership

Adding The 'X' Factor to the Industry's Leading Switching Family

400G, Deep buffers, Internet scale, WAN-MACsec, VoQ Architecture, Coherent DWDM optics

Compact format, fanless

IPsec, 1T stacking, 100G uplinks, Enhanced App hosting

480G/slot, 100G uplinks

NEW Catalyst **9200CX**

NEW Catalyst **9300X**

NEW Catalyst **9400X**

Catalyst 9000 Switching Platform

NEW Catalyst **9500X**

NEW Catalyst **9600X**

Catalyst 9200 Series

Catalyst 9300 Series

Catalyst 9400 Series

Cisco ASIC

Open IOS XE

Catalyst 9500 Series

Catalyst 9600 Series

Catalyst 2960-X/XR

Catalyst 3650/3850

Catalyst 4500-E Series

Catalyst 3850-XS/4500-X

Catalyst 6840-X/6880-X

Catalyst 6500-E/6807-XL

Access Switching

Core Switching

Cisco Catalyst 9200CX Series
Next generation of compact access switches for intent-based networking

9200 (Fixed Uplinks and Fanless)

Security

Resiliency

Application experience

Data

* Power via UPOE/UPOE+ Uplink!

C9200CX-12T-2X2G
12x 1G Ports

802.3bt PD Port

3 x 1G Copper and 2 x 1/10G SFP Uplinks

POE+

C9200CX-12P-2X2G
12x 1G Ports

C9200CX-8P-2X2G
8x 1G Ports

2 x 1G Copper and 2 x 1/10G SFP Uplinks

External PS on Data SKU
Fixed Internal PS on PoE+ SKUs

* Class 6 802.3bt (60W) minimum needed to power

Cisco Catalyst 9200 Series Highlights

UADP 2.0 Mini

Cisco IOS XE Lite Software

SD-Access

MACsec-256 link encryption

Trustworthy solutions

Perpetual/Fast PoE

Programmability

Cold patching

Full Flexible NetFlow
streaming telemetry

All Uplink Ports can be simultaneously used. Providing maximum bandwidth when needed.

Catalyst 9200CX Family

Shipping

PoE+ and Data 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

C9200CX-12T-2X2G

- 12 x 1G data
- 3 x 1G copper and 2 x SFP+ uplinks
- External power adapter (80W)
- 802.3bt Class 6 powered (60W)

Q1CY23

HVDC Models

C9200CX-12P-2X2GH

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

C9200CX-8P-2X2GH

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

Cisco Catalyst 9200 Series

Security

Resiliency

Application experience

Catalyst 9200L
Fixed uplinks, limited scalability

48 ports Full POE+/Data, 1G/10G Uplink

48 ports Full POE+, 12xmGig, 10G Uplink

48 ports Full POE+, 8xmGig, 25G Uplink

24 ports Full POE+/Data, 1G/10G Uplink

24 ports Full POE+, 8xmGig, 10G Uplink

24 ports Full POE+, 8xmGig, 25G Uplink

Catalyst 9200
Modular uplinks

48 ports Full POE+/Data
48 port Full POE+ with 32 VN**

48 ports Full POE+, 8xmGig

24 ports Full POE+/Data
24 ports Full PoE+ with 32 VN**
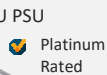
24 ports Full POE+, 8xmGig

Modular fans	Higher Efficiency AC FRU Power Supplies	Modular uplinks

FRU Fan

FRU PSU

Silver Rated

Platinum Rated

Platinum Rated

125W

600W

1000W

FRU Uplinks*

NEW

4x 1G

4x 10G

2x 25G

2x 40G

*C9200 1G skus support 1/10G uplinks while C9200 mGig will support 10/25/40G uplinks
**C9200 32 VN skus only support 1/10G uplinks and these skus cannot be stacked with other C9200 skus

Cisco Catalyst 9300L Series

Fixed Uplink Models

Fixed Uplinks (C9300L Models)

1G & PoE+

48/24 ports Data

Fixed 1G or 10G uplinks

48/24 ports PoE+

Fixed 1G or 10G uplinks

UPOE & mGIG models

C9300L-48UXG-2Q

36 x 10/100/1000 & 12 x 100/1/2.5/5/10G UPOE Ports

C9300L-24UXG-2Q

16 x 10/100/1000 & 8 x 100/1/2.5/5/10G UPOE Ports

C9300L-48UXG-4X

36 x 10/100/1000 & 12 x 100/1/2.5/5/10G UPOE Ports

C9300L-24UXG-4X

16 x 10/100/1000 & 8 x 100/1/2.5/5/10G UPOE Ports

Fixed 40G uplinks

Fixed 10G uplinks

Optional StackWise-320 Kit	Platinum-rated power supplies	Modular Fans

Common components

Stack Adapters

50CM-1M-3M

315W AC

715W AC/DC

1100W AC

1900W AC

* DC PS is Gold-Rated

8

Cisco Catalyst 9300LM Series
Fixed uplink replacement for Catalyst 3650-mini

8 mGig Ports, 4x1/10/25G Uplink

| 48 Port mGig UPOE |

4x1/10/25G Uplink

| 48 Port 1G UPOE |

4x1/10/25G Uplink

| 48 Port 1G Data |

4x1/10/25G Uplink

| 24 Port 1G UPOE |

Cisco Catalyst 9000 leadership

Same UADP performance as C9300L
Cisco IOS® XE Software
SD-Access
x86 CPU and containers
Encrypted Traffic Analytics (ETA)
AES-256/MACsec-256
Trustworthy systems
Cisco StackWise-320
IEEE1588 and AVB
NBAR2
Perpetual/Fast PoE
Model-driven programmability
Patching/GIR
Streaming telemetry
NEBS L3 Certified

UADP 2.0

Multicore X86 CPU

Open IOS XE (X86)

USB 3.0 type-A Front Panel SSD

Stackable with C9300L

mGig

802.3bt Type-3

25G Ready (25G)

Modular fans*

Modular Stacking

Higher-efficiency AC and DC power supplies

600W AC **715W DC** **1000W AC**

Catalyst C9300L — 488 mm

Catalyst C9300LM — 305 -335 mm

Platform Depth <350 mm		
	AC PSU	**DC PSU**
UPOE	335 mm	325 mm
Data	315 mm	305 mm

Note: * Data SKU utilize fixed fans

Cisco Catalyst 9300 Series

C9300 SKUs with _Modular Uplinks_

1G Copper ports with PoE/UPOE/UPOE+

48/24 ports _Data_ 1G

48/24 ports _UPOE_ 1G

2-4x Scale/Buffer

48/24 ports UPOE 1G – **9300B**
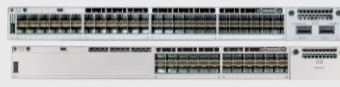
48/24 ports _PoE_+ 1G

48/24 ports _UPOE_+ 1G

Multigigabit Models with UPOE

48/24 ports mGig

1G Fiber Models

48/24 ports SFP 1G

C9300 _Only_ Modular Uplinks

4x Multigigabit

4x 1G SFP

8x 1/10G SFP/SFP+

2x 1/10/25 G SFP/SFP+

2x 40G QSFP

C9300X SKUs with _Modular Uplinks_

High Density Multigigabit Models with UPOE+

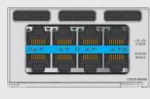### 1/10/25G Fiber Models

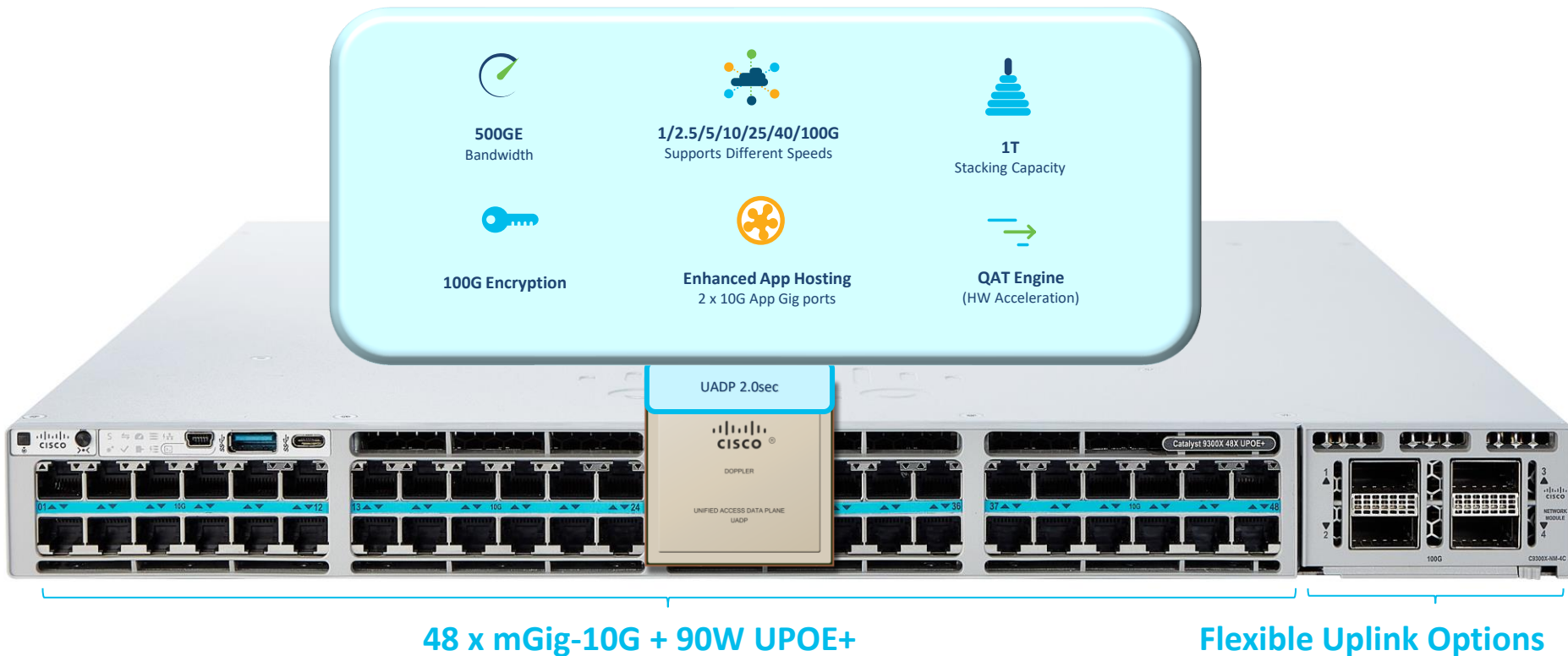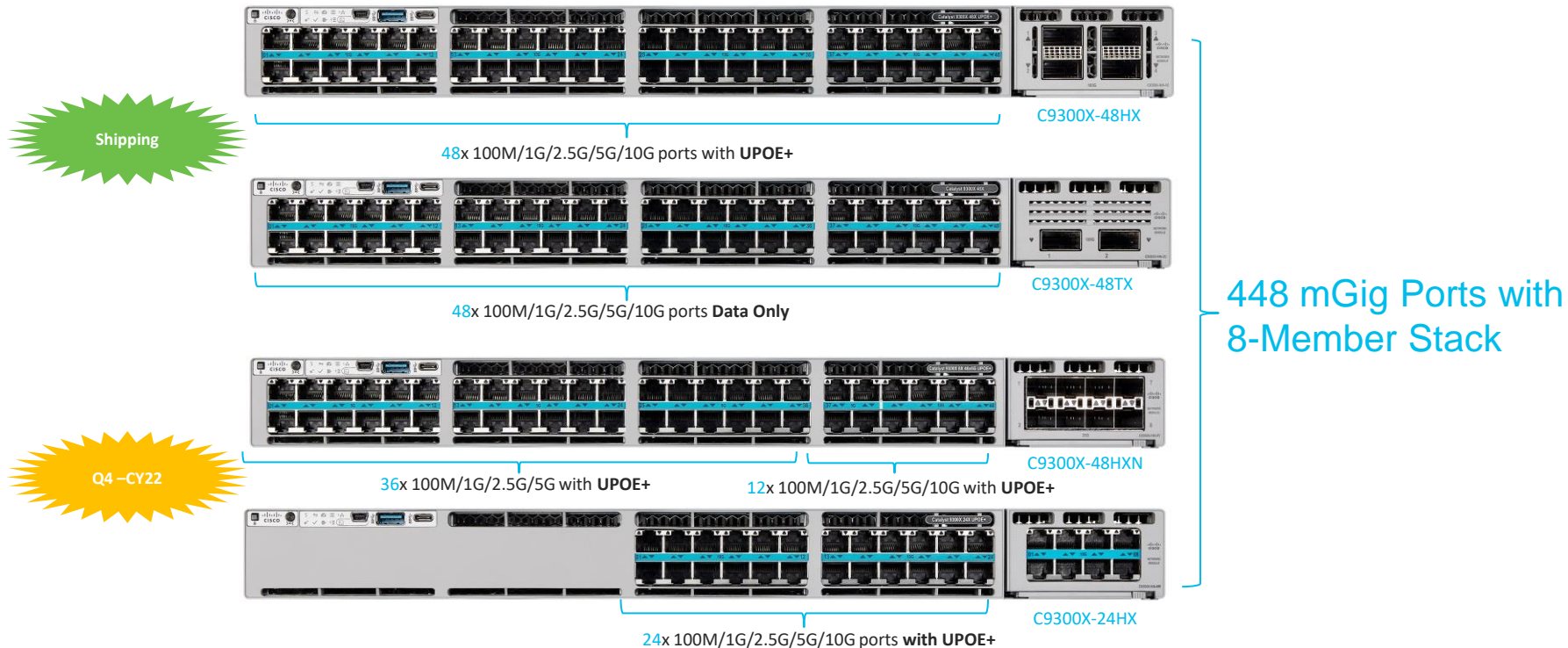### C9300X _Only_ Modular Uplinks

4x 40/100G *

2x 40/100G

8x 10/25G **

8x mGig

StackWise and StackPower Cables

50CM-1M-3M

30CM-150CM

Platinum rated power supplies

315W AC

715W AC/DC

1100W AC

1900WAC

Modular Fans

Common Components

Catalyst 9300X – New High Performance Access Switch

500GE
Bandwidth

1/2.5/5/10/25/40/100G
Supports Different Speeds

1T
Stacking Capacity

100G Encryption

Enhanced App Hosting
2 x 10G App Gig ports

QAT Engine
(HW Acceleration)

UADP 2.0sec

CISCO ®

DOPPLER

UNIFIED ACCESS DATA PLANE
UADP

Catalyst 9300X 48X UPOE+

48 x mGig-10G + 90W UPOE+

Flexible Uplink Options

Catalyst 9300X Multigigabit Models

Shipping

Q4 –CY22

C9300X-48HX
48x 100M/1G/2.5G/5G/10G ports with **UPOE+**

C9300X-48TX
48x 100M/1G/2.5G/5G/10G ports **Data Only**

C9300X-48HXN
36x 100M/1G/2.5G/5G with **UPOE+**   12x 100M/1G/2.5G/5G/10G with **UPOE+**

C9300X-24HX
24x 100M/1G/2.5G/5G/10G ports **with UPOE+**

448 mGig Ports with 8-Member Stack
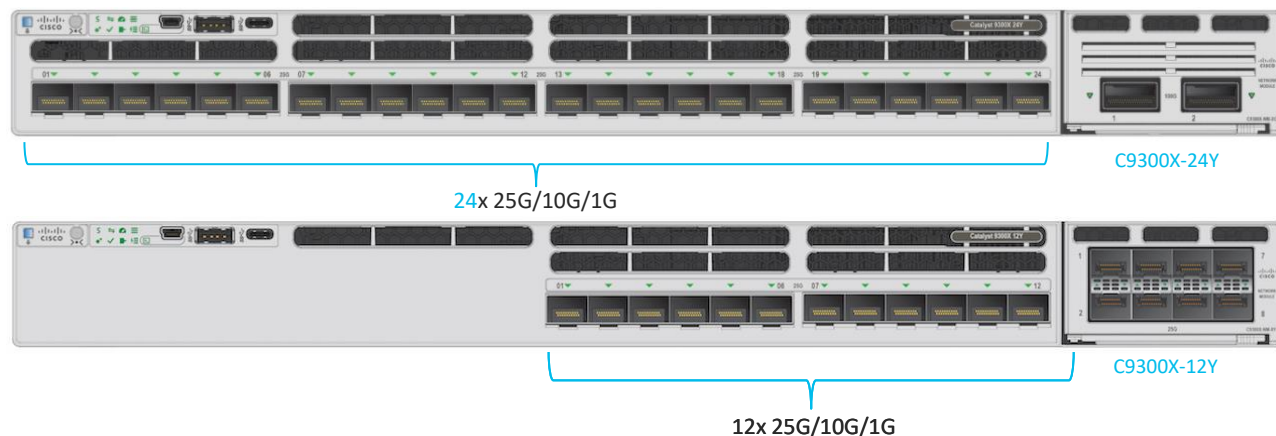
Highest Multigigabit Ports in the Industry with Standalone and StackWise-1T

Catalyst 9300X High Speed Fiber

Shipping

C9300X-24Y

24x 25G/10G/1G

C9300X-12Y

12x 25G/10G/1G

Stackable with
C9300/C9300X

3850 10G Fiber Replacement

Collapsed Access

FTTD

Servers

Bringing Stackable High Speed fiber to the Access

Cisco Catalyst 9400X

UADP 2.0XL

Up to 240G bandwidth

1/2.5/5/10/25/40G Supports Different Speeds

Forwarding + ACL Scale
Up to **96K MACs**
Up to **64K Routes**

Up to 32 MB (2 x 16MB) packet buffer

Sup-1/1XL

240/120/80Gbps/Slot with Sup-1XL (4/7/10 Slot Chassis)
80Gbps/Slot with Sup-1 (All Chassis)

UADP 3.0sec

NEW

Sup-2/2XL

480Gbps/Slot with Sup-2XL
240Gbps/Slot with Sup-2

Up to 1.6T Bandwidth

1/2.5/5/10/25/40/100G Supports Different Speeds

Increased Forwarding + ACL Scale
Up to **128K MACs***
Up to **256K Routes***

Up to 36 MB Unified packet buffer

Up to 100G Encryption
IPSec*, WAN-MACsec*

Customizable Templates for higher Scale*
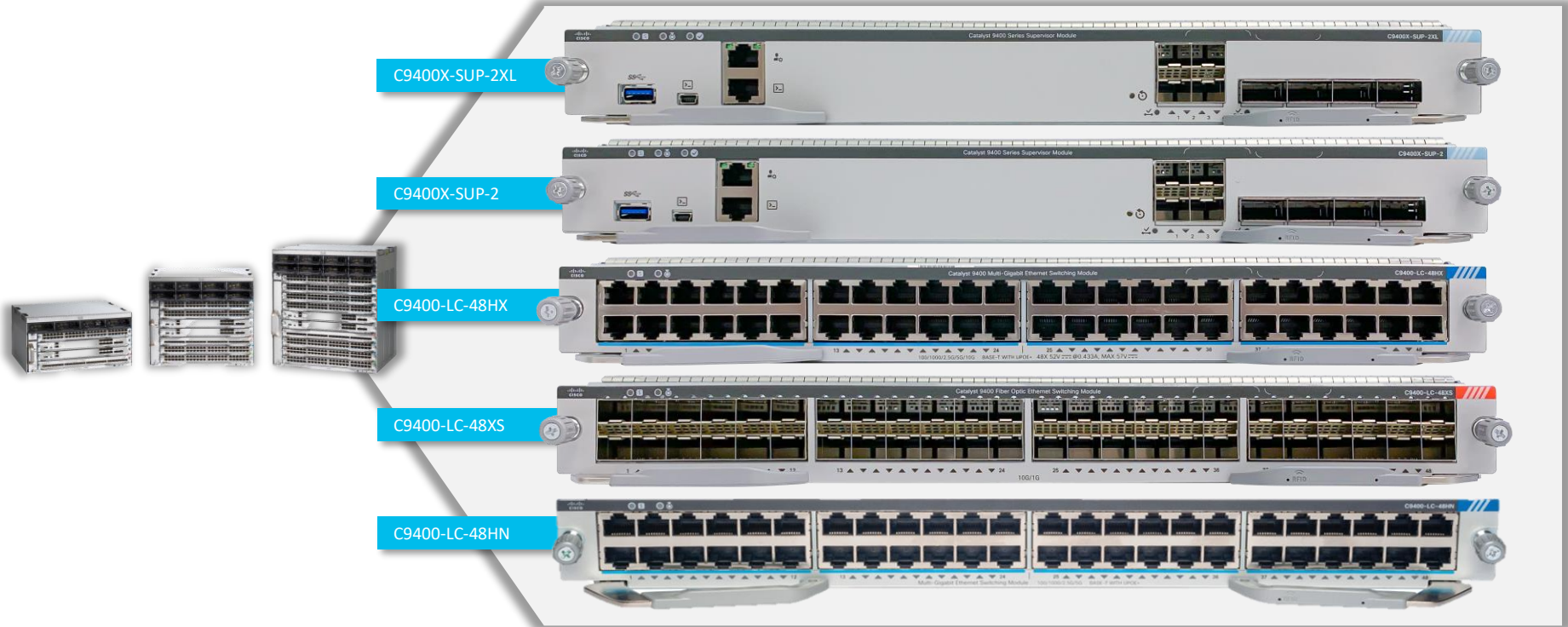
* Hardware Capable, Software Support not committed

Unmatched Flexibility

Maximum Investment Protection

100G Leadership in Access

Same Series, Chassis options – New SUPs and Line cards

Same Chassis with New Supervisors and Line cards

C9400X-SUP-2XL

C9400X-SUP-2

C9400-LC-48HX

C9400-LC-48XS

C9400-LC-48HN

NOTE: Same Supervisor model required in Dual SUP/SSO configuration

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 (New)	UPOE+	-	- Not Supported	-	240	480
C9400-LC-48XS (New)	Fiber	-	-	-	240	480
C9400-LC-48UX	UPOE	80 / 240	80 / 120	80	240	240
C9400-LC-24XS	Fiber	80 / 240	80 / 120	80	240	240
C9400-LC-48HN	UPOE+	80 / 120	80 / 120	80	240	240

Bandwidth in Gbps

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**

Extending Cisco Catalyst 9500 & 9600 Series

Powered by Cisco Silicon One™ Q200 ASIC

NEW

C9500 & C9600-SUP1
(w/ UADP 3.0)

Optimized for Features

✓ **Speed**
- 1/10 & **25G SFP**
- 40 & **100G QSFP**

✓ **Scale**
- Upto **128K MACs**
- Upto **256K Routes**
- **108MB Buffers** (3x 36MB)

✓ **Services**
- L2/L3 Routing, MPLS
- LAN MACsec, Netflow, NAT
- Custom ASIC Templates
- Campus Fabric (SDA & EVPN)

Double Existing Throughput

WAN MACsec, 1588v2 PTP

C9600X-SUP-2
C9600-LC-40YL4CD

10^x Routing & MPLS Scale

C9500X-28C8D

80MB Low-Latency + 8GB High-BW Buffers

50GE, 400GE, Coherent DWDM

C9500X & C9600X-SUP2
(w/ S1 Q200)

Optimized for Scale

✓ **Speed**
- 10/25G & **50G** ** **SFP**
- 40/100G & **200** **/400G QSFP**

✓ **Scale**
- Upto **256K MACs**
- Upto **2M Routes**
- **80MB + 8GB Buffers**

✓ **Services**
- L2/L3 Routing, MPLS/TE
- LAN & **WAN-MACSec***, Netflow, NAT**
- Custom ASIC Templates
- Campus Fabric (SDA & EVPN*)

Maximum Investment Protection

400G Leadership in Campus

Unmatched Flexibility

* Targeted 17.8.1
** Hardware capable. Roadmap (not committed)

Cisco Silicon One™ Q200

Industry leading Switching and Routing Silicon

12.8T BW

8.1 Bpps

8G HBM for deep buffers

10M IPv4 or 5M IPv6 route scale

Fully P4 Programmable Pipeline

50G PAM4 Serdes

Cisco Silicon ONE Q200

Industry Leading
12.8T System on Chip

First 7nm ASIC providing lowest watts/GE power consumption

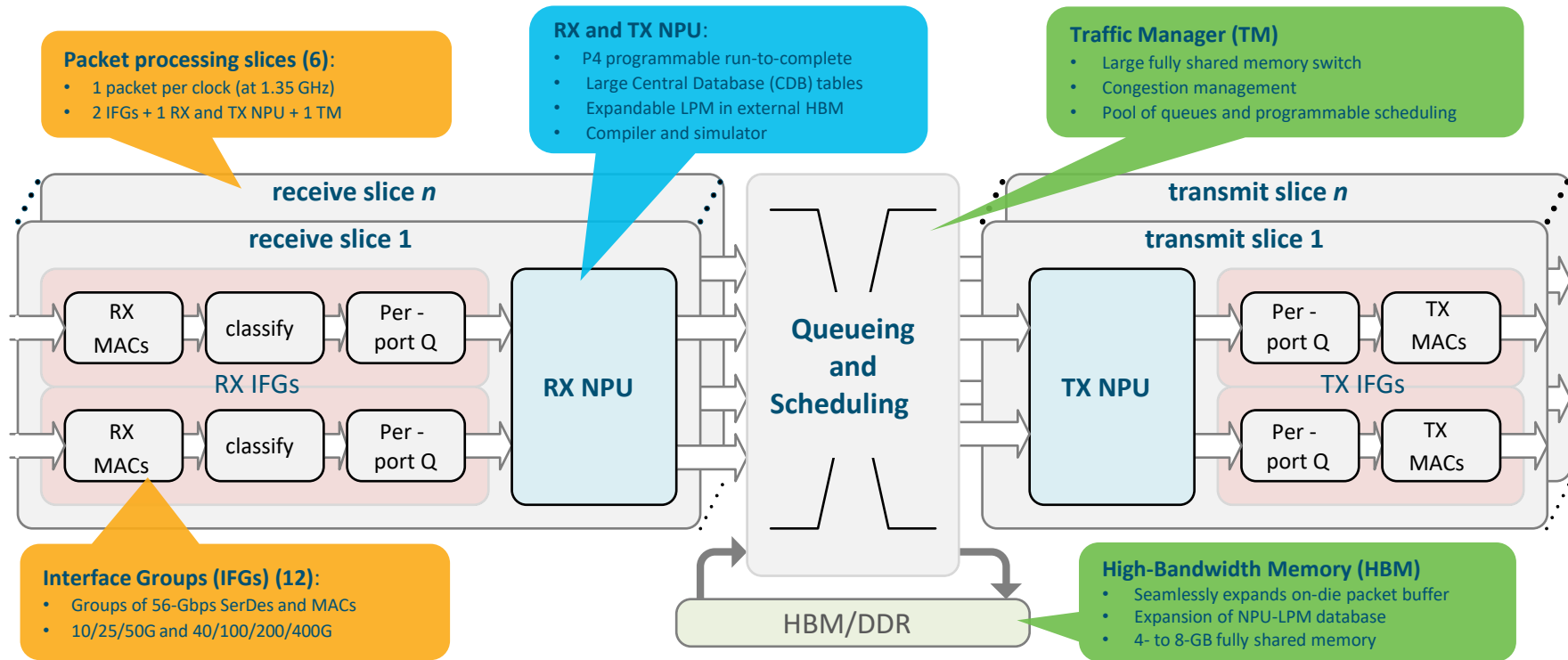**Fully P4 programmable enabling feature velocity**

Multi slice architecture for flexibility and scale

Routing Capabilities with Switching Power and Performance

Silicon One ASIC architecture overview

Packet processing slices (6):
- 1 packet per clock (at 1.35 GHz)
- 2 IFGs + 1 RX and TX NPU + 1 TM

RX and TX NPU:
- P4 programmable run-to-complete
- Large Central Database (CDB) tables
- Expandable LPM in external HBM
- Compiler and simulator

Traffic Manager (TM)
- Large fully shared memory switch
- Congestion management
- Pool of queues and programmable scheduling

receive slice _n_

receive slice 1

RX MACs — classify — Per - port Q

RX IFGs

RX MACs — classify — Per - port Q

RX NPU

Queueing and Scheduling

transmit slice _n_

transmit slice 1

TX NPU

Per - port Q — TX MACs

TX IFGs

Per - port Q — TX MACs

HBM/DDR

Interface Groups (IFGs) (12):
- Groups of 56-Gbps SerDes and MACs
- 10/25/50G and 40/100/200/400G

High-Bandwidth Memory (HBM)
- Seamlessly expands on-die packet buffer
- Expansion of NPU-LPM database
- 4- to 8-GB fully shared memory

Catalyst 9000 Series – Common Building Blocks

Programmable x86
Multi-Core CPU

Application Hosting
Secure Containers

Open IOS XE®
Polaris

Model-Driven APIs
Modular Patching

Cisco Silicon One™
Q200 ASIC

Programmable Pipeline
Flexible Tables

Same binary image for both UADP and Silicon One C9K platforms*

* C9200 uses IOS XE Lite

Catalyst 9500 Series

Extending the Catalyst 9500 High-Performance Fixed Core

Non-XL Scale

Catalyst 9500H
(UADP 3.0)

C9500-32C / C9500-32QC

C9500-48Y4C / C9500-24Y4C

XL Scale

NEW

Catalyst 9500X
(S1 Q200)

C9500X-28C8D

Total Capacity

3.2 Tbps

32 x 100G or
48 x 25G + 4 x 100G

2x

Total Capacity

6.0 Tbps

36 x 100G or
28 x 100G + 8 x 400G

C9500X-28C8D

Gen2 Fixed 1RU QSFP Switch - 36x 100G / 28x 100G + 8x 400G

6.0 Tbps

- **1x Cisco SiliconOne Q200 ASIC**
  - **6.0 Tbps** System Throughput
  - **28x QSFP28** ports - 40/100GE
  - **8x QSFPDD** ports - 100/200*/400GE
- **1x 8C 2.4GHz x86** CPU with 2x **16GB (32GB) DDR4** DRAM
- **16GB Flash;** Optional SSD (480G, 960G)
- **12x CDR5M** PHYs
  - MACSec, WAN-MACSec, ClearTag v3.4
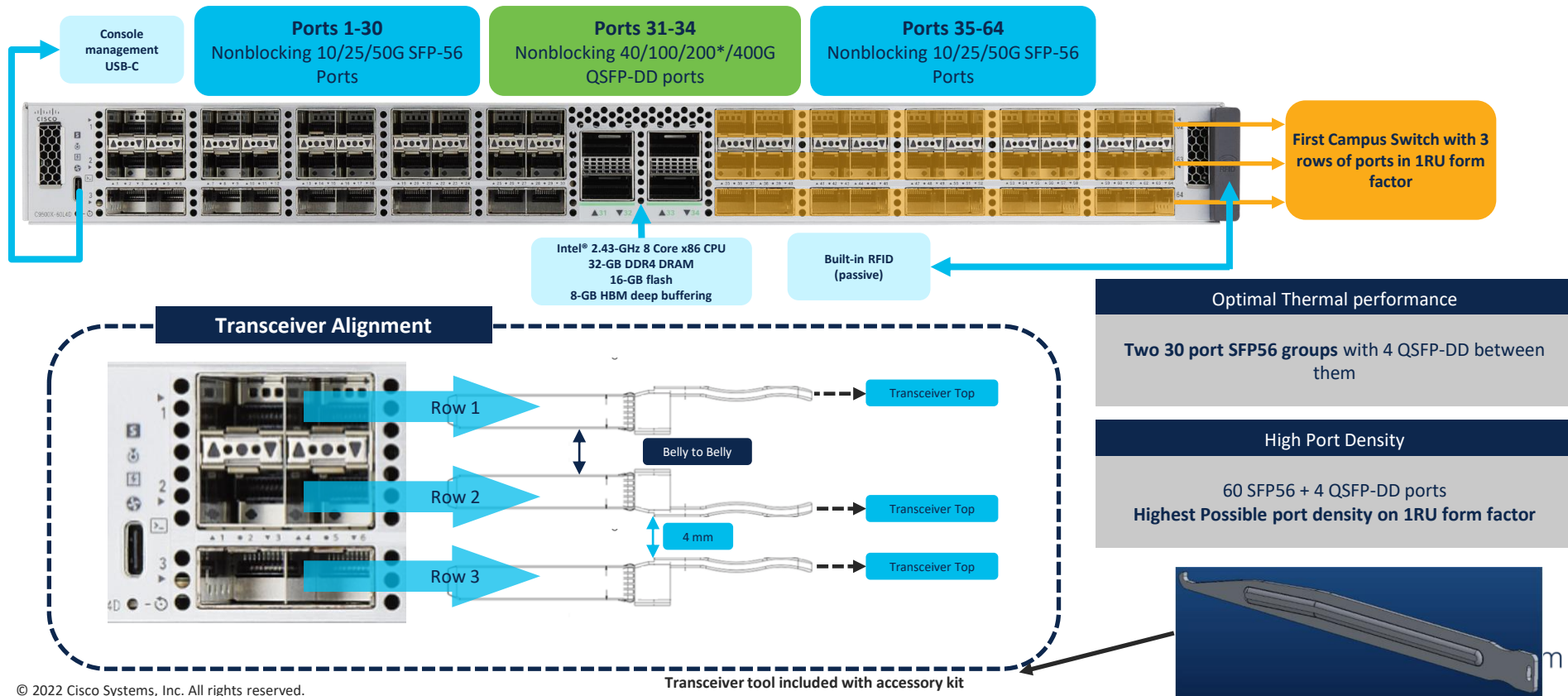 - IEEE 1588 & PTPv2*
- **Various SFP Breakout & QSA support***

*Hardware capable. Roadmap (not committed)
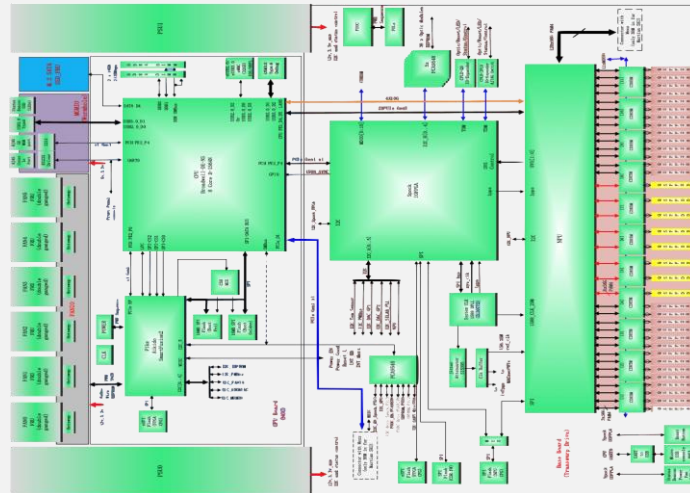
Introducing Catalyst 9500X-60L4D
Dense 1 RU SFP56 Switch – 60 x 10/25/50G + 4 x 40/100/200*/400G

Silicon One™ Q200 | Multicore X86 CPU | Cisco IOS® XE

IOS-XE 17.10.1

~3 x Switch Performance	10x Route Scale and ultra-deep Buffers	50G SFP in Campus
Upto 4.6 Tbps switching capacity Upto 8 Bpps forwarding rate	Up to 2 million route scale 8 GB of ultra-deep buffers	Dual rate optics for future proofing High Port Density

Unmatched Flexibility with Customizable Templates

C9500X-60L4D

50G SFP56

400G QSFP-DD

Powered by S1 Q200

Q1 CY23

Industry first

50G & 400G leadership

Secure with LAN & WAN MACsec or IPsec*

Application Hosting (2 x 10G AppGig ports)

Reversible Airflow	Highest Fixed Resiliency	Hardware Encryption
Front to Back Back to Front	Redundant fans (5+1) Redundant power supplies (AC & DC options) StackWise® Virtual (**17.11.1**)	LAN MACsec WAN MACsec IPsec*

Cisco
Global Sales Enablement Team
Virtual Teams

* HW-Capable

Catalyst C9500X-60L4D
Innovative Design

Console management USB-C

Ports 1-30
Nonblocking 10/25/50G SFP-56 Ports

Ports 31-34
Nonblocking 40/100/200*/400G QSFP-DD ports

Ports 35-64
Nonblocking 10/25/50G SFP-56 Ports

First Campus Switch with 3 rows of ports in 1RU form factor

Intel® 2.43-GHz 8 Core x86 CPU
32-GB DDR4 DRAM
16-GB flash
8-GB HBM deep buffering

Built-in RFID (passive)

Transceiver Alignment

Row 1

Row 2

Row 3

Transceiver Top

Transceiver Top

Transceiver Top

Belly to Belly

4 mm

Transceiver tool included with accessory kit

Optimal Thermal performance

Two 30 port SFP56 groups with 4 QSFP-DD between them

High Port Density

60 SFP56 + 4 QSFP-DD ports
Highest Possible port density on 1RU form factor

Catalyst 9600 Series

Extending Modular Core with a Performance-Optimized Supervisor 2

UADP 3.0

Supervisor 1

Total Capacity

4.8 Tbps

Slot B/W

1.2 Tbps

Gen1
1.2T /slot

Gen2
3.2T /slot

NEW

Gen2
3.2T /slot

Gen1
1.2T /slot

400G

40x 1/10/25/50G + 2x 200G + 2x 400G

NEW

SiliconOne Q200

Supervisor 2

Total Capacity

12.8 Tbps

Slot B/W

3.2 Tbps

3x

C9600X-SUP-2

Gen2 Supervisor Module with Silicon One™ Q200

12.8 Tbps

- **1x Cisco SiliconOne Q200 ASIC** (12.8Tbps)
  - **3.2Tbps per Slot**
  - Optimized for 10G to 400G
- **1x 8C X86 2.4GHz CPU with 2x 16GB (32GB) DDR4 DRAM**
- **Management**
  - 2x 10G SFP+ Mgmt ports to CPU (App Hosting)
  - 1x 10/100/1000M RJ45 Mgmt0 port
  - 1x RJ45 Console port, USB Type-B-Mini port
- **Storage**
  - 2x USB3.0 Type-A SSD ports
  - 480-960GB M.2 SATA Drive (optional)
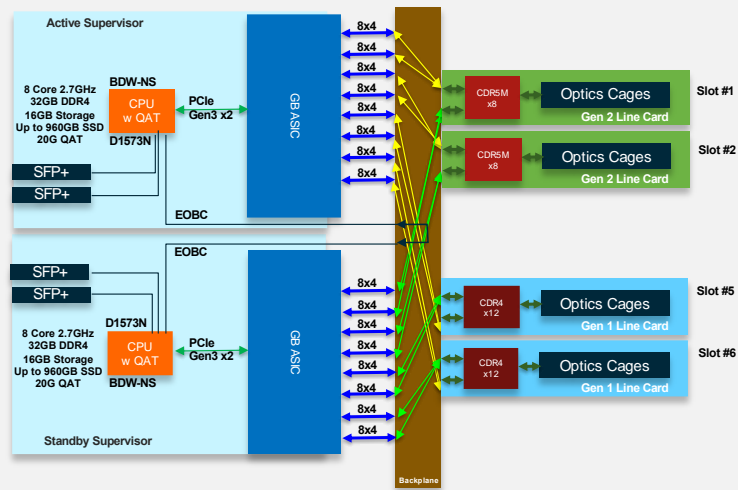
C9600-LC-40YL4CD

Gen2 Combo Line-Card – 40xSFP56 + 2xQSFP56 + 2xQSFPDD

3.2 Tbps

- **3.2 Tbps** With Gen2 Sup
  - **40x SFP56** ports - 10/25/50*GE
  - **2x QSFP56** ports - 40/100/200*GE
  - **2x QSFPDD** ports - 40/100/200*/400GE
- **1.2 Tbps** **With Gen1 Sup**
  - **40x SFP28** ports - 1/10/25GE
  - **2x QSFP28** ports - 40/100GE
- 8x **CDR5M** PHYs
  - MACSec, WAN-MACSec, ClearTag v3.4
  - IEEE 1588 & PTPv2*
  - Hitless MUX (HMUX)
- Various Breakout & QSA support (QSFP ports)*

* Hardware capable. Roadmap (not committed)
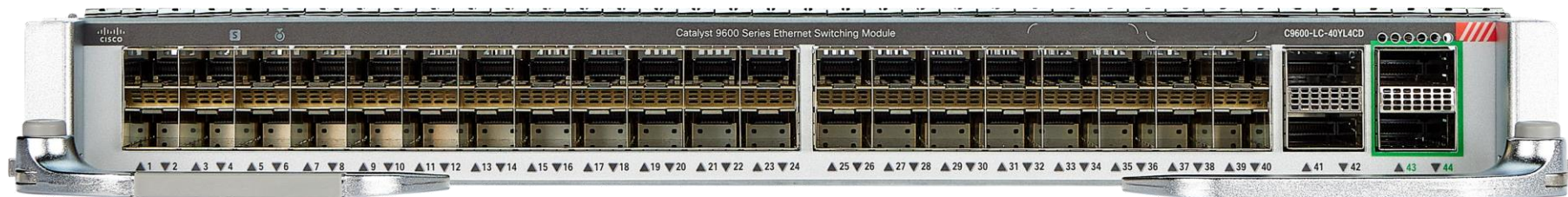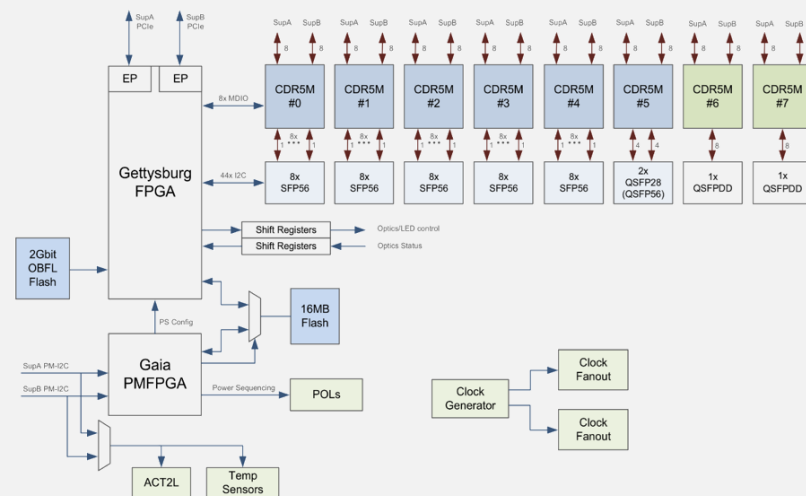
C9600 Line Card – Supervisor Support Matrix

	SUP 1	SUP 2
C9600-LC-24C	✓ 24x 40G or 12x 100G	✓ 24x 40G & **100G** (No MACsec)
C9600-LC-48YL	✓ 48x 1/10 & 25G	✓ 48x 10/25 & **50G*** (No MACsec , No 1G)
C9600-LC-48TX	✓ 48x 1/2.5/5 & 10G (mGig)	✓ 48x 10G (No MACsec, No 1/2.5/5G)
C9600-LC-48S	✓ 48x **1G SFP**	✗
C9600-LC-40YL4CD	✓ 40x 1/10 & 25G + 2x 40 & 100G	✓ 40x 10/25 & **50G*** + 2x 40/100 & **200G*** + 2x 40/100**200*** & **400G** MACsec & **WAN-MACsec** (No 1G)

TIP

SUP2 does not support 1GE or below speeds

If 1GE downlinks are required, position SUP1

* Roadmap (not committed)

Line cards positioning for Catalyst 9600

QSFP

C9600-LC-24C
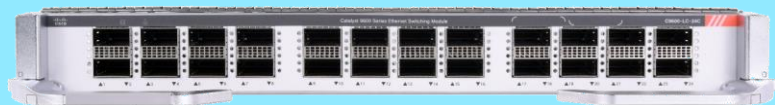
Sup 1
- 24 x 40G or 12 x 100G
- MACsec at line rate across all ports

Sup 2
- **24 x 40/100G**
- **No MACsec**

C9600X-LC-32CD NEW
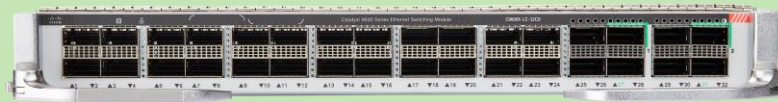
Only supported on Sup 2
- **32 ports at 100G** (or 24 ports at 100G and **2 ports at 400G** or 28 ports at 100G and 1 port at 400G)
- MACsec and **WAN-MACsec*** at line rate across all ports

SFP

C9600-LC-48YL

Sup 1
- 48 x 1/10/25G
- MACsec at line rate across all ports

Sup 2
- **48 x 10/25/50G[1]**
- **No MACsec**

C9600-LC-40YL4CD

Sup 1
- 40 x 1/10/25G and **2 x 100G**
- MACsec at line rate across all ports

Sup 2
- **40 x 10/25/50G[1]** and **2 x 40/100G and 2 x 100/400G**
- MACsec and **WAN-MACsec*** at line rate across all ports

[1]50G support with IOS-XE 17.10 *Requires a HSEC License for WAN-MACsec functionality

StackWise Virtual on Catalyst 9400X, 9500X and 9600X

Campus resiliency across Catalyst 9000 Portfolio*

SVL parity between Gen 1 and Gen 2		
IOS-XE 17.9.1	Catalyst 9400X-SUP2/XL	NEW
IOS-XE 17.10.1	Catalyst 9500X-28C8D and 9600X-SUP2	NEW
IOS-XE 17.11.1	Catalyst 9500X-60L4D	NEW

Traditional 3-tier Campus design
- HSRP/VRRP
- STP/MST/RSTP
- L3
- L2

StackWise Virtual Design
- Active — SVL — Standby — SVL Pair #1
- L3
- Active — SVL — Standby — SVL Pair #2
- Multi-Chassis Ether-channel
- L2
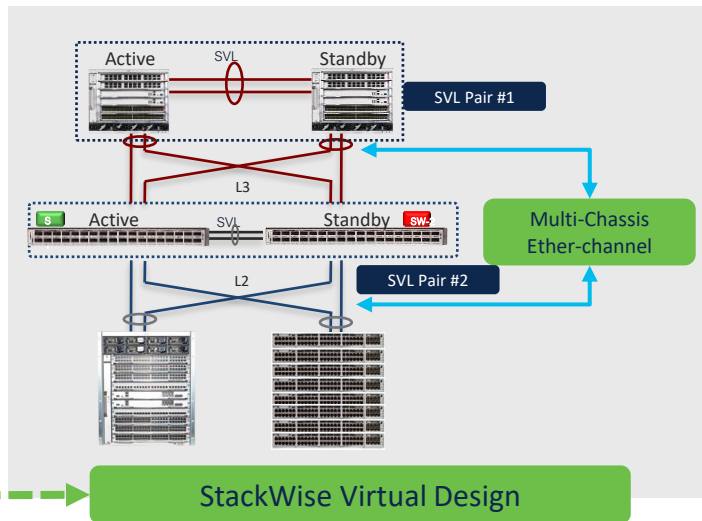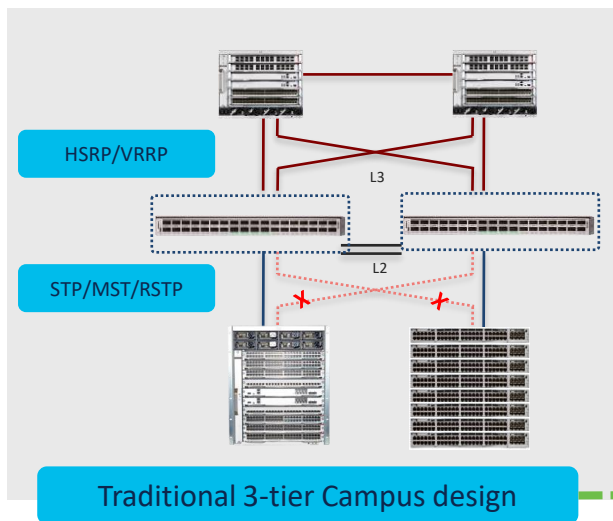
Simplify Operations
Eliminate loop prevention and redundancy protocol like STP, FHRP (HSRP/VRRP)
Double Bandwidth and Reduce Latency
Active-Active Multi-chassis EtherChannel (MEC)
Enhanced Redundancy – SSO/NSF
Sub-second failovers and Graceful protocol recovery
NEW Features specific to Q200 Platforms
Dynamically add/remove SVL and DAD links

ISSU for C9500X/C9600X coming in next EMR release – 17.12.1

Quad Sup RPR not supported on 9400 Sup1/2 & 9600 Sup 2

* Not supported on C9200 and C9300 Switches

Catalyst 9500X & 9600X – Things to know
Next Generation Core + Edge Switching with Silicon One™ Q200

**C9600X-SUP-2 + LC-40YL4CD**
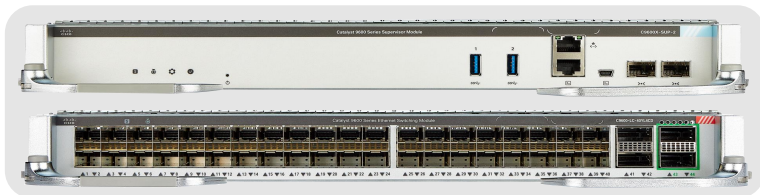
C9500X-28C8D
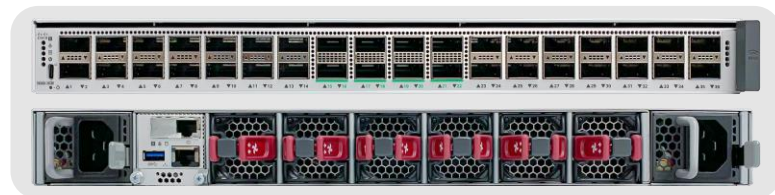
	Technology	Brief Description	Diffs from UADP 3.0
✓	**Large LPM Table**	• **Up to 2M IPv4 or 1M IPv6 (hash efficiency is about 80%)** • **Dedicated Memory for LPM**	• Up to 256K IPv4/IPv6 with Custom SDM template • LPM and other features share 416K ASIC memory
✓	**Large MAC Table**	• **Up to 256K MAC entries Custom SDM template**. • Shared with other features	• Up to 128K MAC entries with Custom SDM template • MAC shared with LPM, etc. in same 416K ASIC memory
✓	**VoQ QoS + HBM**	• **Q200 has 80MB local (low-latency) + 8GB HBM (High Bandwidth Memory) buffer memory.** • **Q200 uses a Virtual Output Queue (VoQ) architecture.** All queuing and policing policies applied on Ingress.	• Max 36MB unified buffer memory per ASIC • Supports both Ingress/Egress queuing & policing
✓	**OGACL & SGACL**	• **8K IPv4, 4K IPv6 ACL TCAM entries.** • **Object-Group & Security-Group ACLs use CEM to map IP-to-Group label, TCAM only uses L4 ACEs.** (OG/SG ACL design is optimal for layer 3 environment).	• 64K ACL TCAM entries per ASIC • Object-group expand into the TCAM space
✓	**LAN & WAN-MACsec**	• **Q200 does not have built-in crypto engine.** • **C9500X & C9600X-LC uses new CDR5M PHY (400Gbps Full-Duplex).** CDR5M provides line-rate (8x 400G = 3.2T) 802.1ae (LAN) MACsec and WAN-MACsec.	• UADP3 has built-in MACsec crypto (speed of ASIC) • UADP3 only supports LAN MACsec (no WAN-MACsec)
✓	**Flexible NetFlow[*]**	• **Q200 does not have built-in Flow Cache memory (no hardware-based Netflow).** • **C9500X & C9600X uses new Software-based FNF (≤ 2M entries), with a dedicated CPU core (~2Mpps).** FNF sampler rate 1:1000, ~10Tbps of 512-Byte packets = ~2Mpps.	• UADP3 has built-in (HW) FNF, max 64K entries per ASIC • FNF shared with LPM, etc. in same 416K ASIC memory

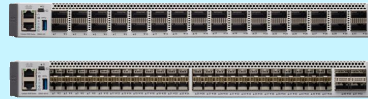# Catalyst 9500 & 9600 Series Core Positioning

Next Generation Core + Edge Switching with Silicon One™ Q200

Feature Optimized
C9500 & C9600-SUP-1
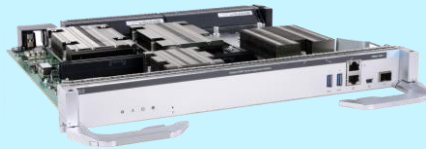
C9600-SUP-1   C9500

- ✓ Best-in-class Enterprise Core feature set
- ✓ Low speeds (1G – 40G) and port density
- ✓ Comprehensive MPLS, EVPN and SDA
- ✓ Ideal for Campus Core, Collapsed Core + Agg

Performance Optimized
C9500X & C9600X-SUP-2

C9600X-SUP-2   C9500X
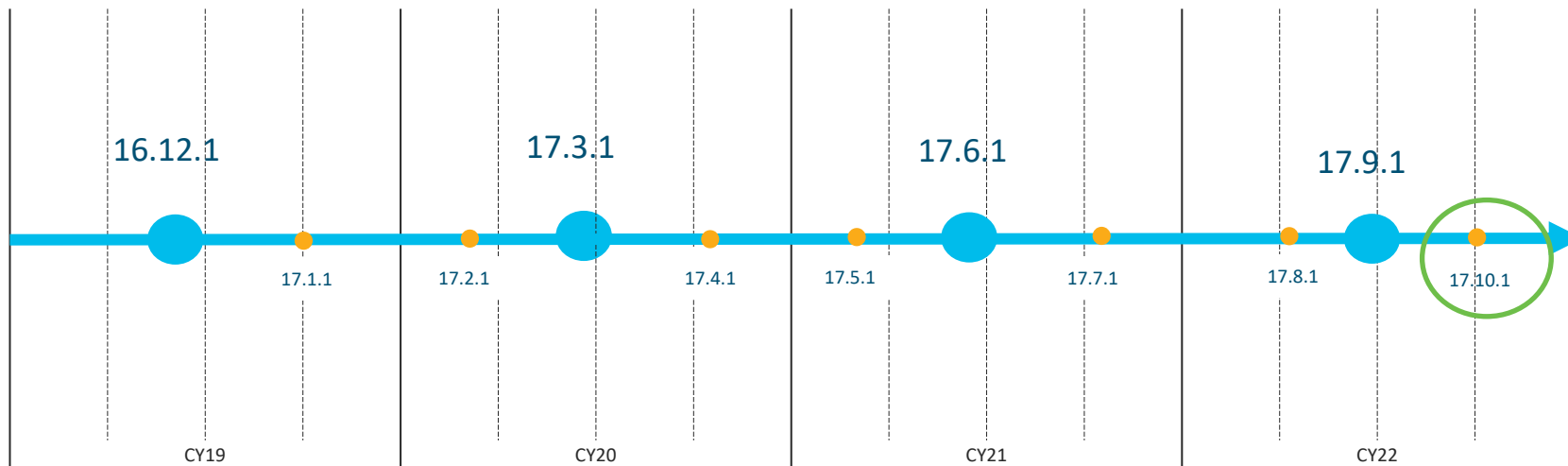
- ✓ Unmatched forwarding scale and performance
- ✓ High speeds (10G – 400G) and port density
- ✓ Scaled MPLS and SDA, WAN-MACsec
- ✓ Ideal for Campus Core + Edge, or Centralized WLC

IOS XE Release Schedule
3 Releases Annually (every 4 months)

16.12.1

17.3.1

17.6.1

17.9.1

17.1.1

17.2.1

17.4.1

17.5.1

17.7.1

17.8.1

17.10.1

CY19

CY20

CY21

CY22

Extended Maintenance Release ("EMR") – **36 months support**.
Recommended for wide-scale production deployments – Supports patches (SMU) and ISSU*

Standard Maintenance Release ("SMR") – **12 months support**

*Subject to change based on technical limitations

IOS XE 17.9.1 Software Release Summary

C9200CX-12T-2X2G

C9300LM-48UX-4Y

C9600X-LC-32CD

Platform/Infra

- ✓ 9400X
  - ✓ StackWise Virtual on C9400X-SUP-2/XL
  - ✓ 4K Active VLAN support for C9400X-SUP-2/XL
  - ✓ C9400X-SUP2/SUP2XL - 432 Port Channels
  - ✓ Perpetual PoE support with C9400X-SUP-2/XL
  - ✓ Auto Negotiation on SUP-2/2XL
- ✓ Destination IP based NAT Scale improvement – 9500H/9600
- ✓ Conditional NAT using Route-map
- ✓ Audio Video Bridging on 9500H (AVB)

Security and Routing

- ✓ NAT-Traversal support for IPSEC
- ✓ VRF Aware IPSEC
- ✓ BGP EVPN over IPsec
- ✓ MACSEC HA on 9400X Linecard Ports
- ✓ MACSEC XPN Support on 9400X SUP ports
- ✓ Phantom RP for PIM-Bidir 9500H and 9600

Programmability

- ✓ OpenConfig: YANG Model Updates
- ✓ YANG Service Model: EVPN
- ✓ gNMI Infrastructure As Code (IAC)
- ✓ CONFD Upgrade to 7.5
- ✓ AAA Method List
- ✓ Guest Shell High Availability
- ✓ YANG model for CLI execution
- ✓ gRPC Dial-Out with mTLS

IOS XE 17.10.1 Software Release Summary

Platform/Infra

- ✓ LACP Standalone Mode on L3 EtherChannels
- ✓ Linecard- 50G and 1G speed support
- ✓ Switch Integrated Security Features
- ✓ StackWise Virtual Support on Silicon 1
- ✓ ERSPAN capabilities for AppGig interface
- ✓ PTP on StackWise Virtual
- ✓ Stateful NAT64
- ✓ NAT on L3 EtherChannel
- ✓ Silicon 1 Bonjour Support

Security

- ✓ DHCP Snooping Glean
- ✓ Reflexive ACL
- ✓ Silicon 1 IPv4 SGACL support
- ✓ IOS-XE automate-tester enhancement for Radius Server
- ✓ MACsec Transparent Pass Through
- ✓ MACsec Fallback Key with High Availability.
- ✓ Secure Data Wipe

Fabric Solutions

- ✓ BGP EVPN Control and Data Plane over IPv6 in the Underlay
- ✓ BGP EVPN Dynamic Peering
- ✓ TRM support with BGP EVPN over IPsec

Programmability

- ✓ YANG 1.1 Support
- ✓ gNMI Native Configuration Yang Model
- ✓ Guest Shell High Availability Guest-Share Folder Sync