PRODUCT COMPARISON

Cisco Catalyst 9500 Comparison

Prepared as a convenient PDF reference for network planning, platform evaluation, and procurement discussions.

Catalyst 9500 Product Comparison

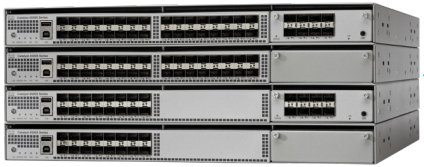
Technical Marketing Engineering

Catalyst Fixed Core Migration

Cisco Catalyst 6840-X/6880-X and XL models

Deep buffers and very high scale- 8GB buffers/2M IPv4 routes/256K Mac addresses

Cisco Catalyst 9500X (Silicon One)



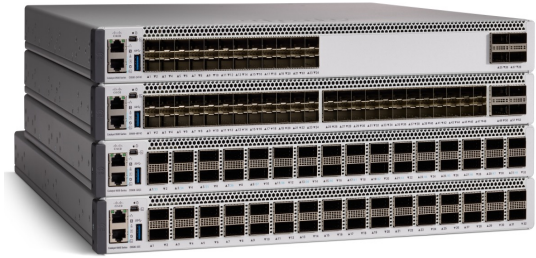
Cisco Catalyst 4500-X

Higher Port speeds – 8*400G/28*100g

High Port Speeds – 1G, 10, 25, 40, 100G

Cisco Catalyst 3850 Fiber

Speed Migration – 1G/10G to 10G/40G/100G Speed



Cisco Catalyst 9500H (UADP 3.0)

Platform Benefits

- Upto 26X Throughput (12Tbps)
- Upto 48X Performance (8Bpps)
- Linerate without Oversubscription
- 8X 400G Port Density
- Pluggable SSD Storage/USB3.0
- Stackwise Virtual^
- 8X Memory & 4XFlash
- 4X CPU Cores (x86, 2.4GHz)
- Customizable Templates
- Platinum Power Supplies
- 256bit MACSec
- WAN MACSEC*
- GIR, Patching
- NETCONF/REST/GRPC interfaces with Native YANG models

* Roadmap for 9500X platforms

^ Roadmap for 9500X platforms. Available for other models

Catalyst 9500 Series core positioning

Next-generation core + edge switching with Silicon One Q200

Feature optimized
Catalyst® C9500 High Performance

- Best-in-class enterprise core feature set
- Low speeds (1G to 40G) and port density
- Comprehensive MPLS, EVPN, and SD-Access
- Ideal for campus core, collapsed core + aggregation

Ideal for Catalyst 6000 Series non-XL deployment migration

Performance optimized
Catalyst C9500X

C9500X-28C8D

- Unmatched forwarding scale and performance
- High speeds (10G to 400G) and port density
- Scaled MPLS and SD-Access, WAN MACsec
- Ideal for campus core + edge, or centralized WLC

Ideal for Catalyst 6000-XL deployment migration

Catalyst 9500X – Scale Overview

Next-generation core + edge switching with Silicon One Q200

C9500X-28C8D

Technology	Brief description	Differences from UADP 3.0
Large LPM table	• **Up to 2 million IPv4 or 1 million IPv6 (hash efficiency is about 80%).** • **Dedicated memory for LPM.**	• Up to 256,000 IPv4/IPv6 with custom SDM template. • LPM and other features share 416K ASIC memory.
Large MAC table	• **Up to 256,000 MAC entries, custom SDM template.** • Shared with other features.	• Up to 128,000 MAC entries with custom SDM template. • MAC shared with LPM, etc. in same 416K ASIC memory.
VOQ QoS + HBM	• **Q200 has 80 MB local (low latency) + 8 GB HBM (high-bandwidth memory) buffer memory.** • **Q200 uses a virtual output queue (VOQ) architecture.** All queuing and policing policies applied on ingress.	• Max 36 MB unified buffer memory per ASIC. • Supports both ingress and egress queuing and policing.
OGACL and SGACL	• **8000 IPv4, 4000 IPv6 ACL TCAM entries.** • **Object group and security group ACLs use CEM to map IP to group label, TCAM uses only Layer 4 ACEs.** (OG/SG ACL design is optimal for Layer 3 environment.)	• 64,000 ACL TCAM entries per ASIC. • Object group ACLs expand into the TCAM space.
LAN and WAN MACsec*	• **Q200 does not have built-in crypto engine** • **Catalyst® 9500X and 9600X-LC use new CDR5M PHY (400 Gbps 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 supports only LAN MACsec (no WAN MACsec).
Flexible NetFlow*	• **Q200 does not have built-in flow cache memory (no hardware-based NetFlow).** • **Catalyst 9500X and 9600X use new software-based Flexible NetFlow (FNF) (≤ 2 million entries), with a dedicated CPU core (~2 Mpps)**. FNF sampler rate 1:1000, ~10 Tbps of 512-byte packets = ~2 Mpps.	• UADP3 has built-in (hardware) FNF, max 64,000 entries per ASIC. • FNF is shared with LPM, etc., in same 416K ASIC memory.

* Roadmap. Target is Release 17.8.1.

Catalyst 9500X and 9500H – physical

	 Catalyst® 9500X	 Catalyst 9500H
	Silicon 1 ASIC	**UADP-3 ASIC**
CPU (BDW-NS, BDW)	**2.7 GHz 8C** Intel® (BDW-NS)	2.4 GHz 4C Intel (BDW)
DRAM (type)	**32 GB** (DDR4)	16 GB (DDR4)
ASIC (number)	**Q200** (1x)	UADP3 (3x)
Capacity	**12** (full duplex)	Upto 6.4 Tbps (full duplex)
10G max	**120** *^	Upto 48
25G max	**120** *^	Upto 48
50G max	**120** *^	–
40G max	**(28+32)60** *^	Upto 32
100G max	**(28+32)60** *^	Upto 32
400G max	**8**	–

* Roadmap (not committed). ^ Using Breakout cable ports.

Catalyst 9500X and 9500H – features and scales

	 Catalyst® 9500X (Silicon One™ Q200)		 Catalyst 9500H (UADP 3)	
	Default	**Maximum** (Custom)	**Default**	**Maximum** (custom)
MAC addresses	**128,000**	256,000	**80,000**	128,000
IP host routes	**128,000**	256,000	**80,000**	128,000
Multicast L2 groups	**16,000**	64,000*	**16,000**	48,000
Multicast L3 routes	**32,000**	64,000*	**32,000**	48,000
IP LPM routes	**2 million**	2 million	**212,000**	256,000
MPLS labels	**256,000**	512,000	**32,000**	64,000
SGT/OG labels	**32,000**	64,000	**32,000**	64,000
NAT* sessions	**16,000***	128,000*	**3000**	16,000
Security ACL entries	**8000**	10,000*	**12,000**	27,000
QoS ACL entries	**8000**	10,000*	**8000**	21,000
PBR* ACL entries	**8000***	10,000*	**3000**	16,000

* Roadmap for Catalyst 9600X (not committed).

Catalyst 9500 - Campus Aggregation and Fixed Core Comparison

* Roadmap

Features & Scale	C3850-10G	C4500X (32x10G)	C6840-X	C6880-X	C9500 (Default)	C9500 High Performance (Default)	C9500X
Chassis Size	1 RU	1RU	2 RU	5 RU	1 RU	1 RU	1 RU
Chassis Bandwidth	160, 320, 640 Gbps	Up to 800 Gbps	160, 320, 480 Gbps	160-800 Gbps	Up to 1.9 Tbps	Up to 6.4 Tbps	Up to 12 Tbps
Memory	8 GB DDR3	4 GB DDR2	4 GB DDR3	4 GB DDR3	16 GB DDR4	16 GB DDR4	32 GB DDR4
Flash	8 GB	2 GB	8 GB	8 GB	16 GB	16 GB	16 GB
SSD storage	No	No	Yes	Yes	Yes(120G USB3.0)	Yes(Upto 1TB SSD SATA)	Yes (Upto 1 TB SSD SATA)
Built-in RFID	No	No	Yes	Yes	Yes	Yes	Yes
Throughput (IPv4 / IPv6)	228, 456, 912 Mpps	250/125 Mpps	60/30, 120/60, 180/90 Mpps	60/30 – 300/150 Mpps	Up to 1440 Mpps	Up to 2 Bpps	Up to 8 Bpps
Max 400G Density	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	8p
Max 100G Density	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Up to 32p	28p
Max 40G Density	2p (24p NM) 4p (48p Onboard) *	Not Supported	2p	Not Supported	24p	32p	NA
Max 25G Density	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	48p	88p
Max 10G Density	12p, 24p or 16p, 32p (NM) 48p or 64p (QSFP Breakout)	40 (32 + 8 uplinks)	16p, 24p, 32p, 40p or 48p (QSFP Breakout)	16p or 32p, 64p, 80p	48p	48p	88p
Non-Blocking 10G Density	12p, 24p or 16p, 32p (NM) 48p or 64p (QSFP Breakout)	40 (32 + 8 uplinks)	8p, 12p, 16p, 20p or 24p (QSFP Breakout)	8p or 16p, 32p, 40p	48p	48p	88p
IPv4 Route Capacity	24K (host) , 8K (routes)	256K	256K (LE only)	2M (XL) or 256K (LE)	48K (host) , 64K (LPM)	212k	2M
IPv6 Route Capacity	12K (host) , 4K (routes)	128K	128K (LE only)	1M (XL) or 128K (LE)	24K (host) , 32K (LPM)	212k	1M
Multicast Route Capacity	4K	32K	64K	64K	32K	32K	64K
MAC Address Capacity	32K	55K	128K	128K	64K	80K	265K
Flexible Netflow Entries	24K (12/24p) or 48K (48p)	128K	512K (16p), 1M (24/32p) or 1.5M (40p)	1M (XL) or 128K (LE) / Slot 5M (XL) or 640K (LE) / Unit	512K	256K* (32C), 128K (32QC, 48Y4C, 24Y4C)	2M (Sampled)
Security & QoS ACL Entries	3K	128K (64K ingress & Egress)	64K	256K (XL) / 64K (LE)	36K	43K	
SPAN Sessions & Type	8 Bi-directional SPAN, RSPAN	8 line rate bidirectional SPAN/RSPAN sessions (ingress and egress)	2 Bi-directional, 14 TX, RSPAN, ERSPAN & VACL	2 Bi-directional, 14 TX, RSPAN, ERSPAN & VACL	8 Bi-directional SPAN, RSPAN,ERSPAN	8 Bi-directional SPAN, RSPAN,ERSPAN	8 Bi-directional SPAN, RSPAN, ERSPAN

Catalyst 9500

Campus Aggregation and Fixed Core Comparison

Features & Scale	C3850-Fiber	C4500X (32x10 GE Port Base SKU)	C6840-X	C6880-X	C9500	C9500 High Performance	C9500X
SD-Access Capable	Yes	No	Yes	Yes	Yes	Yes	Yes
SD-Access Wireless	Yes	No	No	No	Yes	Yes*	
MPLS	Yes	No	Yes	Yes	Yes	Yes	Yes
NAT/PAT	No	No	Yes	Yes	Yes	Yes	Yes
AVC using NBAR2	Yes	No	No	No	Yes	Yes*	
AVC using DNS-AS	Yes *	Yes	No	No	No	No	No
IOS XE 16.x	Yes	No (Runs IOS XE 3.x)	No	No	Yes	Yes	Yes
256-bit MACsec	Yes	No	128 bit only	128 bit only	Yes	Yes	Yes
Stackwise Virtual	Yes	Only VSS mode	Only VSS mode	Only VSS mode	Yes	Yes	Yes
Containers/App Hosting	No	No	No	No	Yes	Yes	Yes
GIR	No	No	No	No	Yes	Yes	Yes
Patching	No	No	No	No	Yes	Yes	Yes
Programmability - Python Scripting	Yes *	Yes*	No	No	Yes	Yes	Yes
Programmability - NETCONF/REST/GRPC interfaces (GA) with base Native YANG models	Yes	Yes	No	No	Yes	Yes	Yes
AVB	Yes	No	No	No	Yes*	Yes*	Yes*
ETA	No	No	No	No	Yes*	Yes*	Yes*

* Roadmap

9500 Hardware Differentiators

	C4500-X	C6840X	C6880X	C9500	C9500 High Performance	C9500X
CPU	Dual Core 1.5 GHz	Dual Core x86 2.0 GHz	Dual Core x86 2.0 GHz	Quad Core x86 2.4GHz	Quad Core x86 2.4GHz	Eight Core x86 2.4GHz
ASIC	K10	Enhanced Earl 8	Enhanced Earl 8	UADP 2.0	UADP 3.0	Silicon One
Memory	4GB DDR2	4GB	4GB	16GB DDR4	16GB DDR4	32GB DDR4
Flash	2GB	8 GB	8GB	16GB	16GB	16GB
SSD storage (USB 3.0) - removable	✗	✗	✗	✓	✓	✓
Built-In RFID	✗	✓	✓	✓	✓	✓
USB Console (Bluetooth)	✗	✗	✗	✓*	✓*	✓*
Platinum Power Supplies	Gold	✓	✓	✓	✓	✓
NG Stacking - Stackwise Virtual	VSS	VSS	VSS	✓	✓	✓
256-bit MACSEC	✗	✗	✗	✓	✓	✓
Containers / App Hosting (HW Capable)	✗	✗	✗	✓	✓	✓

* Roadmap

Catalyst 9500 Software Differentiators

		C4500-X	C6840X	C6880X	C9500	C9500 High Performance	C9500X
Modern OS	Containers/App Hosting	✗	✗	✗	✓	✓	✓
	GIR	✗	✗	✗	✓	✓	✓
	Patching	✗	✗	✗	✓	✓	✓
	ISSU	✗	✓	✓	✓	✓	✓*
	Stackwise Virtual	VSS	VSS	VSS	✓	✓	✓*
SD-Access	Wireless Controller (eWLC) hosting on Switch	✗	✗	✗	✓*	✓*	✗
	VN scale, Host Map Cache, #Access Switch stacks per fabric	✗	4K/25K/NA	4K/25K/NA	256 / 5K / NA	256 / 32K / NA	256 / 32K / NA
Security	ETA (Threat Detection - Encrypted Traffic)	✗	✗	✗	✓*	✓*	✗
Visibility	ERSPAN (Truncation and Fragmentation)	✗	✓	✓	✓	✓	✓

* Roadmap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