Cisco Catalyst 9500 Series 40-Port 100G Backbone Switch Hardware Reference - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

The Cisco Catalyst 9500 Series 40-Port 100G Backbone Switch represents the pinnacle of fixed-form-factor enterprise core and aggregation switching platforms. Purpose-built for the modern campus backbone, this platform delivers wire-rate 100 Gigabit Ethernet density in a compact 1RU chassis, enabling network architects to design non-blocking spine-leaf fabrics and high-capacity core layers without the operational complexity of modular chassis systems. The Catalyst 9500 Series is Cisco's lead purpose-built fixed core and aggregation enterprise switching platform, engineered for security, IoT, and cloud-native workloads .

At the heart of the C9500-32C model lies the Cisco Unified Access Data Plane (UADP) 3.0 Application-Specific Integrated Circuit, delivering up to 6.4 Tbps switching capacity with 2 Bpps forwarding performance . This ASIC architecture provides the programmable pipeline and microengine capabilities necessary for next-generation technologies, including template-based allocation of Layer 2 and Layer 3 forwarding resources, Access Control Lists, and Quality-of-Service entries . The platform supports up to 32 non-blocking 100 Gigabit Ethernet QSFP28 ports, making it an ideal choice for campus core and aggregation

deployments requiring maximum fiber density and line-rate forwarding .



HARDWARE ARCHITECTURE & SILICON

The Cisco Catalyst 9500 Series 40-Port 100G Backbone Switch is architected around the Cisco UADP 3.0 ASIC, a purpose-built silicon solution that balances high-density 100G port configurations with the deep buffer architecture required for enterprise campus traffic patterns. Unlike data center-centric switching silicon optimized solely for latency, the UADP 3.0 provides the intelligent traffic management and routing scale essential for core and aggregation roles .

Each ASIC provides up to 36 MB of unified buffer memory, enabling the platform to absorb microbursts and sustain line-rate forwarding during periods

of network congestion. The unified buffer architecture dynamically allocates memory across ports based on real-time traffic demands, ensuring optimal throughput across all 32 QSFP28 interfaces .

The platform features a high-performance Intel 2.4-GHz x86 CPU with up to 120 GB of USB 3.0 or up to 960 GB of SATA SSD storage, facilitating container-based application hosting directly on the switch . This architecture supports Cisco's vision of infrastructure-as-a-platform, where network devices host essential services such as telemetry collectors, security agents, and network assurance containers without requiring external compute resources.

Power delivery is managed through dual 1+1 redundant, hot-swappable power supplies. The switches ship with Platinum-rated AC/DC power supplies as the default configuration, ensuring maximum energy efficiency and reduced operational costs . Thermal management is handled by field-replaceable variable-speed fan trays supporting front-to-back airflow, with the system capable of operating with up to one individual fan failure before thermal degradation occurs .

KEY FEATURES & ROUTING LOGIC

Non-Blocking 100G Forwarding Architecture: The C9500-32C provides 32

non-blocking 100 Gigabit Ethernet QSFP28 ports, delivering full line-rate forwarding across all interfaces simultaneously. The platform supports up to 2 Bpps of forwarding performance, ensuring that backbone traffic is switched without contention or head-of-line blocking .

Advanced Routing and MPLS Support: The Catalyst 9500 Series supports advanced routing features including MPLS Layer 2 and Layer 3 VPN, Multicast VPN (MVPN), and Network Address Translation (NAT), enabling service provider-grade routing within the enterprise campus . IPv6 support is implemented in hardware, providing wire-rate forwarding for IPv6 networks with dual-stack IPv4/IPv6 capabilities and dynamic hardware forwarding table allocations .

Cisco StackWise Virtual Technology: The platform supports Cisco StackWise Virtual, a network system virtualization technology that combines two physical switches into a single logical entity. This capability increases operational efficiency, boosts nonstop communications, and scales system bandwidth while simplifying management through a single control plane .

Precision Time Protocol (PTP): IEEE 1588v2 Precision Time Protocol support provides accurate clock synchronization with sub-microsecond accuracy, making the platform suitable for distribution and synchronization of time and

frequency over the network. This is essential for applications requiring precise timing, including financial services and industrial automation .

MACsec 256-Bit Encryption: The platform supports AES-256 with the powerful MACsec 256-bit encryption algorithm on all models, providing link-layer security for data in transit. This hardware-based encryption capability ensures that backbone traffic remains protected against interception and tampering without compromising forwarding performance .

Flexible NetFlow: The platform supports up to 512,000 Flexible NetFlow (FNF) entries in hardware, enabling comprehensive traffic visibility and analysis at line rate. This capability is essential for security forensics, capacity planning, and application performance monitoring .

Encrypted Traffic Analytics (ETA): Using machine learning capabilities, ETA identifies and takes action on threats or anomalies in encrypted traffic, including malware detection and distributed anomaly detection. ETA can also detect vulnerable implementations in encrypted traffic, adding a critical security layer without requiring traffic decryption .

COMPLIANCE & STANDARDS

The Cisco Catalyst 9500 Series complies with a comprehensive set of international safety and electromagnetic compatibility standards, ensuring deployment viability across global enterprise environments.

Safety Certifications: The C9500-32C model adheres to IEC 60950-1 plus all amendments (Am1, Am2, Am9, Am10, Am11, Am12) and deviations, AS/NZS 60950.1:2011, CAN/CSA-C22.2 No. 60950-1-07, GB 4943-95, EN 60950-1:2006 plus amendments, NOM-019-SCFI-1998, and UL 60950-1 Second Edition .

EMI and EMC Compliance: The platform meets 47 CFR Part 15 Class A, CNS13438:2006 Class A, EN 300 386 V1.6.1, EN61000-3-2:2014, EN61000-3-3:2013, ICES-003 Issue 6:2016 Class A, KN 32:2015 Class A, TCVN 7189:2009 Class A, EN 55032:2012/AC:2013 Class A, EN 55032:2015 Class A, CISPR 32 Edition 2 Class A, V-2/2015.04 Class A, V-3/2015.04 Class A, CISPR24:2010+A1:2015, EN55024, KN35:2015, and TCVN 7317:2003 standards .

Layer 2 and Layer 3 Protocol Support: The platform supports IEEE 802.3, IEEE 802.3u, IEEE 802.3z, IEEE 802.1D, IEEE 802.1Q, IEEE 802.3ab, IEEE 802.1p, IEEE 802.3x, IEEE 802.3ad (LACP), IEEE 802.1w, IEEE 802.1x, IEEE 802.3ae, IEEE 802.1s, and IEEE 802.1ae standards. Routing protocol support includes OSPF, RIP-1, RIP-2, IGMP, VRRP, PIM-SM, PIM-SSM, policy-based routing (PBR), and RIPng .

TECHNICAL SPECIFICATIONS

The following table presents the core hardware specifications for the Cisco Catalyst 9500 Series 40-Port 100G Backbone Switch (C9500-32C model).

Parameter	**Specification**
Form Factor	1RU fixed-form-factor chassis
Switching Capacity	Up to 6.4 Tbps full duplex
Forwarding Performance	Up to 2 Bpps
Port Configuration	32 x 100 Gigabit Ethernet QSFP28 (non-blocking)
ASIC	Cisco Unified Access Data Plane (UADP) 3.0
CPU	Intel 2.4-GHz x86 CPU
Memory	16 GB RAM
Buffer Memory	Up to 36 MB unified buffer per ASIC
Flash Storage	Up to 120 GB USB 3.0 or up to 960 GB SATA SSD
Power Supply	Dual 1+1 redundant, hot-swappable Platinum-rated AC/DC
Fan Trays	Field-replaceable variable-speed fans, front-to-back airflow, up to one fan

	failure tolerance
MAC Address Table	64K entries
IPv4 Routing Entries	Up to 212,000 (IPv4/IPv6 combined)
Flexible NetFlow Entries	Up to 512,000 in hardware
Jumbo Frame Support	9198 bytes
VLAN IDs	4,000
Switched Virtual Interfaces (SVIs)	4,000
Security ACL Scale	18,000
QoS ACL Scale	18,000
StackWise Virtual	Supported
MACsec Encryption	AES-256 supported on all models
PTP	IEEE 1588v2 Precision Time Protocol
Operating System	Cisco IOS XE Software Release 16.5.1a or later

ORDERING SKU INFORMATION

The Cisco Catalyst 9500 Series 40-Port 100G Backbone Switch is available in two primary license configurations to align with deployment requirements:

C9500-32C-A: Cisco Catalyst 9500 Series high-performance 32-port 100

Gigabit Ethernet switch with Cisco DNA Advantage licensing. This configuration provides full access to advanced automation, assurance, and security features including SD-Access fabric capabilities, Encrypted Traffic Analytics, and Cisco DNA Center integration .

C9500-32C-E: Cisco Catalyst 9500 Series high-performance 32-port 100 Gigabit Ethernet switch with Cisco DNA Essentials licensing. This configuration provides foundational automation and assurance capabilities suitable for organizations beginning their intent-based networking journey .

Software subscription licenses are available in 3-year, 5-year, and 7-year terms, with the flexibility to upgrade from Essentials to Advantage licensing at any point during the subscription period. Cisco Smart Licensing provides centralized license management through the Cisco Smart Software Manager portal, eliminating node-locked license files and simplifying compliance across the enterprise .

Default accessories shipped with the platform include the switch chassis, default power supply, power cable, and 19-inch mounting brackets. Additional accessories including 23-inch rack mount kits, four-point mounting hardware, and SFP/QSFP transceivers must be ordered separately .

