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Introduction to Smart Switches

Smart Switches

Smart Switches are the switches that provide:

- embedded security with Hypershield
- advanced segmentation and connectivity, and
- hardware-accelerated architecture.

Smart Switch capabilities

Embedded security with Hypershield–Smart Switches provide service-accelerated performance and simplify the security architecture by integrating directly into the network, eliminating the need for separate Layer 4 stateful firewalls.

Advanced segmentation and connectivity–These switches facilitate secure segmentation and communication between security zones across the data center, interconnects, and cloud environments.

Hardware-accelerated architecture–Smart Switches integrate Data Processing Units (DPUs) with networking ASICs to enhance both data center networking throughput and security processing capabilities.

N9300 Series Smart Switches

The N9300 Series Smart Switches are integrated network devices designed for

- scalable
- secure, and
- efficient data center operations.

They combine advanced networking and security features with hardware acceleration and software flexibility, embedding stateful security powered by Hypershield directly into the network fabric.

N9300 Series Smart Switches architecture and deployment

The N9300 Series Smart Switches utilize Silicon One® E100 ASICs for high-performance switching and DPUs for enhanced security and services. The family includes 100G and 25G switches with 800G DPU acceleration.

Models such as the N9348Y2C6D-SE1U and N9324C-SE1U offer flexibility and performance, making them ideal Top-of-Rack (ToR) solutions for VXLAN-EVPN, BGP fabrics, and multisite deployments.

These switches can be deployed as leaf switches, border leaf switches, or border gateways, enabling adaptable and high-performing data center architectures.

Smart Switches integrate Hypershield technology to enforce security policies at line rate, embedding DPU security functions into the network infrastructure without requiring additional hardware.

For details about Hypershield and Hypershield integration, refer to Cisco Hypershield Release Notes, Cisco Hypershield User Documentation. and Cisco Hypershield Reference Documentation. For details about support for Hypershield on-premise controller and Cloud Control, also refer to Cisco Cloud Control documentation.

Smart Switch operating modes

The N9300 Series Smart Switches offer converged switching and routing services. The N9300 Series Smart Switches operate in network mode (NPU functions) and DPU security mode (DPU functions). Both the network and DPU security features are available in the DPU security mode.

Note

For visibility into forwarding path tracing between NPU and DPU, use the packet tracer for DPU interfaces.

The DPU security mode refers to the capability of the switch to provide distributed, stateful Layer-4 segmentation and DPU security enforcement directly within the switch using embedded Data Processing Units (DPUs).

N9324C-SE1U switch

Beginning with NX-OS Release 10.6(2)F, the N9300 Series Smart Switches introduce the N9324C-SE1U switch, a 1-RU solution designed to deliver high-performance networking capabilities. Its features include:

- 24 x 100G ports
- Silicon One E100 ASIC offering high-speed connectivity and scalability
- 4 DPU offering software-defined stateful services

N9324C-SE1U hardware details

For hardware details, refer to the Cisco N9324C-SE1U NX-OS-Mode Switch Hardware Installation Guide.

N9348Y2C6D-SE1U switch

Beginning with NX-OS Release 10.6(2)F, the N9300 Series Smart Switches introduce the N9348Y2C6D-SE1U switch, a 1-RU solution designed to deliver high-performance. It features include:

- 48-port 25G + 2-port 100G + 6-port 400G switch
- Silicon One E100 ASIC offering high-speed connectivity and scalability
- 2 DPUs offering software-defined stateful services

N9348Y2C6D-SE1U hardware details

For hardware details, refer to the Cisco N9348Y2C6D-SE1U NX-OS-Mode Switch Hardware Installation Guide.

Smart Switch feature support through NX-OS releases

The N9348Y2C6D-SE1U and N9324C-SE1U Smart Switches support only network mode in NX-OS Release 10.6(2)F and 10.6(3)F. Beginning with 10.6(3s)F, DPU Security mode is is also supported.

Upgrade, licensing, and verified scalability

This table lists the features related to software upgrade, licensing, and verified scalability features for Smart Switches. For more details, refer to the Software upgrade and downgrade on Smart Switches, Licensing on Smart Switches, and N9000 NX-OS Verified Scalability articles respectively.

Table 1: Upgrade, licensing, and verified scalability features

Feature	Release	Document
Software image for Smart Switches	10.6(2)F	Software upgrade and downgrade on Smart Switches
Power-On Auto Provisioning	10.6(2)F	Software upgrade and downgrade on Smart Switches
Graceful Insertion and Removal (GIR)	10.6(2)F	Software upgrade and downgrade on Smart Switches
Smart Licensing Using Policy support	10.6(2)F	Licensing on Smart Switches
Network Mode Scale updates	10.6(x)	N9000 NX-OS Verified Scalability

Network mode feature support

These tables contain the list of software features that are supported as part of the network mode and the guides in which these features are documented.

Interfaces

This table lists the features related to configuring interfaces for Smart Switches in network mode. For more details, refer to the Interfaces configuration for Network Mode article.

Table 2: Interface Configuration Features in Network Mode

Feature	Release	Document
Port profiles	10.6(2)F	Interfaces configuration for Network Mode
Layer 2 access and trunk ports	10.6(2)F	Interfaces configuration for Network Mode
Native VLAN traffic and tagging	10.6(2)F	Interfaces configuration for Network Mode
Reserved VLAN	10.6(2)F	Interfaces configuration for Network Mode
Switch Virtual Interface (SVI) and VLAN logical interfaces	10.6(2)F	Interfaces configuration for Network Mode
Layer 3 routed interfaces and subinterfaces	10.6(2)F	Interfaces configuration for Network Mode
Single-Hop BFD	10.6(2)F	Interfaces configuration for Network Mode
LACP and port channels	10.6(2)F	Interfaces configuration for Network Mode
Virtual Port Channel (vPC)	10.6(2)F	Interfaces configuration for Network Mode
Q-in-Q VLAN tunnels	10.6(2)F	Interfaces configuration for Network Mode

Feature	Release	Document
Unidirectional Link Detection (UDLD)	10.6(2)F	Interfaces configuration for Network Mode

Security

This table lists the features related to NX-OS Security for Smart Switches in network mode. For more details, refer to the Security for Network Mode article.

Table 3: Security Features in Network Mode

Feature	Release	Document
AAA	10.6(2)F	Security for Network Mode
RADIUS	10.6(2)F	Security for Network Mode
TACACS+	10.6(2)F	Security for Network Mode
SSH	10.6(2)F	Security for Network Mode
PACL	10.6(2)F	Security for Network Mode
RACL	10.6(2)F	Security for Network Mode
PBR ACL	10.6(2)F	Security for Network Mode
DHCP relay	10.6(2)F	Security for Network Mode
Custom CoPP	10.6(2)F	Security for Network Mode
MACsec	10.6(2)F	Security for Network Mode
Secure Key Integration Protocol (SKIP)	10.6(2)F	Security for Network Mode
Traffic storm control	10.6(2)F	Security for Network Mode
Live Protect	10.6(2)F	Security for Network Mode
Live Protect enhancements	10.6(3)F	Security for Network Mode

Routing and Switching

This section lists the routing and networking features through releases and where they are documented. The tables list the features per guide. For more details, refer to the Routing and Switching for Network Mode article.

Table 4: Routing and Switching features in Network Mode - Layer 2 switching

Feature	Release	Document
VLANs	10.6(2)F	Layer 2 switching
Global MAC learning	10.6(2)F	Layer 2 switching
STP	10.6(2)F	Layer 2 switching

Feature	Release	Document
Rapid PVST+	10.6(2)F	Layer 2 switching
MST	10.6(2)F	Layer 2 switching

Table 5: Routing and Switching for Network Mode - Unicast

Feature	Release	Document
IPv4 Layer 3 unicast features	10.6(2)F	Unicast routing
IPv6 Layer 3 unicast features	10.6(2)F	Unicast routing
Static routing	10.6(2)F	Unicast routing
VRF	10.6(2)F	Unicast routing
BGP	10.6(2)F	Unicast routing
OSPF	10.6(2)F	Unicast routing;
EIGRP	10.6(2)F	Unicast routing
RIP	10.6(2)F	Unicast routing
IS-IS	10.6(2)F	Unicast routing
ECMP	10.6(2)F	Unicast routing
Policy-Based Routing (PBR)	10.6(2)F	Unicast routing
uRPF and Layer 3 path validation	10.6(2)F	Unicast routing
HSRP, VRRP, vPC, and vPC peer gateway	10.6(2)F	Unicast routing

Table 6: Routing and Switching for Network Mode - Multicast

Feature	Release	Document
IPv4 multicast routing and multicast features	10.6(2)F	Multicast features
IGMP snooping	10.6(2)F	Multicast features
Multicast route-aliveness, hitbit and route statistics, NLB, IPv4 Layer 2 and Layer 3 multicast, and multicast consistency checker	10.6(2)F	Multicast features
IPv6 multicast routing and MLD snooping	10.6(3)F	Multicast features
IPv4 multicast flow counters	10.6(2)F	Multicast features

Table 7: Routing and Switching for Network Mode - VXLAN

Feature	Release	Document
VXLAN BGP EVPN	10.6(2)F	VXLAN features
VXLAN BGP EVPN Multi-Site Anycast BGW and vPC BGW	10.6(2)F	VXLAN features
Multicast fast convergence for vPC BGW failures	10.6(2)F	VXLAN features
VXLAN to SR-MPLS handoff	10.6(2)F	VXLAN features
IPv4 unicast and multicast underlay with ingress replication or PIM ASM	10.6(2)F	VXLAN features
Multicast underlay BUD node	10.6(2)F	VXLAN features
ARP suppression	10.6(2)F	VXLAN features
ND suppression	10.6(3)F	VXLAN features
TRMv4 Layer 3 mode	10.6(2)F	VXLAN features
DHCP relay in VXLAN BGP EVPN	10.6(2)F	VXLAN features
DSVNI	10.6(2)F	VXLAN features
BGW advertisement	10.6(2)F	VXLAN features
VXLAN counters	10.6(2)F	VXLAN features
VXLAN NGOAM	10.6(2)F	VXLAN features
EVPN ECMP for VNF and PVNF	10.6(2)F	VXLAN features

Table 8: Routing and Switching for Network Mode - Segment Routing and Multiprotocol Label Switching

Feature	Release	Document
Segment Routing Layer 3 VPN with SR-MPLS underlay	10.6(2)F	Segment Routing Multiprotocol Label Switching
MPLS encapsulation statistics	10.6(3)F	Segment Routing Multiprotocol Label Switching

Quality of Service

This table lists the features related to Quality of Service (QoS) for Smart Switches in network mode. For more details, refer to the Quality of Service for Network Mode article.

Table 9: QoS features in Network Mode

Feature	Release	Document
QoS classification	10.6(2)F	Quality of Service for Network Mode
Queuing and scheduling	10.6(2)F	Quality of Service for Network Mode
QoS statistics	10.6(2)F	Quality of Service for Network Mode
Interface QoS support for QoS classification policies	10.6(3)F	Quality of Service for Network Mode

System management

This table lists the features related to system management for Smart Switches in network mode. For more details, refer to the System Management for Network Mode article.

Table 10: System Management Features in Network Mode

Feature	Release	Document
Generic Online Diagnostics (GOLD)	10.6(2)F	System Management for Network Mode
Link Layer Discovery Protocol (LLDP)	10.6(2)F	System Management for Network Mode
SNMPv1, SNMPv2c, and SNMPv3	10.6(2)F	System Management for Network Mode
Sampled Flow (sFlow)	10.6(2)F	System Management for Network Mode
Ingress NetFlow	10.6(2)F	System Management for Network Mode
Switched Port Analyzer (SPAN)	10.6(2)F	System Management for Network Mode
Encapsulated Remote SPAN (ERSPAN)	10.6(2)F	System Management for Network Mode
Precision Time Protocol (PTP)	10.6(3)F	System Management for Network Mode

Telemetry and programmability

This table lists the features related to telemetry and programmability for Smart Switches in network mode. For more details, refer to the Telemetry and Programmability for Network Mode article.

Table 11: Telemetry and Programmability Features in Network Mode

Feature	Release	Document
Original and OpenConfig YANG	10.6(2)F	Telemetry and Programmability for Network Mode
NETCONF agent	10.6(2)F	Telemetry and Programmability for Network Mode
RESTCONF agent	10.6(2)F	Telemetry and Programmability for Network Mode

Feature	Release	Document
gNMI management interface	10.6(2)F	Telemetry and Programmability for Network Mode
gNMI set-replace and commit-confirmed workflow	10.6(2)F	Telemetry and Programmability for Network Mode
Syslog subscription through gNMI for OpenConfig	10.6(2)F	Telemetry and Programmability for Network Mode
gRPC agent	10.6(2)F	Telemetry and Programmability for Network Mode
XML management interface	10.6(2)F	Telemetry and Programmability for Network Mode
gNOI operation interface	10.6(2)F	Telemetry and Programmability for Network Mode
Diagnosis and serviceability	10.6(2)F	Telemetry and Programmability for Network Mode
Telemetry	10.6(2)F	Telemetry and Programmability for Network Mode
DME data collection	10.6(2)F	Telemetry and Programmability for Network Mode
NX-API data sources	10.6(2)F	Telemetry and Programmability for Network Mode
GPB encoding over gRPC transport	10.6(2)F	Telemetry and Programmability for Network Mode
JSON encoding over HTTP	10.6(2)F	Telemetry and Programmability for Network Mode
Open NX-OS automation	10.6(2)F	Telemetry and Programmability for Network Mode
NX-API CLI and REST	10.6(2)F	Telemetry and Programmability for Network Mode
Python API	10.6(2)F	Telemetry and Programmability for Network Mode
Tcl scripting	10.6(2)F	Telemetry and Programmability for Network Mode
Ansible integration	10.6(2)F	Telemetry and Programmability for Network Mode
Third-party agent integration	10.6(2)F	Telemetry and Programmability for Network Mode

DPU security mode feature support

This table contains the list of software features that are supported as part of the DPU security mode and the guides in which these features are documented.

Table 12: DPU security mode feature support

Feature	Release	Document
Enhanced software image for DPU	10.6(3s)F	Software upgrade and downgrade on Smart Switches
DPU security mode enablement	10.6(3s)F	Configurations for DPU Security Mode and Troubleshooting Smart Switches in DPU Security mode
Network security operations admin role	10.6(3s)F	Configurations for DPU Security Mode

Feature	Release	Document
VRF redirection and VLAN redirection	10.6(3s)F	Configurations for DPU Security Mode and Troubleshooting Smart Switches in DPU Security mode
Traffic inspection and integration with VXLAN	10.6(3s)F	Configurations for DPU Security Mode and Troubleshooting Smart Switches in DPU Security mode
Inter-VRF Traffic Inspection	10.6(3s)F	Configurations for DPU Security Mode and Troubleshooting Smart Switches in DPU Security mode
High Availability	10.6(3s)F	Configurations for DPU Security Mode and Troubleshooting Smart Switches in DPU Security mode
Layer 2 isolation for micro segmentation	10.6(3s)F	Configurations for DPU Security Mode
DPU Security Mode Scale updates	10.6(x)	N9000 NX-OS Verified Scalability