

Cisco NX-OS Software Release 4.1(3)N1 for Cisco Nexus 5000 Series Switches

PB551648

Cisco® NX-OS Software is a data center–class operating system built with modularity, resiliency, and serviceability at its foundation. Based on the industry-proven Cisco MDS 9000 SAN-OS Software, Cisco NX-OS Software helps ensure continuous availability and sets the standard for mission-critical data center environments. The self-healing and highly modular design of Cisco NX-OS Software makes zero-impact operations a reality and enables exceptional operational flexibility.

Cisco NX-OS Software Release 4.1(3)N1 is a software release on the Cisco Nexus™ 5000 Series Switches and Cisco Nexus 2000 Series Fabric Extenders. This software release introduces multiple hardware and software enhancements, including virtual PortChannel (vPC) functions, T11 standards-compliant Fibre Channel over Ethernet (FCoE) Initialization Protocol (FIP), Private Virtual LAN (PVLAN) enhancements, and additional features to enhance system scalability.

New Features

Cisco NX-OS 4.1(3)N1 supports all hardware platforms for the Cisco Nexus 5000 Series Switches and Cisco Nexus 2000 Series Fabric Extenders previously supported up to and including Cisco NX-OS Software Release 4.0(1a)N2.

Cisco NX-OS 4.1(3)N1 adds support for the hardware components listed in Table 1.

Table 1. New Hardware Supported in Cisco NX-OS 4.1(3)N1

Description	Part Number
Cisco Nexus 5020 750W AC Power Supply	N5K-PAC-750W

Cisco NX-OS 4.1(3)N1 adds support for Gigabit Ethernet and 10 Gigabit Ethernet optic modules on the Cisco Nexus 5000 Series Switches and Cisco Nexus 2000 Series Fabric Extenders (Table 2).

Table 2. New Optics Supported in Cisco NX-OS 4.1(3)N1

Description	Part Number
For 10 Gigabit Ethernet and Gigabit Ethernet interfaces on Cisco Nexus 5000 Series in Gigabit Ethernet mode	
SFP-GE-T	SFP-GE-T
SFP-GE-S	SFP-GE-S
SFP-GE-L	SFP-GE-L

Cisco NX-OS 4.1(3)N1 adds support for the new software features listed in Table 3.

Table 3. New Software Features in Cisco NX-OS 4.1(3)N1

Software Feature	Description
vPC support	Cisco NX-OS 4.1(3)N1 introduces vPC technology on the Cisco Nexus 5000 Series. vPC allows the formation of PortChannels across two Cisco Nexus 5000 Series Switches or Cisco Nexus 2000 Series Fabric Extenders. This feature allows deployment of scalable Layer 2 topologies that do not depend on Spanning Tree Protocol for redundancy and loop avoidance while at the same time providing higher cross-sectional bandwidth by using all physical links that interconnect the devices, whether they be networking equipment, Cisco Nexus 2000 Series Fabric Extenders, or end host systems such as servers.
T11 standards-compliant FIP	The Cisco Nexus 5000 Series currently supports direct-attach FCoE converged network adapters (CNAs) to enable data center I/O consolidation. Cisco NX-OS 4.1(3)N1 allows both direct-attach connections from Cisco Nexus 5000 Series Switches to CNAs and indirect-attach connections using FIP. FIP is used to perform the functions of Fibre Channel Backbone Ethernet (FC-BB_E) device discovery, initialization, and maintenance as defined in T11 FC-BB-5. Indirect-attach CNA connections can be enabled through a FIP-snooping bridge to the CNAs, enabling unified fabric deployments in blade-server enclosure environments.
Converged Enhanced Ethernet (CEE) interoperability	Cisco supports IEEE 802.1 Data Center Bridging (DCB), which is a collection of standards such as Priority Flow Control (PFC; IEEE P802.1Qbb), Enhanced Transmission Selection (ETS; IEEE P802.1Qaz), and DCB Exchange Protocol (DCBX; IEEE P802.1Qaz). These standards allow Ethernet to operate in a lossless manner, which is required for carrying Fibre Channel traffic. Software releases for the Cisco Nexus 5000 Series prior to Cisco NX-OS 4.1(3)N1 supported the Cisco, Intel, and Nuova format type-length values (TLVs) within DCBX. This has been the primary format for capabilities exchange between the first-generation CNAs and the FCoE switch. CEE is another effort by the CEE authors group, which was the informal group of companies that submitted the initial proposals for PFC, ETS, and DCBX to the IEEE DCB working group. Compliance for CEE interoperability required modifications to some TLVs within the DCBX protocol. No changes are required in the Cisco, Intel, and Nuova implementations of PFC and ETS. Cisco NX-OS 4.1(3)N1 implements these modifications as an additional configurable option. This option provides interoperability with all industry-accepted forms of DCB, including CEE-capable devices. Cisco was instrumental in achieving this level of interoperability, and as DCB evolves, Cisco will continue to participate in industry initiatives to help ensure development of interoperable standards.
PVLAN enhancements	PVLANs are used throughout the data center to enforce security groups and access controls between servers or groups of servers without the need to implement multiple IP subnets throughout the data center. There are three categories of PVLANs: • Isolated VLAN ports: Can establish communication only with promiscuous ports • Community VLAN ports: Can establish communication between other devices within the same community VLAN as well as with promiscuous ports • Promiscuous ports: Can establish communication with either isolated VLANs or community VLANs Prior to Cisco NX-OS 4.1(3)N1, isolated VLAN ports could be configured only as access ports, indicating that only a single VLAN—the isolated VLAN—could exist on that particular port. Cisco NX-OS 4.1(3)N1 adds the capability for users to configure the isolated VLAN port as a VLAN trunk port, indicating that the isolated VLAN port can now carry multiple VLANs. The promiscuous uplink interfaces can also carry multiple VLANs and be configured as a trunk port.
Quality-of-service (QoS) classification based on access control list (ACL)	Users can now use the modular QoS command-line interface (CLI) to configure classification of frames for the purposes of differentiated services and marking. The modular QoS CLI (MQC) allows the use of Layer 2, 3 and 4 ACLs to form a match criteria, permitting the user to also specify an associated action as a result of the ACL match.
MQC-based class-of-service (CoS) marking	Users can use the MQC infrastructure to set Layer 2 CoS values for frames that previously did not have a priority setting on them. Along with ACL-based QoS classification, this feature allows the user to flexibly classify and mark traffic according to the level of service desired.
Enhanced system scalability	Cisco NX-OS 4.1(3)N1 extends the scalability of the Cisco Nexus 5000 Series platform with the following enhancements: • Support for Cisco Nexus 2000 Series Fabric Extender connectivity through Ethernet expansion modules, such as the N5K-M1600 or the Ethernet interfaces on the N5K-M1404 • Support for 480 host PortChannels to servers using 2-port VPCs across Cisco Nexus 2000 Series interfaces • Support for 512 active VLANs • Support for up to 16 Ethernet PortChannels • Support for 16-Port EtherChannels
Support for Cisco Data Center Network Manager (DCNM)	Cisco NX-OS 4.1(3)N1 enables management of the Cisco Nexus 5000 Series Switches and Cisco Nexus 2000 Series Fabric Extenders through the Cisco DCNM tool. An updated version of Cisco DCNM (Release 4.2) is required to support the Cisco Nexus 5000 and 2000 Series.

Ordering Information

Cisco NX-OS on the Cisco Nexus 5000 Series is available in two license levels. A rich feature set is provided with the Base license, which is bundled with the hardware at no extra cost. The Storage Protocols Services license provides incremental capabilities for FCoE connectivity and Fibre Channel forwarding services. Table 4 summarizes the three packages.

Table 4. License Packages

Package	Content
Base license	Provides a rich feature set appropriate for most data center requirements
Storage Protocols Services license	Provides incremental functions available only with the Storage Protocols Services license: • Any 10 Gigabit Ethernet SFP+ port configurable as FCoE • Native Fibre Channel modules, including Cisco N5K-M1404 and N5K-M1008, enabled • Segregation of SAN administration from LAN administration • Fibre Channel Protocol (FCP) • Fibre Channel standard port types: E, F, and NP • Fibre Channel enhanced port types: TE and VF • Direct attachment of FCoE and Fibre Channel targets • VSANs • VSAN trunking • N-Port Virtualization (NPV) • N-Port Identifier Virtualization (NPIV) • Fabric services • Fabric Shortest Path First (FSPF) • Standard and enhanced zoning • Fibre Channel debugging tools • Cisco Fabric Manager support For a complete list of supported features, please refer to the Cisco Nexus 5000 Series Switches data sheet.

To place an order, visit the Cisco Ordering homepage. To download software, visit the Cisco Software Center. Table 5 provides ordering information.

Table 5. Ordering Information

Product Name	Part Number
Cisco NX-OS 4.1(3)N1(1) Software for the Cisco Nexus 5000 Series Switches	N5KUK9-413N1.1
Cisco Nexus 5010 Storage Protocols Services License	N5010-SSK9
Cisco Nexus 5020 Storage Protocols Services License	N5020-SSK9

Cisco Services and Support

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing Cisco Nexus 5000 Series Switches and Cisco Nexus 2000 Series Fabric Extenders in your data center. Cisco's innovative services are delivered through a unique combination of people, processes, tools, and partners and are focused on helping you increase operational efficiency and improve your data center network. Cisco Advanced Services use an architecture-led approach to help you align your data center infrastructure with your business goals and achieve long-term value. Cisco SMARTnet[®] Service helps you resolve mission-critical problems with direct access any time to Cisco network experts and award-winning resources. With this service, you can take advantage of the Smart Call Home service capability, which offers proactive diagnostics and real-time alerts on your Cisco Nexus 5000 Series Switches and Cisco Nexus 2000 Series Fabric Extenders. Spanning the entire network lifecycle, Cisco Services help protect your investment, optimize network operations, support migration, and strengthen your IT expertise. For more information about Cisco Data Center Services, visit <http://www.cisco.com/go/dcservices>.

For More Information

For more information about Cisco NX-OS, visit the product homepage at <http://www.cisco.com/go/nxos> or contact your local Cisco account representative.



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