

# Cisco NX-OS Software Release 5.1 for Cisco Nexus 7000 Series Switches

PB617240

This product bulletin introduces Cisco® NX-OS Software Release 5.1 for Cisco Nexus® 7000 Series Switches and summarizes the new features it offers.

## New Features

Cisco NX-OS 5.1 for the Cisco Nexus 7000 Series provides a rich and comprehensive feature set to address the high demands of mission-critical data centers.

Cisco NX-OS 5.1 supports all hardware and software supported in Cisco NX-OS Software Release 5.0. In addition, Cisco NX-OS 5.1 for the Cisco Nexus 7000 Series now supports new I/O modules, several new software features, and new and enhanced optics. The following list summarizes the main software and hardware features introduced in this release:

- Cisco FabricPath
- VLAN Trunking Protocol (VTP) Versions 1 and 2 (client and server)
- Encapsulated Remote Switching Port Analyzer (ERSPAN)
- Cisco Nexus 7000 Series 32-Port 10 Gigabit Ethernet Module with XL Option (M1-Series)
- Cisco Nexus 7000 Series 32-Port 1/10 Gigabit Ethernet Module (F1-Series)
- Cisco Nexus 7000 Series 48-Port 10/100/1000 Ethernet Module with XL Option (M1-Series)\*
- Cisco Nexus 7000 Supervisor 1 Memory Kit Upgrade
- Support for Cisco Nexus 2248TP GE Fabric Extender

\* Supported in Cisco NX-OS 5.1(2)

## Hardware Support

Cisco NX-OS 5.1 supports all the hardware for the Cisco Nexus 7000 Series previously supported up through Cisco NX-OS 5.0. Release 5.1 adds new hardware support for 32-port 10 Gigabit Ethernet (XL) and 32-port 1 and 10 Gigabit Ethernet (F1-Series) line cards. XL refers to the capability to support 1 million hardware routing entries and 256,000 access control list (ACL) entries. This capability requires the XL license. The F1-Series enables the deployment of high-density, low-latency, scalable data center architectures. The F1-Series delivers integrated hardware support for Fibre Channel over Ethernet (FCoE) and IEEE Data Center Bridging (DCB) features, along with Cisco FabricPath multipath Ethernet technologies. Table 1 lists the new modules supported, and Table 2 lists the new optics supported.

**Table 1.** New Hardware Modules Supported on Cisco Nexus 7000 Series with Cisco NX-OS 5.1

Description	Part Number
Cisco Nexus 7000 Series 32-Port 10 Gigabit Ethernet Module with XL Option (M1-Series)	N7K-M132XP-12L
Cisco Nexus 7000 Series 32-Port 1/10 Gigabit Ethernet Module (F1-Series)	N7K-F132XP-15
Cisco Nexus 7000 Series 48-Port 10/100/1000 Ethernet Module with XL Option (M1-Series)	N7K-M148GT-11L
Cisco Nexus 2248TP GE Fabric Extender	N2K-C2248TP-1GE
Cisco Nexus 7000 Supervisor 1 Memory Kit Upgrade	N7K-SUP1-8GBUPG

**Table 2.** New Optics Supported in Cisco NX-OS 5.1

	Part Number
<b>For Cisco Nexus 7000 Series 32-Port 1/10 Gigabit Ethernet Module (F1-Series)</b>	<b>N7K-F132XP-15</b>
<ul style="list-style-type: none"> <li>10GBASE-SR Small Form-Factor Pluggable Plus (SFP+)</li> <li>10GBASE-LRM SFP+</li> <li>SFP-H10GB-CUxM Twinax Cable Passive (1m, 3m, 5m)</li> <li>SFP-H10GB-ACUxM Twinax Cable Active (7m, 10m)</li> <li>1000BASE-T Gigabit Ethernet SFP (DOM)</li> <li>1000BASE-SX Gigabit Ethernet SFP (DOM)</li> <li>1000BASE-LX/LH Gigabit Ethernet SFP (DOM)</li> <li>1000BASE-ZX Gigabit Ethernet SFP (DOM)</li> <li>1000BASE-LX/LH Gigabit Ethernet SFP</li> <li>1000BASE-SX Gigabit Ethernet SFP</li> <li>1000BASE-ZX Gigabit Ethernet SFP</li> <li>1000BASE-T Gigabit Ethernet SFP</li> </ul>	<ul style="list-style-type: none"> <li>SFP-10G-SR</li> <li>SFP-10G-LRM</li> <li>SFP-H10GB-CUxM</li> <li>SFP-H10GB-CUxMA</li> <li>SFP-GE-T</li> <li>SFP-GE-S</li> <li>SFP-GE-L</li> <li>SFP-GE-Z</li> <li>GLC-LH-SM</li> <li>GLC-SX-MM</li> <li>GLC-ZX-SM</li> <li>GLC-T</li> </ul>
<b>For Cisco Nexus 7000 Series 32-Port 10 Gigabit Ethernet Module (M1-Series)</b>	<b>N7K-M132XP-12</b>
<ul style="list-style-type: none"> <li>Cisco Fabric Extender Transceiver (FET)</li> </ul>	<ul style="list-style-type: none"> <li>FET-10G</li> </ul>
<b>For Cisco Nexus 7000 Series 32-Port 10 Gigabit Ethernet Module with XL Option (M1-Series)</b>	<b>N7K-M132XP-12L</b>
<ul style="list-style-type: none"> <li>10GBASE-LRM SFP+</li> <li>10GBASE-SR SFP+</li> <li>10GBASE-LR SFP+</li> <li>10GBASE-ER SFP+</li> <li>SFP-H10GB-ACUxM Twinax Cable Active (7m, 10m)</li> <li>Cisco Fabric Extender Transceiver (FET)</li> </ul>	<ul style="list-style-type: none"> <li>SFP-10G-LRM</li> <li>SFP-10G-SR</li> <li>SFP-10G-LR</li> <li>SFP-10GB-ER</li> <li>SFP-H10GB-CUxMA</li> <li>FET-10G</li> </ul>
<b>For Cisco Nexus 7000 Series 8-Port 10 Gigabit Ethernet Module with XL Option</b>	<b>N7K-M108X2-12L</b>
<ul style="list-style-type: none"> <li>10GBASE-CX4 X2 Module</li> <li>10GBASE-ZR X2 Module</li> <li>10GBASE-LX4 X2 Module</li> </ul>	<ul style="list-style-type: none"> <li>X2-10GB-CX4</li> <li>X2-10GB-ZR</li> <li>X2-10GB-LX4</li> </ul>

## Software Support

Cisco NX-OS 5.1 supports all the software features previously supported on the Cisco Nexus 7000 Series up through Cisco NX-OS 5.0(3). Cisco NX-OS 5.1 is compatible with In-Service Software Upgrade (ISSU) with a 4.0 and 5.0 train. In addition, Cisco NX-OS 5.1 supports the new software features described in Table 3.

For more detailed information about features and ISSU, refer to the Cisco NX-OS 5.1 release notes (see “For More Information” at the end of this document).

**Table 3.** New Software Features in Cisco NX-OS 5.1

Software Feature	Description
<b>Cisco FabricPath</b>	Cisco FabricPath is a set of multipath Ethernet technologies that combine the reliability and scalability benefits of Layer 3 routing with the flexibility of Layer 2 networks, enabling IT to build massively scalable data centers. Cisco FabricPath offers a topology-based Layer 2 routing mechanism that provides an equal-cost multipath (ECMP) forwarding model. Cisco FabricPath implements an enhancement that solves the MAC address table scalability problem characteristic of switched Layer 2 networks. Furthermore, Cisco FabricPath supports vPC+, a technology similar to vPC that allows redundant interconnection of the existing Ethernet infrastructure to Cisco FabricPath without using Spanning Tree Protocol.

Software Feature	Description
<b>VTPv1 and v2, VTP client and server, and VTP pruning</b>	<p>VTP helps reduce the administrative and provisioning tasks in data center switched networks. When a VLAN is configured on a switch in VTP server mode, the VLAN is distributed automatically through all the switches in the same domain, thus removing the need to configure the VLAN everywhere.</p> <p>VTP can be configured in one of the following modes:</p> <ul style="list-style-type: none"> <li>• Server: In this mode, VLANs can be created, deleted, modified for the entire domain, and advertised to the other switches for synchronization.</li> <li>• Client: In this mode, switches receive the VLAN advertisements from the server and synchronize the configuration.</li> <li>• Transparent: In this mode, the switches do not participate in VTP. This function is already available on the Cisco Nexus 7000 Series starting from Cisco NX-OS Software Release 4.1.</li> </ul> <p>VTP pruning allows to prune the support of unneeded VLANs from trunk links to optimize flood traffic.</p>
<b>ERSPAN on M-Series</b>	<p>The Cisco Nexus 7000 Series already provides powerful network traffic monitoring functions through SPAN and RSPAN. ERSPAN introduces an additional level of flexibility to the monitoring capability, since it allows the source and destination ports of the monitored data to be in different locations of the routed or switched network. ERSPAN offers this feature by encapsulating the mirrored traffic within a Layer 3 routable generic routing encapsulation (GRE) tunnel.</p> <p>As extension to this feature, ERSPAN ACL, will be supported as well.</p>
<b>ACL on virtual terminal (VTY)</b>	<p>This feature allows configuration of access control for the switch for a virtual terminal, regardless of where the connection is established (mgmt0 or an external interface).</p>
<b>PortChannel minimum and maximum links</b>	<p>This feature improves the operation and management of PortChannel interfaces. Currently, the first or last port to be bundled or unbundled in the PortChannel makes this logical interface usable or unusable with link up or down. The minimum-link (Min-Link) feature is used to change this behavior so that the PortChannel is usable or unusable when a certain number of configurable ports (minimum links) are available, thereby helping ensure a certain bandwidth availability. This feature offers a number of benefits:</p> <ul style="list-style-type: none"> <li>• Prevents a low-bandwidth Link Aggregation Control Protocol (LACP) PortChannel from becoming active.</li> <li>• Causes an LACP PortChannel to become inactive if there are too few active members ports to supply the required minimum bandwidth.</li> </ul> <p>The maximum-link (Max-Link) parameter defines the maximum number of bundled ports allowed in an LACP PortChannel.</p>
<b>Dynamic Host Configuration Protocol (DHCP) snooping in virtual PortChannel (vPC) environment</b>	<p>This enhancement helps ensure the proper behavior of DHCP snooping in vPC environments. It helps ensure proper DHCP binding on the peer switches to allow the correct behavior of associated features, such as Dynamic ARP Inspection (DAI) and IP source guard.</p>
<b>Default interface command</b>	<p>This feature allows you to revert a given interface configuration to the default state through a command or API.</p>
<b>Web Cache Communication Protocol (WCCP) enhancements</b>	<p>WCCP enhancements include:</p> <ul style="list-style-type: none"> <li>• Support for show ip interface</li> <li>• Configurable timers for service groups</li> <li>• Improved scalability with large number of interfaces</li> </ul>
<b>Cisco IOS® Embedded Event Manager (EEM) enhancement</b>	<p>This enhancement allows Cisco IOS EEM actions to be triggered by the generation of specific syslog messages as configured by the user in the Cisco IOS EEM policies. Specific or wildcard patterns in syslogs can be matched to trigger a configured Cisco IOS EEM action.</p>
<b>MIB enhancements</b>	<ul style="list-style-type: none"> <li>• IP MIB (RFC 4293)</li> <li>• Cisco VTP MIB</li> <li>• TCP MIB (RFC 4022)</li> <li>• MSDP MIB (RFC 4624)</li> <li>• BRIDGE MIB (RFC 4188)</li> <li>• TCP IPV6 MIB (RFC 2452)</li> <li>• TCP MIB (RFC 2012)</li> </ul>
<b>Support for Cisco Nexus 2248TP GE Fabric Extender</b>	<ul style="list-style-type: none"> <li>• 100/1000-BaseT support</li> <li>• NIC Teaming</li> <li>• Switch port</li> <li>• Port Channel from Nexus 2248TP to the Nexus 7000</li> <li>• L2 STP Edge Port (portfast)</li> <li>• L3 support on SVI</li> <li>• Port ACL</li> <li>• VLAN ACL</li> <li>• Port Security</li> <li>• VDC on a per N2248TP basis</li> <li>• QoS marking</li> <li>• Up to 32 N2248TP scale per Nexus 7000</li> </ul>

## Ordering Information

Cisco NX-OS is available in five incremental license levels. A rich feature set is provided with the Base software, which is bundled with the hardware at no extra cost. The Enterprise license enables incremental functions that are applicable to many enterprise deployments. The Advanced LAN Enterprise license enables next-generation functions such as virtual device contexts (VDCs) and the Cisco TrustSec™ solution. The Transport Services license enables the OTV feature, and the Scalable Services license, applied on a per-chassis basis, enables XL capabilities on the line cards. In addition, a new license has been introduced, Enhanced Layer 2, which enables Cisco FabricPath technology.

Table 4 summarizes the license packages.

**Table 4.** License Packages

Package	Content
<b>Base package</b>	Provides a rich feature set appropriate for most data center requirements
<b>Enterprise package</b>	Provides incremental functions available only with the Enterprise license: <ul style="list-style-type: none"> <li>• IP routing</li> <li>• Open Shortest Path First (OSPF) Protocol Versions 2 and 3 (IPv4 and v6)</li> <li>• Intermediate System-to-Intermediate System (IS-IS) Protocol (IPv4)</li> <li>• Border Gateway Protocol (BGP) (IPv4 and v6)</li> <li>• Enhanced Interior Gateway Routing Protocol (EIGRP) (IPv4 and v6)</li> <li>• IP Multicast</li> <li>• Protocol-Independent Multicast (PIM): Sparse, Bidir, Any-Source Multicast (ASM), and Source-Specific Multicast (SSM) modes (IPv4 and v6)</li> <li>• Multicast Source Discovery Protocol (MSDP) (IPv4)</li> <li>• Policy-based routing (PBR) (IPv4 and v6)</li> <li>• GRE tunnels</li> </ul>
<b>Advanced LAN package</b>	Enables use of the following functions in Cisco NX-OS: <ul style="list-style-type: none"> <li>• VDCs</li> <li>• Cisco TrustSec solution</li> </ul>
<b>Transport Services license</b>	Enables OTV feature (requires Enterprise and Advances licenses for most deployments)
<b>Enhanced Layer 2 license</b>	Enables Cisco FabricPath functions
<b>Cisco Nexus 7000 10-Slot Switch Scalable Feature license</b>	Provides chassis license for XL feature modules (one per chassis)
<b>Cisco Nexus 7000 18-Slot Switch Scalable Feature license</b>	Provides chassis license for XL feature modules (one per chassis)

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

Description	Part Number
<b>Cisco NX-OS Enterprise LAN License</b>	N7K-LAN1K9
<b>Cisco NX-OS Advanced LAN License</b>	N7K-ADV1K9
<b>Cisco NX-OS Transport Services License</b>	N7K-TRS1K9
<b>Cisco NX-OS Enhanced Layer 2 License</b>	N7K-EL21K9
<b>Nexus 7010 Scalable Feature License</b>	N7K-C7010-XL
<b>Nexus 7018 Scalable Feature License</b>	N7K-C7018-XL
<b>Cisco NX-OS 5.1 Software for the Cisco Nexus 7000 Supervisor 1</b>	N7KS1K9-51
<b>Cisco NX-OS 5.1 No Payload Encryption Software (no CTS)</b>	N7KS1NPEK9-51

## Cisco Services and Support

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing Cisco Nexus 7000 Series Switches 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 uses an architecture-led approach to help you align your data center infrastructure with your business goals and achieve long-term value. Cisco SMARTnet<sup>®</sup> Service helps you resolve mission-critical problems with direct access at 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 7000 Series Switches. Spanning the entire network lifecycle, Cisco Services helps 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 account representative.



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