Cisco Nexus 1010 and 1010-X Virtual Services Appliances

Product Overview

The Cisco Nexus® 1010 and 1010-X Virtual Services Appliances (VSAs) are members of the Cisco® Nexus 1000V Series (model 1010 is shown in Figure 1). The appliances host a number of Virtual Service Blades (VSBs) to include the following: the Cisco Nexus 1000V Virtual Supervisor Modules (VSM), the Cisco Virtual Security Gateway (VSG), the Cisco Prime™ Network Analysis Module (NAM), and the Cisco Data Center Network Manager (DCNM) for LAN VSB. These VSBs provide a comprehensive solution for virtual access switching. Dedicated hardware for the Cisco Nexus 1000V VSM eases virtual access switch deployment for the network administrator, and with its support for additional VSBs, the Cisco Nexus 1010 or 1010-X is a crucial component of a virtual access switch solution.

Figure 1. Cisco Nexus 1010 Virtual Services Appliance

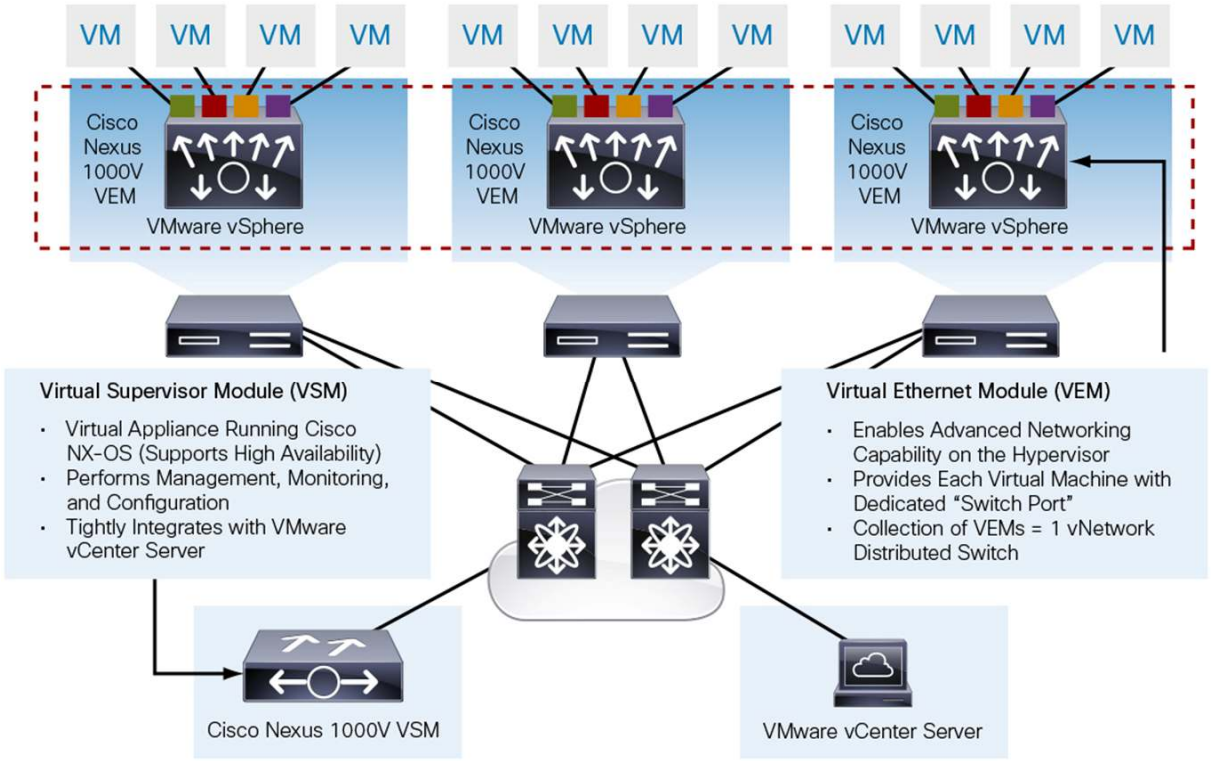
Cisco Nexus 1000V Series Switches

Cisco Nexus 1000V Series Switches are intelligent virtual machine access switches designed for VMware vSphere (vSphere 4.0 and later) environments. Operating inside the VMware ESX hypervisor, the Cisco Nexus 1000V Series supports server virtualization technology to provide:

- Policy-based virtual machine connectivity
- Mobile virtual machine security and network policy
- Nondisruptive operational model for your server virtualization and networking teams

Server virtualization usually changes the deployment and management of server operating systems, leading to longer deployment times, with a greater degree of coordination among server, network, storage, and security administrators. The Cisco Nexus 1000V Series offers a consistent networking feature set and provisioning process all the way from the virtual machine access layer to the core of the data center network infrastructure. Virtual servers can use the same network configuration, security policy, diagnostic tools, and operational models as their physical server counterparts attached to dedicated physical network ports. Virtualization administrators can access predefined network policies that follow mobile virtual machines to help ensure proper connectivity, saving valuable time that administrators can use to focus on virtual machine administration. This comprehensive set of capabilities helps you deploy server virtualization faster and achieve its benefits sooner (Figure 2).

Figure 2. Cisco Nexus 1000V Series Architecture



Product Architecture

The Cisco Nexus 1010 and 1010-X offer dedicated hardware for the Cisco Nexus 1000V VSM and other virtual network services. Network administrators can install and configure virtual access switches similar to the way they install and configure physical switches. Dedicated VSM hardware is especially helpful in a data center power up, because there is no dependency in finding server resources for the VSM. Thus, the Cisco Nexus 1010 and 1010-X allow network administrators to manage the Cisco Nexus 1000V virtual access switch like physical switches and scale server virtualization deployments (Figure 3).

Figure 3. Cisco Nexus 1010 and 1010-X Virtual Services Appliance Architecture

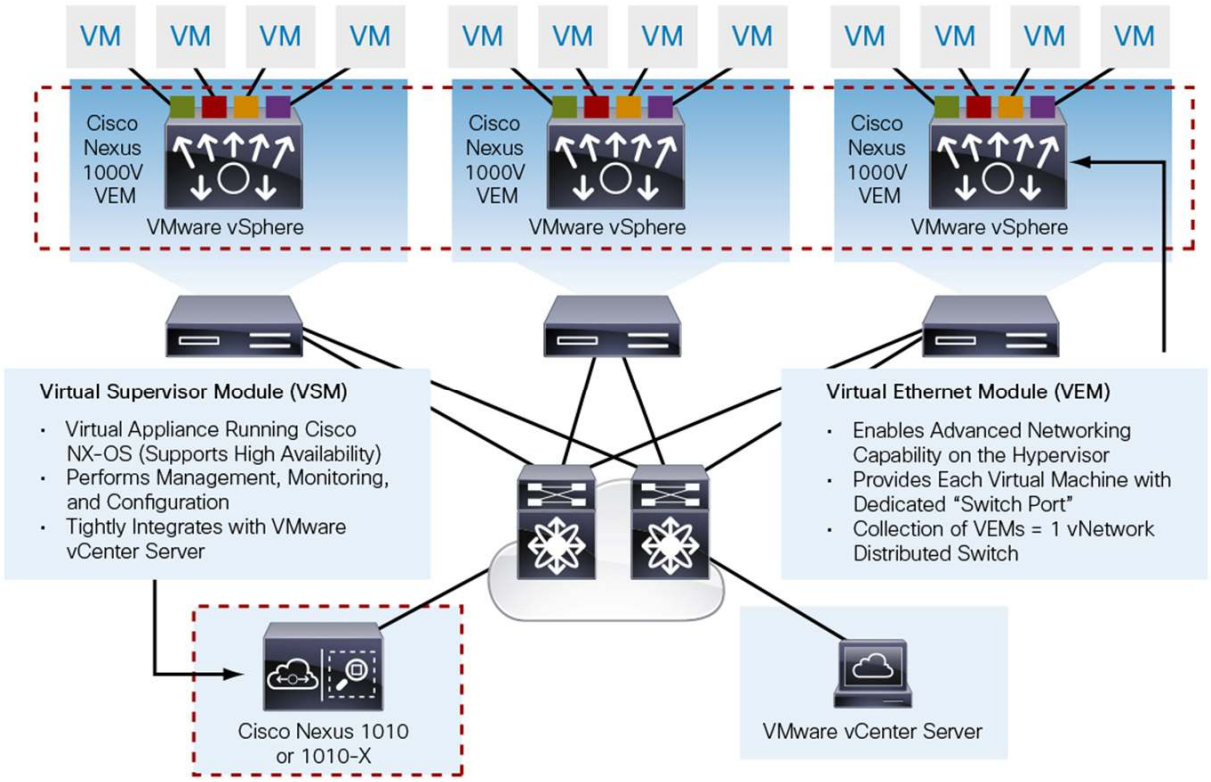
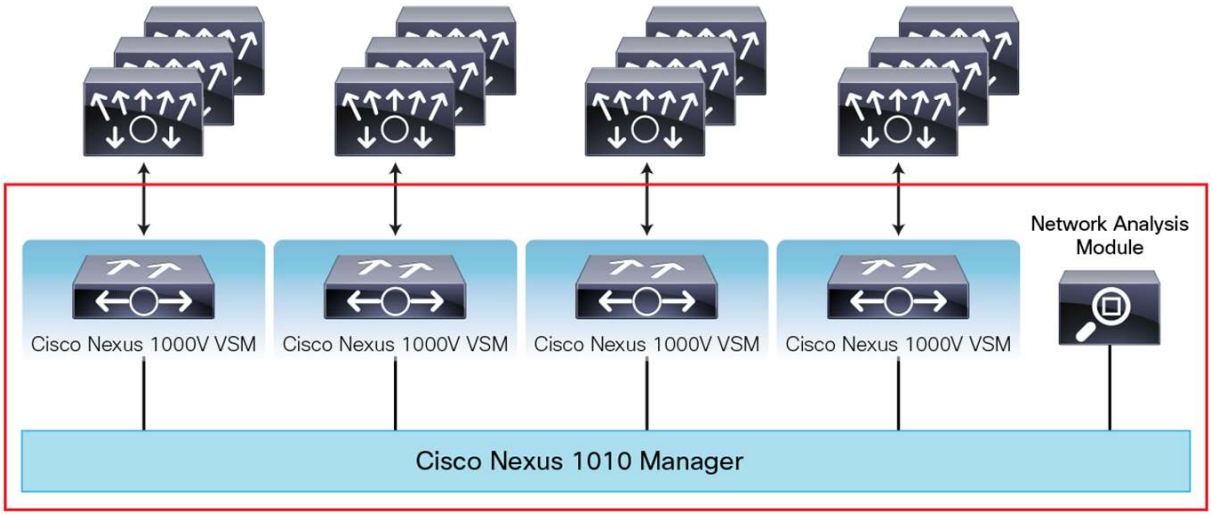


Figure 4 shows the internal architecture of the Cisco Nexus 1010 and 1010-X. The Cisco Nexus 1010 and 1010-X contain the Cisco Nexus 1010 Manager, based on Cisco NX-OS, that manages VSBs, including installation and blade configuration. The Cisco Nexus 1010 Manager, based on Cisco NX-OS, offers a familiar interface for network administrators installing and configuring Cisco Nexus 1010 and 1010-X. Cisco Nexus 1010 Manager also supports Cisco NX-OS high availability, allowing a standby Cisco Nexus 1010 or 1010-X to become active if the primary Cisco Nexus 1010 or 1010-X fails. **Note: Nexus 1010 and 1010-X appliances cannot be mixed in an active/standby high availability configuration.**

Figure 4. Cisco Nexus 1010 and 1010-X Virtual Services Appliance Internal Architecture



Cisco Nexus 1010 and 1010-X High Availability

Cisco Nexus 1010 and 1010-X offer high-availability features for large-scale networking. Within a single appliance, a Cisco Nexus 1010 or 1010-X offers process-level availability conferred by the modular nature of Cisco NX-OS, as well as VSB availability features such as restart-on-failure. Cisco Nexus 1000V Switch VSM active/standby high availability is fully supported on Cisco Nexus 1010 and 1010-X. Finally, with dual Cisco Nexus 1010 or 1010-X appliances deployed in a high-availability cluster, active/standby failover of Cisco Nexus 1010 Manager and Virtual Service Blades are supported. Nexus 1010 and 1010-X VSAs cannot be mixed in an active/standby configuration.

VSM on Cisco Nexus 1010 or 1010-X Compared to VSM as a Virtual Machine

Table 1 compares deployment of a Cisco Nexus 1000V VSM as a virtual machine and on the Cisco Nexus 1010 or 1010-X. For customers who want a complete software deployment of the Cisco Nexus 1000V Series, deployment of the VSM as a virtual machine provides flexibility in VSM placement and even mobility with VMware vMotion. However, for network administrators who want greater control over the management of the VSM, the Cisco Nexus 1010 or 1010-X provides a complete Cisco NX-OS experience in installing the Cisco Nexus 1000V virtual access switch. In addition, the Cisco Nexus 1010 or 1010-X offers fewer dependencies when the data center is powered on because the VSM can be initiated at the same time as the Virtual Ethernet Modules (VEMs).

Table 1. Comparison of VSM on Cisco Nexus 1010 and 1010-X and VSM as Virtual Machine

Feature	VSM as Virtual Machine	VSM on Cisco Nexus 1010 or 1010-X
Cisco Nexus 1000V features and scalability	Yes	Yes
VEM running on Hypervisor (e.g. vSphere)	Yes	Yes
Cisco NX-OS high availability of VSM	Yes	Yes
Software-only deployment (Hypervisor specific)	Yes	No
Installation like that of a standard Cisco switch	No	Yes
Network team ownership and management of the VSM	No	Yes
Support multi-hypervisor VM traffic	No	Yes

Product Specifications

VMware Product Compatibility

The Cisco Nexus 1010 or 1010-X is part of the Cisco Nexus 1000V Series, which is VMware Ready Certified to be compatible with VMware vSphere 4.0 and later as a VMware vNetwork Distributed Switch with support for VMware ESX and ESXi hypervisors and integration with VMware vCenter Server.

Nexus 1010 Maximum Supported Configurations (Up to 6x VSBs Total; see weighting matrix)

- 6x Cisco Nexus 1000V VSMs, each capable of managing 64x ESX/ESXi hosts for a total of 384x VMware ESX/ESXi hosts
- 6x Cisco VSG VSBs

Nexus 1010-X Maximum Supported Configurations [Up to 10x VSBs Total Using Cisco Nexus 1010 Release 4.2(1)SP1(4) and later; see weighting matrix]

- 10x Cisco Nexus 1000V VSMs, each capable of managing 64x ESX or ESXi for a total of 640x VMware ESX/ESXi hosts
- 10x Cisco VSG VSBs

Weighting Matrix (to determine max capacity of various VSBs on the Nexus 1010 and 1010-X)

	VSM	VSG	NAM	DCNM	Total Weighting
Nexus 1010 and 1010-X Release 4.2(1)SP1(3)	1	1	2	2	<=6
Nexus 1010 Release 4.2(1)SP1(4)	1	1	2	2	<=6
Nexus 1010-X Release 4.2(1)SP1(4)	1	1	2	2	<=10

Example Nexus 1010 configurations:

- 6x VSMs
- 6x VSGs
- 3x VSMs, 3x VSGs
- 1x VSM, 1x VSG, 1x NAM, 1x DCNM

Example Nexus 1010-X configurations with Release 4.2(1)SP1(4):

- 10x VSMs
- 10x VSGs
- 5x VSMs, 5x VSGs
- 3x VSMs, 3x VSGs, 1x NAM, 1x DCNM

High Availability

- Stateful failover between active and standby Cisco Nexus 1010 Managers
- Restart of VSMs and VSBs
- VSB export and import and VSM backup and restore

Management

- Cisco NX-OS Software command-line interface (CLI) console
- Cisco Discovery Protocol Versions 1 and 2
- Simple Network Management Protocol (SNMP) (read) Versions 1, 2, and 3
- XML API support
- Enhanced SNMP MIB support
- Secure Shell (SSH) Version 2
- Telnet
- Authentication, authorization, and accounting (AAA)
- TACACS+
- RADIUS
- Syslog
- Role-based access control (RBAC)
- Ingress and egress packet counters per interface
- Network Time Protocol (NTP) RFC 1305
- Domain Name System (DNS) for management interfaces
- CiscoWorks LAN Management Solution (LMS) 3.2, 3.1, and 3.0.1

SNMP MIBs

- Generic MIBs
  - CISCO-TC
  - SNMPv2-MIB
  - SNMP-COMMUNITY-MIB
  - SNMP-FRAMEWORK-MIB
  - SNMP-NOTIFICATION-MIB
  - SNMP-TARGET-MIB
- Configuration MIBs
  - IF-MIB (only control0 and mgmt0 interface of Nexus1010 mgr uses this MIB. Any physical interfaces and VSB interfaces are not covered by this MIB)
  - CISCO-IMAGE-MIB
  - CISCO-CONFIG-COPY-MIB
  - CISCO-ENTITY-VENDORTYPE-OID-MIB
  - ETHERLIKE-MIB
  - MIB-II
- Monitoring MIBs
  - NOTIFICATION-LOG-MIB
  - CISCO-PROCESS-MIB

- Security MIBs
  - CISCO-AAA-SERVER-MIB
  - CISCO-COMMON-MGMT-MIB
- Miscellaneous MIBs
  - CISCO-CDP-MIB
  - CISCO-ENTITY-ASSET-MIB

Supported Standards

Table 2 presents IEEE compliance information, and Table 3 presents RFC compliance information.

Table 2. IEEE Compliance

Standard	Description
IEEE 802.1Q	VLAN tagging
IEEE 802.3	Ethernet
IEEE 802.3ad	Link Aggregation Control Protocol (LACP)

Table 3. RFC Compliance

Standard	Description
IP Services	
RFC 768	User Data Protocol (UDP)
RFC 791	IP
RFC 792	Internet Control Message Protocol (ICMP)
RFC 793	TCP
RFC 826	Address Resolution Protocol (ARP)
RFC 854	Telnet
RFC 894	IP over Ethernet
RFC 1305	NTP Version 3
RFC 1492	TACACS+
RFC 1591	DNS client
RFC 2068	HTTP server
RFC 2138	RADIUS authentication
RFC 2139	RADIUS accounting

System Requirements

- VMware vSphere 4.0 and later
- Cisco Nexus 1000V Series VSM
  - Hard disk: 3 GB
  - RAM: 2 GB
  - One virtual CPU at 1.5 GHz
- Cisco Nexus 1000V Series VEM
  - VMware ESX/ESXi 4.0 and later
  - Hard disk space: 6.5 MB

- RAM: 150 MB

- Number of VLANs for Layer 2 connectivity between VSM and VEM: 1
- Server on VMware Hardware Compatibility List (http://www.vmware.com/go/hcl)
- Compatibility with any upstream physical switches, including all Cisco Nexus and Cisco Catalyst® switches as well as Ethernet switches from other vendors

Hardware Specifications

Table 4 lists the hardware specifications for the Cisco Nexus 1010 and 1010-X Virtual Services Appliances.

Table 4. Cisco Nexus 1010 and 1010-X Specifications

Item	Specification
Processors	2 Intel Xeon E5650 series 2.66-GHz Hexa Core CPUs
Memory	Nexus 1010: Four 4-GB RDIMMs RAM Nexus 1010-X: Six 8-GB RDIMMs RAM
PCIe slots	• 2 PCIe 2.0 slots available • 2 x8 half-length slots • x16 connector on full-height slot and x8 connector on low-profile slot
Mezzanine card	LSI 1064 Controller-Based Mezzanine Card (RAID 1; 4 ports)
Hard disk drive	Nexus 1010: Two 500-GB SATA; 7200 RPM Nexus 1010-X: Two 2TB SAS; 7200 RPM
Optical drive	24x CD-R/RW DVD±R/RW read-write optical drive
Integrated graphics	Matrox G200 core embedded in the ServerEngines Pilot II baseboard management controller (BMC)
Cisco Unified Computing System™ (Cisco UCS™) Integrated Management Controller	• Integrated ServerEngines Pilot II BMC • IPMI 2.0 compliant for management and control • One 10/100BASE-T out-of-band management interface • CLI and web GUI management tool for automated, lights-out management • Keyboard, video, and mouse (KVM)
Front-panel connector	Ease of access to front-panel video, 2 USB ports, and serial console
Front-panel locator LED	Indicator to help direct administrators to specific servers in large data center environments
Additional rear connectors	Additional interfaces include a DB-15 video port, 2 USB 2.0 ports, and a DB-9 serial port
Physical dimensions (H x W x D)	1RU: 1.7 x 16.9 x 27.8 in. (4.32 x 42.93 x 70.61 cm)
Temperature: Operating	50 to 95℉ (10 to 35℃)
Temperature: Nonoperating	-40 to 149℉ (-40 to 65℃)
Humidity: Operating	5 to 93% noncondensing
Humidity Nonoperating	5 to 93% noncondensing
Altitude: Operating	0 to 10,000 ft (0 to 3000m); maximum ambient temperature decreases by 1℃ per 300m)
Altitude: Nonoperating	40,000 ft (12,000m)
Power supply	One 650W; redundant power supply is optional when ordering or as Field Replaceable Unit (FRU)
Additional	• Cable management arm (CMA) • Rail kit

Solution Deployment Requirements

Table 5 presents deployment requirements for the Cisco Nexus 1010 and 1010-X Virtual Services Appliances.

Table 5. Cisco Nexus 1010 and 1010-X Deployment Requirements

Product	Requirement
Cisco Nexus 1010 and 1010-X	Cisco Nexus 1010 NX-OS Release 4.2(1)SP1(4) and later
Cisco VSG as a VSB on the Cisco Nexus 1010 or 1010-X	• Cisco Nexus 1010 NX-OS Release 4.2(1)SP1(4) and later • Cisco VSG Release 4.2(1)VSG1(3) or later, ISO or OVA format
Hypervisor and hypervisor management	VMware vSphere 4.0 and later
Cisco Nexus 1000V	Cisco Nexus 1000V Series NX-OS Software Release 4.2(1)SV1(5.1) or later, including: • VSM (hosted on the Cisco Nexus 1010 or 1010-X Virtual Services Appliance) • Virtual Ethernet module (embedded in the VMware vSphere ESX/ESXi hypervisor)

Regulatory Compliance

Table 6 provides regulatory standards compliance information for the Cisco Nexus 1010 and 1010-X.

Table 6. Regulatory Standards Compliance: Safety and EMC

Specification	Description
Safety	• UL 60950-1 No. 21CFR1040 • CAN/CSA-C22.2 No. 60950-1 • IRAM IEC60950-1 • CB IEC60950-1 • EN 60950-1 • IEC 60950-1 • GOST IEC60950-1 • SABS/CB IEC6095-1 • CCC*/CB GB4943-1995 • CNS14336 • CB IEC60950-1 • AS/NZS 60950-1 • GB4943
EMC: Emissions	• 47CFR Part 15 (CFR 47) Class A • AS/NZS CISPR22 Class A • CISPR2 2 Class A • EN55022 Class A • ICES003 Class A • VCCI Class A • EN61000-3-2 • EN61000-3-3 • KN22 Class A • CNS13438 Class A
EMC: Immunity	• EN55024 • CISPR24 • KN 61000-4 Series, KN 24

Ordering Information

Table 7 provides ordering information for the Cisco Nexus 1010 and 1010-X. To place an order, visit the Cisco Ordering homepage. To download software, visit the Cisco Software Center.

Table 7. Cisco Nexus 1010 and 1010-X Virtual Services Appliance Ordering Information

Part Number	Description
Nexus 1010 and 1010-X Virtual Services Appliance Options	
N1K-C1010	Cisco Nexus 1010 Appliance with 32x Nexus 1000V
N1K-C1010-HA00	Cisco Nexus 1010 Appliance High-Availability Pair without Nexus 1000V
N1K-C1010-HA32	Cisco Nexus 1010 Appliance High-Availability Pair with 32x Nexus 1000V
N1K-C1010-HA64	Cisco Nexus 1010 Appliance High-Availability Pair with 64x Nexus 1000V
N1K-C1010-X	Cisco Nexus 1010-X Appliance with 48x Nexus 1000V
N1K-C1010-X-HA00	Cisco Nexus 1010-X Appliance High-Availability Pair without Nexus 1000V
N1K-C1010-X-HA48	Cisco Nexus 1010-X Appliance High-Availability Pair with 48x Nexus 1000V
N1K-C1010-X-HA96	Cisco Nexus 1010-X Appliance High-Availability Pair with 96x Nexus 1000V
Redundant Power Supply	
R2X0-PSU2-650W-SB	650W Power Supply, with added 5A standby
Virtual Service Blade Options	
VSG-Cisco Prime Network Services Controller-1010-32	VSG and Cisco Prime Network Services Controller Paper CPU License for Nexus 1010 and 1010-X Promotion Quantity 32
N1K-C1010NAM51-K9	Cisco Prime NAM Software 5.1 for Nexus 1010 and 1010-X
Service and Support Options	
CON-xxx-N1010	SMARTNet® for Nexus 1010 hardware only; various levels of support available
CON-xxx-N1010-X	SMARTNet for Nexus 1010-X hardware only; various levels of support available
CON-SAU-VLCPU32	Software Application Support plus Upgrades (SASU) Nexus 1000V Paper CPU Quantity 32 for Nexus 1010
CON-SAU-CPU-48	SASU Nexus 1000V Paper CPU Quantity 48 for Nexus 1010-X
CON-SAU-VLCP32P2	SASU Cisco Prime Network Services Controller VSG Paper CPU 1010 Promotion Quantity 32 for Nexus 1010 and 1010-X
CON-SAS-N1K1C101	SASU Cisco NAM Virtual Service Blade Software

Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco Services helps you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco Services, see Cisco Technical Support Services or Cisco Advanced Services.

Warranty information is available at http://www.cisco.com/go/warranty.

Cisco Software Application Support plus Upgrades (SASU) is a comprehensive support service that helps you maintain and enhance the availability, security, and performance of your business-critical applications. Cisco SASU includes the following resources:

- Software updates and upgrades: The Cisco SASU service provides timely, uninterrupted access to software updates and upgrades to help you keep existing systems stable and network release levels current. Update releases, including major upgrade releases that may include significant architectural changes and new capabilities for your licensed feature set, are available by software download from Cisco.com or by CD-ROM shipment.
- Cisco Technical Assistance Center (TAC): Cisco TAC engineers provide accurate, rapid diagnosis and resolution of software application problems to help you reduce outages and performance degradation. These specialized software application experts are trained to support the Cisco VSG for Cisco Nexus 1000V Series Switches. Their expertise is available to you 24 hours a day, 365 days a year, by telephone, fax, email, or the Internet.
- Online support: Cisco SASU provides access to a wide range of online tools and communities to help you resolve problems quickly, support business continuity, and improve competitiveness.

For More Information

- For additional information about the Cisco Nexus 1010 and 1010-X, visit http://www.cisco.com/go/1010.
- For additional information about the Cisco Nexus 1000V Series, visit http://www.cisco.com/go/nexus1000v.
- For a free evaluation version of the Cisco Nexus 1000V Series, visit http://www.cisco.com/go/1000veval.
- For additional information about the Cisco VSG and a free evaluation version, visit http://www.cisco.com/go/vsg.
- For additional information about the Cisco Prime Network Services Controller and a free evaluation version, visit http://www.cisco.com/go/services-controller.
- For additional information about the Cisco Prime NAM VSB, visit http://www.cisco.com/go/1000nam.
- For additional information about the Cisco Data Center Network Manager (DCNM) LAN VSB, visit http://www.cisco.com/go/dcnm.
- For additional information about Cisco NX-OS Software, visit http://www.cisco.com/go/nxos.
- For additional information about VMware vSphere, visit http://www.vmware.com/go/vsphere.
- For more information about how Cisco and VMware are working together, visit http://www.vmware.com/cisco.

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