Cisco Nexus 1100 Series Virtual Services Appliances

Product Overview

The Cisco Nexus® 1100 Series Virtual Services Appliances (VSAs) offer dedicated hardware platforms for the deployment of network services critical to virtualized data center infrastructure (Figure 1). The appliances host a number of virtual service blades (VSBs), including the following: the Cisco Nexus 1000V Virtual Supervisor Module (VSM), the Cisco Virtual Security Gateway (VSG), the Cisco Prime™ Network Analysis Module (NAM), and the Cisco Data Center Network Manager (DCNM) for both LAN and SAN management. These VSBs provide a comprehensive solution for virtual networking services in the data center. 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 1100 Series VSAs are crucial components of a virtualized data center.

Figure 1. Cisco Nexus 1100 Series Virtual Services Appliance

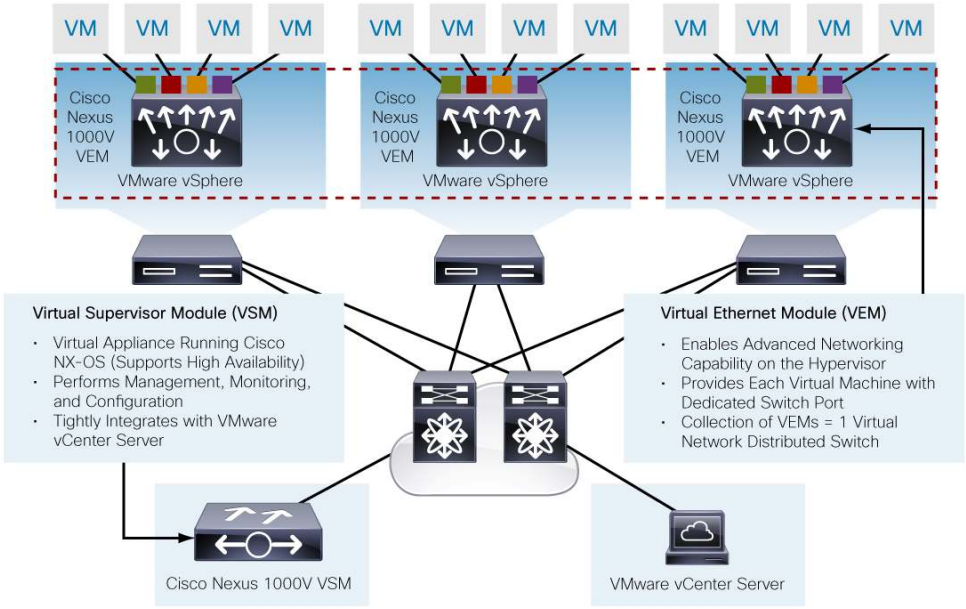
Cisco Nexus 1000V Series Switches

Cisco Nexus 1000V Series Switches are intelligent virtual machine access switches designed for hypervisor environments. Operating inside a 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 operation 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 operation 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 1100 Series VSAs 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 during data center power up, because there is no dependency in finding server resources for the VSM. Thus, the Cisco Nexus 1100 Series VSAs allow network administrators to manage the Cisco Nexus 1000V Series virtual access switch like physical switches and scale server virtualization deployments (Figure 3).

Figure 3. Cisco Nexus 1100 Series Architecture

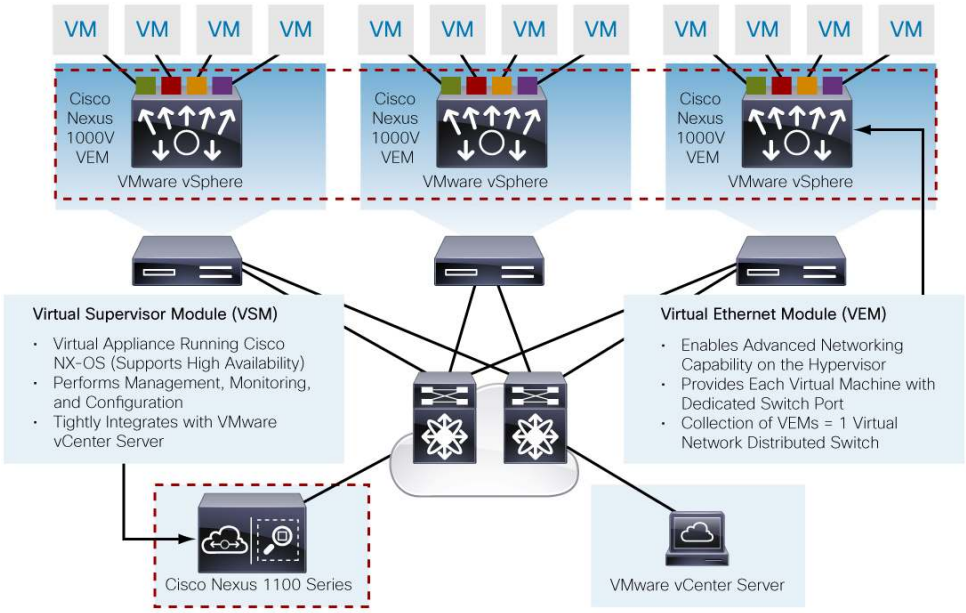
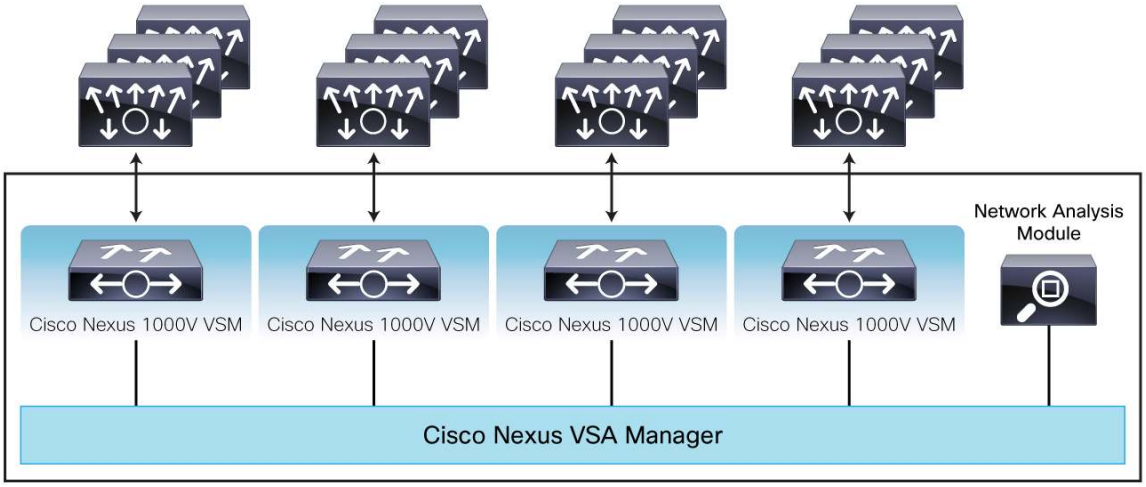


Figure 4 shows the internal architecture of the Cisco Nexus 1100 Series. The Cisco Nexus VSA Manager, based on the Cisco® NX-OS Software, manages VSBs, installation, and blade configuration. The Cisco Nexus VSA Manager offers a familiar Cisco NX-OS interface for network administrators installing and configuring VSBs. The Cisco Nexus VSA Manager also supports Cisco NX-OS high availability, allowing a standby Cisco Nexus 1100 Series VSA to become active if the primary Cisco Nexus 1100 Series VSA fails.

Figure 4. Cisco Nexus 1100 Series Internal Architecture



Cisco Nexus 1100 Series High Availability (HA)

Cisco Nexus 1100 Series VSAs offer high-availability features for large-scale networking. Within a single appliance, a Cisco Nexus 1100 Series VSA 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 VSM active-standby high availability is fully supported on the Cisco Nexus 1100 Series. With dual Cisco Nexus 1100 Series VSAs deployed in a high-availability cluster, active-standby failover of Cisco Nexus VSA Manager and VSBs is also supported.

VSM on Cisco Nexus 1100 Series VSA 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 1100 Series. 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 1100 Series provides a complete Cisco NX-OS experience while installing the Cisco Nexus 1000V Series virtual access switch. In addition, the Cisco Nexus 1100 Series offers fewer dependencies when the data center is powered on because the VSM can be initiated at the same time as the Cisco Nexus 1000V Virtual Ethernet Modules (VEMs).

Table 1. Comparison of VSM on Cisco Nexus 1100 Series and VSM as Virtual Machine

Feature	VSM as Virtual Machine	VSM on Cisco Nexus 1100 Series
Cisco Nexus 1000V Series features and scalability	Yes	Yes
VEM running on a hypervisor	Yes	Yes
Cisco NX-OS high availability of VSM	Yes	Yes
Software-only deployment (hypervisor specific)	Yes	No

Feature	VSM as Virtual Machine	VSM on Cisco Nexus 1100 Series
Installation like that of a standard Cisco switch	No	Yes
Network team ownership and management of the VSM	No	Yes
Support for multiple-hypervisor virtual machine traffic	No	Yes

Product Specifications

The Cisco Nexus 1110-S VSA maximum supported configuration (up to six VSBs total; see Table 2) is either:

- 6 Cisco Nexus 1000V VSMs, each capable of managing 64 VMware ESX or ESXi hosts for a total of 384 VMware ESX or ESXi hosts
- 6 Cisco Virtual Security Gateway (VSG) VSBs

The Cisco Nexus 1110-X VSA maximum supported configuration (up to 10 VSBs total; Table 2) is either:

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

Table 2. Weighting Matrix (to Determine Maximum Capacity of VSBs on Cisco Nexus 1100 Series VSBs)

	VSM	Cisco VSG	NAM	Cisco Data Center Network Manager (DCNM; LAN and SAN)	Total Weighting
Cisco Nexus 1110-S Release 4.2(1)SP1(5.1)	1	1	2	4	<=6
Cisco Nexus 1110-X Release 4.2(1)SP1(5.1)	1	1	2	4	<=10

Examples of Cisco Nexus 1110-S configurations include:

- 6 VSMs
- 6 Cisco VSGs
- 3 VSMs and 3 VSGs
- 2 VSMs, 2 Cisco VSGs, and 1 NAM
- 1 Cisco DCNM and 1 NAM
- 1 Cisco DCNM, 1 VSM, and 1 Cisco VSG

Examples of Cisco Nexus 1110-X configurations include:

- 10 VSMs
- 10 Cisco VSGs
- 5 VSMs and 5 Cisco VSGs
- 4 VSMs, 4 Cisco VSGs, and 1 NAM
- 3 VSMs, 3 Cisco VSGs, and 1 Cisco DCNM
- 2 Cisco DCNMs and 1 NAM

High Availability

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

Management

- Cisco NX-OS 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 the control0 and mgmt0 interfaces of Cisco Nexus VSA Manager use 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 3 presents IEEE compliance information, and Table 4 presents RFC compliance information.

Table 3. IEEE Compliance

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

Table 4. 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 Enterprise Plus 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 VEM
  - VMware ESX or 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
- 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 5 lists the hardware specifications for the Cisco Nexus 1110-S and 1110-X VSAs.

Table 5. Cisco Nexus 1110-S and 1110-X Specifications

Item	Specification
Processor	2 Intel Xeon E5-2650 processors: 2.00 GHz, 95 watts (W), 8 cores, 20-MB cache, and DDR3 1600-MHz RDIMM
Memory	Cisco Nexus 1110-S: 4x 8-GB DDR3 1600-MHz RDIMM Cisco Nexus 1110-X: 8x 8-GB DDR3 1600-MHz RDIMM
Network I/O	• LAN on motherboard (LoM): 2x 1 Gigabit Ethernet • Intel Quad Gigabit Ethernet adapter • Cisco Nexus 1110-X: 10 Gigabit Ethernet ready with Cisco UCS® Virtual Interface Card (VIC) 1225 dual-port 10 Gigabit Ethernet Enhanced Small Form-Factor Pluggable (SFP+) converged network adapter (CNA) installed, but not enabled under current software Release 4.2(1)SP1(5.1)
RAID card	LSI 2008 SAS RAID mezzanine card Cisco Nexus 1110-S: RAID 1 Cisco Nexus 1110-X: RAID 10
Hard disk drives	Cisco Nexus 1110-S: 2x 1-terabyte (TB) SATA, 7200-rpm, 2.5-inch drive Cisco Nexus 1110-X: 4x 1-TB SATA, 7200-rpm, 2.5-inch drive
Cisco Flexible Flash (FlexFlash)	One internal 16-GB Cisco FlexFlash drive (Secure Digital [SD] card)
Power supply	One 650W redundant power supply is optional when ordering or as a field replaceable unit (FRU)
Cisco UCS Integrated Management Controller (IMC)	• Integrated Emulex Pilot-3 baseboard management controller (BMC) • IPMI 2.0 compliant for management and control • One 10/100/1000 Ethernet out-of-band management interface • CLI and WebGUI management tool for automated, lights-out management • Keyboard, video, and mouse (KVM)
Front-panel connector	One KVM console connector (supplies 2 USB, 1 VGA, and 1 serial connector)
Front-panel locator LED	Indicator to help direct administrators to specific servers in large data center environments
Additional rear connectors	Additional interfaces including a VGA video port, 2 USB 2.0 ports, an RJ45 serial port, and a 1 Gigabit Ethernet management port
Physical dimensions (H x W x D)	One rack unit (1RU): 1.7 x 16.9 x 28.5 in. (4.32 x 43 x 72.4 cm)
Temperature: Operating	32 to 104℉ (0 to 40℃) (at sea level, with no fan fa il, no CPU throttling, and turbo mode)
Temperature: Nonoperating	-40 to 158℉ (-40 to 70℃)
Humidity: Operating	10 to 90% 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	0 to 40,000 ft (12,000m)

Additional	• Cable management arm (CMA) • Rail kit

Solution Deployment Requirements

Table 6 presents deployment requirements for the Cisco Nexus 1100 Series VSAs.

Table 6. Cisco Nexus 1100 Series Deployment Requirements

Product	Requirement
Cisco Nexus 1110-S and 1110-X	Cisco NX-OS Release 4.2(1)SP1(5.1) and later
Cisco VSG as a VSB on the Cisco Nexus 1100 Series	Cisco VSG Release 4.2(1)VSG1(4.1) and later; ISO or OVA format
Hypervisor and hypervisor management	VMware vSphere 4.0 and later
Cisco Nexus 1000V Switch	Cisco NX-OS Software Release 4.2(1)SV1(5.2) and later

Regulatory Compliance

Table 7 provides regulatory standards compliance information for the Cisco Nexus 1110-S and 1110-X.

Table 7. Regulatory Standards Compliance: Safety and EMC

Specification	Description
Safety	• UL 60950-1 No. 21CFR1040 Second Edition • CAN/CSA-C22.2 No. 60950-1 Second Edition • IEC 60950-1 Second Edition • EN 60950-1 Second Edition • IEC 60950-1 Second Edition • AS/NZS 60950-1 • GB4943 2001
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 • EN300386 • KN24

Ordering Information

Table 8 provides ordering information for the Cisco Nexus 1110-S and 1110-X. To place an order, visit the Cisco Ordering homepage. To download software, visit the Cisco Software Center.

Table 8. Cisco Nexus 1110 and 1110-X Virtual Services Appliances Ordering Information

Part Number	Description
Nexus 1110-S and 1110-X Virtual Services Appliances (VSAs)	
N1K-1110-S	ONE Nexus 1110-S with 32x Nexus 1000V

Part Number	Description
N1K-1110-S-HA00	Nexus 1110-S HA Pair without Nexus 1000V
N1K-1110-S-HA32	Nexus 1110-S HA Pair with 32x Nexus 1000V
N1K-1110-S-HA64	Nexus 1110-S HA Pair with 64x Nexus 1000V
N1K-1110-X	ONE Nexus 1110-X with 48x Nexus 1000V
N1K-1110-X-HA00	Nexus 1110-X HA Pair without Nexus1000V
N1K-1110-X-HA48	Nexus 1110-X HA Pair with 48x Nexus 1000V
N1K-1110-X-HA96	Nexus 1110-X HA Pair with 96x Nexus 1000V
Redundant Power Supply Available As Field Replaceable Unit (FRU)	
UCSC-PSU-650W=	650W Power Supply

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. 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 1100 Series, visit http://www.cisco.com/go/1100.
- For additional information about the Cisco Nexus 1000V Series and a free evaluation version, visit http://www.cisco.com/go/nexus1000v.
- 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 and SAN 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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