Cisco Catalyst 6500 Series Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet Uplinks

Product Overview

The Cisco® Catalyst® 6500 Series Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks and IPv6 in hardware is an industry first. The new supervisor engine combines high-density uplinks, system virtualization, and increased throughput with scalable performance and a rich IP feature set. This supervisor is a key component of the Cisco VSS 1440 Virtual Switching System and enables high availability, operational efficiency, and increased bandwidth with great ease of deployment.
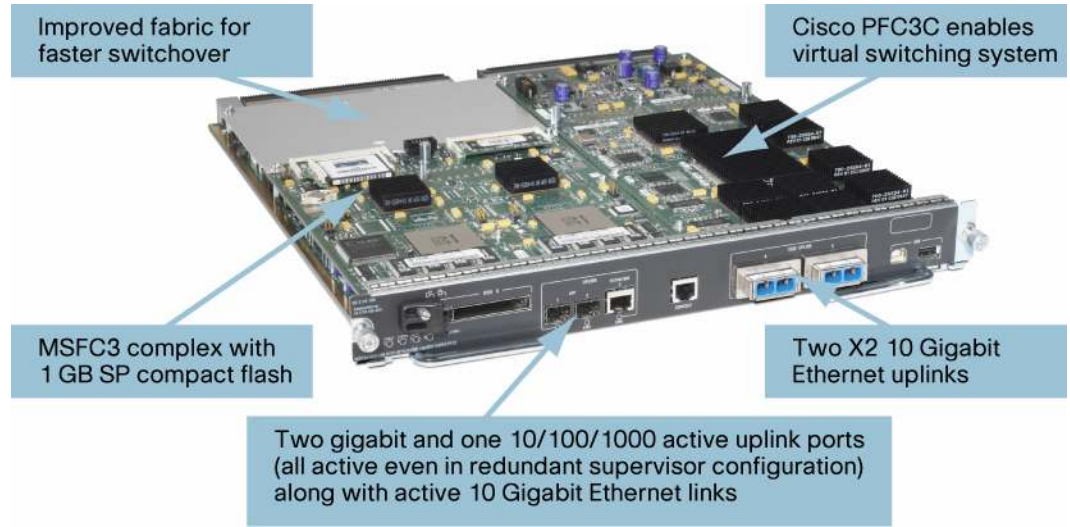
The Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks has a new forwarding engine that combines all the capabilities of its predecessor, the Cisco Catalyst 6500 Series Supervisor Engine 720, with system virtualization and increased throughput. While introducing new features, the Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks also continues to provide investment protection to Cisco customers by supporting all three generations of Cisco Catalyst 6500 Series interfaces and services modules.

The Cisco Virtual Switching Supervisor Engine 720 includes:

- Two X2-based 10 Gigabit Ethernet ports, ideal for high-density access and aggregation areas such as data center, LAN campus, and backbone areas.
- Two Gigabit Ethernet Small Form-Factor Pluggable (SFP) ports and one 10/100/1000 gigabit port for additional flexibility. All the links in the Cisco Virtual Switching Supervisor Engine 720 can be active simultaneously even in the redundant configurations, thereby increasing the supervisor throughput from 48 to 82 Mpps. This improves total system performance to 450 Mpps for IPv4 traffic and 225 Mpps for IPv6 traffic.
- Additional fabric capabilities offering subsecond failover rates, allowing faster switchover to a standby supervisor. The Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks is supported on Cisco IOS® Software.

In addition, the Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks continues to offer a hardware-based feature set that enables applications such as traditional IP forwarding, Layer 2 and Layer 3 Multiprotocol Label Switching (MPLS) VPNs, and Ethernet over MPLS (EoMPLS) with quality of service (QoS) and security features.

Figure 1. Cisco Virtual Switching Supervisor Engine 720 Features

The Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks works with the Cisco VSS 1440 to deliver high-density uplinks and system virtualization along with scalable performance (Figure 2). For detailed deployment guidance, please see http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps9336/white_paper_c11_429338.pdf .

Figure 2. System Virtualization Using the Cisco VSS 1440
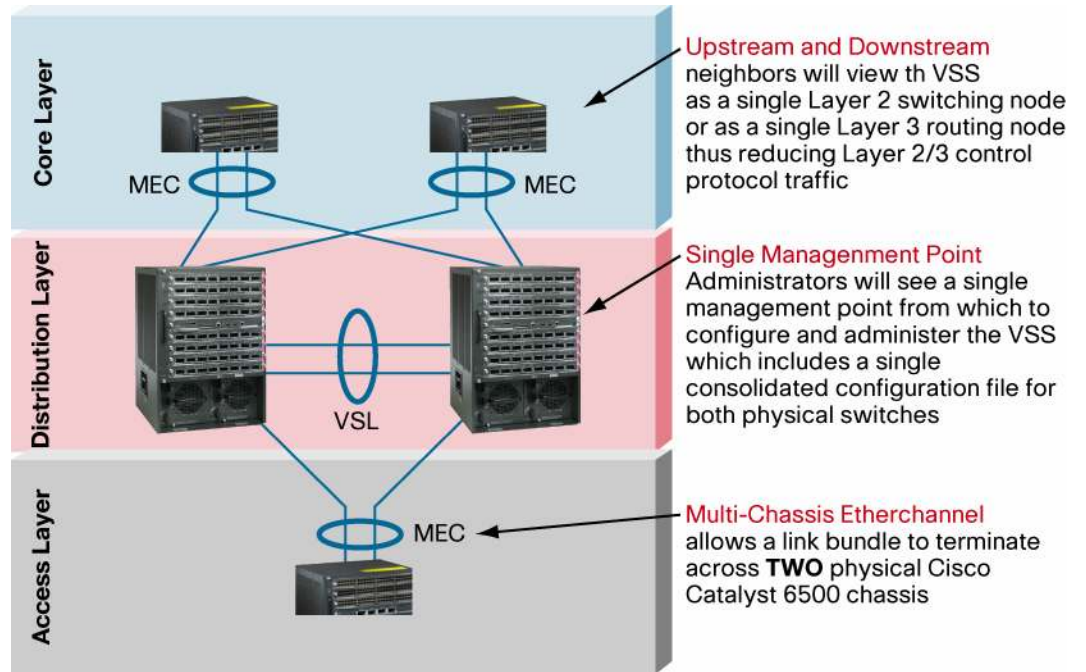
VSS 1440's system virtualization technology pools multiple Cisco Catalyst 6500 Series Switches into one virtual switch, scaling the system bandwidth capacity to 1.4 Tbps. This innovation helps to close IT resource allocation and application integration gaps, advancing the Cisco Service-Oriented Network Architecture (SONA) and the Cisco Campus Communications Fabric (CCF) framework. Cisco VSS 1440, with sup720-10G-VSS as a key enabler, brings the following benefits to customer networks:

- **Increases operational efficiency:** Using Multichassis EtherChannel, the Cisco VSS 1440 eliminates the need for Hot Standby Router Protocol/Virtual Router Redundancy Protocol/ Gateway Load Balancing Protocol (HSRP/VRRP/GLBP) configuration and allows customers to use a standards-based aggregation mechanism for server network interface card (NIC) teaming across redundant switches. Since multiple Cisco Catalyst 6500 Series Switches are viewed as one virtual switch, the management overhead is reduced by at least 50 percent. Using the Cisco VSS 1440, only one gateway IP address is required per VLAN, instead of the current requirement of three IP addresses per VLAN.

  The Cisco VSS 1440 is flexible enough to be deployed in separate geographical locations. CiscoWorks further eases Cisco VSS 1440 management by seeing two Cisco Catalyst switches as one virtual switch.

- **Boosting nonstop communication:** The Cisco VSS 1440 uses Multichassis EtherChannel for link failover and eliminates Layer 2 and 3 protocol reconvergence. This results in a deterministic, subsecond virtual switch recovery avoiding any disruption to applications that rely on network state information (such as forwarding table information, NetFlow, Network Address Translation [NAT], authentication, or authorization).

- **Scales system bandwidth capacity to 1.4 Tbps:** The Cisco VSS 1440 provides automatic, even load sharing by using all the available Layer 2 bandwidth across redundant Cisco Catalyst 6500 Series Switches. The Cisco VSS 1440 eliminates unicast flooding caused by asymmetrical routing in the campus, and maximizes the use of all of the 10-gigabit ports in a virtual switch.

- **Uses existing multilayer switching architecture:** Unlike many new technologies, the Cisco VSS 1440 eases deployment by using customers' existing Cisco Catalyst 6500 Series investments and by supporting standards-based 10 Gigabit Ethernet connections. Standards-based 10 Gigabit Ethernet connections between Cisco Catalyst 6500 Series Switches results in flexible distances between connections. Furthermore, the CiscoWorks LAN Management Solution (LMS) management tool converts existing switch configurations into simpler VSS 1440 configurations, simplifying deployment.

- **Provides slot efficiency:** With two X2-based 10 Gigabit Ethernet uplinks built into the supervisor engine, the system saves slot for additional integrated services or high-density chassis.

- **Increases throughput:** The Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks enables all Gigabit Ethernet and 10 Gigabit Ethernet links to be active simultaneously. This is true for redundant systems (systems with dual supervisor engines in the chassis), thereby increasing the supervisor throughput to 82 Mpps. As a result, the system throughput increases to 450 Mpps for IPv4 traffic and 225 Mpps for IPv6 traffic.

- **Improves resiliency:** The Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks includes switch fabric capabilities that offer deterministic, subsecond failover. This results in faster switchover to a standby supervisor.

Table 1 lists specifications of the Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks.

Table 1. Specifications of the Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks

Feature	Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks (PFC 3C)	Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks (PFC 3CXL)
Support for Cisco VSS 1440	Yes	Yes
MAC entries	96,000	96,000
IP Routes	256,000 (IPv4); 128,000 (IPv6)	1,000,000 (IPv4); 500,000 (IPv6)
IPv4 Routing	• In hardware • Up to 450 Mpps*	• In hardware • Up to 450 Mpps*
IPv6 Routing	• In hardware • Up to 225 Mpps*	• In hardware • Up to 225 Mpps*
Layer 2 Bridging	• In hardware • Up to 450 Mpps*	• In hardware • Up to 450 Mpps*
NetFlow Entries	128,000	• 256,000
MPLS	• MPLS in hardware to enable use of Layer 3 VPNs and EoMPLS tunneling. • Up to 1024 virtual routing and forwarding instances (VRFs) with a total of up to 256,000 routes per system.	• MPLS in hardware to enable use of Layer 3 VPNs and EoMPLS tunneling. • Up to 1024 VRFs with a total of up to 1,000,000 routes per system.
GRE	In hardware	In hardware
NAT	Hardware-assisted	Hardware-assisted

* With Cisco Distributed Forwarding Card 3C (DFC3C)

Application Areas

The Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks demonstrates its versatility and ability to meet the requirements of areas of the network with its hardware capabilities and support and a mix of Gigabit Ethernet and 10 Gigabit Ethernet uplinks. The supervisor engine can be used in numerous applications, including:

Enterprise backbone (core/distribution) and data center: The Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks offers high-density uplinks, system virtualization, enhanced security, rich QoS, and scalable performance for Gigabit Ethernet and 10 Gigabit Ethernet, making it ideal for enterprise core and distribution applications and for data centers.

Campus access, Ethernet WAN, and Metro Ethernet: The Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks offers a strong set of security features. System security is hardened with support for features such as one-touch AutoSecure, CPU rate limiting, multipath unicast Reverse Path Forwarding (uRPF), and numerous 802.1x extensions. Extensive hardware-based feature support of QoS mechanisms, hardware-based Generic Route Encapsulation (GRE) tunneling, and access control lists (ACLs) enable customers to build high-performance, feature-rich campus networks, metropolitan aggregation, and various WAN edge networks.

Summary/Conclusion

The Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks eases the 10 Gigabit Ethernet migration, providing system virtualization benefits by enabling the Cisco VSS 1440 and scaling the system bandwidth to 1.4 Tbps. Support for all Cisco Catalyst 6500 Series interface module classes (Classic, CEF256, dCEF256, and CEF720) combined with hardware support for MPLS and IPv6 makes the Cisco Virtual Switching Supervisor Engine 720 an excellent choice in all network locations. For the first time in the industry, with all links active (including redundant supervisor links), the Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks offers improved forwarding capacity (82 Mpps) and system throughput, along with system virtualization through VSS 1440.

Table 2 lists product specifications for the Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks.

Table 2. Product Specifications for the Cisco Virtual Switching Supervisor Engine 720 with 10 Gigabit Ethernet uplinks

Product	Specifications
Chassis Compatibility	• Cisco Catalyst 6503-E, 6504-E, 6506, 6506-E, 6509, 6509-E, 6509-NEB-A, 6509-V-E, 6513 • Cisco 7604, 7609, 7613
Fan Tray and Minimum Power Supply Required	• E Chassis supports Cisco Virtual Switching Supervisor Engine 720 　◦ 2500W AC or DC • Non E Chassis requires the following: 　◦ High-speed fan 　◦ 2500W AC or DC
Slot Requirements	Occupies the following slots in the chassis: • 3-slot chassis: slots 1 and 2 • 4-slot chassis: slots 1 and 2 • 6-slot chassis: slots 5 and 6 • 9-slot chassis: slots 5 and 6 • 13-slot chassis: slots 7 and 8
Software Compatibility	• Cisco Catalyst 6500 Series 　◦ Cisco IOS Software Release 12.2(33)SXH and later • Cisco 7600 Series 　◦ Cisco IOS Software Release 12.2(33)SXH and later
Protocols	• Layer 3 routing protocols, Border Gateway Protocol version 4 (BGPv4), Open Shortest Path First (OSPF), Intermediate System-to-Intermediate System (IS-IS), Enhanced Interior Gateway Routing Protocol(EIGRP), Routing Information Protocol (RIP), Distributed FIB Switching, Cisco Discovery Protocol, Internet Control Message Protocol (ICMP) • Multicast forwarding, Protocol independent Multicast (PIM) (both sparse and dense mode), (S,G), (*,G), Bidirectional PIM in hardware • Comprehensive MPLS support • Cisco Group Management Protocol and Internet Group Management Protocol (IGMP) snooping
Memory	• Cisco Virtual Switching Supervisor Engine 720 3C supports 1 GB of DRAM for the route processor and 1 GB for the switch processor • Cisco Virtual Switching Supervisor Engine 720 3CXL supports 1 GB DRAM for the route processor and 1 GB DRAM for the switch processor • 1 GB compact flash for switch processor and 64 MB of boot flash for route processor
Storage Options	Removable storage: 256 MB, 512 MB, 1 GB (compact flash)
Uplink Ports	Two 10 Gigabit optics (X2) ports, two Gigabit Ethernet SFP ports, one selectable 10/100/100 RJ-45
Console Ports	One (RS-232)
USB Ports	• One host and one device port**

Product	Specifications
Reliability and Availability	• Virtual Switching System (VSS) • Fast software upgrade • Route Processor Redundancy+ (RPR+) • Stateful Switchover + Nonstop Forwarding (SSO + NSF) • Online insertion and removal (OIR) hot swap • Fast fabric switchover
MIBs	• MPLS LDP MIB, MPLS Label Switch Router (LSR) MIB, MPLS-TE MIB, MPLS VPN MIB; see software release notes for additional information • Check the following MIB finder for more information: http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml
Network Management	CiscoWorks
Physical Specifications	• (H x W x D): 1.6 x 15.3 x 16.3 in. (4.0 x 37.9 x 40.3 cm) • Weight: 11.5 lb; 12.5lb with Optics and SFP
Power Consumption	• Cisco Virtual Switching Supervisor Engine 720 3C (includes PFC3C): 338W • Cisco Virtual Switching Supervisor Engine 720 3CXL (includes PFC3CXL): 363W
Environmental Conditions	• Operating temperature: 32 to 104°F (0 to 40°C) • Storage temperature: –40 to 158°F (–40 to 70°C) • Relative humidity, operating, noncondensing: 10 to 90% • Relative humidity, nonoperating, noncondensing: 10 to 95% • MTBF: Demonstrated 85,000 hours
EMI and EMC Compliance	• FCC Part 15 (CFR 47) Class A • ICES-003 Class A • EN 55022 Class A • CISPR 22 Class A • AS/NZS 3548 Class A • VCCI Class A • EN 55024 • EN300 386 • EN 50082-1 • EN 61000-3-2 • EN 61000-3-3 • EN 61000-6-1 • CISPR24
Safety Compliance	• UL 60950 • CAN/CSA-C22.2 NO. 60950 • EN 60950 • IEC 60950

** Will be disabled at FCS but will be enabled by future software releases.

Ordering Information

Table 3 lists ordering information for the Cisco Virtual Switching Supervisor Engine 720. To place an order, visit the Cisco Ordering Home Page.

Table 3. Ordering Information

Part Number	Product Description
VS-S720-10G-3C(=)	Cisco Catalyst 6500 Series Virtual Switching Supervisor Engine 720 with two 10 Gigabit Ethernet ports and MSFC3 PFC3C
VS-S720-10G-3CXL(=)	Cisco Catalyst 6500 Series Virtual Switching Supervisor Engine 720 with two 10 Gigabit Ethernet ports and MSFC3 PFC3C XL
WS-F6K-PFC3CXL=	Cisco Catalyst 6500 Series Supervisor Engine 720 PFC-3CXL
X2-10GB-LR	10GBASE-LR X2 Module
X2-10GB-SR	10GBASE-SR X2 Module
X2-10GB-ER	10GBASE-ER X2 Module

Part Number	Product Description
X2-10GB-LX4	10GBASE-LX4 X2 Module
X2-10GB-CX4	10GBASE-CX4 X2 Module
GLC-T	1000BASE-T SFP
GLC-BX-D	1000BASE-BX SFP 1490NM
GLC-BX-U	1000BASE-BX SFP 1310NM
GLC-LH-SM	Gigabit Ethernet SFP, LC connector, LX/LH transceiver
GLC-SX-MM	Gigabit Ethernet SFP, LC connector, SX transceiver
GLC-ZX-SM	1000BASE-ZX SFP
MEM-C6K-CPTFL1G	1 GB of Cisco Catalyst 6500 Series Supervisor Engine 720/Supervisor Engine 32 compact flash memory
MEM-C6K-CPTFL512M	512 MB of Cisco Catalyst 6500 Series Supervisor Engine 720/Supervisor Engine 32 compact flash memory
MEM-C6K-CPTFL256M	256 MB of Cisco Catalyst 6500 Series Supervisor Engine 720/Supervisor Engine 32 compact flash memory

Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you to protect your network investment, optimize network operations, and prepare the 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.

For More Information

For more information about the Cisco Catalyst 6500 Series, visit http://www.cisco.com/en/US/products/hw/switches/ps708/index.html.