

## Cisco Catalyst 6500/Cisco 7600 Series Supervisor Engine 720

### Product Overview

The Cisco® Catalyst® 6500/Cisco 7600 Series Supervisor Engine 720 is a family of Supervisor Engine(s) designed to deliver scalable performance and rich set of IP features in hardware. Its hardware-based feature set enables applications such as traditional IP forwarding, Layer 2 and Layer 3 Multiprotocol Label Switching (MPLS) VPNs, Ethernet over MPLS (EoMPLS) with quality of service (QoS) and security features. The Supervisor engine 720 integrates a high-performance 720 Gbps crossbar switch fabric with a forwarding engine in a single module, delivering 40 Gbps of switching capacity per slot (enabling 4-port 10GE and 48-port 10/100/1000 density line cards). With hardware-enabled forwarding for IPv4, IPv6 and MPLS, the system performance is capable of 400 Mpps for IPv4, 200 Mpps for IPv6 traffic, with features and 1024 VRFs each populated with up to 700 routes/VRF for MPLS.



The Cisco Supervisor Engine 720 offers a strong set of security features. System security is hardened with support for features such as Port Security, CPU rate limiting, Multi-Path uRPF and a long list 802.1x extension. Extensive feature support such as QoS mechanisms, hardware-based generic-routing-encapsulation (GRE) tunneling, and access control lists (ACLs) enable customers to build high-performance, feature-rich campus networks, metropolitan (metro) aggregation, and various WAN edge networks.

With enhanced security, rich QoS and scalable performance for Gigabit and 10gigabit, the Sup720 is ideal for enterprise core and distribution and datacenters.

The Supervisor Engine 720 builds on the proven Cisco Express Forwarding (CEF) architecture, by supporting centralized forwarding (CEF) and distributed forwarding (dCEF). The variants of PFC3 distinguish the various Supervisor 720 families of engines. There are three flavors—PFC3A, PFC3B and PFC3BXL—correspond to WS-SUP720, WS-SUP720-3B and WS-SUP720-3BXL. The Supervisor Engine 720 family is supported on both operating systems—Cisco Catalyst OS® and Cisco IOS®.

The Supervisor Engine 720 delivers scalable-performance, intelligence, and a broad set of features to address the needs of the most demanding service provider and enterprise deployment requirements for building modular, resilient, scalable, and secure layer 2 or layer 3 solution by:

- Delivering scalable forwarding Performance: up to 400 Mpps\* IPv4 and 200 Mpps\* IPv6 with dCEF
- Multi Protocol Label Switching support (MPLS) in hardware: enabling the use of VPNs and layer 2 tunneling while improving traffic engineering for QoS
- Delivering up to 40 Gbps per slot of switching capacity; 720 Gbps aggregate bandwidth
- Providing support for new high performance next generation gigabit and 10Gigabit interfaces
- Protecting customer's investment—supporting all three generations of Catalyst 6500 series interfaces and service module configurations
- Supporting all 3 generations of Catalyst 6500 series interfaces, services modules and WAN interfaces
- Enabling an increase in chassis interface port density and services module configurations

\* Requires DFC3's

The Supervisor Engine 720's PFC3 and MSFC3 provide the numerous functions:

### **MSFC3**

The MSFC3 is an integral part of the Supervisor Engine 720, providing high performance, multilayer switching and routing intelligence. Equipped with a high performance processor, the MSFC runs layer 2 protocols on one CPU and layer 3 protocols on the second CPU. These include routing protocol support, layer 2 protocols (Spanning Tree Protocol and VLAN Trunking Protocol for example), and security services.

The MSFC builds the Cisco Express Forwarding information Base (FIB) table in software and then downloads this table to the hardware Application-specific-integrated circuits (ASICs) on the PFC3 and Distributed forwarding engine (if present) that make the forwarding decisions for IP unicast and multicast traffic.

### **PFC3**

The Supervisor Engine 720 features the PFC3, which is equipped with a high-performance ASIC complex supporting a range of hardware-based features. The PFC3 supports routing and bridging, QoS, and multicast packet replication, and processes security policies such as access control lists (ACLs).

The Supervisor engine 720 has a field-upgradeable Policy Feature Card3. The PFC3 is equipped with a high performance ASIC complex supporting a range of hardware based features. The PFC3 supports IPv4, IPv6 routing and bridging functionality, quality of service (QoS) and multicast forwarded and ACL-based policies.

## Features and Benefits

The Supervisor Engine 720 with integrated fabric delivers scalable-performance, user-based rate limiting enforcing up to 64 policy rates, rate limiting on per-flow or aggregate basis, security enhancements and wire-rate MPLS and IPv6 hardware support.

**Table 1.** Scalability Table

Name	WS-SUP720	WS-SUP720-3B	WS-SUP720-3BXL
IPv4 routing	In hardware Up to 400 Mpps*	In hardware Up to 400 Mpps*	In hardware Up to 400 Mpps*
IPv6 routing	In hardware Up to 200 Mpps*	In hardware Up to 200 Mpps*	In hardware Up to 200 Mpps*
L2 bridging	In hardware Up to 400 Mpps*	In hardware Up to 400 Mpps*	In hardware Up to 400 Mpps*
MPLS	No	MPLS in hardware to enable use of layer 3 VPNs and EoMPLS tunneling. Up to 1024 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	In hardware
NAT	Hardware assisted	Hardware assisted	Hardware assisted
MAC Entries	64,000	64,000	64,000
Routes	256,000 (IPv4); 128,000 (IPv6)	256,000 (IPv4); 128,000 (IPv6)	1,000,000 (IPv4); 500,000 (IPv6)
Netflow Entries	128,000	128,000	256,000

\* Requires DFC3's

**Table 2.** QoS Features

Feature	WS-SUP720	WS-SUP720-3B	WS-SUP720-3BXL
Layer—3 classification and marking access control entries (ACEs)	32K dedicated for QoS	32 K dedicated for QoS	32K dedicated for QoS
Aggregate rate-limiting location	Ingress port or VLAN and egress VLAN or Layer -3 port	Ingress port or VLAN and egress VLAN or Layer-3 port	Ingress port or VLAN and egress VLAN or Layer-3 port
Rate-limiting level types <i>Committed Information Rate (CIR), Peak Information Rate (PIR)</i>	CIR, PIR	CIR, PIR	CIR, PIR
Aggregate traffic rate-limiting policers	1023	1023	1023
Flow—based rate-limiting method; number of rates	Per source address, destination address, or full flow; 64 rates	Per source address, destination address, or full flow; 64 rates	Per source address, destination address, or full flow; 64 rates
MAC ACL's featuring per-port/per VLAN granularity	No	Yes	Yes

**Table 3.** Security Features

Feature	WS-SUP720	WS-SUP720-3B	WS-SUP720-3BXL
ACE counters	No	Yes	Yes
Port security	Yes	Yes	Yes
IEEE 802.1x and 802.1x extensions	Yes	Yes	Yes
VLAN and router ACLs and Port ACLs	Yes	Yes	Yes
Security ACL entries	32K	32 K	32K
Reflexive ACLs	128K	128 K	256K
uRPF check in hardware	Up to 6 paths	Up to 6 paths	Up to 6 paths
CPU rate limiters (DoS protection)	10 special case rate limiters plus Control Plane Policing	10 special case rate limiters plus Control Plane Policing	10 special case rate limiters plus Control Plane Policing
Private VLANs	Yes	Yes	Yes
# of Interfaces with unique ACLs	512	4000	4000
MAC ACLs on IP	No	Yes	Yes
Transmission Control Protocol (TCP) intercept hardware acceleration	Yes	Yes	Yes

**Table 4.** MPLS Features

Feature	WS-SUP720	WS-SUP720-3B	WS-SUP720-3BXL
Interface support	LAN and WAN interface modules as applicable	LAN and WAN interface modules, as applicable	LAN and WAN interface modules as applicable
Label imposition/disposition (MPLS-PE), swapping (MPLS-P)	No	Yes	Yes
Label Distribution Protocol (LDP)	No	Yes	Yes
Tag Distribution Protocol support (TDP)	No	Yes	Yes
MPLS VPN	No	Yes	Yes
VRF Lite	Yes	Yes	Yes
QoS mechanisms using experimental (EXP) bits	No	Yes	Yes
MPLS-RSVP-TE	No	Yes	Yes
MPLS Differentiated Services (DiffServ)-Aware Traffic Engineering (MPLS-DS-TE)	No	Yes	Yes
MPLS traceroute	No	Yes, see release notes for details	Yes, see release notes for details
EoMPLS	No	Yes	Yes

### Summary/Conclusion

Suited for deployment in the distribution and core and in the data center, Supervisor engine 720 supports all Cisco Catalyst 6500 Series interface module classes (Classic, CEF256, dCEF256, and CEF720) offering hardware support for MPLS and IPv6. Supported in both IOS and hybrid (IOS on RP and CatOS on SP) the Supervisor engine 720 offers significant improvements in performance (upto 400 Mpps) with dCEF, maximum bandwidth of 720 Gbps, DRAM of up to 1GB, integrated switch fabric.

**Table 5.** Product Specifications

Product Specifications	
Chassis compatibility	<ul style="list-style-type: none"> <li>• Cisco 6503, 6503-E, 6404-E, 6506, 6506-E, 6509, 6509-E, 6509-NEB, 6509-NEB-A, 6513</li> <li>• Cisco 7603, 7606, OSR-7609, 7609, 7613</li> </ul>
Fan tray and power supply required	<ul style="list-style-type: none"> <li>• High speed fan</li> <li>• 2500W AC or DC</li> </ul>
Slot requirements	<p>Occupies the switch fabric slots in the chassis:</p> <ul style="list-style-type: none"> <li>• 3-slot chassis: slots 1 and 2</li> <li>• 4-slot chassis: slots 1 and 2</li> <li>• 6-slot chassis: slots 5 and 6</li> <li>• 9-slot chassis: slots 5 and 6</li> <li>• 13-slot chassis: slots 7 and 8</li> </ul>
Software compatibility	<ul style="list-style-type: none"> <li>• Catalyst 6500 Series <ul style="list-style-type: none"> <li>◦ CatOS</li> <li>◦ WS-Sup720: 8.1(1) and higher</li> <li>◦ WS-Sup720-3B: 8.3(2) and higher</li> <li>◦ WS-Sup720-3BXL: 8.3(2) and higher</li> </ul> </li> <li>• Native <ul style="list-style-type: none"> <li>◦ WS-SUP720: 12.2(14)SX and higher</li> <li>◦ WS-Sup720-3B: 12.2(17d)SXB1 and higher</li> <li>◦ WS-Sup720-3BXL: 12.2(17d)SXB1 and higher</li> </ul> </li> <li>• Cisco 7600 Series <ul style="list-style-type: none"> <li>◦ WS-SUP720 supports Cisco IOS 12.2(14)SX2 and later</li> <li>◦ WS-SUP720-3B supports Cisco IOS 12.2(17d)SXB1 and later</li> <li>◦ WS-SUP720-3BXL supports Cisco IOS 12.2(17b)SXB and later</li> </ul> </li> </ul>
Protocols	<ul style="list-style-type: none"> <li>• Layer 3 routing protocols, Border Gateway Protocol version 4 (BGPv4), Open Shortest Path First (OSPF), Intermediate System-to-Intermediate System (IS-IS), Routing Information Protocol (RIP), Distributed FIB Switching, Cisco Discover Protocol (CDP), Internet Control Message Protocol (ICMP)</li> <li>• Traditional Protocols such as Internetwork Packet Exchange (IPX), Appletalk, DECnet, Virtual Integrated Network Service (VINES), Connectionless Network Service (CLNS)</li> <li>• Multicast forwarding, Protocol independent Multicast (PIM) (both sparse and dense mode), (S,G), (*,G), Bi-Directional PIM in hardware</li> <li>• Comprehensive MPLS support</li> <li>• Cisco Group Management Protocol and Internet Group Management Protocol (IGMP) snooping</li> </ul>
Memory	<ul style="list-style-type: none"> <li>• WS-SUP720 supports 512MB of DRAM for the route processor and 512 MB for the switch processor</li> <li>• WS-SUP720-3B supports 512MB of DRAM for the route processor and 512 MB for the switch processor, upgradeable to 1GB</li> <li>• WS-SUP720-3BXL supports 1GB DRAM for route the processor and 1GB DRAM for the switch processor</li> <li>• 64MB Boot Flash for SP switch processor and 64 MB of Boot Flash for the route processor</li> </ul>
Options	Removable storage: 64MB, 128 MB, 256 MB, 512 MB (Compact Flash)
Uplink ports	Two Gigabit Ethernet ports, one Small Form-Factor Pluggable (SFP), one selectable SFP or 10/100/100 RJ-45
Console ports	One (RS-232)
Reliability and availability	<ul style="list-style-type: none"> <li>• FSU (Fast software upgrade)</li> <li>• RPR+ (Route Processor Redundancy+)</li> <li>• SSO+NSF (Stateful Switchover + Nonstop Forwarding)</li> <li>• OIR (Online insertion and removal) Hot Swap</li> </ul>
MIBs	<ul style="list-style-type: none"> <li>• MPLS LDP MIB, MPLS Label Switch Router (LSR) MIB, MPLS-TE MIB, MPLS VPN MIB; see software release notes for additional information</li> <li>• Check the following MIB finder for more info: <a href="http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml">http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml</a></li> </ul>
Network management	Cisco Works
Physical specifications	<ul style="list-style-type: none"> <li>• (H x W x D): 1.6 x 15.3 x 16.3 in. (4.0 x 37.9 x 40.3 cm)</li> <li>• Weight: 11.5 lb</li> </ul>

Product Specifications	
Power consumption	<ul style="list-style-type: none"> <li>• Sup720 (includes PFC3A, MSFC3): 7.5A (315W)</li> <li>• Sup720-3B (includes PFC3B, MSFC3): 6.72A (282W)</li> <li>• Sup720-3BXL (includes PFC3BXL, MSFC3): 7.82A (328W)</li> </ul>
Environmental conditions	<ul style="list-style-type: none"> <li>• Operating temperature: 32 to 104°F (0 to 40°C)</li> <li>• Storage temperature: -40 to 167°F (-40 to 75°C)</li> <li>• Relative humidity: 10 to 90 percent, noncondensing</li> <li>• Regulatory compliance</li> </ul>
Compliance	<p><b>CE Markings</b></p> <ul style="list-style-type: none"> <li>• Safety <ul style="list-style-type: none"> <li>◦ UL 60950</li> <li>◦ EN 60950</li> <li>◦ CSA-C22.2 No. 60950</li> <li>◦ IEC 60950</li> <li>◦ AS/NZS 3260</li> <li>◦ IEC 60825-1,-2</li> <li>◦ EN 60825 -1,-2</li> <li>◦ 21CFR1040-10</li> <li>◦ TS001</li> </ul> </li> <li>• EMC <ul style="list-style-type: none"> <li>◦ FCC Part 15 (CFR 47) Class A</li> <li>◦ ICES-003 Class A</li> <li>◦ EN 55022 Class A</li> <li>◦ CISPR 22 Class A</li> <li>◦ AS/NZS 3548 Class A</li> <li>◦ VCCI Class A</li> <li>◦ EN55024</li> <li>◦ ETS300 386</li> <li>◦ EN50082-1</li> <li>◦ EN61000-6-1</li> </ul> </li> </ul>

\*\*Check software release for availability

## Ordering Information

To place an order, visit the [Cisco Ordering Home Page](#).

**Table 6.** Ordering Information

Part Number	Description
WS-SUP720-3BXL	Catalyst 6500/Cisco 7600 Supervisor 720 Fabric MSFC3 PFC3BXL
WS-SUP720-3B	Catalyst 6500/Cisco 7600 Supervisor 720 Fabric MSFC3 PFC3B
WS-SUP720	Catalyst 6500/Cisco 7600 Supervisor 720 Fabric MSFC3 PFC3A
MEM-S3-1GB	Catalyst 6500 1GB SP DRAM for Sup720 and Sup720-3B
MEM-MSFC2-512MB	Catalyst 6500 512MB DRAM on the MSFC2 or SUP720 MSFC3
MEM-MSFC3-1GB	1GB Mem for Sup720, Sup720-3B and MSFC2A
MEM-C6K-CPTFL128M	Cat6500 Sup720 Compact Flash Mem 128MB
MEM-C6K-CPTFL256M	Cat6500 Sup720 Compact Flash Mem 256MB
MEM-C6K-CPTFL512M	Catalyst 6500 Sup720 Compact Flash Mem 512MB
WS-F6K-PFC3BXL	Sup720 PFC-3BXL Plus 2x1Gig Mem
WS-F6K-PFC3B	Catalyst 6500 Sup720 Policy Feature Card-3B
GLC-LH-SM	Gigabit Ethernet SFP singlemode fiber optics, LC connector LX/LH transceiver
GLC-SX-MM	Gigabit Ethernet SFP multimode fiber optics, LC connector SX transceiver
GLC-T	Gigabit Ethernet SFP Category 5 unshielded twisted pair (UTP), RJ-45 connector
GLC-ZX-SM	Gigabit Ethernet SFP singlemode fiber optics, LC connector ZX transceiver

Part Number	Description
FAN-MOD-3HS	Cisco Catalyst 6503 high-speed fan tray
WS-C6K-6SLOT-FAN2	Cisco Catalyst 6506 high-speed fan tray
WS-C6K-9SLOT-FAN2	Cisco Catalyst 6509 high-speed fan tray
FAN-MOD-09	Cisco Catalyst 6509-NEB-A high-speed fan tray
WS-C6K-13SLT-FAN2	Cisco Catalyst 6513 high-speed fan tray
WS-6509-NEB-UPGRD=	Upgrade to NEB chassis to support Sup720

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## For More Information

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



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