Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS for the Cisco Catalyst 4503-E Switch and Cisco Catalyst 4503 Switch

Enterprise-Class Security and Reliability for the Medium-Sized Business

Overview

Exclusive to the Cisco® Catalyst® 4503-E and 4503 Switches chassis, the Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS (shown with a Cisco Catalyst 4503 Switch and two line cards in Figure 1) offers 64-Gbps, 48-millions of packets per second (mpps) switching with 12 ports of wire-speed 10/100/1000 802.3af Power over Ethernet (PoE) and eight wire-speed Small Form-Factor Pluggable (SFP) ports directly on the supervisor engine. These additional ports scale the maximum density of the Cisco Catalyst 4503 to 116 ports when deployed with a Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS.

Optimized for small offices, the Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS (Figure 2) provides a highly flexible and scalable deployment alternative to medium-sized businesses for end-user and server connectivity.

Figure 1. Cisco Catalyst 4503 Switch with Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS and Two Line Cards

Figure 2. Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS

Integrated Reliability and Serviceability

The Cisco Catalyst 4503 minimizes network downtime with 1+1 redundant hot-swappable power supplies, a hot-swappable fan tray with redundant fans, and hot-swappable line cards. The centralized switching architecture of the Cisco Catalyst 4500 Series Switches helps ensure consistent backplane performance, even if a line card should fail.

The Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS includes a dedicated 10/100 copper RJ-45 management port located on the supervisor engine faceplate for disaster recovery. If all the flash storage devices local to the switch are corrupted or completely full, the supervisor engine can download an image from a Trivial File Transfer Protocol (TFTP) server within seconds, minimizing network disruptions.

Scalable Performance

The Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS extends enterprise-class switching capacity and predictable performance to the medium-sized business. A robust 64-Gbps backplane delivers 48 mpps of forwarding throughput in hardware to support high-density gigabit to the desktop and server connections. Extensive ternary content addressable memory (TCAM) resources provide extensive capacity for concurrent wire-rate intelligent services and help enable new services quickly.

Comprehensive Management for Ease of Use

The Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS can be managed with Cisco Network Assistant, embedded CiscoView, or the command-line interface (CLI). Cisco Network Assistant is a Web-based application that provides automated routines that perform easy setup and configuration of one or more switches. Data, voice, video, and security automated routines allow quick configuration of advanced enterprise features.

Part of the Cisco Catalyst 4500 Family

The Supervisor Engine II-Plus-TS is the entry-level supervisor engine in the growing family of Cisco Catalyst 4500 Series Switches. There are other supervisor engines specifically for user access with Layer 2 features and supervisor engines for full Layer 3 capability for access, aggregation, and distribution functions. For a list of all Cisco Catalyst 4500 Series supervisor engines, visit: http://www.cisco.com/en/US/products/hw/switches/ps4324/products_data_sheets_list.html.

Table 1 compares the features of the Cisco Catalyst 4500 Series supervisor engines specifically for Layer 2 access

Table 1. Cisco Catalyst Supervisor Engines for Layer 2 Access Only

Feature	Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS	Cisco Catalyst 4500 Series Supervisor Engine II-Plus	Cisco Catalyst 4500 Series Supervisor II-Plus-10GE
Layer 2–4 Performance	48 mpps and 64 Gbps	48 mpps and 64 Gbps	81 mpps and 108 Gbps
Multilayer Switching	Basic Layer 2–4 services	Basic Layer 2–4 services	Basic Layer 2–4 services
Enhanced Interior Gateway Routing Protocol (EIGRP),Open Shortest Path First (OSPF), Intermediate System-to-Intermediate System (IS-IS), and Border Gateway Protocol (BGP)	No	No	No
EIGRP Stub	Yes	Yes	Yes
Redundant Capable	No	Yes	Yes
CPU (MHz)	266 MHz	266 MHz	667 MHz
NetFlow Support	No	No	No
IP Forwarding Information Base (FIB) Entries	32,000	32,000	32,000
Chassis Support	Cisco Catalyst 4503 and 4503-E Switches chassis	Cisco Catalyst 4503, 4506, 4507R, 4503-E, 4506-E, 4507R-E and 4507R+E Switches chassis	Cisco Catalyst 4503, 4506, 4507R, 4503-E, 4506-E, 4507R-E and 4507R+E Switches chassis
Quality-of-Service (QoS) Sharing	Nonblocking Gigabit Ethernet only	Nonblocking Gigabit Ethernet only	All ports
Broadcast Suppression	Software[1]	Software[2]	Hardware
Multicast Suppression	No	No	Hardware
802.1Q-in-801.1Q (Q-in-Q)	No	No	In hardware
Active Redundant Supervisor Engine Uplinks	No	2 Gigabit Ethernet uplinks	Two 10 Gigabit Ethernet uplinks and four Gigabit Ethernet uplinks

[1] Hardware performance for nonblocking Gigabit Ethernet ports, and software performance for all other ports.
[2] Hardware performance for nonblocking Gigabit Ethernet ports, and software performance for all other ports.

Feature	Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS	Cisco Catalyst 4500 Series Supervisor Engine II-Plus	Cisco Catalyst 4500 Series Supervisor II-Plus-10GE
Synchronous Dynamic RAM (SDRAM)	256 MB	256 MB	256 MB (512 MB optional upgrade)
Onboard Flash Memory	32 MB	32 MB	64 MB
Active Virtual LANs (VLANs)	2000	2000	2000
Multicast Entries	8000	8000	8000
Spanning Tree Protocol Instances	1500	1500	1500
Switched Virtual Interfaces (SVIs)	1000	1000	1000
Internet Group Management Protocol (IGMP) Snooping	Yes (16,000)	Yes (16,000)	Yes (16,000)
Security/QoS Hardware Entries	32,000	32,000	32,000
Policers	512 egress; 512 ingress	512 egress; 512 ingress	512 egress; 512 ingress

Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS Features at a Glance

Layer 2 Features

- Layer 2 hardware forwarding at 48 mpps
- Layer 2 switch ports and VLAN trunks
- IEEE 802.1Q VLAN encapsulation
- Inter-Switch Link (ISL) VLAN encapsulation (excluding blocking ports on WS-X4418-GB)
- Dynamic Trunking Protocol (DTP)
- VLAN Trunking Protocol (VTP) and VTP domains
- Support for 2048 active VLANs and 4096 VLAN IDs per switch
- Spanning-tree PortFast and PortFast guard
- Spanning-tree UplinkFast and BackboneFast
- 802.1s
- 802.1w
- 802.3ad
- Spanning-tree root guard
- Cisco Discovery Protocol
- IGMP snooping Versions 1, 2, and 3
- Cisco EtherChannel® technology, Fast EtherChannel, and Gigabit EtherChannel technology across line cards
- Port Aggregation Protocol (PAgP)
- Link Aggregation Control Protocol (LACP)
- Unidirectional link detection (UDLD) and aggressive UDLD
- Q-in-Q passthrough
- Jumbo Frames (up to 9216 bytes)
- Baby Giants (up to 1600 bytes)
- Unidirectional Ethernet
- Storm control (formally known as broadcast and multicast suppression)

- Forced 10/100 autonegotiation
- Web Content Communication Protocol Version 2 Layer 2 Redirect
- Private VLAN (PVLAN) Promiscuous Trunk
- Match class of service (CoS) for non-IPv4 traffic
- L2TP
- CoS mutation
- Per VLAN Control Traffic Intercept

Layer 3 Features

- Hardware-based IP Cisco Express Forwarding routing at 48 mpps
- Static IP routing
- Routing Information Protocol (RIP) and RIP2
- Hot Standby Router Protocol (HSRP)
- IGMP Versions 1, 2, 3
- IGMP filtering on access and trunk ports
- IP multicast routing protocols (Protocol Independent Multicast [PIM], Source Specific Multicast [SSM], Distance Vector Multicast Routing Protocol [DVMRP])
- Cisco Group Multicast Protocol server
- Full Internet Control Message Protocol (ICMP) support
- ICMP Router Discovery Protocol
- IPv6 software switches
- EIGRP stub
- Virtual Router Redundancy Protocol (VRRP)

Sophisticated QoS and Traffic Management

- Per-port QoS configuration
- Support for four queues per port in hardware
- Strict priority queuing
- IP differentiated service code point (DSCP) and IP Precedence
- Classification and marking based on IP type of service (ToS) or DSCP
- Classification and marking based on full Layer 3 and Layer 4 headers (IP only)
- Input and output policing based on Layer 3 and Layer 4 headers (IP only)
- Support for 512 policers on ingress and 512 policers on egress configured as aggregate or individual
- Shaping and sharing output queue management
- Dynamic Buffer Limiting (DBL): congestion-avoidance feature
- No performance penalty for granular QoS functions
- Auto-QoS CLI for voice-over-IP (VoIP) deployment
- Per-port, per-VLAN QoS
- Selective DBL

Predictable Performance

- 64-Gbps switching fabric
- Layer 2 hardware forwarding at 48 mpps
- Layer 3 hardware-based IP Cisco Express Forwarding routing at 48 mpps
- Layer 4 TCP/User Datagram Protocol (UDP) hardware-based filtering at 48 mpps
- No performance penalty with advanced Layer 3 and Layer 4 services enabled
- Software-based learning at a sustained rate of 500 hosts per second
- Support for 32,000 MAC addresses
- Support for 32,000 entries in routing table (shared between unicast and multicast)
- Bandwidth aggregation up to 16 Gbps through Cisco Gigabit EtherChannel technology
- Hardware-based multicast management
- Hardware-based access control lists (ACLs), router ACLs (RACLs), and VLAN ACLs (VACLs)

Comprehensive Management

- Manageable through Cisco Network Assistant
- Single console port and single IP address to manage all system features
- Software configuration management, including local and remote storage
- Manageable through CiscoWorks Windows network-management software on a per-port and per-switch basis, providing a common management interface for Cisco routers, switches, and hubs
- Simple Network Management Protocol (SNMP) Versions 1, 2, and 3 instrumentation, delivering comprehensive in-band management
- CLI-based management console to provide detailed out-of-band management
- Remote Monitoring (RMON) software agent to support four RMON groups (history, statistics, alarms, and events) for enhanced traffic management, monitoring, and analysis
- Support for all nine RMON groups through the use of a Cisco SwitchProbe® analyzer (Switched Port Analyzer [SPAN]) port, which permits traffic monitoring of a single port, a group of ports, or the entire switch from a single network analyzer or RMON probe
- Analysis support, including ingress port, egress port, and VLAN SPAN
- Layer 2 traceroute
- Remote SPAN (RSPAN)
- Cisco Smartports macros
- SPAN ACL filtering
- SPAN CPU port
- Dynamic Host Configuration Protocol (DHCP) client autoconfiguration
- Enhanced SNMP MIB support
- HTTPS
- Time Domain Reflectometry (TDR)
- MAC Address Notification
- Cisco Generic Online Diagnostics (GOLD)

Advanced Network Security

- TACACS+ and RADIUS, which help enable centralized control of the switch and restrict unauthorized users from altering the configuration
- Standard and extended ACLs on all ports
- 802.1x user authentication (with VLAN assignment, voice VLAN, port security, guest VLAN, private guest VLAN, PVLAN, and RADIUS-supplied session timeout extensions)
- 802.1x accounting
- 802.1x authentication failure
- 802.1x PVLAN assignment
- 802.1x Private Guest VLAN
- 802.1x RADIUS-supplied time out
- NAC Layer 2 802.1x
- NAC Layer 2 IP
- Trusted boundary
- RACLs on all ports (no performance penalty)
- VACLs
- Port ACLs (PACLs)
- PVLANs on access and trunk ports
- DHCP snooping
- DHCP Option 82
- DHCP Option 82 insertion
- DHCP Option 82 Pass Through
- Port security
- Sticky port security
- Secure Shell (SSH) Protocol Versions 1 and 2
- VLAN Management Policy Server (VMPS) client
- Unicast MAC filtering
- Unicast port flood blocking
- Dynamic Address Resolution Protocol (ARP) inspection
- IP Source Guard
- Community PVLANs
- Trunk Port Security
- 802.1x Inaccessible Authentication Bypass
- MAC Authentication Bypass
- Control Plane Policing
- 802.1x Unidirectional Controlled Port
- Voice VLAN Sticky Port Security
- Secure Copy Protocol (SCP)
- EtherChannel Trunk Port Security

- IP Source Guard for Static Hosts
- IEEE 802.1x Multidomain Authentication

High Availability

- HSRP
- VRRP
- Cisco GOLD

Software Requirements

The Cisco Catalyst 4503 chassis with the Cisco Catalyst 4500 Series Supervisor Engine II-Plus requires Cisco IOS Software Release 12.2(25)SG or later.

The Cisco Catalyst 4503-E chassis with the Cisco Catalyst 4500 Series Supervisor Engine II-Plus requires Cisco IOS Software Release 12.2(37)SG or later.

Hardware Requirements

The Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS can only be used with the Cisco Catalyst 4503 or 4503-E chassis.

PoE-enabled power supplies are required to support PoE on the 12 10/100/1000 supervisor engine faceplate ports[3] and PoE-enabled line cards added to the Cisco Catalyst 4503.

Technical Specifications

Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS Performance and Switching Specifications

The supervisor engine includes the following:

- 64-Gbps nonblocking switch fabric
- 48-mpps Layer 2 forwarding (hardware)
- 48-mpps Layer 3 and Layer 4 forwarding based on Cisco Express Forwarding (hardware)
- Layers 2 through 4 hardware-based switch engine (application-specific integrated circuit [ASIC] based)
- Centralized design
- Unicast and multicast routing entries: 32,000
- Layer 2 multicast addresses: 16,384
- MAC addresses: 32,768
- VLANs: 2048 active VLANs
- Per-VLAN Spanning Tree (PVST+) and Per-VLAN Rapid Spanning Tree Protocol (PVRST)

Traffic and Congestion Management

The Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS offers the following:

- Number of queues: four per port
- Type of buffers: dynamic

[3] Up to 160 Watts (W) maximum –48 volt (V) DC PoE can be allocated to the 12 faceplate ports in any combination (up to 15.4W maximum on a single port). PoE can be enabled on the 12 10/100/1000 faceplate ports with a 1000W or 1400W AC power supply; however, PoE-enabled line cards would require a PoE-enabled power supply.

Switch Architecture Specifications

The switch architecture of the Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS is as follows:

- Store-and-forward switching
- Functionally transparent line-card architecture
- Packet buffering: dynamic, 16-MB shared memory
- SDRAM: 256 MB
- Onboard flash memory: 32 MB
- Startup configuration: onboard flash memory
- CPU: 266 MHz

Management

The Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS offers the following management features:

- CiscoWorks LAN Management Solution (LMS); includes CiscoWorks Resource Manager Essentials
- Cisco Network Assistant
- CiscoView
- BGP4-MIB.my
- BRIDGE-MIB.my* (RFC 1493)
- CISCO-BULK-FILE-MIB.my
- CISCO-CDP-MIB.my
- CISCO-CLASS-BASED-QOS-MIB.my
- CISCO-CONFIG-COPY-MIB.my
- CISCO-CONFIG-MAN-MIB.my
- CISCO-ENTITY-ASSET-MIB.my
- CISCO-ENTITY-EXT-MIB.my
- CISCO-ENTITY-FRU-CONTROL-MIB.my
- CISCO-ENTITY-SENSOR-MIB.my
- CISCO-ENTITY-VENDORTYPE-OID-MIB.my
- CISCO-ENVMON-MIB.my
- CISCO-FLASH-MIB.my
- CISCO-FTP-CLIENT-MIB.my
- CISCO-HSRP-MIB.my
- CISCO-IETF-IP-MIB.my
- CISCO-IETF-IP-FORWARD-MIB.my
- CISCO-IETF-ISIS-MIB.my
- CISCO-IF-EXTENSION-MIB.my
- CISCO-IGMP-FILTER-MIB.my
- CISCO-IMAGE-MIB.my
- CISCO-IPMROUTE-MIB.my
- CISCO-L2-TUNNEL-CONFIG-MIB.my
- CISCO-L2L3-INTERFACE-CONFIG-MIB.my

- CISCO-LAG-MIB.my
- CISCO-MEMORY-POOL-MIB.my
- CISCO-NDE-MIB.my
- CISCO-PAGP
- MIB.my
- CISCO-PAE-MIB.my
- CISCO-PING-MIB.my
- CISCO-PORT-SECURITY-MIB.my
- CISCO-PORT-STORM-CONTROL-MIB.my
- CISCO-PRIVATE-VLAN-MIB.my CISCO-PROCESS-MIB.my
- CISCO-PRODUCTS-MIB.my CISCO-RF-MIB.my
- CISCO-RMON-CONFIG-MIB.my CISCO-RTTMON-MIB.my
- CISCO-STP-EXTENSIONS-MIB.my CISCO-SYSLOG-MIB.my
- CISCO-VLAN-IFTABLE-RELATIONSHIP-MIB.my
- CISCO-VLAN-MEMBERSHIP-MIB.my CISCO-VTP-MIB.my
- DOT3-MAU-MIB.my (RFC 3636) ENTITY-MIB.my
- ETHERLIKE-MIB.my
- EXPRESSION-MIB.my
- HC-RMON-MIB.my
- IEEE8021-PAE-MIB.my
- IEEE8023-LAG-MIB.my (802.3ad)
- IF-MIB.my
- IGMP-MIB.my
- IPMROUTE-MIB.my
- NOVELL-IPX-MIB.my
- NOVELL-RIPSAP-MIB.my
- OLD-CISCO-TS-MIB.my
- PIM-MIB.my
- RFC1213-MIB.my (MIB-II)
- RFC1243-MIB.my (APPLETALK MIB)
- RFC1253-MIB.my (OSPF-MIB)
- RMON-MIB.my (RFC 1757)
- RMON2-MIB.my (RFC 2021)
- SMON-MIB.my (Internet draft)
- SNMP-FRAMEWORK-MIB.my (RFC 2571)
- SNMP-MPD-MIB.my (RFC 2572)
- SNMP-NOTIFICATION-MIB.my (RFC 2573)
- SNMP-TARGET-MIB.my (RFC 2573)
- SNMP-USM-MIB.my (RFC 2574)

- SNMP-VACM-MIB.my (RFC 2575)
- SNMPv2-MIB.my
- TCP-MIB.my
- UDP-MIB.my
- RIP SNMP MIB

Industry Standards

The Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS meets the following industry standards:

- Ethernet: IEEE 802.3, 10BASE-T
- Fast Ethernet: IEEE 802.3u, 100BASE-TX, 100BASE-FX
- Gigabit Ethernet: IEEE 802.3z, 802.3ab
- IEEE 802.3af PoE
- IEEE 802.1D Spanning Tree Protocol
- IEEE 802.1w rapid reconfiguration of Spanning Tree Protocol
- IEEE 802.1s multiple VLAN instances of Spanning Tree Protocol
- IEEE 802.3 ad LACP
- IEEE 802.1p CoS prioritization
- IEEE 802.1Q VLAN
- IEEE 802.1x user authentication
- 1000BASE-SX
- 1000BASE-LX/LH
- 1000BASE-ZX
- RMON I and II standards

Supported Cisco Catalyst 4500 Series Classic Line Cards

- WS-X4148-FE-BD-LC: Cisco Catalyst 4500 Series Fast Ethernet Switching Module, 48-port 100BASE-BX-D SMF (LC)
- WS-X4124-FX-MT: Cisco Catalyst 4000 Series Fast Ethernet Switching Module, 24-port 100BASE-FX (MT-RJ)
- WS-X4148-FX-MT: Cisco Catalyst 4500 Series Fast Ethernet Switching Module, 48-port 100BASE-FX multimode fiber (MMF) (MT-RJ)
- WS-X4124-RJ45: Cisco Catalyst 4500 Series 10/100 Module, 24 ports (RJ-45)
- WS-X4148-RJ: Cisco Catalyst 4500 Series 10/100 Module, 48 ports (RJ-45)
- WS-X4148-RJ21: Cisco Catalyst 4500 Series 10/100 Module, 48-port telco (4 x RJ-21)
- WS-X4248-RJ21V: Cisco Catalyst 4500 Series PoE 802.3af 10/100, 48 ports (RJ-21)
- WS-X4224-RJ45V: Cisco Catalyst 4500 Series PoE 803.3af 10/100, 24 ports (RJ-45)
- WS-X4248-RJ45V: Cisco Catalyst 4500 Series PoE 802.3af 10/100, 48 ports (RJ-45)
- WS-X4248-FE-SFP-Cisco Catalyst 4500 Series Fast Ethernet Switching Module, 48-port 100BASE-X (SFP)
- WS-X4232-GB-RJ: Cisco Catalyst 4500 Series 32-Port 10/100 (RJ-45), 2-Gigabit Ethernet (GBIC) module
- WS-X4302-GB: Cisco Catalyst 4500 Series Gigabit Ethernet Module, 2 ports (GBIC)
- WS-X4306-GB: Cisco Catalyst 4500 Series Gigabit Ethernet Module, 6 ports (GBIC)

- WS-X4506-GB-T: Cisco Catalyst 4500 Series Gigabit Ethernet Module, 6 ports 10/100/1000 802.3af PoE or 1000BASE-X (SFP)
- WS-X4418-GB: Cisco Catalyst 4500 Series Gigabit Ethernet Module, server switching 18 ports (GBIC)
- WS-X4448-GB-SFP: Cisco Catalyst 4500 Series Gigabit Ethernet Module, 48 ports 1000BASE-X (optional SFPs)
- WS-X4424-GB-RJ45: Cisco Catalyst 4500 Series 24-Port 10/100/1000 Module (RJ-45)
- WS-X4448-GB-RJ45: Cisco Catalyst 4500 Series 48-Port 10/100/1000 Module (RJ-45)
- WS-X4548-GB-RJ45: Cisco Catalyst 4500 Series Enhanced 48-Port 10/100/1000 Module (RJ-45)
- WS-X4524-GB-RJ45V: Cisco Catalyst 4500 Series PoE 802.3af 10/100/1000, 24 ports (RJ-45)
- WS-X4548-GB-RJ45V: Cisco Catalyst 4500 Series PoE 802.3af 10/100/1000, 48 ports (RJ45)

Optics Support

The eight Gigabit Ethernet SFP ports directly on the Supervisor Engine II-Plus-TS module support the following SFP media types:

- GLC-T-1000BASE-T SFP
- GLC-SC-MM-Gigabit Ethernet SFP, LC connector, SX transceiver
- GLC-LH-SM-Gigabit Ethernet SFP, LC connector, LX/LH transceiver
- GLC-ZX-SM-1000BASE-ZX SFP
- Cisco coarse wavelength-division multiplexing (CWDM) SFP
- Cisco dense wavelength-division multiplexing (DWDM) SFP
- GLC-FE-100BX-U: FE SFP, LC connector BX-U transceiver, 10 kilometers

Indicator and Port Specifications

The Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS has the following indicator and port specifications:

- System status: green (operational), red (faulty)
- Switch utilization load: 1 to 100 percent aggregate switching usage
- Console: RJ-45
- Reset (switch recessed protected)
- SFP and 10/100/1000 PoE ports: link and active
- Image management port: 10/100BASE-TX (RJ-45 female) data terminal equipment (DTE); green (good), orange (disabled), off (not connected)

Environmental Conditions

The Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS requires the following environmental conditions:

- Operating temperature: 32 to 104ºF (0 to 40ºC)
- Storage temperature: –40 to 167ºF (–40 to 75ºC)
- Relative humidity: 10 to 90 percent, noncondensing
- Operating altitude: –60 to 2000 meters (m) Regulatory Standards Compliance

The Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS complies with the regulatory standards listed in Table 2.

Table 2. Regulatory Standards Compliance Details

Specification	Standard
Regulatory Compliance	CE marking
Safety	• UL 60950 • CAN/CSA-C22.2 No. 60950 • EN 60950 • IEC 60950 • TS 001 • AS/NZS 3260
EMC	• FCC Part 15 (CFR 47) Class A • ICES-003 Class A • CISPR22 Class A • AS/NZS 3548 Class A • VCCI Class A • EN 55022 • EN 55024 • EN 61000-6-1 • EN 50082-1 • EN 61000-3-2 • EN 61000-3-3 • ETS 300 386

Table 3 lists ordering information for the Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS.

Table 3. Ordering Information

Product Number	Description
WS-X4013+TS(=)	Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS, 12 10/100/1000 802.3af PoE, 8 SFPs, console RJ-45 (based on Cisco IOS Software)
S45IPB-12231SG	Cisco IOS Software for the Cisco Catalyst 4500 Series (IP Base image with EIGRP stub support)
S45IPBK9-12231SG	Cisco IOS Software for the Cisco Catalyst 4500 Series (IP Base image with Triple Data Encryption Standard [3DES] and EIGRP stub support)
MEM-C4K-FLD64M	Compact flash memory, 64-MB option, for Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS
MEM-C4K-FLD128M	Compact flash memory, 128-MB option, for Cisco Catalyst Supervisor Engine II-Plus-TS

Warranty

Cisco Catalyst 4500 E-Series and Cisco Catalyst 4500 switches are covered by the Cisco Limited Lifetime Hardware Warranty. For more information, see this document on Cisco.com: http://www.cisco.com/en/US/docs/general/warranty/English/LH2DEN__.html.

Note: If you purchased the Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS before May 1, 2009, it is covered by the Cisco 90-Day Limited Hardware Warranty. For more information, see this document on Cisco.com: http://www.cisco.com/en/US/docs/general/warranty/English/901DEN__.html.

Cisco Technical Support Services: Extending Network Intelligence That Protects Your Network Investment Now

Cisco Technical Support Services help to ensure that your Cisco products operate efficiently, remain highly available, and benefit from current system software to assist you in effectively managing your network service while controlling operational costs.

Cisco Technical Support Services (Table 4) provide significant benefits that go beyond what is offered under the Cisco warranty policy. Services available under a Cisco SMARTnet® Service contract that are not covered under a warranty are:

- Latest software updates
- Rapid replacement of hardware in next-day, 4-hour, or 2-hour dispatch options
- Ongoing technical support through the Cisco Technical Assistance Center (TAC)
- Registered access to http://www.cisco.com/

Table 4. Technical Support Services: Components

Service Feature Overview	Benefits or Advantages
Software Support	Offers maintenance and minor and major updates for licensed feature set. Downloading new maintenance releases, patches, or updates of Cisco IOS Software helps to enhance and extend the useful life of Cisco devices. Through major software updates it is possible to extend the life of equipment and maximize application technology investments by: • Increasing the performance of current functions • Adding new capability that, in many cases, requires no additional hardware investment • Enhancing network or application availability, reliability, and stability
TAC Support	With more than 1000 highly trained customer support engineers, 390 CCIE® certified engineers, and access to 13,000 research and development engineers, the Cisco TAC complements your in-house staff with a high level of knowledge about voice, video, and data communications networking technology. Its sophisticated call-routing system quickly routes calls to the correct technology personnel. The Cisco TAC is available 24 hours a day, 365 days a year.
Cisco.com	This award-winning Website provides 24-hour access to an extensive collection of online product and technology information, interactive network management and troubleshooting tools, and knowledge-transfer resources that can help customers reduce costs by increasing staff self-sufficiency and productivity.
Advance Hardware Replacement	Advance-replacement and onsite field engineer options supply fast access to replacement hardware and field resources for installing hardware, minimizing the risk of potential network downtime.

Table 5 lists the benefits of Cisco Technical Support Services.

Table 5. Cisco Technical Support Services: Competitive Differentiators

Feature	Benefits or Advantages
Worldwide Virtual Lab	This extensive lab of Cisco equipment and Cisco IOS Software releases provides an invaluable engineering resource and knowledge base for training, product information, and recreation and testing of selected network issues to help decrease time-to-resolution.
Cisco TAC Training • Courses • Technical Calls • Technical Forums	Cisco is committed to providing customers the latest in technology support. These TAC training programs assist customers in case-avoidance as well as provide knowledge transfer of Cisco networking expertise.
Cisco Live	Provides a powerful suite of Internet-enabled tools with firewall-friendly features; these secure, encrypted Java applets can turn a simple phone call into an interactive collaboration session, allowing a customer and Cisco TAC support engineer to work together more effectively.
Global Logistics	Delivers award-winning, worldwide hardware-replacement support with 650 depots, covering 120 countries, at a US$2.3 billion investment in inventory, with 10,000 onsite field engineers.
Cisco IOS Software	Employs 100 discrete technologies with more than 2000 features; 400 new features are added each year. Cisco IOS Software is installed in more than 10 million devices and is running on more than 10,000 networks worldwide. It operates on the world's largest IPv6 and VoIP networks and in all major service provider networks worldwide.

For More Information

To learn more about how you can take advantage of Cisco Technical Support Services, talk to your Cisco representative or visit Cisco Technical Support Services at: http://www.cisco.com/en/US/products/svcs/ps3034/ps2827/serv_category_home.html.

For additional information about the Cisco Catalyst 4500 Series, visit: http://www.cisco.com/go/catalyst4500.

For additional information about Cisco products, visit http://www.cisco.com or contact:

- United States and Canada: 800 553-6387
- Europe: 32 2 778 4242
- Australia: 612 9935 4107
- Other: 408-526-7209

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV
Amsterdam, The Netherlands

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