Cisco Catalyst 4500 Series Chassis

Secure, Flexible, Nonstop Communications

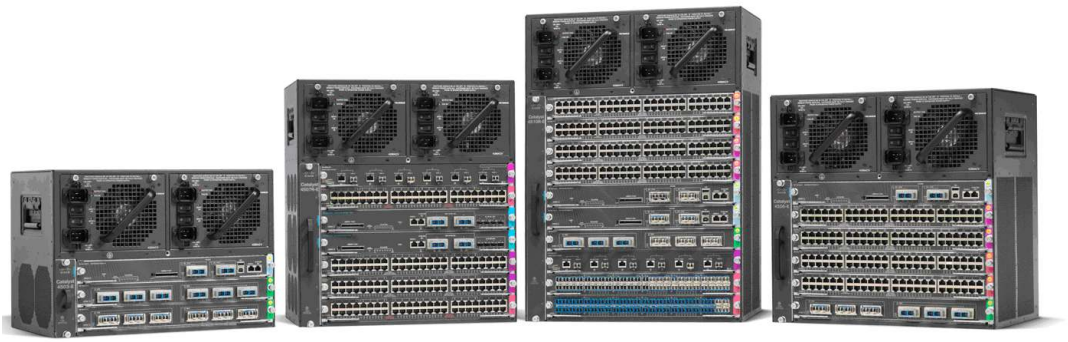
Overview

The Cisco® Catalyst® 4500 Series provides scalable, nonblocking Layer 2–4 switching with secure, flexible, nonstop communications, enabling business resilience for enterprises, small and medium-sized businesses (SMBs), and Metro Ethernet customers deploying business-critical applications.

Catalyst 4500 has a centralized forwarding architecture that enables collaboration, virtualization and operational manageablity through simplified operations. With forward and backward compatibility spanning multiple generations, the new Catalyst 4500 E-Series provides exceptional investment protection and deployment flexibility to meet the evolving needs of organizations of all sizes. Catalyst 4500 E-Series platform has 10G uplinks and PoEP support as standard enabling the customers to future proof their network.

The Cisco Catalyst 4500 Series includes two series of chassis: the Catalyst 4500 E-Series and classic Catalyst 4500 Series chassis. Catalyst 4500 E-Series chassis (Figure 1) are extremely flexible and support both 6 Gbps and 24 Gbps per line card slot. The classic Catalyst 4500 Series chassis supports 6 Gbps per line card slot. There are four models of Catalyst 4500 E-Series and classic Catalyst 4500 chassis: 10-slot, 7-slot, 6-slot, and 3-slot. Integrated resiliency in the Catalyst 4500-E and classic Catalyst 4500 Series include 1+1 supervisor engine redundancy (10-slot and 7-slot only), redundant fans, software-based fault tolerance, and 1+1 power supply redundancy. Integrated resiliency in both hardware and software minimizes network downtime, helping to ensure workforce productivity, profitability, and customer success.

Figure 1. Cisco Catalyst 4500 E-Series



Cisco Catalyst 4503-E | Cisco Catalyst 4507R-E | Cisco Catalyst 4510R-E | Cisco Catalyst 4506-E

The Cisco Catalyst 4500 Series extends control to the network edge with intelligent network services, including sophisticated quality of service (QoS),, predictable performance, advanced security, comprehensive management, and integrated resiliency. Scalability of these intelligent network services is made possible with dedicated, specialized resources known as ternary content addressable memory (TCAM). Ample TCAM resources (up to 384,000 entries) enable “high feature capacity,” which provides wire-speed routing/switching performance independent of provisioning of services such as QoS and security.

Cisco Catalyst 4500 E-Series Chassis

The Cisco Catalyst 4500 E-Series offers four chassis options and eight supervisor engine options (Table 1). It provides a common architecture that can scale up to 388 ports. The Cisco Catalyst WS-C4507R-E and WS-C4510R-E offer high availability by supporting 1+1 redundant supervisor engines with subsecond failover time and full-image In Service Software Upgrades (ISSUs). Non stop forwarding with Stateful Switchover (NSF/SSO) and ISSU ensure continuous packet forwarding during Supervisor engine switchover to ensure high availability for collaboration applications and VoIP. Using the same line cards as the widely deployed Catalyst 4000 Series Switches and classic Catalyst 4500 Series Switches, the Catalyst 4500-E Series furthers Cisco’s commitment to affordable enterprise and branch scalability.

Table 1. Cisco Catalyst 4500 E-Series Chassis Features

Feature	Cisco Catalyst WS-C4503-E Chassis	Cisco Catalyst WS-C4506-E Chassis	Cisco Catalyst WS-C4507R-E Chassis	Cisco Catalyst WS-C4510R-E Chassis
Total Number of Slots	3	6	7	10
Line Card Slots	2	5	5	8
Supervisor Engine Slots	1*	1*	2**	2***
Dedicated Supervisor Engine Slot Numbers	1	1	3 and 4	5 and 6
Supervisor Engine Redundancy	No	No	Yes (Supervisor II-Plus, II-Plus-10GE, IV, V, V-10GE, 6-E, 6L-E)	Yes (Supervisor V, V-10GE, and 6-E)
Supervisor Engines Supported	Supervisor 6-E Supervisor 6L-E Supervisor V-10GE Supervisor V Supervisor IV Supervisor II-Plus-10GE Supervisor II-Plus Supervisor II-Plus-TS	Supervisor 6-E Supervisor 6L-E Supervisor V-10GE Supervisor V Supervisor IV Supervisor II-Plus-10GE Supervisor II-Plus	Supervisor 6-E Supervisor 6L-E Supervisor V-10GE Supervisor V Supervisor IV Supervisor II-Plus-10GE Supervisor II-Plus	Supervisor 6-E Supervisor V-10GE Supervisor V
Bandwidth per Line Card Slot Using Supervisor 6-E	Up top 24 Gbps on all slots****	Up to 24 Gbps on all slots	Up to 24 Gbps on all slots	Up to 24 Gbps on slots 1-4 and 7; 6 Gbps only on slots 8-10
Number of Power Supply Bays	2	2	2	2
AC Input Power	Yes	Yes	Yes	Yes
DC Input Power	Yes	Yes	Yes	Yes
Integrated Power over Ethernet	Yes	Yes	Yes	Yes
Minimum Number of Power Supplies	1	1	1	1

Feature	Cisco Catalyst WS-C4503-E Chassis	Cisco Catalyst WS-C4506-E Chassis	Cisco Catalyst WS-C4507R-E Chassis	Cisco Catalyst WS-C4510R-E Chassis
Power Supplies Supported	• 1000W AC • 1400W AC • 1300W ACV • 2800W ACV • 4200W ACV • 6000W ACV • 1400W DC (triple input) • 1400W-DC-P • External AC power shelf	• 1000W AC • 1400W AC • 1300W ACV • 2800W ACV • 4200W ACV • 6000W ACV • 1400W DC (triple input) • 1400W-DC-P • External AC power shelf	• 1000W AC • 1400W AC • 1300W ACV • 2800W ACV • 4200W ACV • 6000W ACV • 1400W DC (triple input) • 1400W-DC-P • External AC power shelf	• 1400W AC***** • 2800W ACV***** • 4200W ACV***** • 6000W ACV • 1400W DC (triple input) • 1400W-DC-P • External AC Power Shelf
Number of Fan-Tray Bays	1	1	1	1
Location of 19-inch Rack Mount	Front	Front	Front	Front
Location of 23-inch Rack Mount	Front (option)	Front (option)	Front (option)	Front (option)

* Slot 1 is reserved for supervisor engine only; slots 2 and higher are reserved for line cards.
** Slots 3 and 4 are reserved for supervisor engines only in Cisco Catalyst 4507R-E; slots 1–2 and 5–7 are reserved for line cards.
*** Slots 5 and 6 are reserved for supervisor engines only in Cisco Catalyst 4510R-E; slots 1–4 and 7–10 are reserved for line cards; slots 8–10 support only classic line cards.
**** Classic Catalyst 4000 or 4500 Series chassis operate at 6 Gbps per slot.
***** The 1400W AC, 6000W ACV, 4200W ACV, and 2800W ACV power supplies are required to support a fully loaded Cisco Catalyst 4510R. The 1000W AC and 1300W AC power supplies can be deployed in the Catalyst 4510R; however, power management is required.

Configuration Alternatives

The Cisco Catalyst 4500 Series offers a powerful and flexible network solution that can be built with eight supervisor engine alternatives. Each provides a high-performance, centralized, shared-memory switch fabric, protecting your line card investment by supporting the addition of optional higher-layer engines (Table 2).

Table 2. a. Cisco Catalyst 4500-E Series Supervisor Engine Support and Performance

Feature	Catalyst 4500 Supervisor II-Plus-TS	Catalyst 4500 Supervisor II-Plus	Catalyst 4500 Supervisor II-Plus-10GE	Catalyst 4500 Supervisor IV	Catalyst 4500 Supervisor V	Catalyst 4500 Series Supervisor V-10GE	Catalyst 4500 Series Supervisor 6L-E	Catalyst 4500 Series Supervisor 6-E
Cisco Catalyst WS-C4503-E Chassis	64 Gbps 48 mpps	28 Gbps 21 mpps	72 Gbps 54 mpps	28 Gbps 21 mpps	28 Gbps 21 mpps	72 Gbps 54 mpps	136 Gbps 116 mpps	136 Gbps 116 mpps
Cisco Catalyst WS-C4506-E Chassis	Not supported	64 Gbps 48 mpps	108 Gbps 81 mpps	64 Gbps 48 mpps	64 Gbps 48 mpps	108 Gbps 81 mpps	280 Gbps 225 mpps	280 Gbps 225 mpps
Cisco Catalyst WS-C4507R-E Chassis	Not supported	64 Gbps 48 mpps	108 Gbps 81 mpps	64 Gbps 48 mpps	68 Gbps 51 mpps	108 Gbps 81 mpps	280 Gbps 225 mpps	280 Gbps 225 mpps
Cisco Catalyst WS-C4510R-E Chassis	Not supported	Not supported	Not supported	Not supported	96 Gbps 72 mpps	136 Gbps 102 mpps	Not supported	320 Gbps 250 mpps

b. Cisco Catalyst 4500 Series Supervisor Engine Support and Performance

Feature	Catalyst 4500 Supervisor II-Plus-TS	Catalyst 4500 Supervisor II-Plus	Catalyst 4500 Supervisor II-Plus-10GE	Catalyst 4500 Supervisor IV	Catalyst 4500 Supervisor V	Catalyst 4500 Series Supervisor V-10GE	Catalyst 4500 Series Supervisor 6L-E	Catalyst 4500 Series Supervisor 6-E
Cisco Catalyst WS-C4503 Chassis	64 Gbps 48 mpps	28 Gbps 21 mpps	72 Gbps 54 mpps	28 Gbps 21 mpps	28 Gbps 21 mpps	72 Gbps 54 mpps	64 Gbps 48 mpps	64 Gbps 48 mpps
Cisco Catalyst WS-C4506 Chassis	Not supported	64 Gbps 48 mpps	108 Gbps 81 mpps	64 Gbps 48 mpps	64 Gbps 48 mpps	108 Gbps 81 mpps	100 Gbps 75 mpps	100 Gbps 75 mpps
Cisco Catalyst WS-C4507R Chassis	Not supported	64 Gbps 48 mpps	108 Gbps 81 mpps	64 Gbps 48 mpps	68 Gbps 51 mpps	108 Gbps 81 mpps	100 Gbps 75 mpps	100 Gbps 75 mpps
Cisco Catalyst WS-C4510R Chassis	Not supported	Not supported	Not supported	Not supported	96 Gbps 72 mpps	136 Gbps 102 mpps	Not supported	136 Gbps 102 mpps

The Cisco Catalyst 4500 Series has flexible interface types and port densities that allow network configurations to be mixed and matched to meet the specific needs of campus networks (Table 3).

Table 3. Cisco Catalyst 4500 Series Port Densities

Cisco Catalyst 4500 Series Switching Modules	Number of Interfaces Supported per Line Card	Cisco Catalyst 4503-E	Cisco Catalyst 4506-E	Cisco Catalyst 4507R-E	Cisco Catalyst 4510R-E
Switched 10/100 Fast Ethernet (RJ-45)	24, 32, or 48	96	240	240	384
Switched 10/100 Fast Ethernet (RJ-45) with IEEE 802.3af Power over Ethernet (PoE)	24 or 48	96	240	240	384
Switched 10/100 Fast Ethernet (RJ-21) with or without IEEE 802.3af PoE	48	96	240	240	384
Switched 100 FX Fast Ethernet (MT-RJ)	24 or 48	96	240	240	384
Switched 100 LX-10 (MT-RJ) or 100 BX-D (LC) Fast Ethernet	48	96	240	240	384
Switched 1000BASE-X (fiber)	2, 6, 18, or 48	104	244	244	388
Switched 10/100/1000BASE-T Gigabit Ethernet	24 or 48	108	240	240	384
Switched 10/100/1000BASE-T Gigabit Ethernet with IEEE 802.3af PoE	24 or 48	108	240	240	384
Switched 10 Gigabit Ethernet	6	14	32	34	34

Configuration Flexibility and Modular Superiority

Cisco Catalyst 4500 Series line cards can be mixed and matched to suit numerous LAN access, server connectivity, SMB, or branch-office deployments. The Cisco Catalyst 4500 Series supports the following line cards, listed in Table 4 by part number:

Table 4. Catalyst 4500 E-Series Line Cards and Modules

Product Number	Description
WS-X4624-SFP-E	Catalyst 4500 E-Series 24-Port GE (SFP)
WS-X4648-RJ45V-E	Catalyst 4500 E-Series 48-Port PoE 10/100/1000(RJ45)
WS-X4648-RJ45V+E	Catalyst 4500 E-Series 48-Port Premium PoE 10/100/1000(RJ45)

Product Number	Description
WS-X4606-X2-E	Catalyst 4500 E-Series 6-Port 10GE (X2)
CVR-X2-SFP10G	OneX converter module supporting 1 SFP+ module
CVR-X2-SFP	TwinGig Converter Module
Catalyst 4500 Classic 10/100 Line Cards	
WS-X4148-RJ	Catalyst 4500 10/100 Auto Module, 48-Port (RJ-45)
WS-X4124-RJ45	Catalyst 4500 10/100 Module, 24-Port (RJ-45)
WS-X4148-RJ21	Catalyst 4500 10/100 Module, 48-Port Telco (4xRJ-21)
WS-X4248-RJ21V	Catalyst 4500 PoE 802.3af 10/100, 48-Port (RJ-21)
WS-X4248-RJ45V	Catalyst 4500 PoE 802.3af 10/100, 48-Port (RJ-45)
WS-X4224-RJ45V	Catalyst 4500 10/100 PoE 802.3af 24-Port (RJ-45)
WS-X4232-GB-RJ	Catalyst 4500 32-10/100 (RJ-45), 2 GE (GBIC)
Catalyst 4500 Classic 10/100/1000 Line Cards	
WS-X4548-GB-RJ45	Catalyst 4500 Enhanced 48
WS-X4548-RJ45V+	Catalyst 4500 Classic 48
WS-X4548-GB-RJ45V	Catalyst 4500 PoE 802.3af 10/100/1000, 48
WS-X4524-GB-RJ45V	Catalyst 4500 PoE 802.3af 10/ 100/1000, 24
WS-X4506-GB-T	Catalyst 4500 6
WS-X4424-GB-RJ45	Catalyst 4500 24
Catalyst 4500 Classic 100 BASE-X FE Line Cards	
WS-X4248-FE-SFP	Catalyst 4500 48
WS-X4124-FX-MT	Catalyst 4500 Fast Ethernet Switching Module, 24
WS-X4148-FE-BD-LC	Catalyst 4500 Fast Ethernet Module, 48
WS-X4148-FX-MT	Catalyst 4500 Fast Ethernet Switching Module, 48
Catalyst 4500 Classic 1000 BASE-X GE Line Cards	
WS-X4306-GB	Catalyst 4500 Gigabit Ethernet Module, 6
WS-X4506-GB-T	Catalyst 4500 6
WS-X4302-GB	Catalyst 4500 Gigabit Ethernet Module, 2
WS-X4418-GB	Catalyst 4500 GE Module, Server Switching 18
WS-X4448-GB-SFP	Catalyst 4500 48
Catalyst 4500 Transceiver Modules	
WS-G5483	1000BASE-T GBIC
WS-G5484	1000BASE-SX short-wavelength GBIC (multimode only)
WS-G5486	1000BASE-LX/LH long-haul GBIC (single mode or multimode)
WS-G5487	1000BASE-ZX extended-reach GBIC (single mode)
GLC-T	1000BASE-T SFP
GLC-T24	24 GLC-T SFP
GLC-SX-MM	GE SFP, LC connector SX transceiver
GLC-LH-SM	GE SFP, LC connector LX/LH transceiver
GLC-FE-100BX-D48	48 units of GLC-FE-100BX-D
GLC-FE-100BX-D	100BASE-BX10-D SFP
GLC-FE-100BX-U	100BASE-BX10-U SFP
GLC-FE-100FX	100BASE-FX SFP for Fast Ethernet port
GLC-FE-100FX24	24 units of GLC-FE-100FX
GLC-FE-100FX48	48 units of GLC-FE-100FX
GLC-FE-100LX	100BASE-LX SFP for Fast Ethernet port

Product Number	Description
GLC-FE-100LX48	48 units of GLC-FE-100LX
GLC-BX-D	1000BASE-BX SFP, 1490nm
GLC-BX-U	1000BASE-BX SFP, 1310nm
GLC-ZX-SM	1000BASE-ZX SFP
X2-10GB-CX4	10GBASE-CX4 X2 Module
X2-10GB-SR	10GBASE-SR X2 Module
X2-10GB-ER	10GBASE-ER X2 Module
X2-10GB-LX4	10GBASE-LX4 X2 Module
X2-10GB-LR	10GBASE-LR X2 Module
X2-10GE-LRM	10GBASE-LRM X2 Module
X2-10GB-ZR	10GBASE-ZR X2 Module
X2-10GB-DWDM	Cisco Dense Wavelength-Division Multiplexing X2 Pluggable Module

Table 5 lists the minimum software requirements for the Cisco Catalyst 4500 supervisor engines, and Table 6 compares the Cisco Catalyst 4500 chassis.

Table 5. Cisco Catalyst Supervisor Engine Software Minimum Requirements

Chassis	Supervisor Engine	Minimum Software Requirement
Cisco WS-C4503-E	All Classic Supervisor Engines	Cisco IOS Software Release 12.2(37)SG
Cisco WS-C4503-E and WS-C4506-E	All Classic Supervisor Engines (Except II-Plus) Supervisor Engine 6-E Supervisor Engine 6L-E	Cisco IOS Software Release 12.2(37)SG Cisco IOS Software Release 12.2(40)SG Cisco IOS Software Release 12.2(52)SG
Cisco WS-C4507R-E	All Classic Supervisor Engines (Except II-Plus) Supervisor Engine 6-E Supervisor Engine 6L-E	Cisco IOS Software Release 12.2(40)SG Cisco IOS Software Release 12.2(40)SG Cisco IOS Software Release 12.2(52)SG
Cisco ES-C4510R-E	Supervisor Engine V Supervisor Engine V-10GE Supervisor Engine 6-E	Cisco IOS Software Release 12.2(40)SG Cisco IOS Software Release 12.2(40)SG Cisco IOS Software Release 12.2(40)SG
Cisco WS-C4503	Supervisor II-Plus-TS	Cisco IOS Software Release 12.2(20)EWA
Cisco WS-C4503, WS-C4506, and WS-C4507R	Supervisor Engine II-Plus Supervisor Engine II-Plus-10GE Supervisor Engine IV	Cisco IOS Software Release 12.1(19)EW Cisco IOS Software Release 12.2(25)SG Cisco IOS Software Release 12.1(12c)EW
Cisco WS-C4503, WS-C4506, WS-C4507R, and WS-C4510R	Supervisor Engine V Supervisor Engine V-10GE Supervisor Engine 6-E Metro Supervisor Engine 6-E	Cisco IOS Software Release 12.2(18)EW Cisco IOS Software Release 12.2(25)EW Cisco IOS Software Release 12.2(40)SG Cisco IOS Software Release 12.2(46)XO

Table 6. Comparison Between Classic Catalyst 4500 Series and 4500 E-Series Chassis

Feature	Catalyst 4500 Classic Chassis	Catalyst 4500 E-Series Chassis
Bandwidth per slot maximum	6 Gbps	24 Gbps per slot with future scalability
Maximum PoE per line card slot	830W	1440W
Line card support	Classic line cards only	E-Series and classic line cards
Supervisor engine support	Same as E-Series chassis	Same as classic chassis
Power supply support	Same as E-Series chassis	Same as classic chassis
Fan tray support	Different from E-Series chassis	Different from classic chassis

Standard Network Protocols

- Ethernet
  - IEEE 802.3, 10BASE-T
- Fast Ethernet
  - IEEE 802.3u, 100BASE-TX
  - IEEE 802.3, 100BASE-FX
- Gigabit Ethernet
  - IEEE 802.3z
  - IEEE 802.3x
  - IEEE 802.3ab
- 1000BASE-X (GBIC)
  - 1000BASE-SX
  - 1000BASE-LX/LH
  - 1000BASE-ZX
- VLAN trunking and tagging
  - IEEE 802.1Q
  - IEEE 802.3ad
- Spanning Tree Protocol
  - IEEE 802.1D
  - IEEE 802.1w
  - IEEE 802.1s
- Security
  - IEEE 802.1x
- Power over Ethernet (PoE)
  - IEEE 802.3af

Network Management

Cisco Network Assistant

The Cisco Network Assistant application manages standalone devices from anywhere on your intranet. Using its GUI, you can perform multiple configuration tasks without using command-line interface (CLI) commands. You can apply actions to multiple devices and ports at the same time for VLAN and quality-of-service (QoS) settings, inventory and statistics reports, link and device monitoring, software upgrades, and many other networking features.

Cisco Network Assistant simplifies device management by offering an intuitive GUI, alternative modes for configuring network devices, two levels of access, and comprehensive online help. It features two modes of display: device view and topology view. In the device view, the Catalyst 4500 Series administrator may configure the switch, configure ports on the switch, or configure groups of ports. In the topology view, the administrator may configure VLAN settings, configure EtherChannels, and view a variety of reports on system and network status.

Resource Manager Essentials

CiscoWorks Resource Manager Essentials (RME), a component of CiscoWorks LAN Management Solution (LMS), provides the following benefits to the Cisco Catalyst 4500 Series:

- Builds and maintains an up-to-date hardware and software inventory
- Maintains an active archive and simplifies deployment of configuration changes to multiple devices
- Simplifies and accelerates software-image analysis and automates deployment
- Records and displays comprehensive reports of software, hardware, and configuration changes
- Highlights critical devices and their ability to respond
- Isolates network error conditions and suggests probable causes
- Network-topology discovery and display services
- VLAN provisioning and logical display representation
- Traffic monitoring and performance assessment
- End-station tracking with search utilities
- CiscoView graphical device management
- Network-topology integrity checking
- Cisco Discovery Protocol
- Cisco Virtual Trunking Protocol (VTP)
- Simple Network Management Protocol (SNMP) Version 1 (RFCs 1155-1157)
- SNMP Version 2c
- Cisco Workgroup MIB
- Ethernet MIB (RFC 1643)
- Ethernet Repeater MIB (RFC 1516)
- SNMP MIB II (RFC 1213)
- Remote Monitoring (RMON) (RFC 1757)
- RMON II (RFC 2021)
- Interface table (RFC 1573)
- Bridge MIB (RFC 1493)
- Switched Port Analyzer (SPAN)
- Enhanced Switched Port Analyzer (ESPAN)
- Port snooping and connection steering
- Standard Cisco IOS Software security capabilities: passwords and TACACS+
- Telnet, Trivial File Transfer Protocol (TFTP), and BOOTP for management access

Physical Specifications

Table 7. Physical Specifications of Cisco Catalyst 4500 Series Chassis

Specification	WS-C4503-E and WS-C4503	WS-C4506-E and WS-C4506	WS-C4507R-E and WS-C4507R	WS-C4510R-E and WS-C4510R
Dimensions (H x W x D)	12.25 x 17.31 x 12.50 in. (31.12 x 43.97 x 31.70 cm)	17.38 x 17.31 x 12.50 in. (44.13 x 43.97 x 31.70 cm)	19.19 x 17.31 x 12.50 in. (48.74 x 43.97 x 31.70 cm	24.35 x 17.31 x 12.50 in. (61.84 x 43.97 x 31.70 cm)

Rack Units (RU)	7 RU	10 RU	11 RU	14 RU
Chassis Weight (with fan tray)	32.25 lb (14.63 kg)	40.50 lb (18.37 kg)	44.50 lb (20.19 kg)	54.50 lb (24.73 kg)
Mounting	19- and 23-in. rack compatible (19-in. rack and cable guide hardware included)	19- and 23-in. rack compatible (19-in. rack and cable guide hardware included)	19- and 23-in. rack compatible (19-in. rack and cable guide hardware included)	19- and 23-in. rack compatible (19-in. rack and cable guide hardware included)

Power Supply Indicators and Interfaces

- Fan cooling: Integrated in hot-insertion/hot-extraction unit
- Good: Green
- Fail: Red (faulty)
- SNMP MIB supported

Table 8. Cisco Catalyst 4500-E and Classic 4500 Series Power Supply Specifications (Data Only)

Power Supply	1000W AC	1400W AC	1400W DC Triple Input
Integrated PoE	No (data only)	No (data Only)	No (data only)
Input Current (rated)	12A at 100 VAC, 5A at 240 VAC	16A at 100 VAC, 7A at 240 VAC	2x –48 VDC at 15A 1x –48 VDC at 12.5A
Output Current (data)	• 12V at 83.4A • 3.3V at 12.2A	• 12V at 113.4A • 3.3V at 12.2A	• 12V at 1360W • 3.3V at 40W
Output Power Redundant Mode (data)	1000W + 40W	1360W + 40W	1400W + 40W
Output Power Combined Mode (data)	1667W	2473W	–
Heat Dissipation	943 Btus per hour	1048 Btus per hour	1048 Btus per hour
Holdup Time	20 ms	20 ms	20 ms
Hot Swappable	Yes	Yes	Yes

Table 9. Cisco Catalyst 4500-E and Classic 4500 Series Power Supply Specifications (Data and PoE)

Power Supply	1300W AC	2800W AC	4200W AC	6000 AC	1400W DC with PEM	2500W AC—Power Shelf
Integrated PoE	Yes (up to 800W)	Yes (up to 1400W)	Yes (up to 3855W)	Yes (up to 4800W)	Up to 7500W (minus the power consumed for data) when connected directly to a DC power plant or 2 external AC power shelves	2500W per power supply; 5000W per shelf (minus the power consumed for data)
IEEE 802.3af-Compliant PoE	Yes	Yes	Yes	Yes	Yes	Yes
Input Current (rated)	• 16A at 100 VAC • 7A at 240 VAC	16A at 200 VAC	• 2x 12A at 100VAC Or • 2x 12A at 200VAC	• 2x 12A at 100VAC Or • 2x 16A at 200VAC	• 31A at –60 VDC (data only) • 180A at –48 VDC (PoE)	15A at 200 VAC
Output Current (data)	• 12V at 84.7A • 3.3V at 12.5A	• 12V at 113.3A • 3.3V at 12.1A	• 12V at 115.3A • 3.3V at 12.5A	• 12V at 186.9A • 3.3V at 12.5A	• 12V at 120A • 3.3V at 10A	–52 VDC at 50A (total output per supply)
Output Current (PoE)	–50V at 16.7A	–50V at 28A	-50V at 77.1A (200V) -50V at 38A (100V)	-50V at 100.0A (200V) -50V at 38.5A (120V)	140A at –48/–60 VDC	–52 VDC at 50A (total output per supply)

Power Supply	1300W AC	2800W AC	4200W AC	6000 AC	1400W DC with PEM	2500W AC—Power Shelf
Output Power Redundant Mode (data)	1000W + 40W	1360W + 40W	1383W + 40W	2200W + 40W	1360W + 40W	Up to 1400W (through DC supply)
Output Power Redundant Mode (PoE)	800W maximum per power supply	1400W maximum per power supply	• 3700W (220V) • 1850W (110V)	• 4800W (220V) • 1850W (110V)	Up to 7500W (minus the power consumed for data)	2500W per supply (minus the power consumed for data)
Output Power Combined Mode (data)	1667W	2473W	2766W	4400W	–	–
Output Power Combined Mode (PoE)	1333W	2333W	6700W (220V) 3360W (110V)	8700W (220V) 3360W (110V)	3800W (100V)	–
Heat Dissipation	1568 Btus per hour	2387 Btus per hour	3580 BTU/hr	2720 BTU/hr	Data only: 1591 Btus per hour Data and voice: 2905 Btus per hour	1210 Btus per hour, per power supply
Holdup Time	20 ms	20 ms	20 ms	20 ms	4 ms	20 ms
Number of 802.3af Class 2 Power Devices Supported with 1 Power Supply (1+1)	106	186	• 384 power devices (200V) • 245 power devices (100V)	• 384 power devices (200V) • 245 power devices (100V)	384	384
Number of 802.3af Class 0 and 3 Power Devices Supported with 1 Power Supply (1+1)	48	84	• 223 power devices (200V) • 111 power devices (100V)	• 289 power devices (200V) • 111 power devices (100V)	384	384
Hot Swappable	Yes	Yes	Yes	Yes	Yes	Yes

Additional notes for Table 8 and 9:

- Output power is per power supply, unless otherwise stated.
- Heat dissipation numbers represent the power-conversion losses of the power supply in operation.
- The number of power devices supported will depend on customer configuration.

Fan Trays

Each Cisco Catalyst 4500-E Series and classic Catalyst 4500 Series chassis uses a single fan tray for cooling. All fan trays are composed of independent fans. If one fan fails, the system will continue to operate without a significant degradation in cooling. The system will detect and notify the user (through LED, command-line interface [CLI], and SNMP) that a fan has failed and the tray needs to be replaced. Catalyst 4500-E Series fans cannot be interchanged with classic Catalyst 4500 Series fans. The classic Catalyst 4500 Series chassis needs an E-Series fan tray in order to support the Metro Supervisor Engine 6-E.

Fabric-Redundancy Modules (Cisco WS-C4507R-E, WS-C4510R-E, WS-C4507R, WS-C4510R Only)

The Cisco Catalyst 4500 and 4500-E Series redundancy scheme uses removable fabric-redundancy modules on the passive backplane to switch traffic to the active supervisor engine. There is one fabric-redundancy module per line card. Fabric-redundancy modules and redundant clocks ship standard with every Cisco Catalyst 4507R-E, 4507R, 4510R-E, and 4510R chassis. Fabric-redundancy modules cannot be interchanged between the Catalyst 4500-E and classic Catalyst 4500 chassis. Spare fabric-redundancy modules and clock modules are available for serviceability.

Environmental Conditions

The Cisco Catalyst 4500 and 4500-E Series require the following 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

Table 10 lists the regulatory standards compliance of the Cisco Catalyst 4500 and 4500-ESeries.

Table 10. Regulatory Standards Compliance

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 • EN55022 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
Industry EMC, Safety, and Environmental Standards	• NEBS Level 3 • ETS 300 019 Storage Class 1.1 • ETS 300 019 Transportation Class 2.3 • ETS 300 019 Stationary Use Class 3.1 • ETS 300 386
Telecom (E1)	• CTR 12/13 • CTR 4 • ACA TS016

Specification	Standard
Telecom (T1)	• FCC Part 68 • Canada CS-03 • JATE Green Book

Ordering Information

Table 11 lists the ordering information for chassis, power supplies, supervisor engines, and memory that are commonly used with the Cisco Catalyst 4500 Series.

Table 11. Ordering Information

Product Number	Description
WS-C4503-E	Cisco Catalyst E-Series 4503 switch (3-slot chassis), fan, no power supply
WS-C4506-E	Cisco Catalyst E-Series 4506 switch (6-slot chassis), fan, no power supply
WS-C4507R-E	Cisco Catalyst E-Series 4507R switch (7-slot chassis), fan, no power supply, redundant supervisor capable
WS-C4510R-E	Cisco Catalyst E-Series 4510R switch (10-slot chassis), fan, no power supply; redundant supervisor capable
WS-C4503	Cisco Catalyst 4503 classic switch (3-slot chassis), fan, no power supply
WS-C4506	Cisco Catalyst 4506 classic switch (6-slot chassis), fan, no power supply
WS-C4507R	Cisco Catalyst 4507R classic switch (7-slot chassis), fan, no power supply, supports redundant supervisor engines
WS-C4510R	Cisco Catalyst 4510R classic switch (10-slot chassis), fan, no power supply; supports redundant supervisor engines
PWR-C45-1000AC	Cisco Catalyst 4500 Series 1000W AC power supply (data only)
PWR-C45-1400AC	Cisco Catalyst 4500 Series 1400W AC power supply (data only)
PWR-C45-1300ACV	Cisco Catalyst 4500 Series 1300W AC power supply (with integrated PoE)
PWR-C45-2800ACV	Cisco Catalyst 4500 Series 2800W AC power supply (with integrated PoE)
PWR-C45-4200ACV	Cisco Catalyst 4500 Series 4200W AC power supply (with integrated PoE)
PWR-C45-1400DC-P	Cisco Catalyst 4500 Series 1400W DC power supply with integrated power entry module (PEM)
PWR-C45-1400DC	Cisco Catalyst 4500 Series triple input 1400W DC power supply (data only)
WS-P4502-1PSU	Catalyst 4500 Series auxiliary power shelf (2-slot), including 1 PWR-4502
PWR-4502	Catalyst 4500 Series auxiliary power-shelf redundant power supply
PWR-4502	Cisco Catalyst 4500 Series Supervisor Engine II-Plus
WS-X4013+	Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS, twelve 10/100/1000 PoE (RJ-45) and eight 1000-X SFP ports included on supervisor-engine faceplate
WS-X4013+TS	Cisco Catalyst 4500 Series Supervisor Engine II-Plus-10GE
WS-X4013+10GE	Cisco Catalyst 4500 Supervisor Engine IV
WS-X4515	Cisco Catalyst 4000/4500 Supervisor Engine V
WS-X4516	Cisco Catalyst 4500 Series Supervisor Engine V-10GE
WS-X45-Sup6-E	Cisco Catalyst 4500 Series Supervisor Engine 6-E
MEM-C4K-FLD64M	Compact Flash memory, 64-MB option
MEM-C4K-FLD128M	Compact Flash memory, 128-MB option
MEM-X45-512MB-E	Cisco Catalyst 4500 Series Supervisor Engine 6-E, 512-MB option

Warranty

Cisco Catalyst 4500 E-Series and 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 Cisco Catalyst 4500 Series Chassis 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

Cisco offers Cisco Technical Support Services to help 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 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 include the following:

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

Tables 12 and 13 list the components and competitive differentiators of Cisco Technical Support Services.

Table 12. Technical Support Services—Components

Service Feature Overview	Benefits
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 and application availability, reliability, and stability
TAC Support	With more than 1000 highly trained customer support engineers, 390 CCIE® certifications, and access to 13,000 research and development engineers, Cisco TAC complements your in-house staff with a high level of knowledge in 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 13. Technical Support Services—Competitive Differentiators

Feature	Benefits
Worldwide Virtual Lab • TAC Training • Boot Camps • Tech Calls	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.
Tech 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	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, using 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, contact:

- United States and Canada: 800 553-NETS (6387)
- Europe: 32 2 778 4242
- Australia: 612 9935 4107
- Other: 408 526-7209
- http://www.cisco.com

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Cisco and our certified partners can help you prepare your network and teams as you adopt new technologies to transform your business. We can help you establish a secure, resilient architecture and successfully integrate Cisco Unified Communications and mobility technologies. Planning and design services align technology with business goals and can increase the accuracy, speed, and efficiency of deployment. Technical services help maintain operational health, strengthen software application functionality, solve performance issues, and lower expenses. Optimization services are designed to continually improve performance and help your team succeed with new technologies. For more information, visit http://www.cisco.com/go/services.

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