

Cisco Catalyst 4500E Series Chassis

High Performance, Mobile, and Secure User Experience

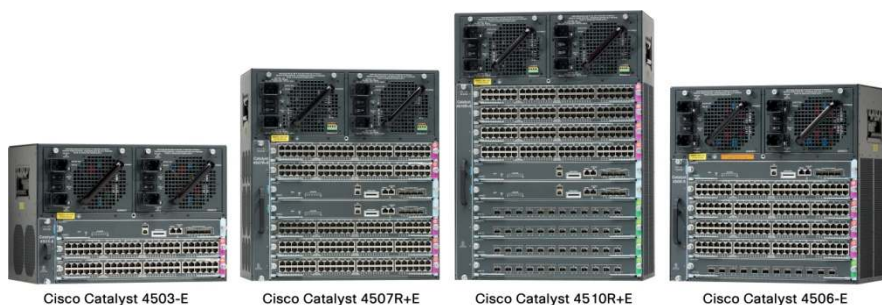
Overview

The Cisco® Catalyst® 4500 Series Switches enable borderless networks, providing high performance, mobile, and secure user experience through Layer 2-4 switching investments. They enable security, mobility, application performance, video, and energy savings over an infrastructure that supports resiliency, virtualization, and automation. Cisco Catalyst 4500 Series Switches provide borderless performance, scalability, and services with reduced total cost of ownership and superior investment protection.

Cisco Catalyst 4500 (Figure 1) has a centralized forwarding architecture that enables collaboration, virtualization, and operational manageability through simplified operations. With forward and backward compatibility spanning multiple generations, the new Cisco Catalyst 4500E Series provides exceptional investment protection and deployment flexibility to meet the evolving needs of organizations of all sizes. The Cisco Catalyst 4500E Series platform has 10 Gigabit Ethernet (GE) uplinks and supports Power over Ethernet Plus (PoE+) and Universal POEP (UPOE), enabling customers to future proof their network.

E-Series chassis come in four different form factors: 3-slot (4503-E), 6-slot (4506-E), 7-slot (4507R+E/4507R-E), and 10-slot (4510R+E/4510R-E). 4503-E, 4506-E, 4507R+E, and 4510R+E chassis are extremely flexible and support either 6 Gbps, 24 Gbps, or 48Gbps per line-card slot. 4507R-E and 4510R-E chassis are limited to 6 Gbps and 24 Gbps per line-card slot. Integrated resiliency in the Cisco Catalyst 4500E Series includes 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 4500E Series



The Cisco Catalyst 4500E 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 4500E Series Chassis

The Cisco Catalyst 4500E Series offers four chassis options and four supervisor engine options (Table 1). It provides a common architecture that can scale up to 388 ports. The Cisco Catalyst WS-C4507R+E, WS-C4510R+E, WS-C4507R-E, and WS-C4510RE offer high availability by supporting 1+1 redundant supervisor engines with subsecond failover time and full-image In-Service Software Upgrades (ISSUs). Nonstop forwarding with stateful switchover (NSF/SSO) and ISSU help ensure continuous packet forwarding during supervisor engine switchover to help ensure high availability for collaboration applications and voice over IP (VoIP). Using the same line cards as the widely deployed Cisco Catalyst 4000 Series Switches and classic Cisco Catalyst 4500 Series Switches, the Cisco Catalyst 4500E Series furthers Cisco's commitment to affordable enterprise and branch scalability.

Table 1. Cisco Catalyst 4500E 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	1 ¹	2 ²	2 ³
Dedicated supervisor engine slot numbers	1	1	3 and 4	5 and 6
Supervisor engine redundancy	No	No	Yes	Yes (Supervisor V-10GE, 6-E and 7-E)
Supervisor engines supported	Supervisor 7-E Supervisor 7L-E Supervisor 6-E Supervisor 6L-E Supervisor V-10GE	Supervisor 7-E Supervisor 7L-E Supervisor 6-E Supervisor 6L-E Supervisor V-10GE	Supervisor 7-E Supervisor 7L-E Supervisor 6-E Supervisor 6L-E Supervisor V-10GE	Supervisor 7-E Supervisor 6-E ⁴ Supervisor V-10GE
Maximum PoE per slot	1,500W	1,500W	1,500W	1,500W slots 1 and 2, 750W slots 3,4,7-10
Bandwidth scalability per line-card slot	Up to 48 Gbps on all slots	Up to 48 Gbps on all slots	Up to 48 Gbps on all slots ⁵	Up to 48 Gbps on all slots ⁵
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

¹ Slot 1 is reserved for supervisor engine only; slots 2 and higher are reserved for line cards.

² Slots 3 and 4 are reserved for supervisor engines only in Cisco Catalyst 4507R-E and 4507R+E; slots 1-2 and 5-7 are reserved for line cards.

³ Slots 5 and 6 are reserved for supervisor engines only in Cisco Catalyst 4510R-E and 4510R+E; slots 1-4 and 7-10 are reserved for line cards.

⁴ 6 Gbps only on slots 8-10.

⁵ WS-C4507R-E and WS-C4510R-E chassis support up to 24G per line-card slot when used with Sup6-E.

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	<ul style="list-style-type: none"> • 1000W AC • 1400W AC • 1300W ACV • 2800W ACV • 4200W ACV • 6000W ACV • 1400W DC (triple input) • 1400W-DC-P 	<ul style="list-style-type: none"> • 1000W AC • 1400W AC • 1300W ACV • 2800W ACV • 4200W ACV • 6000W ACV • 1400W DC (triple input) • 1400W-DC-P 	<ul style="list-style-type: none"> • 1000W AC • 1400W AC • 1300W ACV • 2800W ACV • 4200W ACV • 6000W ACV • 1400W DC (triple input) • 1400W-DC-P 	<ul style="list-style-type: none"> • 1400W AC • 2800W ACV • 4200W ACV • 6000W ACV • 1400W DC (triple input) • 1400W-DC-P
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)

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. Cisco Catalyst 4500E Series Supervisor Engine Support

Feature	Cisco Catalyst 4500 Series Supervisor V-10GE	Cisco Catalyst 4500 Series Supervisor 6L-E	Cisco Catalyst 4500 Series Supervisor 6-E	Cisco Catalyst 4500 Series Supervisor 7-E	Cisco Catalyst 4500 Series Supervisor 7L-E
Cisco Catalyst WS-C4503-E chassis	6Gbps/slot	24Gbps/slot	24Gbps/slot	48Gbps/slot	48Gbps/slot
Cisco Catalyst WS-C4506-E chassis	6Gbps/slot	24Gbps/slot	24Gbps/slot	48Gbps/slot	48Gbps/slot
Cisco Catalyst WS-C4507R+E chassis	6Gbps/slot	24Gbps/slot	24Gbps/slot	48Gbps/slot	48Gbps/slot
Cisco Catalyst WS-C4510R+E chassis	6Gbps/slot	Not supported	24Gbps/slot (slot 1-7) 6Gbps/slot (slot 8-10)	48Gbps/slot	Not supported
Cisco Catalyst WS-C4507R-E chassis	6Gbps/slot	24Gbps/slot	24Gbps/slot	24Gbps/slot	24Gbps/slot
Cisco Catalyst WS-C4510R-E chassis	6Gbps/slot	Not supported	24Gbps/slot (slot 1-7) 6Gbps/slot (slot 8-10)	24Gbps/slot	Not supported

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)	48	96	240	240	384
Switched 10/100 Fast Ethernet (RJ-45) with IEEE 802.3af at Power over Ethernet (PoE/PoEP)	48	96	240	240	384
Switched 100 FX Fast Ethernet (MT-RJ)	48	96	240	240	384
Switched 1000BASE-X (Fiber)	6, 18, or 48	100	244	244	388
Switched 10/100/1000BASE-T Gigabit Ethernet	48	96	240	240	384

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 10/100/1000BASE-T Gigabit Ethernet with IEEE 802.3af at PoE/PoEP	48	96	240	240	384
Switched 10/100/1000BASE-T Gigabit Ethernet with UPOE	48	96	240	240	384
Switched 10 Gigabit Ethernet	6 or 12	28	64	64 ⁶	100 ⁶

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. Cisco Catalyst 4500 Series Line Cards

Product Number	Description
Cisco Catalyst 4500E Series Line Cards	
WS-X4748-UPOE+E	Cisco Catalyst 4500E Series 48-Port UPOE 10/100/1000 (RJ-45)
WS-X4748-RJ45V+E	Cisco Catalyst 4500E Series 48-Port 802.3at PoEP 10/100/1000 (RJ-45)
WS-X4748-RJ45-E	Cisco Catalyst 4500E Series 48-Port 10/100/1000 (RJ-45)
WS-X4712-SFP+E	Cisco Catalyst 4500E Series 12-port 10 Gigabit Ethernet (SFP+)
WS-X4624-SFP-E	Cisco Catalyst 4500E Series 24-port GE (SFP)
WS-X4612-SFP-E	Cisco Catalyst 4500E Series 12-port GE (SFP)
WS-X4648-RJ45V-E	Cisco Catalyst 4500E Series 48-Port PoE 10/100/1000(RJ45)
WS-X4648-RJ45V+E	Cisco Catalyst 4500E Series 48-Port Premium PoE 10/100/1000(RJ45)
WS-X4606-X2-E	Cisco Catalyst 4500E Series 6-Port 10GE (X2)
WS-X4648-RJ45-E	Cisco Catalyst 4500E Series 48-Port Data 10/100/1000(RJ45)
Cisco Catalyst 4500 Classic 10/100 Line Cards	
WS-X4148-RJ	Cisco Catalyst 4500 10/100 Auto Module, 48-Port (RJ-45)
WS-X4248-RJ45V	Cisco Catalyst 4500 PoE 802.3af 10/100, 48-Port (RJ-45)
Cisco Catalyst 4500 Classic 10/100/1000 Line Cards	
WS-X4548-GB-RJ45	Cisco Catalyst 4500 Enhanced 48-Port 10/100/1000 Module (RJ-45)
WS-X4548-RJ45V+	Cisco Catalyst 4500 48-Port 802.3af PoE and 802.3at PoEP 10/100/1000 (RJ-45)
WS-X4548-GB-RJ45V	Cisco Catalyst 4500 PoE IEEE 802.3af 10/100/1000, 48 Ports (RJ-45)
Cisco Catalyst 4500 Classic 100 BASE-X FE Line Cards	
WS-X4248-FE-SFP	Cisco Catalyst 4500 Fast Ethernet Switching Module, 48-Port 100BASE-X (SFP)
Cisco Catalyst 4500 Classic 1000 BASE-X GE Line Cards	
WS-X4306-GB	Cisco Catalyst 4500 Gigabit Ethernet Module, 6 Ports (GBIC)
WS-X4506-GB-T	Cisco Catalyst 4500 6-Port 10/100/1000 RJ-45 PoE IEEE 802.3af and 1000BASE-X (SFP)
WS-X4418-GB	Cisco Catalyst 4500 Gigabit Ethernet Module, Server Switching 18 Ports (GBIC)
WS-X4448-GB-SFP	Cisco Catalyst 4500 Gigabit Ethernet Module, 48 Ports 1000X (SFP)

⁶ WS-C4507R-E and WS-C4510R-E chassis support up to 34 switched 10 Gigabit Ethernet ports.

Table 5 lists the minimum software requirements for the Cisco Catalyst 4500 supervisor engines.

Table 5. Cisco Catalyst Supervisor Engine Software Minimum Requirements

Chassis	Supervisor Engine	Minimum Software Requirement
Cisco WS-C4503-E and WS-C4506-E	Supervisor Engine V-10GE	Cisco IOS® Software Release 12.2(37)SG
	Supervisor Engine 6-E	Cisco IOS Software Release 12.2(40)SG
	Supervisor Engine 6L-E	Cisco IOS Software Release 12.2(52)SG
	Supervisor Engine 7-E	Cisco IOS XE Software Release 3.0(1)SG
	Supervisor Engine 7L-E	Cisco IOS XE Software Release 3.2.0XO
Cisco WS-C4507R+E	Supervisor Engine V-10GE	Cisco IOS Software Release 12.2(54)SG
	Supervisor Engine 6-E	Cisco IOS Software Release 12.2(54)SG
	Supervisor Engine 6L-E	Cisco IOS Software Release 12.2(54)SG
	Supervisor Engine 7-E	Cisco IOS XE Software Release 3.0(1)SG
	Supervisor Engine 7L-E	Cisco IOS XE Software Release 3.2.0XO
Cisco WS-C4510R+E	Supervisor Engine V-10GE	Cisco IOS Software Release 12.2(54)SG
	Supervisor Engine 6-E	Cisco IOS Software Release 12.2(54)SG
	Supervisor Engine 7-E	Cisco IOS XE Software Release 3.0(1)SG
Cisco WS-C4507R-E	Supervisor Engine V-10GE	Cisco IOS Software Release 12.2(40)SG
	Supervisor Engine 6-E	Cisco IOS Software Release 12.2(40)SG
	Supervisor Engine 6L-E	Cisco IOS Software Release 12.2(52)SG
	Supervisor Engine 7-E	Cisco IOS XE Software Release 3.0(1)SG
Cisco WS-C4510R-E	Supervisor Engine V-10GE	Cisco IOS Software Release 12.2(40)SG
	Supervisor Engine 6-E	Cisco IOS Software Release 12.2(40)SG
	Supervisor Engine 7-E	Cisco IOS XE Software Release 3.0(1)SG

Managing the Cisco Catalyst 4500E Series Switch

Network management applications are instrumental in lowering operating expenditures (OpEx) while improving network availability by simplifying and automating many of the day-to-day tasks associated with managing an end-to-end network.

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 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 Cisco 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.

CiscoWorks LAN Management Solution

CiscoWorks LAN Management Solution (LMS) is an integrated suite of management functionality that simplify the configuration, administration, monitoring, and troubleshooting of Cisco Borderless Networks. Built upon popular Internet-based standards, CiscoWorks LMS enables network operators to manage the network through a browser-based interface that can be accessed any time from anywhere within the network. The user experience allows for maximum flexibility and quick-and-easy access to management functions and tasks reducing complexity and error-prone tasks typically associated with managing a network. The breadth and depth of device support coupled with “day-one” device support program make sure that the 4500E Series Switch and the latest Cisco platforms are supported and manageable the day they ship.

Once installed, out-of-the-box monitoring and troubleshooting dashboards provide immediate results and actionable information to quickly isolate and fix network problems before they affect service. Work centers provide a single place where operators can quickly provision, monitor, and manage new Cisco Catalyst 4500E Series Switch value-added network services such as Cisco EnergyWise, Cisco TrustSec[®], and Auto SmartPorts.

Network Analysis Module

Cisco NAM 2200 series appliance provides comprehensive operational visibility into Cisco Catalyst 4500 Series Switch deployments. It combines application performance visibility, traffic analysis, and troubleshooting to enable network administrators to effectively manage delivery of converged network services. The visibility provided by NAM allows IT to deliver consistent end-user experience and improve service levels. It also helps to optimize resources with comprehensive analysis of traffic and effective use of intelligent network services such as QoS and Cisco WAAS. In addition, Cisco NAM improves operational efficiency with proactive detection of performance issues and accelerated problem isolation and root-cause analysis.

Physical Specifications

Table 6 lists physical specifications.

Table 6. Physical Specifications of Cisco Catalyst 4500 Series Chassis

Specification	WS-C4503-E	WS-C4506-E	WS-C4507R+E and WS-C4507R-E	WS-C4510R+E and WS-C4510R-E
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

Tables 7 and 8 describe power supply indicators and interfaces:

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

Table 7. Cisco Catalyst 4500E 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)	<ul style="list-style-type: none"> • 12V at 83.4A • 3.3V at 12.2A 	<ul style="list-style-type: none"> • 12V at 113.4A • 3.3V at 12.2A 	<ul style="list-style-type: none"> • 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 8. Cisco Catalyst 4500E Series Power Supply Specifications (Data and PoE)

Power Supply	1300W AC	2800W AC	4200W AC	6000 AC	1400W DC with PEM
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
IEEE 802.3af/at compliant PoE/PoEP	Yes	Yes	Yes	Yes	Yes
Input current (rated)	<ul style="list-style-type: none"> • 16A at 100 VAC • 7A at 240 VAC 	<ul style="list-style-type: none"> • 16A at 200 VAC 	<ul style="list-style-type: none"> • 2x 12A at 100VAC Or • 2x 12A at 200VAC 	<ul style="list-style-type: none"> • 2x 12A at 100VAC Or • 2x 16A at 200VAC 	<ul style="list-style-type: none"> • 31A at -60 VDC (data only) • 180A at -48 VDC (PoE)
Output current (data)	<ul style="list-style-type: none"> • 12V at 84.7A • 3.3V at 12.5A 	<ul style="list-style-type: none"> • 12V at 113.3A • 3.3V at 12.1A 	<ul style="list-style-type: none"> • 12V at 115.3A • 3.3V at 12.5A 	<ul style="list-style-type: none"> • 12V at 186.9A • 3.3V at 12.5A 	<ul style="list-style-type: none"> • 12V at 120A • 3.3V at 10A
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
Output power redundant mode (data)	1000W + 40W	1360W + 40W	1383W + 40W	2200W + 40W	1360W + 40W
Output power redundant mode (PoE)	800W maximum per power supply	1400W maximum per power supply	<ul style="list-style-type: none"> • 3700W (220V) • 1850W (110V) 	<ul style="list-style-type: none"> • 4800W (220V) • 1850W (110V) 	Up to 7500W (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
Holdup time	20 ms	20 ms	20 ms	20 ms	4 ms
Hot swappable	Yes	Yes	Yes	Yes	Yes

Additional notes for Tables 7 and 8:

- 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 4500E Series and classic Cisco 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, CLI, and Simple Network Management Protocol [SNMP]) that a fan has failed and the tray needs to be replaced. Cisco Catalyst 4500E Series fans cannot be interchanged with classic Cisco Catalyst 4500 Series fans. The classic Cisco 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-E, and WS-C4510R-E Only)

The Cisco Catalyst 4500 and 4500E 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-E, 4510R+E, and 4510R-E chassis. Fabric-redundancy modules cannot be interchanged between the Cisco Catalyst 4507R+E/4510R+E and 4507R-E/4510R-E chassis.

Environmental Conditions

The Cisco Catalyst 4500 and 4500E Series require the following conditions:

- Operating temperature: 32 to 104°F (0 to 40°C)
- Storage temperature: -40 to 167°F (-40 to 75°C)
- Relative humidity: 10 to 90 percent, noncondensing
- Operating altitude: -60 to 3000 meters (m)

Regulatory Standards Compliance

Table 9 lists the regulatory standards compliance of the Cisco Catalyst 4500 and 4500E Series.

Table 9. Regulatory Standards Compliance

Specification	Standard
Regulatory compliance	CE Marking
Safety	<ul style="list-style-type: none">• UL 60950• CAN/CSA-C22.2 No. 60950• EN 60950• IEC 60950• TS 001• AS/NZS 3260

Specification	Standard
EMC	<ul style="list-style-type: none"> • 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 50121-4 • 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	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • CTR 12/13 • CTR 4 • ACA TS016
Telecom (T1)	<ul style="list-style-type: none"> • FCC Part 68 • Canada CS-03 • JATE Green Book
ROHS compliance	ROHS5

Power and MTBF Information

Table 10 gives power and MTBF information for different chassis

Table 10. Power and MTBF Info

Part Number	Max Rated Power (W)	Rated MTBF (Hours)
WS-C4503-E	60	1,064,279
WS-C4506-E	120	710,119
WS-C4507R+E	135	248,630
WS-C4510R+E	200	179,714
WS-C4507R-E	135	365,896
WS-C4510R-E	200	290,525

Note: All power numbers shown in Table 10 are maximum values recommended for facility power and cooling capacity planning. These figures are not indicative of the actual power draw during operation. Typical power draw is about 20 percent lower than the maximum value shown.

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-C4507R+E	Cisco Catalyst E-Series 4507R+E 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-C4510R+E	Cisco Catalyst E-Series 4510R+E switch (10-slot chassis), fan, no power supply; redundant supervisor capable
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-C45-6000ACV	Cisco Catalyst 4500 Series 6000W 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-X4516-10GE	Cisco Catalyst 4500 Series Supervisor Engine V-10GE
WS-X45-Sup6-E	Cisco Catalyst 4500 Series Supervisor Engine 6-E
WS-X45-Sup6L-E	Cisco Catalyst 4500 Series Supervisor Engine 6L-E
WS-X45-Sup7-E	Cisco Catalyst 4500 Series Supervisor Engine 7-E
WS-X45-Sup7L-E	Cisco Catalyst 4500 Series Supervisor Engine 7L-E
MEM-C4K-FLD64M	Compact Flash memory, 64-MB option
MEM-C4K-FLD128M	Compact Flash memory, 128-MB option

Cisco Limited Lifetime Hardware Warranty

The Cisco limited lifetime hardware warranty (LLW) includes 10-day advance hardware replacement for as long as the original end user owns the product. Table 12 describes the limited lifetime hardware warranty.

Your formal warranty statement, including the warranty applicable to Cisco software, appears in the Cisco information packet that accompanies your Cisco product. We encourage you to review carefully the warranty statement shipped with your specific product before use.

For additional information on warranty terms, visit <http://www.cisco.com/go/warranty>.

Table 12. Limited Lifetime Hardware Warranty

Cisco Limited Lifetime Hardware Warranty ¹	
Warranty duration	As long as the original customer owns the product.
EoL policy	In the event of discontinuance of product manufacture, Cisco warranty support is limited to 5 years from the announcement of discontinuance
Hardware replacement	Cisco or its service center will use commercially reasonable efforts to ship a replacement part within 10 business days after receipt of the RMA request and confirmation that a replacement part is appropriate response. Actual delivery times may vary depending on customer location
Effective date	Hardware warranty commences from the date of shipment to the customer (and in case of resale by a Cisco reseller, not more than 90 days after original shipment by Cisco)
TAC support	None
Cisco.com access	Warranty allows guest access only to Cisco.com

¹ Cisco reserves the right to refund the purchase price as its exclusive warranty remedy.

Cisco and Partner Services for Expanding the Borderless Network

Drive borderless network innovation, optimize operational efficiencies, establish business flexibility, and gain competitive advantage using intelligent, personalized services from Cisco and our partners. Through a discovery process that begins with understanding your business objectives, we help you integrate the next-generation Cisco Catalyst 4500-E Series Switches into your architecture and incorporate network services onto that platform. Sharing knowledge and leading practices, we support your success every step of the way as you deploy, absorb, manage, and scale new technology.

For additional information about Cisco services, visit <http://www.cisco.com/go/services>.

Adding a Cisco technical services contract to your device coverage provides benefits not available with warranty, including access to the Cisco Technical Assistance Center (TAC), a variety of hardware replacement options to meet critical business needs, updates for licensed Cisco IOS software, and registered access to the extensive Cisco.com knowledge base and support tools. Choose from a flexible suite of support services designed to meet your business needs and help you maintain high-quality network performance while controlling operational costs. Table 13 shows the Cisco technical services available for Cisco Catalyst 4500-E Series Switches.

For information about Cisco Technical Services, go to <http://www.cisco.com/go/ts>.

Table 13. Cisco Technical Services for Cisco Catalyst 4500-E Series Switches

Technical Services
<p>Cisco SMARTnet Service</p> <ul style="list-style-type: none"> • Around-the-clock, global access to the Cisco Technical Assistance Center (TAC) • Unrestricted access to the extensive Cisco.com resources, communities, and tools • Next-business-day, 8x5x4, 24x7x4, and 24x7x2 advance hardware replacement² and onsite parts replacement and installation available • Ongoing operating system software updates within the licensed feature set¹ • Proactive diagnostics and real-time alerts on Smart Call Home-enabled devices
<p>Cisco Smart Foundation Service</p> <ul style="list-style-type: none"> • Next business day advance hardware replacement as available • Business hours access to SMB TAC (access levels vary by region) • Access to Cisco.com SMB knowledge base • Online technical resources through Smart Foundation Portal • Operating system software bug fixes and patches
<p>Cisco Focused Technical Support Services</p> <p>Three levels of premium, high-touch services are available:</p> <ul style="list-style-type: none"> • Cisco High-Touch Operations Management Service

Technical Services

- Cisco High-Touch Technical Support Service
- Cisco High-Touch Engineering Service

Valid Cisco SMARTnet® or SP Base contracts on all network equipment are required

Notes:

¹. Cisco operating system updates include the following: maintenance releases, minor updates, and major updates within the licensed feature set.

². Advance hardware replacement is available in various service-level combinations. For example, 8x5xNBD indicates that shipment will be initiated during the standard 8-hour business day, 5 days a week (the generally accepted business days within the relevant region), with next business day (NBD) delivery. Where NBD is not available, same day ship is provided. Restrictions apply; please review the appropriate service descriptions for details.



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