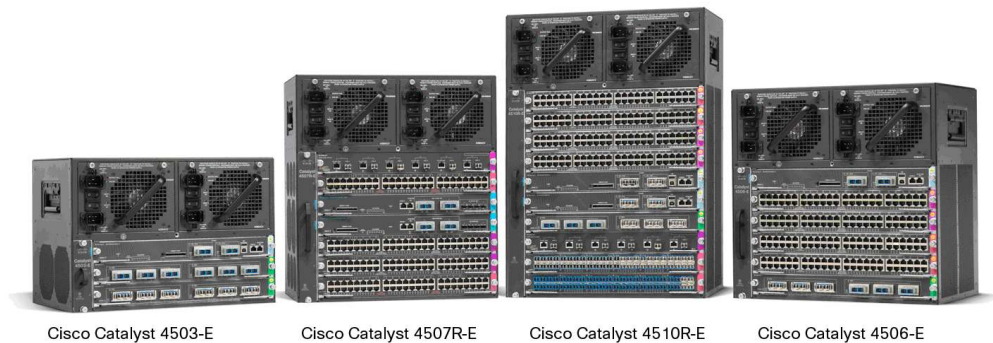




Cisco Catalyst 4500 Series Chassis Data Sheet

Secure, Flexible, Non-Stop Communications

Figure 1. Cisco Catalyst 4500 E-Series



Overview

The Catalyst 4500 Series with CenterFlex technology provides scalable nonblocking Layer 2–4 switching with Secure, Flexible, Non-Stop communications, enabling business resilience for enterprises, small and medium-sized businesses (SMBs), and Metro Ethernet customers deploying business-critical applications. CenterFlex technology is the technology enabled by the Supervisor 6-E centralized ASICs, which deliver the highest centralized performance and configuration flexibility in the industry. CenterFlex technology enables granular optimization of real-time voice, video and data communication, maximizing performance and enhancing end user experience. The new “E-Series” with CenterFlex technology is designed with unprecedented backward and forward compatibility delivering exceptional investment protection and deployment flexibility to meet the evolving needs of organizations of all sizes.

The Cisco Catalyst 4500 Series includes two series of Catalyst chassis: the E-Series and Classic Series chassis. Catalyst 4500 E-Series chassis are extremely flexible and will support both 6 Gbps and 24Gbps 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 Catalyst 4500 classic chassis: ten-slot, seven-slot, six-slot and three-slot. Integrated resiliency enhancements offered in the Catalyst 4500-E and Classic Series include 1+1 supervisor-engine redundancy (Ten-slot and seven-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.

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. This helps ensure scalability for today's network requirements with ample room for future growth.

With unprecedented forward and backward compatibility spanning multiple generations, the Catalyst 4500 Series reduces the cost of ownership by minimizing recurring operational expenses, improving return on investment (ROI).

Cisco Catalyst 4500 E-Series Chassis

The Cisco Catalyst 4500 E-Series offers four chassis options and seven supervisor engine options. 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 in supporting 1+1 redundant supervisor engines with subsecond failover time and full image In Service Software Upgrades (ISSU). Using the same line cards as the widely deployed legacy Catalyst 4000 Series Switches and Classic Catalyst 4500 Series Switches, the Catalyst 4500-E Series enhances the Cisco commitment to affordable enterprise and branch scalability. It provides a cost-effective, flexible network solution that scales to meet today's high-performance needs with investment protection (Table 1).

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	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 (Supervisor II-Plus, II-Plus-10GE, IV, V, V-10GE, 6-E)	Yes (Supervisor V, V-10GE, and 6-E)
Supervisor Engines Supported	Supervisor II-Plus Supervisor II-Plus-TS Supervisor II-Plus-10GE Supervisor IV Supervisor V Supervisor V-10GE Supervisor 6-E	Supervisor II-Plus Supervisor II-Plus-10GE Supervisor IV Supervisor V Supervisor V-10GE Supervisor 6-E	Supervisor II-Plus Supervisor II-Plus-10GE Supervisor IV Supervisor V Supervisor V-10GE Supervisor 6-E	Supervisor V Supervisor V-10GE Supervisor 6-E
Bandwidth Per Line Card Slot using Supervisor 6-E	Up to 24 Gbps on all slots ⁴	Up to 24 Gbps on all slots ⁴	Up to 24 Gbps on all slots ⁴	Up to 24 Gbps on slots 1-4 & 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

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; 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; Slots 1-4 and 7-10 are reserved for line cards; Slot 8-10 support only Classic line cards.

⁴ Classic Catalyst 4000 or 4500 chassis operate at 6Gbps per slot.

Minimum Number of Power Supplies	1	1	1	1
Power Supplies Supported	<ul style="list-style-type: none"> • 1000W AC • 1400W AC • 1300W ACV • 2800W ACV • 4200W ACV 1400W DC (triple input) 1400W-DC-P External AC Power Shelf	<ul style="list-style-type: none"> • 1000W AC • 1400W AC • 1300W ACV • 2800W ACV • 4200W ACV 1400W DC (triple input) 1400W-DC-P External AC Power Shelf	<ul style="list-style-type: none"> • 1000W AC • 1400W AC • 1300W ACV • 2800W ACV • 4200W ACV 1400W DC (triple input) 1400W-DC-P External AC Power Shelf	<ul style="list-style-type: none"> • 1400W AC⁵ • 2800W ACV⁵ • 4200W ACV⁵ 1400W DC (triple input) 1400W-DC-P External AC Power Shelf
Number of Fan-Tray Bays	1	1	1	1
Location of 19 in. Rack Mount	Front	Front	Front	Front
Location of 23 in. 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 seven 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 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, 102 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, 210 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, 210 Mpps
Cisco Catalyst WS-C4510R-E Chassis	Not supported	Not supported	Not supported	Not supported	96 Gbps, 72 Mpps	136 Gbps, 102 Mpps	320 Gbps, 250 Mpps

⁵ The 1400W AC, 4200W AC and 2800W AC 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.

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 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
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
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
Cisco Catalyst WS-C4510R Chassis	Not supported	Not supported	Not supported	Not supported	96 Gbps, 72 Mpps	136 Gbps, 102 Mpps	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 1000 Gigabit Ethernet (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 10,000 (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 by part number:

Catalyst 4500 E-Series Linecards and Modules

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)
WS-X4606-X2-E	Catalyst 4500 E-Series 6-Port 10GbE (X2)
CVR-X2-SFP	TwinGig Converter Module

Catalyst 4500 Classic 10/100 Linecards

WS-X4148-RJ	Catalyst 4500 10/100 Auto Module, 48-Ports (RJ-45)
WS-X4124-RJ45	Catalyst 4500 10/100 Module,24-Ports(RJ45)
WS-X4148-RJ21	Catalyst 4500 10/100 Module, 48-Ports Telco (4xRJ21)
WS-X4248-RJ21V	Catalyst 4500 PoE 802.3af 10/100, 48-Ports (RJ21)
WS-X4248-RJ45V	Catalyst 4500 PoE 802.3af 10/100, 48-Ports (RJ45)
WS-X4224-RJ45V	Catalyst 4500 10/100 PoE 802.3af 24-ports (RJ45)
WS-X4232-GB-RJ	Catalyst 4500 32-10/100 (RJ-45),2-GE(GBIC)

Catalyst 4500 Classic 10/100/1000 Linecards

WS-X4548-GB-RJ45	Catalyst 4500 Enhanced 48-Port 10/100/1000 Base-T (RJ-45)
WS-X4548-GB-RJ45V	Catalyst 4500 PoE 802.3af 10/100/1000, 48-Ports (RJ45)
WS-X4524-GB-RJ45V	Catalyst 4500 PoE 802.3af 10/ 100/1000 24-ports (RJ45)
WS-X4506-GB-T	Catalyst 4500 6-Port 10/100/1000 PoE or SFP (Optional)
WS-X4424-GB-RJ45	Catalyst 4500 24-port 10/100/1000 Module (RJ45)

Catalyst 4500 Classic 100 Base-X FE Linecards

WS-X4248-FE-SFP	Catalyst 4500 48-Port 100BASE-X (SFPs Optional)
WS-X4124-FX-MT	Catalyst 4500 FE Switching Module, 24- 100FX (MTRJ)
WS-X4148-FE-BD-LC	Catalyst 4500 FE Module, 48-Port BX-D (LC) (1550)
WS-X4148-FX-MT	Catalyst 4500 FE Switching Module, 48-100FX MMF(MTRJ)

Catalyst 4500 Classic 1000 Base-X GE Linecards

WS-X4306-GB	Catalyst 4500 Gigabit Ethernet Module, 6-Ports (GBIC)
WS-X4506-GB-T	Catalyst 4500 6-Port 10/100/1000 PoE or SFP (Optional)
WS-X4302-GB	Catalyst 4500 Gigabit Ethernet Module, 2-Ports (GBIC)
WS-X4418-GB	Catalyst 4500 GE Module, Server Switching 18-Ports (GBIC)
WS-X4448-GB-SFP	Catalyst 4500 48-Port 1000Base-X (SFPs Optional)

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 (singlemode or multimode)
WS-G5487	1000Base-ZX extended reach GBIC(singlemode)
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 FE 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 FE port
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

Table 4 lists the minimum software requirements for the Cisco Catalyst supervisor engines, and Table 5 compares the Cisco Catalyst chassis.

Table 4. Cisco Catalyst Supervisor Engine Software Minimum Requirements

Chassis	Supervisor	Minimum Software Requirement
Cisco WS-C4503-E, and WS-C4506-E	All Classic Supervisor Engines Supervisor Engine 6-E	Cisco IOS Software Release 12.2(37)SG Cisco IOS Software Release 12.2(40)SG
Cisco WS-C4507R-E, and WS-C4510R-E	All Classic Supervisor Engines Supervisor Engine 6-E	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	Cisco IOS Software Release 12.2(18)EW Cisco IOS Software Release 12.2(25)EW Cisco IOS Software Release 12.2(40)SG

Table 5. Comparison Between Catalyst 4500 Classic and E-Series Chassis

Feature	Catalyst 4500 Classic Chassis	Catalyst 4500 E-Series Chassis
Band width per slot maximum	6 Gbps	24 Gbps per slot with future scalability
PoE per line card Slot Maximum	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

CNA

Cisco Network Assistant is an application that 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 device view, the Catalyst 4500 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.

RME

CiscoWorks Resource Manager Essentials, 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 6. 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 7. Cisco Catalyst 4500-E and Classic 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	20ms
Hot Swappable	Yes	Yes	Yes

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

Power Supply	1300W AC	2800W AC	4200W AC	1400W DC with PEM	2500W AC—Power Shelf
Integrated PoE	Yes (up to 800W)	Yes (up to 1400W)	Yes (up to 3855W)	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
Input Current (rated)	<ul style="list-style-type: none"> • 16A at 100 VAC • 7A at 240 VAC 	16A at 200 VAC	<ul style="list-style-type: none"> • 2x 12A at 100VAC Or <ul style="list-style-type: none"> • 2x 12A at 200VAC 	<ul style="list-style-type: none"> • 31A at –60 VDC (data only) • 180A at –48 VDC (PoE) 	15A at 200 VAC
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 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)	140A at –48/–60 VDC	–52 VDC at 50A (total output per supply)
Output Power Redundant Mode (data)	1000W + 40W	1360W + 40W	1383W + 40W	1360W + 40W	Up to 1400W (through DC supply)
Output Power Redundant Mode (PoE)	800W maximum per power supply	1400W maximum per power supply	<ul style="list-style-type: none"> • 3855W (200V) • 1900W (100V) 	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	–	–
Output Power Combined Mode (PoE)	1333W	2333W	7710W (200V)	3800W (100V)	–
Heat Dissipation⁸	1568 Btus per hour	2387 Btus per hour	3580 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	4 ms	20 ms

Number of 802.3af Class 2 Power Devices Supported with 1 Power Supply (1+1)	102	178	<ul style="list-style-type: none"> • 384 PDs (200V) • 241 PDs (100V) 	384	384
Number of 802.3af Class 0 and 3 Power Devices Supported with 1 Power Supply (1+1)	46	80	<ul style="list-style-type: none"> • 222 PDs (200V) • 109 PDs (100V) 	384	384
Hot Swappable	Yes	Yes	Yes	Yes	Yes

Additional notes for Table 7 and 8:

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

Fan Trays

Each Cisco Catalyst 4500-E Series and Classic Catalyst 4500 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.

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

The Cisco Catalyst 4500-E and Classic Catalyst 4500 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 and 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-E and Classic Catalyst 4500 Series requires 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 2000 meters (m)

Regulatory Standards Compliance

Table 9 lists the regulatory standards compliance of the Cisco Catalyst 4500-E and Classic 4500 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
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 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

Ordering Information

Table 10 lists the ordering information for Chassis, Power Supplies, Supervisors, and Memory that are commonly used with the Cisco Catalyst 4500 Series.

Table 10. 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, redundant supervisor capable
WS-C4510R	Cisco Catalyst 4510R Classic 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-C45-1400DC-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
WS-X4013+	Cisco Catalyst 4500 Series Supervisor Engine II-Plus
WS-X4013+TS	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+10GE	Cisco Catalyst 4500 Series Supervisor Engine II-Plus-10GE
WS-X4515	Cisco Catalyst 4500 Supervisor Engine IV
WS-X4516	Cisco Catalyst 4000/4500 Supervisor Engine V
WS-X4516-10GE	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

The warranty for the Cisco Catalyst 4500 Series is 90 days; it includes hardware replacement with a 10 day turnaround from return to manufacturer authorization (RMA).

Cisco Technical Support Services

Cisco Systems® 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 11 and 12 list the components and competitive differentiators of Cisco Technical Support Services.

Table 11. 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: <ul style="list-style-type: none"> • 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 12. Technical Support Services—Competitive Differentiators

Feature	Benefits
Worldwide Virtual Lab <ul style="list-style-type: none"> • 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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