

CISCO SYSTEMS



# Cisco Catalyst Switch Guide

Scalable, intelligent LAN switching for campus, branch,  
and data center networks of all sizes

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Cisco® Catalyst® 6500 and Catalyst 4500 Series Modular Switches

Cisco Catalyst 4900, Catalyst 3750, Catalyst 3560, Catalyst 2960,  
Catalyst 2950, Catalyst 2940, and Catalyst Express 500 Series  
Fixed-Configuration Switches

Spring 2006 V.2

# Cisco Catalyst Switches

Scalable, intelligent LAN switching for campus, branch, and data center networks of all sizes.

This is your guide to Cisco® Catalyst® switches, the industry's most advanced and versatile portfolio of modular and fixed-configuration LAN switches.

Individually, these switches offer the performance and features required for virtually any deployment, from small workgroups and wiring closets to corporate data centers and network cores. Working together, they are even more powerful, delivering intelligent services from the wiring closet to the core required to protect, optimize, and grow your network as your business needs evolve.

Over the past 20 years, networks have transformed the way people live, work, and play, enhancing and accelerating communication in countless ways. Yet each new benefit comes at a price. The proliferation of powerful desktop computers, bandwidth-intensive applications, and new devices, such as wireless access points, IP phones, and video surveillance has left networks—and network managers—looking for holistic and simple solutions to their business challenges.

Cisco Systems, the worldwide leader in networking systems for organizations of every size, offers an architectural approach to networking that makes it easy for organizations to adapt and grow. As part of the foundation of the Intelligent Information Network, Cisco Catalyst switches provide the high availability, integrated security, application delivery optimization, and enhanced manageability needed for today's most valuable converged network services, including networked applications, IP voice and video, wireless access, and other demanding applications.

# Cisco Catalyst Switches

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# Intelligent Switching for the Evolving Network

From edge to core, Cisco Catalyst switches provide the performance, high availability, comprehensive security, delivery optimization, and enhanced manageability needed to get the most out of your network for years to come.

## MODULAR SWITCHES



### Cisco Catalyst 6500 Series

Optimized for secure, converged voice, video, and data networks, the Catalyst 6500 offers industry-leading scalability (32Gbps to 720Gbps), operational control, and investment protection to meet the needs of enterprises, medium-sized businesses, and service providers.

- **Flexible Options:** Modular 3-, 4-, 6-, 9-, and 13-slot chassis all support redundant supervisors; LAN/WAN service modules; modular Power over Ethernet (PoE), and forwarding engines
- **Highest Availability:** Cisco IOS Software Modularity featuring subsystem In Service Software Upgrades (ISSUs); Generic Online Diagnostics (GOLD)
- **Comprehensive Security:** H/W-based Control Plane Policing (CoPP); integrated HW NetFlow; 802.1x enhancements; firewall; web VPN; intrusion prevention and anomaly detection modules
- **Enhanced Manageability:** Subsystem ISSUs with IOS modularity; integrated TDR; Encapsulated Remote Span (ERSPAN); Embedded Event Manager (EEM); Network Analysis Module (NAM); CiscoWorks; CNA
- **Highest Port Densities:** Up to 1,152 10/100 ports, 577 10/100/1000 ports, 410 SFP Gigabit Ethernet ports, or 32 10GbE ports
- **IP Communications:** Highest integrated PoE density; TDM/ Analog gateway and media services; industry-leading scalability and quality for voice and video applications
- **Integrated Service Modules:** Accelerated IT performance with simplified architectures and integrated wireless technologies



### Cisco Catalyst 4500 Series

Midrange modular platform offering Layer 2–4 switching intelligent network services up to 136Gbps, and added investment protection for enterprises, small- to medium-sized businesses, and service providers.

- **Investment Protection:** Evolutionary centralized modular architecture with functionally transparent line cards allow for easy upgrade of all system ports to higher level functions with Supervisor upgrade
- **Flexible Options:** Modular 3- and 6-slot single supervisor chassis and 7- and 10-slot redundant supervisor chassis supporting numerous connectivity and service configurations
- **Highest Availability:** Redundant supervisor engines with Non-stop Forwarding/Stateful Switchover (NSF/SSO) offering 50ms failover; redundant power supplies with power circuit redundancy; hot-swappable fan trays with redundant fans
- **Comprehensive Security:** Integrated Network Admission Control (NAC) and 802.1x, H/W-based Control Plane Policing (CoPP); integrated man-in-the-middle and DoS attack mitigation; NetFlow; access control lists and SSH
- **Comprehensive Management:** CiscoWorks; CNA; RSPAN; TDR and NetFlow
- **High Port Density:** Up to 384 Fast Ethernet or Gigabit Ethernet ports available in copper or fiber with 10 Gigabit uplinks; PoE (Cisco pre-standard and IEEE 802.3af)

## FIXED-CONFIGURATION SWITCHES



### Cisco Catalyst 4900 Series

Fixed-configuration switches offering high-performance and highest availability in a 1 RU configuration, optimized for Datacenter top of rack server aggregation.

- Standalone fixed-configuration for low-latency and wire-speed switching
- Layer 2–4 switching and intelligent services with dynamic IP routing and IPv6
- Up to 48 10/100/1000 ports with 4 SFP ports or 48 10/100/1000 ports with two 10GbE ports
- Dual, hot-swappable internal AC or DC power supplies
- Hot-swappable fan trays



### Cisco Catalyst 3750 Series

Stackable switches offering multilayer switching and Cisco StackWise™ technology for enterprise branch offices and midsize organizations.

- Stackable fixed-configuration switches featuring Cisco StackWise technology, a 32Gbps interconnect for a unified, resilient system of up to nine switches
- Layer 2–4 switching and intelligent services with dynamic IP routing and IPv6
- Fast Ethernet, Gigabit Ethernet, and 10 Gigabit Ethernet (10GbE) connectivity
- Up to 48 10/100/1000 ports plus 4 SFP ports per stackable switch
- Integrated PoE (Cisco pre-standard and IEEE 802.3af); up to 24 ports with 15.4 watts or 48 ports with 73 watts
- AC power supply failure protection with external power supply



### Cisco Catalyst 2950 Series

Fixed-configuration switches offering Fast Ethernet and Gigabit Ethernet connectivity for branch offices, small wiring closets, and industrial deployments.

- Standalone fixed-configuration switches
- Layer 2 switching with intelligent Layer 2–4 services
- Fast Ethernet connectivity with Gigabit Ethernet Uplinks
- Up to 48 10/100 ports
- AC power supply failure protection with external power supply; DC power option available



### Cisco Catalyst 3560 Series

Fixed-configuration switches combining Gigabit Ethernet connectivity and PoE for enterprise LAN access and branch office deployments.

- Standalone fixed-configuration switches
- Layer 2–4 switching and intelligent services with dynamic IP routing and IPv6
- Fast Ethernet and Gigabit Ethernet connectivity
- Up to 48 10/100/1000 ports plus 4 SFP ports
- Integrated PoE (Cisco pre-standard and IEEE 802.3af); up to 24 ports with 15.4 watts or 48 ports with 73 watts
- AC power supply failure protection with external power supply



### Cisco Catalyst 2940 Series

Compact fixed-configuration switches delivering Fast Ethernet connectivity for workgroup, conference room, and classroom deployments.

- Standalone fixed-configuration Layer 2 switches with no fan
- Fast Ethernet connectivity with Gigabit Ethernet Uplinks
- Up to 8 10/100 ports



### Cisco Catalyst 2960 Series

Fixed-configuration switches offering Fast Ethernet and Gigabit Ethernet connectivity with enhanced LAN services for mid-market and branch office networks.

- Standalone fixed-configuration switches
- Layer 2 switching with intelligent Layer 2–4 services
- Fast Ethernet and Gigabit Ethernet connectivity
- Up to 48 10/100 ports or 10/100/1000 ports
- AC power supply failure protection with external power supply



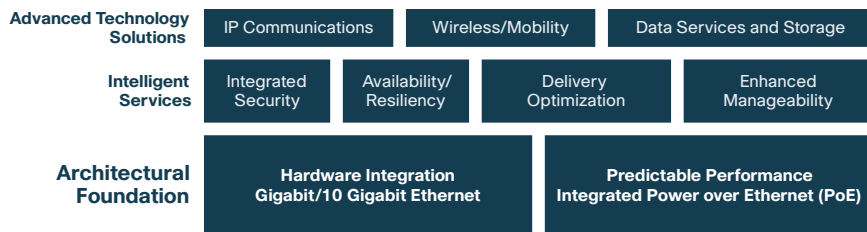
### Cisco Catalyst Express 500 Series

Cisco-class switches that make advanced network services and IP Communications easy to manage for businesses with 20 to 250 employees.

- Standalone fixed-configuration Layer 2 switches
- Fast Ethernet and Gigabit Ethernet connectivity
- Up to 24 10/100 ports with optional PoE or 12 10/100/1000 ports

# The architectural foundation of the Intelligent Information Network.

Cisco Systems offers the industry’s most complete range of switching solutions, supporting a wide variety of deployment requirements in networks of every size. Yet Cisco Catalyst switches are much more than a collection of point products to meet isolated IT needs; they are part of an integrated approach to the broader goals of protecting, optimizing, and growing networks for years to come.



Cisco Catalyst switches provide an architectural foundation for the intelligent services that enable new applications and uses for the network. Key elements include:

### Hardware Integration

At the core of Cisco’s hardware integration is application-specific integrated circuit (ASIC) innovation. Cisco has developed more than one hundred ASICs for the Cisco Catalyst switching family since 1995, with each generation including more capabilities. For example, Cisco was the first vendor to integrate Layer 3 switching into hardware, and has gone on to integrate security access control lists (ACLs), quality of service (QoS) classification, and queuing across the entire Cisco Catalyst line. Cisco is also the only switching vendor to offer hardware-based services modules, which integrate key functions such as firewalling, content networking, and network analysis directly into Catalyst 6500 switches.

### Predictable Performance

Cisco offers among the highest performance modular and stackable switches in the industry, but throughput alone is not enough. Organizations need to be assured of predictable performance, regardless of variables like congestion, traffic type, or the use of software- or hardware-enabled services. That’s why all Cisco Catalyst switches are designed to maintain predictable performance through a unique combination of mechanisms, including Cisco Express Forwarding (CEF), Ternary Content Addressable Memory (TCAM), buffering, and congestion management. This ensures that network managers can enable complex features without fear of losing speed in their networks.

### High-Density Gigabit and 10 Gigabit Ethernet

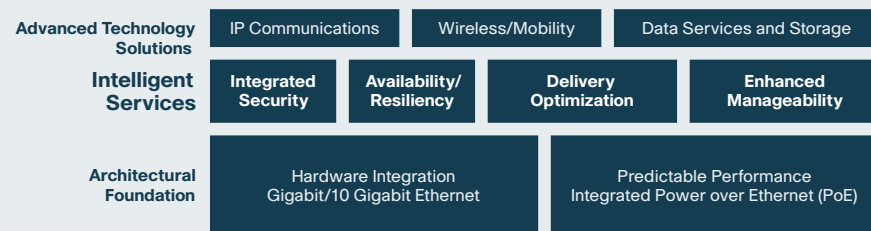
The Catalyst portfolio leads the industry in Gigabit and 10 Gigabit Ethernet (10GbE) port density. Desktop Gigabit Ethernet, also called 10/100/1000, provides investment protection for future connectivity needs while also making use of the “free” LAN-on-motherboard solutions shipping on most new desktop and laptop computers. Additionally, the ability to process networked applications faster means that each PC’s performance improves, increasing productivity. Similarly, 10GbE is being rapidly adopted in many enterprise networks, particularly in the network core, distribution, and in data center networks. Together, Gigabit Ethernet and 10GbE help to ensure rapid access into the network and between network devices.

### Power over Ethernet

Cisco pioneered the delivery of Power over Ethernet (PoE), simplifying the deployment of devices such as IP phones and wireless access points by eliminating the need for additional power cabling. Cisco drove the 802.3af power standard through IEEE and today offers extensions to the IEEE standard through the use of intelligent power management. In keeping with Cisco’s evolutionary approach, the Cisco Catalyst line includes switches that support both pre-standard inline power as well as IEEE 802.3af-compliant devices, enabling our customers to deploy new technology while continuing to make the most of past investments.

## End-to-end intelligent switching for today's converged network services.

The LAN switching infrastructure connects users, applications, and communications systems together. That basic task has become much more challenging as the variety and complexity of network uses have increased. Cisco Catalyst switches provide the intelligent services required to create secure, resilient networks that optimize the delivery of disparate services, yet remain easy to configure, manage, and troubleshoot.



Cisco Catalyst switches support today's technology trends and business goals through a unique combination of intelligent capabilities. Major advantages include:

### Integrated Security

Cisco Catalyst switches help make networks self-defending. Encrypted passwords, multilevel account privileges, and authentication protocols prevent unauthorized network access—a problem exacerbated by the rapid adoption of wireless networking. The switches can also prevent devices from connecting if they fail to meet certain criteria, such as having the latest antivirus software. Users can be separated into private subnets to permit varying levels of access. Other features enable the switches to protect themselves from worms and denial-of-service (DoS) attacks, prevent routing and spanning tree information from being spoofed, and ensure malicious users can't steal confidential information, either from the company or from other employees.

### Availability and Resiliency

Cisco Catalyst switches help maintain the highest levels of network availability and resiliency. Each switch is designed to protect itself from hardware, software, power, or connection failures—or at the very least, minimize recovery times by enabling redundant backup systems and protocols to take over in as little as a millisecond. The switches are also designed to increase resiliency on a network-wide level, utilizing an array of Cisco innovations to recover from device, link, or protocol failures and maintain uninterrupted access. Integrated security features also play a role in preserving availability in the event of incidents like DoS attacks. Conversely, resilient designs help networks recover faster from security breaches, or even nullify their impact.

### Delivery Optimization

Today's networks must be intelligent and adaptable enough to meet the varying requirements of converged data, voice, video, and storage traffic. Cisco Catalyst switches optimize the delivery of disparate traffic types using three key technologies: quality of service (QoS), multicast, and content switching. QoS allows network managers to prioritize traffic and ensure low-latency traffic, such as voice, gets handled accordingly. Multicast makes it much more efficient to deliver video or music on-hold to multiple points on the network, reducing the burden on servers. The Cisco Catalyst 6500 Series Content Switching Module adds advanced Layer 4–7 load balancing to the Catalyst line's existing Layer 2 and 3 features, further optimizing service delivery.

### Enhanced Manageability

All Cisco Catalyst switches offer enhanced capabilities that make them much easier to configure, manage, and troubleshoot. These include wizards that automatically configure switches, integrated Web-based management tools, device discovery and intelligent power management features for PoE equipment such as IP phones and wireless access points, and an array of data collection and analysis tools. The benefits are real-time visibility, faster response and repair times, more adaptive policy management, and reduced cost and complexity. In the case of the Cisco Catalyst 6500 Series, optional Network Analysis Modules embed a rich set of management features on a single blade, providing volumes of performance information without burdening the switch itself.

Cisco Catalyst Switches: **FEATURE COMPARISON**

	MODULAR SWITCHES			FIXED-CONFIGURATION SWITCHES					
	Catalyst 6500	Catalyst 4500	Catalyst 4900	Catalyst 3750	Catalyst 3560	Catalyst 2960	Catalyst 2950	Catalyst 2940	Catalyst Express 500
<b>LAN SWITCHING FEATURES</b>									
<b>Connectivity and Filtering</b>									
EtherChannel®/802.3ad	▪	▪	▪	▪	▪	▪	▪	▪	▪
Jumbo Frames—Gigabit Ethernet on Copper	▪	6-port card only	▪	L2 only	L2 only	L2 only			
Jumbo Frames—Gigabit Ethernet on Fiber	▪	all non-blocking ports	▪	L2 only	L2 only	L2 only			
Broadcast Suppression	▪	▪	▪	▪	▪	▪	▪	▪	▪
Multicast Suppression	▪	▪	▪	▪	▪	▪	▪	▪	▪
<b>Layer 2</b>									
ISL/802.1Q	▪	▪	▪	▪	▪	802.1Q only	802.1Q only	802.1Q only	802.1Q only
Private VLAN Edge	▪	▪	▪	▪	▪	▪	▪	▪	▪
Private VLAN	▪	▪	▪	IP Services	IP Services				
Voice VLAN	▪	▪	▪	▪	▪	▪	▪	▪	▪
VLAN Trunking Protocol (VTP)	▪	▪	▪	▪	▪	▪	▪	▪	transparent mode only
GVRP	▪								
GARP	▪								
URT/VMPS	▪	▪	▪	▪	▪	▪	▪	▪	
VTP v3	▪								
VTP Bomb Protection	▪								
VMPS Server	▪								
Number of Active VLANs	4,096	4,096	2,048	1,005	1,005	255	128 (SI), 250 (EI)	128	32
Number of VLAN IDs	4,096	4,096	4,096	4,096	4,096	4,096	4,096	4,096	1,005
<b>Layer 3</b>									
H/W-based MPLS/EoMPLS	▪								
EIGRP	▪	▪	▪	EIGRP Stub-IP Base	EIGRP Stub-IP Base				
OSPF	▪	▪	▪	IP Services	IP Services				
BGP	▪	▪	▪	IP Services	IP Services				
Equal Cost Load Balancing	▪	▪	▪	▪	▪				
RIP, RIPv2	▪	▪	▪	▪	▪				
Static Routes	▪	▪	▪	▪	▪				
IS-IS	▪	▪	▪						
H/W-based IPv6 Routing	▪	in software	in software	Advanced IP Services	Advanced IP Services				

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<b>LAN SWITCHING FEATURES</b> <small>continued</small>										
<b>Layer 3</b> <small>continued</small>										
H/W-based Policy Routing IPv4	▪	▪	▪		IP Services	IP Services				
H/W-based Policy Routing IPv6	▪				Advanced IP Services only	Advanced IP Services only				
Multiprotocol Routing (IPX, AppleTalk)	▪	▪	▪							
Cisco Express Forwarding (CEF)	▪	▪	▪		▪	▪				
H/W FIB Entries	up to 1,000,000	up to 128,000	up to 128,000		up to 20,000	up to 11,000				
VRF Lite	IP Services	IP Services	IP Services		IP Services	IP Services				
<b>INTEGRATED SECURITY</b>										
<b>Access Control Lists</b>										
Reflexive ACL	▪									
Port ACL	▪	▪	▪		▪	▪	▪	El only		
Time-based ACL	▪	▪	▪		▪	▪	▪	▪		
Router ACL	▪	▪	▪		▪	▪				
VLAN ACL	▪	▪	▪		▪	▪				
VACL with Redirect/Capture/Logging of Denied Traffic	▪	▪*	▪*		capture and logging	capture and logging				
Context-based Access Control	▪									
H/W-based Access Control Entry (ACE) Counters	▪									
Order-dependent ACL Merge	▪									
Dedicated Hardware Resources for Security ACLs	▪	▪	▪							
ACL Scalability (ACE entries)	32,000	32,000	32,000		2,000	2,000	512	300 ACP—El only		
<b>Attack Mitigation</b>										
Control Plane Policing (Multiple CPU Rate Limiters)	▪	▪	▪							
IP Source Guard	▪	▪	▪		▪	▪				
DHCP Snooping/Option 82	▪	▪	▪		▪	▪	▪	▪	SI Option 82 only	
Dynamic ARP Inspection	▪	▪	▪		▪	▪				
MAC Address Notification	▪	▪	▪		▪	▪	▪	▪	▪	▪
Port Security	▪	▪	▪		▪	▪	▪	▪	▪	▪
H/W-based uRPF Check	▪									
H/W-based MAC Learning	▪									
H/W-assisted MAC Aging	▪									



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<b>INTEGRATED SECURITY</b> <small>continued</small>										
<b>Attack Mitigation</b> <small>continued</small>										
Routing Protocol Pass Through	▪									
ARP Policing	▪									
H/W-based Directed Broadcast	▪									
<b>Trust and Identity Management</b>										
802.1x Identity-based Networking Port Authentication	▪	▪	▪		▪	▪	▪	▪	▪	▪
802.1x with VLAN assignment	▪	▪	▪		▪	▪	▪	▪	▪	
802.1x with Guest VLAN	▪	▪	▪		▪	▪	▪	▪	▪	
802.1x with Aux. VLAN Support	▪	▪	▪		▪	▪	▪	▪	▪	
TACACS+/RADIUS	▪	▪	▪		▪	▪	▪	▪	▪	RADIUS only
<b>Secure Connectivity</b>										
H/W-based NAT/PAT	▪									
MD5 Route Authentication	▪	▪	▪							
Multilevel Account Privilege	▪	▪	▪		▪	▪				
<b>AVAILABILITY AND RESILIENCY</b>										
<b>Switch Redundancy</b>										
IOS Software Modularity	▪									
Non-stop Forwarding/Stateful Switchover (NSF/SSO)	▪	▪								
NSF-aware	▪	▪	▪		▪	▪				
Redundant Power Supplies	▪	▪	▪		external only	external only	external only	external only		External WS-CE500-24PC
Redundant Fans	▪	▪	▪							
Redundant Supervisors	▪	▪								
Generic Online Diagnostics (GOLD)	▪									
Basic Support for GOLD Services	▪	▪	▪		▪	▪				
Power Supply Failure Redundancy	▪	▪	▪		▪	▪	▪	▪		24, PC only
Power Circuit Failure Redundancy	▪	▪	▪							
<b>Network Protocols</b>										
Unidirectional Link Detection (UDLD)	▪	▪	▪		▪	▪	▪	▪	▪	▪
Gateway Load Balancing Protocol (GLBP)	▪									

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<b>AVAILABILITY AND RESILIENCY</b> <i>continued</i>									
<b>Network Protocols</b> <i>continued</i>									
Hot Standby Routing Protocol (HSRP)	▪	▪	▪	▪	▪	▪			
Virtual Router Redundancy Protocol (VRRP)	▪	▪	▪						
UplinkFast/BackBoneFast/802.1w	▪	▪	▪	▪	▪	▪	▪	▪	▪
PortFast	▪	▪	▪	▪	▪	▪	▪	▪	▪
Per VLAN STP (PVSTP)	▪	▪	▪	▪	▪	▪	▪	▪	▪
Multiple Instance STP (MISTP)/802.1s	▪	▪	▪	▪	▪	▪	▪	▪	
STP Root/BDPDU/Loop Guard	▪	▪	▪	▪	▪	▪	▪	▪	▪
IP Event Dampening	▪								
Bidirectional Forwarding Detection	▪								
Digital Optical Monitoring	▪	▪	▪						
Flexlink	▪			▪	▪	▪			
<b>DELIVERY OPTIMIZATION</b>									
<b>Quality of Service</b>									
Number of Queues per Port	up to 8	4	4	4	4	4	4	4	4
Congestion Avoidance	▪	▪	▪	WTD	WTD	WTD			WTD
L2-L3 Rewrite/Mapping	▪	▪	▪	▪	▪	▪	El only		
Ingress Queuing	▪	N/A	N/A	▪	▪	▪			
Ingress Strict Priority	▪	N/A	N/A	▪	▪	▪			
Egress Queuing	▪	▪	▪	▪	▪	▪	▪	▪	▪
Egress Strict Priority	▪	▪	▪	▪	▪	▪	▪	▪	▪
Traffic Classification	▪	▪	▪	▪	▪	▪	▪	▪	▪
IP Service Level Agreement	▪								
<b>Policers</b>									
H/W-based Policing	▪	▪	▪						
Per-port Policers	▪	▪	▪	▪	▪	▪	El only		
Per-VLAN Policers	▪	▪	▪						
H/W-based Aggregate Policers	▪	▪	▪	▪	▪				
Hierarchical Policers	▪								
User-based (Source IP) Rate Limiting	▪	▪							
Shaped Round Robin	▪			▪	▪	▪			

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<b>DELIVERY OPTIMIZATION</b> <i>continued</i>										
<b>Multicast</b>										
H/W-based IPv6 Multicast	▪	in software	in software		no PIM	no PIM				
H/W-based IPv4 Multicast	▪	▪	▪		▪	▪	▪	▪	▪	▪
H/W-based Bi-directional PIM	▪									
Multicast Manager	▪									
Source Specific Multicast (SSM)	▪	▪	▪							
Multicast NSF/SSO	▪									
PIM Sparse	▪	▪	▪		▪	▪				
PIM Dense	▪	▪	▪		▪	▪				
PIM Sparse/Dense	▪	▪	▪		▪	▪				
PIM Snooping	▪									
IGMP V1/V2	▪	▪	▪		▪	▪	▪	▪	▪	▪
IGMP V3	▪	▪	▪		▪	▪	▪	▪	▪	▪
CGMP	▪	▪	▪		▪	▪				
RGMP	▪									
DVMRP Interoperability	▪	▪	▪		▪	▪				
Number of Multicast Routes	32,000	28,000	28,000		1,000	1,000				
IGMP Snooping	▪	▪	▪		▪	▪	▪	▪	▪	▪
IGMP Querier	▪				▪	▪	▪			
SSM Mapping	▪	▪	▪							
H/W-based Multicast Tunneling	▪									
mVRF Lite	▪									
Multicast VPN (mVPN)	▪									
<b>Tunneling Protocols</b>										
H/W-based GRE	▪	in software	in software							
H/W-based Multipoint GRE	▪	▪	▪							
H/W-based IPv4 in IPv6	▪	in software	in software							
H/W-based IP in IP	▪	in software	in software							

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<b>ENHANCED MANAGEABILITY</b>									
Embedded Event Manager	▪								
Cisco Discovery Protocol (CDP)	▪	▪	▪	▪	▪	▪	▪	▪	▪
Time Domain Reflectometry (TDR) Interface 10/100	▪					▪			▪
Time Domain Reflectometry (TDR) Interface 10/100/1000	▪	▪	▪	▪	▪	▪			▪
Cisco Network Assistant (CNA)	▪	▪	▪	▪	▪	▪	▪	▪	▪
Smartports	▪	▪	▪	▪	▪	▪	▪	▪	▪
NetFlow	▪	▪							
NetFlow Data Export	▪	▪							
Syslog	▪	▪	▪	▪	▪	▪	▪	▪	▪
Switch TopN	▪								
SNMP	▪	▪	▪	▪	▪	▪	▪	▪	▪
RMON	▪	▪	▪	▪	▪	▪	▪	▪	▪
SPAN	▪	▪	▪	▪	▪	▪			▪
RSPAN	▪	▪	▪	▪	▪	▪	El only		
ERSPAN	▪								
L2-Traceroute	▪	▪	▪	▪	▪	▪	▪	▪	▪
SSH v2	▪	▪	▪	▪	▪	▪	▪	▪	▪
AutoQoS	▪	▪	▪	▪	▪	▪	El only		
E-911 MIB Support	▪	▪	▪	▪	▪	▪	▪	▪	▪
Out of Band Management (serial) —RJ45	▪	▪	▪	▪	▪	▪	▪	▪	
Out of Band Management (serial) —USB	▪								
Compact Flash	▪	▪							
Configuration Rollback	▪				▪				
Call Home	▪								
Digital Optical Monitoring	▪	▪							
<b>NETFLOW</b>									
Integrated H/W-based NetFlow	▪	▪							
NetFlow Top Talkers	▪								
Sampled NetFlow	▪								
NetFlow v9	▪								

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<b>NETFLOW continued</b>										
Multicast NetFlow	▪									
Per Interface NetFlow Data Export	▪	▪								
Bridged IP Flows	▪	▪								
NetFlow v5	▪	▪								
NetFlow v8	▪	▪								
Microflow Policing	▪	▪								
<b>SOFTWARE MODULARITY</b>										
Subsystem In Service Software Upgrade (ISSU)	▪									
Fault Containment	▪									
Memory Protection	▪									
Process Restartability	▪									
<b>APPLICATION, SECURITY, AND MANAGEABILITY MODULES</b>										
Virtualized Firewall Module	▪									
Intrusion Detection and Prevention Module	▪									
VPN: IPsec, SSL Module	▪									
Anomaly Detection and Guard Module	▪									
Network Analysis Module	▪									
Communication Media Module	▪									
Wireless LAN Service Module	▪									
Content Switching and SSL Module	▪									
Application-oriented Networking Module	▪									
<b>IPT SOLUTION</b>										
802.3af—15W on 48 ports in a module/ fixed switch	▪	▪								
802.3af—7W on 48 ports in a module/ fixed switch	▪	▪			▪	▪				
802.3af—15W on 24 ports in a module/ fixed switch	▪	▪			▪	▪				▪
802.3af Modular PoE Daughter Card	▪									
Subsystem In Service Software Upgrade (ISSU)	▪									
Fast Link Failure Detection (Bidirectional Forwarding Detection)	▪									
Redundant Supervisors with Stateful Switchover	▪	▪								

Cisco Catalyst Switches: **FEATURE COMPARISON**

	MODULAR SWITCHES			FIXED-CONFIGURATION SWITCHES						
	Catalyst 6500	Catalyst 4500	Catalyst 4900		Catalyst 3750	Catalyst 3560	Catalyst 2960	Catalyst 2950	Catalyst 2940	Catalyst Express 500
<b>IPT SOLUTION</b> <i>continued</i>										
Redundant Power Supply	▪	▪	▪		▪	▪				
Redundant Power Circuit	▪	▪	▪							
Communication Media Module	▪									
AutoQoS	▪	▪	▪		▪	▪	▪	El only		
Encapsulated RSPAN	▪									
IP Service Level Agreement	▪									
<b>SYSTEM SCALABILITY</b>										
Switching Fabric (Gbps)	32–720	64–136	96–136		32	32	16–32	8.8–13.6	3.6	8.8–24
Packets per Second (Mpps)	15–410	48–102	72–102		6.5–39	6.5–39	6.5–35.7	6.5–10.1	2.7	6.5–179
Modular Memory Upgrade	▪	▪								

For more product information on Cisco Catalyst Switches, go to:  
<http://www.cisco.com/en/US/products/hw/switches/index.html>

# Cisco Catalyst Modular Switches

The Cisco Catalyst 6500 and 4500 Series modular switches provide customers with an intelligent high performance platform for deploying numerous concurrent intelligent services without degrading the overall performance of the switch. With a broad selection of line cards, power supplies, and their highly versatile architecture, modular switches deliver the highest levels of port density and flexibility, including PoE scalability to deploy new converged applications and extending investment protection well into the future. The modular architecture also provides scalable performance via a selection of supervisors which can be upgraded to enhance the performance and service features of the entire switch as needed.

To minimize costly user downtime, modular switches are optimized for high availability. Critical redundant hardware and software features deliver the highest resiliency for all places in the network. Another key advantage is the ease of use of modular switches. Modular switches have a single IOS image to manage no matter how many line cards are inserted. This allows for simpler IOS configurations, updating, and management leading to a reduction in overall cost of ongoing operations.



## Cisco Catalyst 6500 Series

Flagship modular switches offering the highest levels of intelligence, operational efficiency, scalability, investment protection, and performance for enterprise customers, medium-sized businesses, and service providers.

The Cisco Catalyst 6500 Series continues to be the industry's most innovative switching platform, delivering the highest levels of availability, integrated security, virtualization, enhanced manageability, IP communications, wireless, and applications support. The feature-richness, flexibility, density, and scalability of this product line sets the standard for converged data, voice, and video networks, and enables maximum operational efficiency and investment protection.

The flagship switch series offers integrated service modules that provide high-speed advanced services such as integrated wireless, TDM/analog gateway, firewalling, Web VPN, intrusion detection, application-oriented networking, content switching, SSL termination, and network analysis services.

With a choice of Modular 3-, 4-, 6-, 9-, and 13-slot chassis, the Cisco Catalyst 6500 Series scales to support the highest port densities for PoE, 10/100 Fast Ethernet, 10/100/1000 Gigabit Ethernet, and 10 Gigabit Ethernet. The Cisco Catalyst 6500 Series platforms also offer the investment protection of backwards compatibility, enabling new services and functions on older line cards by simply upgrading a supervisor with up to 720Gpbs of performance.



## Hardware Features: Catalyst 6500 Chassis

Chassis	WS-C6503-E	WS-C6504-E	WS-C6506-E	WS-C6509-E	WS-C6509-NEB-A	WS-C6513
Slots	3	4	6	9	9	13
Gigabit Ethernet GBIC/SFP density	98	144	242	386	384	410
10 GbE XENPAK/X2 port density	8	12	20	32	32	20
10/100/1000 density	97	144	241	385	385	577
10/100 density	192	288	480	768	768	1152
100BASE-FX density	96	144	240	384	384	576
Max. watt power consumption (redundant mode)						
AC Internal (redundant mode)	1,400	2,700	6,000	6,000	6,000	6,000
AC External with power shelf (redundant mode)	N/A	N/A	N/A	N/A	N/A	N/A
DC Internal (redundant mode)	950	2,700	4,000	4,000	4,000	4,000
Max. number of Class 3 devices (15.4W) Max. power supplies						
AC Internal (redundant mode)	48	110	284	288	215	281
AC External with power shelf (redundant mode)	N/A	N/A	N/A	N/A	N/A	N/A
DC Internal (redundant mode)	31	110	173	184	206	176
Dimension (H x W x D) inches	7 x 17.37 x 21.75	8.75 x 17.5 x 21.75	19.2 x 17.5 x 18.2	24.5 x 17.5 x 18.2	33.3 x 17.2 x 18.1	33.3 x 17.3 x 18.1
Dimension (H x W x D) centimeters	17.8 x 44.1 x 55.2	22.2 x 44.5 x 55.2	48.8 x 44.5 x 46.0	62.2 x 44.5 x 46.0	84.6 x 43.7 x 46.0	84.6 x 43.7 x 46.0
Rack Unit (RU)	4	5	12	15	21	20
Unit weight pounds (kilograms) (chassis only)	33 (15.0)	40 (18.1)	50 (22.7)	60 (27.3)	55 (24.9)	98 (45.0)

## Hardware Features: Catalyst 6500 Supervisor Engines

Supervisor Engines	SUP 720 WS-SUP720-3BXL WS-SUP720-3B	SUP 32 WS-SUP32-10GE-3B WS-SUP32-GE-3B
Chassis supported	All	All
Bandwidth per slot (Gbps)	40	32 shared
Total bandwidth (Gbps)	720	32
Packets per second (Mpps)	407	15
MAC addresses supported	64K max./32K effective	64K max./32K effective
Routes supported	1,000,000 (3BXL) 256,000 (3B)	256,000
Onboard memory (DRAM)	Up to 1GB	Up to 1GB
Uplinks	2xGE	2x10GE (-10GE) 8-GE (-GE)

### Catalyst 6500 Supervisor Common Features

- Supports next generation performance of Gigabit and 10 Gigabit interfaces
- Compatible with all three generations of Catalyst 6500 series interfaces and service modules
- User-based rate limiting enforcing up to 64 policy rates
- High performance features in hardware:
  - IPv4 and IPv6 forwarding
  - Layer 2 and Layer 3 MPLS and EoMPLS
  - Virtual Route Forwarding Lite (VFR-Lite)
  - Generic Route Encapsulation (GRE)
- Advanced security features
  - 802.1x and NAC
  - Access control lists (ACLs)
  - Virtual LANs (VLANs)
  - Port Security
  - CPU rate limiting
  - Multi-path uRFP



Catalyst Supervisor Engine 720

- Optimized for maximum bandwidth
- Integrated 720Gbps switch fabric
- 3BXL Policy Feature Card expands routing, MPLS, and netflow capacity



Catalyst Supervisor Engine 32

- Optimized for the access layer
- Shared 32Gbps bus



Catalyst Supervisor Engine 32 with 10 Gigabit Uplinks

- Optimized for the access layer
- Shared 32Gbps bus
- High bandwidth 10GE uplinks

## Series Spotlight

### Cisco IOS Software Modularity

Catalyst 6500 Series with Cisco IOS Software Modularity boosts operational efficiency and minimizes downtime through evolutionary software infrastructure advancements. By enabling modular Cisco IOS subsystems to run as independent, self-healing processes, this innovation minimizes unplanned downtime through fault containment and stateful process restarts, simplifies software changes through subsystem In-Service Software Upgrades (ISSU), and enables process-level, automated policy control by integrating the Embedded Event Manager (EEM).

### Maximum PoE Scalability

Cisco Catalyst 6500 Series provides the industry leading levels of power scalability needed to support high-density PoE deployments. The enhanced 6- and 9-slot chassis (C6506-E and C6509-E models) are designed to scale beyond the current 6000W power supplies. Continuing this product line's tradition of unmatched investment protection, all existing supervisors, line cards, switch fabrics, and software releases are supported in the E-series chassis.

## Product Overview

### CATALYST 6500—CHASSIS

Product Number	Description
WS-C6503-E	Enhanced 3-slot chassis, no fan or power supply
WS-C6504-E	Enhanced 4-slot 6500 chassis, no fan or power supply
WS-C6506-E	Enhanced 6-slot 6500 chassis, no fan or power supply
WS-C6509-E	Enhanced 9-slot 6500 chassis, no fan or power supply
WS-C6509-NEB-A	9-slot 6500 chassis (vertically oriented slots), no fan or power supply
WS-C6513	13-slot 6500 chassis, no fan or power supply

### CATALYST 6500—SUPERVISOR ENGINES

Product Number	Description
WS-SUP720-3B	Supervisor 720 fabric MSFC3 PFC3B
WS-SUP720	Supervisor 720 fabric MSFC3 PFC3A
WS-SUP32-10GE-3B	Supervisor 32 with 2 ports 10 GbE and PFC3B
WS-SUP32-GE-3B	Supervisor 32 with 8 GbE uplinks and PFC3B

### CATALYST 6500—10 GIGABIT ETHERNET

Product Number	Description
WS-X6704-10GE	4-port 10 Gigabit Ethernet module (requires XENPAK)

### CATALYST 6500—GIGABIT ETHERNET

Product Number	Description
WS-X6408A-GBIC	8-port Gigabit Ethernet module, enhanced QoS (requires GBICs)
WS-X6516A-GBIC	16-port Gigabit Ethernet module, fabric-enabled (requires GBICs)
WS-X6724-SFP	24-port Gigabit Ethernet module, fabric-enabled (requires SFPs)
WS-X6748-SFP	48-port Gigabit Ethernet module, fabric-enabled (requires SFPs)

## Product Overview *continued*

### CATALYST 6500—10/100/1000 ETHERNET

Product Number	Description
WS-X6148A-GE-TX	48-port 10/100/1000 with Jumbo Frame, RJ-45
WS-X6148A-GE-45AF	48-port PoE 802.3af 10/100/1000, with Jumbo Frame
WS-X6516-GE-TX	16-port 10/100/1000 Gigabit Ethernet module, cross-bar
WS-X6548-GE-TX	48-port fabric-enabled 10/100/1000 module
WS-X6548-GE-45AF	PoE 802.3af 10/100/1000 48-port (RJ-45) CEF256 card
WS-X6748-GE-TX	48-port 10/100/1000 Gigabit Ethernet module, fabric-enabled, RJ-45

### CATALYST 6500—10/100 ETHERNET

Product Number	Description
WS-X6148-RJ-21	48-port 10/100 upgradeable to voice, RJ-21
WS-X6148-21AF	PoE 802.3af 10/100, 48-port (RJ-21) line card
WS-X6148-RJ21V	48-port 10/100 Inline Power module, RJ-21
WS-X6148A-RJ-45	48-port 10/100 with TDR, upgradeable to PoE 802.3af
WS-X6148A-45AF	48-port PoE 802.3af 10/100, card with TDR
WS-X6148X2-RJ-45	96-port 10/100 (RJ-45), upgradeable to PoE 802.3af
WS-X6148X2-45AF	PoE 802.3af 10/100, 96-port (RJ-45) line card
WS-X6196-RJ-21	96-port 10/100 upgradeable to PoE 802.3af
WS-X6196-21AF	96-port, PoE 802.3af 10/100-RJ-21
WS-X6548-RJ-21	48-port 10/100, RJ-21, fabric-enabled
WS-X6548-RJ-45	48-port 10/100, RJ-45, x-bar

### CATALYST 6500 10FL/100FX ETHERNET

Product Number	Description
WS-X6024-10FL-MT	24-port 10BASE-FL MT-RJ module
WS-X6148-FE-SFP	48-port 100BASE-X module (requires SFP)
WS-X6524-100FX-MM	24-port 100FX, MT-RJ, fabric-enabled

Product Overview *continued*

## CATALYST 6500—SERVICES MODULES

Product Number	Description
<b>ACE10-6500-K9</b>	Application Control Engine Module
<b>WS-X6066-SLB-APC</b>	Catalyst 6000 Content Switching module
<b>WS-X6066-SLB-S-K9</b>	Content Switching module with SSL daughter card
<b>WS-SVC-ADM-1-K9</b>	Catalyst 6500 Cisco Anomaly Detection module
<b>WS-SVC-AGM-1-K9</b>	Catalyst 6500 Cisco Anomaly Guard module
<b>WS-SVC-CMM</b>	Communication Media module
<b>WS-SVC-CMM-6E1</b>	6-port E1 Interface Port Adapter
<b>WS-SVC-CMM-6T1</b>	6-port T1 Interface Port Adapter
<b>WS-SVC-CMM-ACT</b>	Adhoc Conferencing and Transcoding Port Adapter
<b>WS-SVC-CMM-24FXS</b>	24-port FXS Interface Port Adapter
<b>WS-SVC-CSG-1</b>	Content Services Gateway
<b>WS-SVC-FWM-1-K9</b>	Firewall blade for 6500 and 7600, VFW license separate
<b>WS-SVC-IDS2-BUN-K9</b>	600M IDSM-2 module for Catalyst 6500
<b>SPA-IPSEC-2G</b>	IPSec SPA with 2 Gbps DES/3DES/AES
<b>7600-SSC-400</b>	Cisco 7600/6500 Services SPA Carrier Card (6 Gbps)
<b>SPA-IPSEC-SSC400-1</b>	Cisco 6500/7600 IPSec VPN Bundle 1: 1 IPSec VPN SPA + SSC-400
<b>SPA-IPSEC-SSC400-2</b>	Cisco 6500/7600 IPSec VPN Bundle 2: 2 IPSec VPN SPA + SSC-400
<b>WS-SVC-IPSEC-1</b>	IPSec VPN Security module for 6500 and 7600 Series
<b>WS-SVC-MWAM-1</b>	Multi-processor WAN Application module
<b>WS-SVC-NAM-1</b>	Catalyst 6500 Network Analysis module-1
<b>WS-SVC-NAM-2</b>	Catalyst 6500 Network Analysis module-2
<b>WS-SVC-PSD-1</b>	Persistent Storage Device
<b>WS-SVC-SSL-1-K9</b>	SSL module
<b>WS-X6608-E1</b>	Catalyst 6000 8-port Voice E1 and Services module
<b>WS-X6608-T1</b>	Catalyst 6000 8-port Voice T1 and Services module
<b>SC-ADM-4.0-K9</b>	Cisco Traffic Anomaly Detector module MVP-OS R4.0 Software
<b>SF-PIX-PDM-2.1</b>	PIX Device Manager for FW module

Product Overview *continued*

## CATALYST 6500—FLEXWAN AND OS

Product Number	Description
<b>WS-X6582-2PA</b>	Enhanced FlexWAN module, fabric-enabled
<b>OSM-1CHOC12/T1-SI</b>	1-port CHOC-12/CHSTM-4 (SM-IR), to DS0 and T1/E1, with 4 GbE
<b>OSM-12CT3/T1</b>	12-port Channelized DS-3 to DS-1/DS-0
<b>OSM-1CHOC12/T3-SI</b>	1-port CHOC-12/CHSTM-4 OSM, to T3/E3, SM-IR, with 4 GbE
<b>OSM-2OC12-ATM-MM+</b>	Enhanced 2-port OC12/STM4 ATM OSM+, MM, with 4 GbE
<b>OSM-2OC12-ATM-SI+</b>	Enhanced 2-port OC12/STM4 ATM OSM+, SI, with 4 GbE
<b>OSM-2OC48/1DPT-SS</b>	2-port OC-48/STM-16 POS/DPT OSM, SM-SR, with 4 GbE
<b>OSM-2OC48/1DPT-SI</b>	2-port OC-48/STM-16 POS/DPT OSM, SM-IR, with 4 GbE
<b>OSM-2OC48/1DPT-SL</b>	2-port OC-48/STM-16 POS/DPT OSM, SM-LR, with 4 GbE
<b>OSM-8OC3-POS-SL+</b>	Enhanced 8-port OC-3/STM-1 SONET/SDH SM-LR OSM, with 4 GbE
<b>OSM-8OC3-POS-SI+</b>	Enhanced 8-port OC-3/STM-1 SONET/SDH SM-IR OSM, with 4 GbE
<b>OSM-4OC3-POS-SI+</b>	Enhanced 4-port OC-3/STM-1 SONET/SDH SM-IR OSM, with 4 GbE
<b>OSM-2OC12-POS-MM+</b>	Enhanced 2-port OC-12/STM-4 SONET/SDH OSM, MM, with 4 GbE
<b>OSM-4OC12-POS-SI+</b>	Enhanced 4-port OC-12/STM-4 SONET/SDH OSM, SM-IR, with 4 GbE
<b>OSM-2OC12-POS-SI+</b>	Enhanced 2-port OC-12/STM-4 SONET/SDH OSM, SM-IR, with 4 GbE
<b>OSM-1OC48-POS-SS+</b>	Enhanced 1-port OC-48/STM-16 SONET/SDH OSM, SM-SR, with 4 GbE
<b>OSM-1OC48-POS-SI+</b>	Enhanced 1-port OC-48/STM-16 SONET/SDH OSM, SM-IR, with 4 GbE
<b>OSM-1OC48-POS-SL+</b>	Enhanced 1-port OC-48/STM-16 SONET/SDH OSM, SM-LR, with 4 GbE
<b>OSM-2+4GE-WAN+</b>	Enhanced OSM with 4 GbE WAN ports and 2 GbE LAN ports

## CATALYST 6500—POWER SUPPLIES

Product Number	Description
<b>PWR-950-AC</b>	950W AC power supply for Cisco 7603 and Catalyst 6503
<b>PWR-950-DC</b>	950W DC power supply for Cisco 7603 and Catalyst 6503
<b>PWR-1400-AC</b>	1400W AC power supply for Cisco 7603 and Catalyst 6503 chassis
<b>PWR-2700-AC/4</b>	2700W AC power supply for Cisco 7604/6504-E
<b>PWR-2700-DC/4</b>	2700W DC power supply for Cisco 7604/6504-E
<b>PEM-15A-AC</b>	Power Entry module for Cisco 7603 and Catalyst 6503 (950W AC power supply)
<b>PEM-20A-AC+</b>	Power Entry module used with 1400W AC power supply for Cisco 7603 and Catalyst WS-C6503

**Product Overview** *continued***CATALYST 6500—POWER SUPPLIES** *continued*

Product Number	Description
<b>PEM-DC/3</b>	DC Power Entry module for Cisco 7603 and Catalyst 6503
<b>WS-CDC-1300W</b>	Catalyst 6000 1300W DC power supply
<b>WS-CAC-3000W</b>	Catalyst 6500 3000W AC power supply
<b>WS-CDC-2500W</b>	Catalyst 6000 2500W DC power supply
<b>WS-CAC-4000W-INT</b>	4000W AC power supply, International (cable included)
<b>WS-CAC-4000W-US</b>	4000W AC power supply for U.S. (cable attached)
<b>PWR-4000-DC</b>	4000W DC power supply for Cisco 7609/13, Catalyst 6509/13 chassis
<b>WS-CAC-6000W</b>	Catalyst 6500 6000W AC power supply

**Product Transitions****CHASSIS**

Current Product	Recommended Product
WS-C6503	WS-C6503-E
	WS-C6504-E
WS-C6506	WS-C6506-E
WS-C6509	WS-C6509-E
WS-C6509-NEB	WS-C6509-NEB-A

**POWER SUPPLIES**

Current Product	Recommended Product
WS-CAC-1000W	WS-CAC-3000W
WS-CAC-1300W	WS-CAC-3000W
WS-CAC-2500W	WS-CAC-3000W
	WS-CAC-6000W
WS-CAC-4000W-US	WS-CAC-6000W
WS-CAC-4000W-INT	WS-CAC-6000W

**Product Transitions** *continued***SUPERVISORS**

Current Product	Recommended Product
WS-X6K-SUP1A-2GE	WS-SUP32-GE-3B
	WS-SUP32-10GE-3B
WS-X6K-SUP1A-PFC	WS-SUP32-GE-3B
	WS-SUP32-10GE-3B
WS-X6K-S1A-MSFC2	WS-SUP32-GE-3B
	WS-SUP32-10GE-3B
	WS-SUP720
	WS-SUP720-3B
	WS-SUP720-3BXL
WS-X6K-S2-PFC2	WS-SUP32-GE-3B
	WS-SUP32-10GE-3B
WS-X6K-S2-MSFC2	WS-SUP720
	WS-SUP720-3B
	WS-SUP720-3BXL
WS-X6K-S2U-MSFC2	WS-SUP720
	WS-SUP720-3B
	WS-SUP720-3BXL

**LINE CARDS**

Current Product	Recommended Product
WS-X6348-RJ-45	WS-X6148A-RJ-45
WS-X6148-RJ-45	WS-X6148A-RJ-45
WS-X6348-RJ45V	WS-X6148A-45AF
WS-X6148-RJ45V	WS-X6148A-45AF
WS-X6148-45AF	WS-X6148A-45AF
WS-X6148-GE-TX	WS-X6148A-GE-TX
WS-X6148V-GE-TX	WS-X6148A-GE-45AF
WS-X6148-GE-45AF	WS-X6148A-GE-45AF
WS-X6516-GBIC	WS-X6516A-GBIC

For more product information on Cisco Catalyst Switches, go to:  
<http://www.cisco.com/en/US/products/hw/switches/index.html>

For more product ordering information, go to:  
<http://www.cisco.com/cgi-bin/front.x/pricing?Request=Home>

# Cisco Service Modules

The modular design of the Cisco Catalyst 6500 Series allows organizations to scale their networks and adapt to changing needs, without having to redesign the network or add additional devices. Cisco integrated services modules enable network administrators to quickly and easily deploy the industry's most advanced, high-performance network services.



## Wireless LAN Services Module (WLSM)

This module is the industry's only enterprise-class wireless and wireline switching system, enabling secure, easily managed, unified networking deployments for enterprises, midsize businesses, universities, and service providers.

- Enables the industry's fastest, secure campus-wide Layer 3 roaming system, allowing organizations to individually manage, authenticate, and control access to disparate wireless user groups.
- Extends the Catalyst 6500 Series' rich, intelligent network services, such as denial of service (DoS) prevention, access control lists (ACLs), firewall, network-based intrusion detection, and VPN services to the wireless edge.
- Maximizes network uptime for wireless traffic with the industry's only Layer 3 Supervisor Non-Stop Forwarding/Stateful Switchover (NSF/SSO) system for wireless traffic.



## Wireless Services Module (WiSM)

This enables scalable wireless LAN network deployments without requiring special client devices or changes to the underlying wireline infrastructure, providing an ideal solution for enterprises, midsize businesses, universities, and service providers.

- Delivers centralized security policies, IPS, RF management, QoS, and Layer 3 fast secure roaming for WLAN deployments of all sizes.
- Provides automated recovery from failures of Cisco Aironet® lightweight access points, Cisco WiSMs, and Cisco Catalyst 6500 Series Supervisor Engine 720, maximizing the availability of the wireless network.
- Creates an intelligent RF control plane for self-configuration, self-healing, and self-optimization.
- Deploys without manually configuring access points or modifying existing network infrastructures.
- Adapts to changing corporate security needs with flexible policies and features, including integrated wireless intrusion protection to ensure the integrity of sensitive data.
- Allows user to roam between access points and across bridged and routed subnets without requiring changes to the underlying infrastructure.
- Enables better visibility and control of the air space, reducing operational costs.



## Communication Media Module (CMM)

This module provides high-performance and high-density voice over IP (VoIP) gateways and media services, allowing organizations to connect their existing time-division multiplexing (TDM) network to their IP communications network, provide connectivity to the public switched telephone network (PSTN), and enable conferencing, transcoding, and media termination services for their IP Communication networks.

- Supports four port adapters in a single line card, including 6-port T1, 6-port E1, 24-port foreign-exchange-station (FXS), and 128-port conferencing and transcoding.
- Integration of VoIP gateways, analog, and digital, and conferencing and transcoding in a single module saves space and allows for remote management along with the other Catalyst 6500 modules.
- Field-upgradeable components allow customers to easily add, replace, or change interface port adapters without upgrading or replacing the entire module.
- Hot-swappable design allows hardware maintenance with little or no service interruption, since only the calls on the card being removed or replaced are affected.
- Cisco AVVID design lends itself to the robust, fault-tolerant architecture of clustered Cisco CallManagers.

# Cisco Service Modules continued



## Applications Control Engine Module

This module is Cisco's next-generation application delivery solution, providing the industry's highest throughput (up to 16 Gigabits per second), rich multi-layer security, and unique virtual partitioning capabilities. The ACE multi-service module offers many new capabilities, including hundreds of virtual partitions, per-partition resource allocation, role-based access control, and a XML management API.

- Partitions network into up to 250 logical devices that can be managed and operated separately. Role-based access control capabilities enable IT to delegate management tasks to distributed IT teams, guarantee resource levels for each logical partition, and apply desired functions to each partition separately.
- Allows IT to control the infrastructure centrally while delegating application administration to separate operational teams. Also simplifies application infrastructures, shortens the workflow necessary to bring applications and business services online, and shortens time-to-deployment of applications.
- Also consolidates functionality such as server load balancing and off-load application acceleration, and application-layer security.
- Supports 4, 8, or 16Gbps of data throughput and up to 345,000 sustained connection setups per second. Several ACE modules can be deployed in a Catalyst 6500 Series chassis for even higher throughput.



## Applications-oriented Networking Module

This module provides an essential point of convergence between today's intelligent networks and applications based on highly distributed, service-oriented, and traditional architectures. It embeds a new class of application intelligence into the network to better meet the underlying needs of applications for real-time visibility, security, event-driven messaging, optimized delivery, and other core integration and deployment services.

- State-of-the-art design incorporates hardware and software components pre-integrated into a complete subsystem that can be flexibly deployed in enterprise data centers, service provider networks, or other scenarios as an embedded network function.
- Includes software tools for managing and provisioning Cisco AON nodes, as well as for designing application policies using a library of "bladelets" that can be configured in different sequences as required.
- Also includes a software development kit and API for flexible extension to any custom environment, operation, or format.
- Provides operational consistency and reduces total cost of ownership by consolidating elements of network and application infrastructures and providing centralized management capabilities.



## Content Switching Module

This module adds advanced, high-performance Layer 4–7 content switching and load balancing to existing Layer 2 and 3 features of the Catalyst 6500 switches, reducing application response times, optimizing service delivery, increasing application time, and increasing service scalability for servers, firewalls, VPN devices, SSL termination devices, and caches.

- Supports a wide range of common IP protocols, including TCP, User Datagram Protocol (UDP), and higher-level protocols, including Hypertext Transfer Protocol (HTTP), File Transfer Protocol (FTP), Telnet, Domain Name System (DNS), Real-Time Streaming Protocol (RTSP), and Simple Mail Transfer Protocol (SMTP).
- Reduces the cost and complexity of deploying content switching services by allowing for integration into existing infrastructure.
- Fault-tolerant configurations to provide improved application uptime, utilizing both connection and sticky state redundancy for seamless failover.
- Ability to integrate content switching services into an existing infrastructure minimizes the time and resources required for deployment.
- High-density, scalable platform with proven reliability offers unparalleled investment protection.



## Content Switching Module with SSL

This module combines advanced Layer 4–7 content switching capabilities with Secure Sockets Layer acceleration, freeing backend servers from the CPU-intensive task of processing SSL transactions.

- High-speed content switching provides load balancing, increases performance, ensures connection persistence, and helps maximize uptime for application and Web servers, caches, firewalls, and other devices.
- End-to-end encryption with intelligent load balancing ensures information on the network never appears as clear text.
- Reduces the number of SSL devices needed and reduces the number of certificates that a site requires to purchase and manage, lowering both capital and operating expenses.
- Combines content switching and SSL acceleration in a single chassis slot, freeing up space for other integrated services.

# Cisco Security Service Modules

Cisco Catalyst 6500 series switches support a variety of high-performance security modules that protect networks from the full range of threats, while also simplifying management and reducing overhead by consolidating security services into the switching chassis.



## Traffic Anomaly Detector Services Module

This module helps large organizations protect against distributed denial-of-service (DDoS) or other cyber attacks, enabling users to quickly initiate mitigation services and block the attack before business is adversely affected. It utilizes the latest behavioral analysis and attack recognition technology to proactively detect and identify all types of cyber assaults.

- Monitors and processes attack traffic at full Gigabit line rates, delivering a high-performance solution that detects DDoS attacks without consuming valuable switch or router resources.
- Identifies and blocks all types and sizes of assaults, including those launched by hundreds of thousands of distributed zombie hosts, providing complete protection against the widest range of attacks.
- Scales through clustering in a single chassis to support multi-gigabit performance, providing maximum protection for the largest enterprise and service provider environments or for individual vulnerable zones.
- Automatic learning builds baseline profiles of normal operating conditions, enabling rapid identification of anomalous or unusual activity that indicates an attack.
- Supports real-time monitoring of individual devices and protected zones with web-based graphical manager, as well as historical attack-level reports showing specific attack types seen and associated statistics.



## Anomaly Guard Services Module

This module mitigates DDoS and other cyber attacks. It effectively stops the DDoS attack while allowing legitimate traffic to continue to its destination, thereby maintaining continuous business operations.

- Monitors and processes attack traffic at full Gigabit line rates, delivering a high-performance solution that detects DDoS attacks without consuming valuable switch or router resources.
- Multi-verification process (MVP) architecture utilizes advanced anomaly recognition, source verification and anti-spoofing technologies to identify and block individual attack flows without affecting legitimate transactions.
- Dynamic diversion redirects and cleans only traffic destined for targeted devices, allowing unaffected traffic to flow freely and ensuring business continuity.
- Automatic learning builds baseline profiles of normal operating conditions, enabling rapid identification of anomalous or unusual activity that indicates an attack.
- Identifies and blocks all types and sizes of assaults, including those launched by hundreds of thousands of distributed zombie hosts, providing complete protection against the widest range of attacks.



## Intrusion Detection Services Module (IDSM-2)

This module helps detect, classify, and stop threats including worms, spyware/adware, network viruses, and application abuse. The Cisco IDSM-2 combines inline prevention services with innovative technologies that improve accuracy, allowing you to stop more threats without dropping legitimate network traffic.

- Accurate inline prevention technologies offer intelligent, automated, contextual analysis of your data and help ensure you are getting the most out of your intrusion prevention solution.
- Offers 600Mbps performance per module, providing the high bandwidth detection capabilities required for larger networks.
- Multivector threat identification protects your network from policy violations, vulnerability exploitations, and anomalous activity through detailed inspection of traffic in Layers 2-7.
- Unique network collaboration enhances scalability and resiliency through network collaboration, including efficient traffic capture techniques, load-balancing capabilities, and visibility into encrypted traffic.



## IPSec VPN Shared Port Adapter

This module delivers scalable and cost-effective VPN performance with Data Encryption Standard (DES), Triple Data Encryption Standard (3DES), plus next-generation Advanced Encryption Standard (AES) technology, including all key sizes (128-, 192-, and 256-bit keys) for ultimate in IPSec VPN security and interoperability.

- Provides up to 2.5Gbps of AES and 3DES IPSec throughput with large packets and 1.6Gbps with Internet mix (IMIX) traffic.
- Up to 10 Cisco IPSec VPN SPAs can be installed in a system, scaling to 25Gbps of total throughput for wire-speed security transport for native 10 Gigabit Ethernet interfaces.
- Using the Cisco Services SPA Carrier-400, each slot of the Cisco Catalyst 6500 supports up to two IPSec VPN SPAs, increasing total performance per slot.



# Cisco Security Service Modules

continued



## Network Analysis Module

This module provides traffic monitoring services for visibility into network and application usage, helping network managers troubleshoot delivery issues, improve the utilization of network resources, and ease the deployment of new network services. The NAM is available in two hardware versions, NAM-1 and NAM-2, to meet diverse network analysis needs in scalable switching environments.

- Includes an embedded, web-accessible Traffic Analyzer interface that presents both configuration menus and real-time and historical reports.
- Provides visibility into what applications are running on the network and how they're performing, tracking response times and identifying whether issues are server- or network-related.
- Offers web-based captures and decodes for anytime, anywhere troubleshooting.
- Analyzes the performance of IP-based services, including VoIP, video, and QoS.



## SSL Services Module

This module offloads processor-intensive tasks related to securing traffic with Secure Sockets Layer (SSL), increases the number of secure connections supported by a web site, and reduces the operational complexity of high performance web server farms.

- Ensures high availability when installed in a redundant Cisco Catalyst 6500 configuration, maintaining SSL sessions if hardware failures occur.
- Simplifies security management while encrypting user data to the web servers, providing privacy, confidentiality, and authentication using a wide range of certificates, including Netscape and VeriSign.
- An integrated Content Switching Module or external load-balancing appliance can load balance secure HTTPS content requests to multiple Cisco SSL services modules, maximizing SSL termination performance and providing SSL scalability.
- Provides the best price/performance ratio of any SSL accelerator on the market. Cost of maintenance is included in the maintenance contract of the Cisco Catalyst chassis, providing cost savings on annual service contracts. And by offloading the processing-intensive SSL termination burden from the web servers, the SSL Service Module eliminates the need to purchase additional servers.



## Firewall Services Module

This module delivers the fastest firewall data rates in the industry: 5Gbps throughput, 100,000 CPS, and one million concurrent connections. Up to four modules can be installed in a single chassis, offering scalability to 20Gbps per chassis. Based on Cisco PIX® Firewall technology, it provides large enterprises and service providers with unmatched security, reliability, and performance.

- Allows any port on Cisco Catalyst 6500 to operate as a firewall port and integrates firewall security inside the network infrastructure.
- Provides unsurpassed performance to meet future requirements, scaling to up to 20Gbps per chassis without requiring a system overhaul.
- Offers the best price/performance ratio of any firewall, utilizing the familiar, time-tested Cisco PIX Operating System to reduce the cost of training, and integrating firewall services into the chassis to reduce management requirements.
- An intuitive graphical user interface (GUI) simplifies management and configuration, and it's supported by the Cisco management framework and by Cisco AVVID partners for configuration and monitoring.
- Virtualized FWSM delivers multiple firewalls on one physical hardware platform, allowing network administrators to configure, deploy, and manage functions as if they were separate devices, while reducing the cost and complexity of managing network infrastructure.



## Cisco Catalyst 4500 Series

**Modular switches with Layer 2–4 intelligent network services offer enterprises, small- to medium-sized businesses, and service providers added investment protection.**

The Catalyst 4500 Series switches are mid-range, medium-density modular chassis delivering robust Layer 2–4 intelligent services. The modular architecture, media flexibility, and expandability of the Cisco Catalyst 4500 Series extends deployment life, while reducing the cost of ownership by minimizing recurring operational expenses and improving return on investment.

Cisco Catalyst 4500 Series switches extend control to the network edge with intelligent network services, including sophisticated quality of service (QoS), predictable performance, advanced security, and comprehensive management. This series delivers advanced control with integrated resiliency in both hardware and software. This minimizes network downtime and helps to ensure workforce productivity, profitability, and customer success.

The Cisco Catalyst 4500 Series includes four chassis: the Catalyst 4510R (10 slots), the Catalyst 4507R (seven slots), Catalyst 4506 (six slots), and Catalyst 4503 (three slots). A choice of supervisor engines delivers up to 136Gbps of Layer 2–4 switching. The series supports an extensive set of line cards, providing up to 384 10/100 or 10/100/1000 ports with integrated PoE. The series also supports 10 Gigabit Ethernet uplink ports for high-density Gigabit Ethernet-to-the-desk deployments and switch-to-switch applications.

## Hardware Features: Catalyst 4500 Chassis

Chassis	WS-C4503	WS-C4506	WS-C4507R	WS-C4510R
Slots	3	6	7	10
Redundant Supervisor Option	no	no	yes	yes
Gigabit Ethernet GBIC/SFP density	104	240	240	384
10 GbE X2 port density	2	2	2	2
10/100/1000 density	108	240	240	384
10/100 density	108	240	240	384
100BASE-FX, LX-10, BX-D density	96	240	240	384
Max. watt power consumption (redundant mode)				
AC Internal (redundant mode)	4,200	4,200	4,200	4,200
AC External power shelf (N+1)	8,500	8,500	8,500	8,500
DC Internal (redundant mode)	8,500	8,500	8,500	8,500
Max. number of Class 3 devices (15.4W) Max. power supplies				
AC Internal (redundant mode)	108	240	240	270
AC External power shelf (N+1)	108	240	240	364
DC Internal (redundant mode)	108	240	240	384
Dimension (H x W x D) inches	12.25 x 17.31 x 12.50	17.38 x 17.31 x 12.50	19.19 x 17.31 x 12.50	24.35 x 17.31 x 12.50
Dimension (H x W x D) centimeters	31.12 x 43.97 x 31.70	44.13 x 43.97 x 31.70	48.74 x 43.97 x 31.70	61.84 x 43.97 x 31.70
Rack Unit (RU)	7	10	11	14
Unit weight pounds (kilograms) (chassis only)	31.25 (14.18)	40.5 (18.37)	44.25 (20.07)	51.50 (23.36)

## Hardware Features: Catalyst 4500 Supervisor Engines

Supervisor Engines	SUP V-10GbE WS-X4516-10GE	SUP V WS-X4516	SUP IV WS-X4515	SUP II Plus-10GbE WS-X4013+10GE	SUP II-Plus WS-X4013+	SUP II-Plus-TS WS-X4013+TS
Chassis supported	All	All	4503, 4506, 4507R	4507R, 4506, 4503	4503, 4506, 4507R	4503
Enhanced Layer 3 option	yes	yes	yes	EIGRP Stub	EIGRP Stub	EIGRP Stub
Total bandwidth (Gbps)	136	96	64	108	64	64
Packets per second (Mpps)	102	72	48	81	48	48
Uplinks	2x10GE + 4GE	2GE	2GE	2x10GE + 4GE	2GE	12 10/100/1000 PoE + 8 SFP
CPU Mhz	800	400	333	667	266	266
NetFlow	included	option	option	no	no	no
Onboard memory (DRAM)	512MB	512MB	512MB	256MB (upgradable up to 512MB)	256MB	256MB



## Supervisor V-10GE

- Highest performance L2/3/4
- Future proofing with 10GbE uplinks
- Built-in Netflow feature
- High Performance access layer
- Medium core/distribution



## Supervisor V

- High performance L2/3/4
- GE uplinks
- Netflow card optional
- Access layer
- Medium core/distribution



## Supervisor IV

- Entry level L2/3/4
- GE uplinks
- Netflow card optional
- Access layer
- Small core/distribution



## Supervisor II-Plus-10GE

- Highest performance L2
- Future proofing with 10GbE uplinks
- High performance access layer



## Supervisor II-Plus

- High performance L2
- GE uplinks
- Access layer



## Supervisor II-Plus-TS

- Entry level, small business
- 12 10/100/1000 with PoE and 8 SFP ports
- Supported in 4503 chassis

## Series Spotlight

### Scalable, Resilient Architecture

The modular architecture of the Cisco Catalyst 4500 Series provides the scalability and flexibility to eliminate the need for multiplatform deployments and minimizes maintenance expenses. Network downtime is minimized with redundant supervisor engine (subsecond failover) capability (Catalyst 4507R and Catalyst 4510R switches), software-based fault tolerance, redundant fans, and 1+1 power-supply redundancy across the Cisco Catalyst 4500 Series. The scalable architecture allows for easy upgrade of all system ports to higher-layer switching functions by simply adding a new supervisor engine such as the Cisco Catalyst 4500 Series Supervisor Engines II-Plus, IV, V or V-10 GbE. Higher-layer functional enhancements such as NetFlow or Dynamic Buffer Limiting are possible on all system ports without replacing existing line cards and wiring.

### Wire-speed Performance with all Services Enabled

The Cisco Catalyst 4500 Series offers up to 102 million packets per second (mpps) wire-speed forwarding rate in hardware for Layer 2–4 traffic. Switching performance is independent of the number of route entries or advanced Layer 3 services enabled. This ensures exceptional performance on applications which are jitter and latency sensitive.

## Product Overview

### CATALYST 4500—BASE CONFIGURATION

Product Number	Description
WS-C4503	3-slot chassis, fan, no power supply
WS-C4506	6-slot chassis, fan, no power supply
WS-C4507R	7-slot chassis, fan, no power supply, redundant-supervisor support
WS-C4510R	10-slot chassis, fan, no power supply, redundant-supervisor support

### CATALYST 4500 SUPERVISOR ENGINES

Product Number	Description
WS-X4516-10GE	Catalyst 4500 Supervisor V-10 GbE, 2x10 GbE (X2) and 4x1 GbE (SFP)
WS-X4516	Catalyst 4500 Supervisor V (2 GbE), Console (RJ-45)
WS-X4515	Catalyst 4500 Supervisor IV (2 GbE), Console (RJ-45)
WS-X4013+10GE	Catalyst 4500 Supervisor Engine II-Plus-10GE, 2x10 GbE (X2) and 4x1 GbE (SFP)
WS-X4013+	Catalyst 4500 Supervisor II-Plus (IOS), 2 GbE, Console (RJ-45)

## Product Overview *continued*

### CATALYST 4500 SUPERVISOR ENGINES *continued*

Product Number	Description
WS-X4013+TS	Catalyst 4503 Supervisor II-Plus-TS, 12 10/100/1000 PoE + 8 SFP slots
WS-F4531	Catalyst 4500 NetFlow services card
S45ES-12xxxx	Catalyst 4500 Enterprise Services Software
S45EK9-12xxxx	Catalyst 4500 Enterprise Services Software with 3DES

### CATALYST 4500 MODULES

Product Number	Description
WS-X4124-FX-MT	Catalyst 4500 FE Switching module, 24-port 100FX (MTRJ)
WS-X4124-RJ45	Catalyst 4500 10/100 module, 24 ports (RJ-45)
WS-X4148-FE-BD-LC	Catalyst 4500 FE module, 48-port BX-D (LC) (1550)
WS-X4148-FE-LX-MT	Catalyst 4500 FE module, 48-port 100LX-10 SMF (MTRJ)
WS-X4148-FX-MT	Catalyst 4500 FE Switching module, 48-port 100FX MMF (MTRJ)
WS-X4148-RJ	Catalyst 4500 10/100 Auto module, 48 ports (RJ-45)
WS-X4148-RJ21	Catalyst 4500 10/100 module, 48-port Telco (4xRJ21)
WS-X4148-RJ45V	Catalyst 4500 pre-standard PoE 10/100, 48 ports (RJ-45)
WS-X4224-RJ45V	Catalyst 4500 10/100 PoE 802.3af 24 ports (RJ-45)
WS-X4232-GB-RJ	Catalyst 4500 32-10/100 (RJ-45), 2 GbE (GBIC)
WS-X4232-RJ-XX	Catalyst 4500 10/100 module, 32 ports (RJ-45) + modular uplinks
WS-X4248-FE-SFP	Catalyst 4500 FE module, 48-port 100BASE-X (SFP optional)
WS-X4248-RJ21V	Catalyst 4500 PoE 802.3af 10/100, 48 ports (RJ-21)
WS-X4248-RJ45V	Catalyst 4500 PoE 802.3af 10/100, 48 ports (RJ-45)
WS-X4302-GB	Catalyst 4500 GbE module, 2 ports (GBIC)
WS-X4306-GB	Catalyst 4500 GbE module, 6 ports (GBIC)
WS-X4418-GB	Catalyst 4500 GbE module, Server Switching 18 ports (GBIC)
WS-X4424-GB-RJ45	Catalyst 4500 24-port 10/100/1000 module (RJ-45)
WS-X4448-GB-RJ45	Catalyst 4500 48-port 10/100/1000 module (RJ-45)
WS-X4448-GB-SFP	Catalyst 4500 48-port 1000BASE-X (SFPs optional)
WS-X4506-GB-T	Catalyst 4500 6-port 10/100/1000 PoE or SFP (optional)
WS-X4524-GB-RJ45V	Catalyst 4500 PoE 802.3af 10/100/1000 24 ports (RJ-45)
WS-X4548-GB-RJ45	Catalyst 4500 Enhanced 48-port 10/100/1000BASE-T (RJ-45)
WS-X4548-GB-RJ45V	Catalyst 4500 PoE 802.3af 10/100/1000, 48 ports (RJ-45)

**Product Overview** *continued***CATALYST 4500—POWER SUPPLIES**

Product Number	Description
<b>PWR-C45-4200ACV</b>	Catalyst 4500 4200W AC dual input power supply (Data + PoE)
<b>PWR-C45-4200ACV/2</b>	Catalyst 4500 4200W AC dual input power supply (Data + PoE)
<b>PWR-C45-2800ACV</b>	Catalyst 4500 2800W AC power supply (Data + PoE)
<b>PWR-C45-2800ACV/2</b>	Catalyst 4500 2800W AC power supply (Data + PoE)
<b>PWR-C45-1400AC</b>	Catalyst 4500 1400W AC power supply (Data Only)
<b>PWR-C45-1400AC/2</b>	Catalyst 4500 1400W AC power supply redundant (Data Only)
<b>PWR-C45-1400DC-P</b>	Catalyst 4500 1400W DC power supply with Int. PEM
<b>PWR-C45-1400DC-P/2</b>	Catalyst 4500 1400W DC power supply redundant with Int. PEM
<b>PWR-C45-1400DC</b>	Catalyst 4500 1400W DC Triple Input SP power supply (Data Only)
<b>PWR-C45-1400DC/2</b>	Catalyst 4500 1400W DC Triple Input SP power supply (Data Only)
<b>PWR-C45-1300ACV</b>	Catalyst 4500 1300W AC power supply (Data + PoE)
<b>PWR-C45-1300ACV/2</b>	Catalyst 4500 1300W AC power supply (Data + PoE)
<b>PWR-C45-1000AC</b>	Catalyst 4500 1000W AC power supply (Data Only)
<b>PWR-C45-1000AC/2</b>	Catalyst 4500 1000W AC power supply redundant (Data Only)
<b>WS-P4502-1PSU</b>	Catalyst 4500 Aux. Power Shelf (2 slots), including one PWR-4502
<b>PWR-4502</b>	Catalyst 4500 Aux. Power Shelf redundant power supply

**Product Transitions****Current Product****Recommended Product**

WS-C4003

WS-C4503

WS-C4006

WS-C4506

WS-C4507R

WS-C4510R

**Transition Matrix Supervisors**

WS-X4012 (SUP I)

WS-X4013+ (SUP II+)

WS-X4013+TS (SUP II Plus-TS)

WS-X4013+10GE (SUP II-Plus-10GE)

WS-X4515 (SUP IV)

WS-X4013 (SUP II)

WS-X4013+ (SUP II+)

WS-X4013+TS (SUP II Plus-TS)

WS-X4013+10GE (SUP II-Plus-10GE)

WS-X4515 (SUP IV)

WS-X4014 (SUP III)

WS-X4515 (SUP IV)

WS-X4516 (SUP V)

WS-X4516-10GE (SUP V-10GE)

WS-X4032-L3

WS-X4515 (SUP IV)

WS-X4516 (SUP V)

WS-X4516-10GE (SUP V-10GE)

For more product information on Cisco Catalyst Switches, go to:  
<http://www.cisco.com/en/US/products/hw/switches/index.html>

For more product ordering information, go to:  
<http://www.cisco.com/cgi-bin/front.x/pricing?Request=Home>

# Cisco Catalyst Fixed-Configuration Switches

The Cisco Catalyst family includes the industry's widest and most versatile selection of fixed-configuration switches, making it easy for customers to find the ideal platform for any deployment. Yet unlike point solutions, these switches share the feature-rich functionality of Cisco IOS software, providing a firm foundation for converged data, voice, and video services.

Cisco Catalyst 4900, 3750, 3560, 2960, 2950, 2940, and Catalyst Express 500 Series switches offer an array of connectivity options, from Fast Ethernet to 10GbE. They range from small, standalone switches to stackable models that function as a single, scalable switching unit. And many models are available with a choice of software images, allowing customers to dictate the level of intelligent network services based on individual needs.



## Cisco Catalyst 4900 Series

**Fixed-configuration switches offering high-performance, rack-optimized server switching for organizations of all sizes.**

The Cisco Catalyst 4900 Series is based on the proven hardware and software architecture of Cisco's 4500 Series modular switches, but is distinguished by a 1-RU design that is ideal for top-of-rack server aggregation. The Cisco Catalyst 4900 Series includes two Layer 2–4 fixed-configuration switches.

Cisco Catalyst 4948 switch offers 48 ports of wire-speed 10/100/1000BASE-T with four alternative wired ports that can accommodate optional 1000BASE-X Small Form-factor Pluggable (SFP) optics. Cisco Catalyst 4948-10GE switch offers 48 ports of wire-speed 10/100/1000BASE-T with two wire-speed 10 Gigabit Ethernet uplinks via optional 10GbE (X2) optics. Both models provide exceptional reliability and serviceability, supporting optional internal AC or DC 1+1 hot-swappable power supplies and a hot-swappable fan tray with redundant fans.

These switches are available with either the IP Base Software image or the Enterprise Services Software image. The Enterprise Services Software additionally supports Shortest Path First (OSPF), Intermediate System-to-Intermediate System (IS-IS), Enhanced Interior Gateway Routing Protocol (EIGRP), and Border Gateway Protocol (BGP).

## Hardware Features

	WS-C4948	WS-C4948-10GE
Forwarding bandwidth per box (Gbps)	96	136
Maximum stack members	0	0
Total bandwidth of stack (Gbps)	0	0
Packets per second per box (Mpps)	72	102
MAC addresses supported	32,768	55,000
Routes supported	32,000	32,000
Onboard memory (DRAM MB)	256	256
10 GbE density	0	2
Gigabit Ethernet GBIC/SFP density	4	0
10 GbE X2 port density	0	2
10/100/1000 density	48	48
10/100 density	0	0
100BASE-FX density	0	0
Max. watt power consumption	300	300
PoE: Max. 802.3af Class 3 devices (15.4W)	0	0
PoE: Max. 802.3af Class 2 devices (7.3W)	0	0
AC/DC support	Yes	Yes
Dimensions (H x W x D) inches	1.71 x 17.3 x 16.1	1.71 x 17.3 x 16.1
Dimensions (H x W x D) centimeters	4.4 x 43.9 x 40.9	4.4 x 43.9 x 40.9
Unit weight pounds (kilograms)	16.5 (7.48)	16.5 (7.48)

## Series Spotlight

### Wire-speed Performance

Cisco Catalyst 4900 Series delivers wire-speed throughput on all ports from 96Gbps to 136Gbps with low-latency for data-intensive applications. Switching performance is guaranteed regardless of the number of route entries or Layer 3 and 4 services enabled. The hardware-based Cisco Express Forwarding (CEF) routing architecture allows for increased scalability and performance.

### Exceptional Reliability

Cisco Catalyst 4900 Series offers redundant hot-swappable internal AC or DC power supplies for nonstop operation. The 1 + 1 power supply design provides A-to-B failover when power supplies are connected to different circuits. AC and DC power supplies can be mixed in the same unit for maximum deployment flexibility. The Cisco Catalyst 4900 Series also features a hot-swappable fan tray with four redundant fans for additional serviceability and availability.

## Product Overview

### CATALYST 4948 SWITCH

Product Number	Description
<b>WS-C4948-S</b>	48 10/100/1000 ports + 4 SFP ports with 1 AC power supply; IP Base Image
<b>WS-C4948-E</b>	48 10/100/1000 ports + 4 SFP ports with 1 AC power supply; Enterprise Services Image
<b>WS-C4948</b>	48 10/100/1000 ports + 4 SFP ports with no power supply; optional Image
<b>WS-C4948-10GE</b>	48 10/100/1000 ports + 2 10 Gigabit Ethernet (X2) optic ports with no power supply; optional Image
<b>WS-C4948-10GE-S</b>	48 10/100/1000 ports + 2 10 Gigabit Ethernet (X2) optics ports with 1 AC power supply; IP Base Image
<b>WS-C4948-10GE-E</b>	48 10/100/1000 ports + 2 10 Gigabit Ethernet (X2) optics ports with 1 AC power supply; Enterprise Services Image

### CATALYST 4948/4900 POWER SUPPLIES

Product Number	Description
<b>PWR-C49-300AC</b>	Catalyst 4948 300W AC power supply
<b>PWR-C49-300AC/2</b>	Catalyst 4948 300W AC power supply (Redundant)
<b>PWR-C49-300DC</b>	Catalyst 4900 300W DC power supply
<b>PWR-C49-300DC/2</b>	Catalyst 4900 300W DC power supply (Redundant)

For more product information on Cisco Catalyst Switches, go to:  
<http://www.cisco.com/en/US/products/hw/switches/index.html>

For more product ordering information, go to:  
<http://www.cisco.com/cgi-bin/front.x/pricing?Request=Home>





## Cisco Catalyst 3750 Series

**Fixed-configuration switches offering multilayer switching and Cisco StackWise technology for enterprise branch offices and midsize organizations.**

The Cisco Catalyst 3750 Series is an innovative line of multilayer Fast Ethernet and Gigabit Ethernet switches featuring Cisco StackWise™ technology, a 32Gbps stack interconnect that allows customers to build a unified, highly resilient switching system—one switch at a time.

Up to nine Cisco Catalyst 3750 switches can be stacked in any combination, enabling organizations to mix and match to meet specific requirements. Additional 10/100, 10/100/100, 10 Gigabit Ethernet, and PoE connectivity can be deployed as necessary, offering a simple and cost-effective pay-as-you-go approach to network upgrades.

Cisco Catalyst 3750 switches can be purchased with the IP Base (formerly called SMI) or IP Services (formerly called EMI) licenses, and can be upgraded in the field to Advanced IP Services licenses. The IP Base license offers advanced QoS, rate-limiting, ACLs, and basic routing functionality. The IP Services license provides a richer set of enterprise-class features, including advanced hardware-based IP Unicast and IP Multicast routing as well as Policy-based Routing (PBR). The Advanced IP Services license adds IPv6 routing and advanced IP services.

## Hardware Features

	WS-C3750-24TS	WS-C3750-48TS	WS-C3750-24PS	WS-C3750-48PS		WS-C3750-24FS	WS-C3750G-24T	WS-C3750G-24TS-1U	WS-C3750G-48TS	WS-C3750G-24PS	WS-C3750G-48PS
Switching Fabric (Gbps)	32	32	32	32		32	32	32	32	32	32
Maximum stack members	9	9	9	9		9	9	9	9	9	9
Total bandwidth of stack (Gbps)	32	32	32	32		32	32	32	32	32	32
Packets per second per box (Mpps)	6.5	13.1	6.5	13.1		6.5	35.7	38.7	38.7	38.7	38.7
MAC addresses supported	12,000	12,000	12,000	12,000		12,000	12,000	12,000	12,000	12,000	12,000
Routes supported	11,000	11,000	11,000	11,000		11,000	11,000	11,000	11,000	11,000	11,000
Onboard memory (DRAM MB)	128	128	128	128		128	128	128	128	128	128
10 GbE density	0	0	0	0		0	0	0	0	0	0
Gigabit Ethernet GBIC/SFP density	2	4	2	4		2	0	4	4	4	4
10 GbE XENPAK/X2 port density	0	0	0	0		0	0	0	0	0	0
10/100/1000 density	0	0	0	0		0	24	24	48	24	48
10/100 density	24	48	24	48		0	0	0	0	0	0
100BASE-FX density	0	0	0	0		24	0	0	0	0	0
Max. watt power consumption	50	75	495	540		125	165	100	160	540	590
PoE: Max. 802.3af Class 3 devices (15.4W)	0	0	24	24		0	0	0	0	24	24
PoE: Max. 802.3af Class 2 devices (7.3W)	0	0	24	48		0	0	0	0	24	48
AC/DC support	AC only	AC only	AC only	AC only		AC only	AC only	AC only	AC only	AC only	AC only
Dimensions (H x W x D) inches	1.73 x 17.5 x 11.8	1.73 x 17.5 x 11.8	1.73 x 17.5 x 11.8	1.73 x 17.5 x 14.9		1.73 x 17.5 x 11.8	1.73 x 17.5 x 12.8	1.73 x 17.5 x 14.9	1.73 x 17.5 x 16.1	1.73 x 17.5 x 14.9	1.73 x 17.5 x 16.1
Dimensions (H x W x D) centimeters	4.4 x 44.5 x 30.1	4.4 x 44.5 x 30.1	4.4 x 44.5 x 30.1	4.4 x 44.5 x 37.8		4.4 x 44.5 x 30.1	4.4 x 44.5 x 32.6	4.4 x 44.5 x 37.8	4.4 x 44.5 x 40.9	4.4 x 44.5 x 37.8	4.4 x 44.5 x 40.9
Unit weight pounds (kilograms)	8 (3.6)	9.1 (4.1)	11.3 (5.1)	13.2 (6.0)		9.15 (4.15)	10 (4.6)	12 (5.5)	14 (6.4)	13.5 (6.1)	15.5 (7.0)

For further information on the Cisco Catalyst 3750 Metro Ethernet Series, go to:  
<http://www.cisco.com/en/US/partner/products/hw/switches/ps5532/index.html>

**Hardware Features** *continued*

	WS-C3750G-12S	WS-C3750G-12S-SD	WS-C3750G-16TD
Switching Fabric (Gbps)	32	32	32
Maximum stack members	9	9	9
Total bandwidth of stack (Gbps)	32	32	32
Packets per second per box (Mpps)	17.8	17.8	35.7
MAC addresses supported	12,000	12,000	12,000
Routes supported	20,000	20,000	11,000
Onboard memory (DRAM MB)	128	128	128
10 GbE density	0	0	1
Gigabit Ethernet GBIC/SFP density	12	12	0
10 GbE XENPAK/X2 port density	0	0	1
10/100/1000 density	0	0	16
10/100 density	0	0	0
100BASE-FX density	0	0	0
Max. watt power consumption	120	72	180
PoE: Max. 802.3af Class 3 devices (15.4W)	0	0	0
PoE: Max. 802.3af Class 2 devices (7.3W)	0	0	0
AC/DC support	AC only	DC only	AC only
Dimensions (H x W x D) inches	1.73 x 17.5 x 12.8	1.73 x 17.5 x 12.8	1.73 x 17.5 x 16.1
Dimensions (H x W x D) centimeters	4.4 x 44.5 x 32.6	4.4 x 44.5 x 32.6	4.4 x 44.5 x 40.9
Unit weight pounds (kilograms)	10 (4.6)	9 (4.08)	12.5 (5.7)

**Series Spotlight****Cisco StackWise Technology**

A unique stacking architecture optimized for Gigabit Ethernet, this technology is designed to respond to additions, deletions, and redeployment while maintaining constant performance. It unites up to nine individual Cisco Catalyst 3750 switches into a single logical unit, using special interconnect cables and stacking software. The stack is managed as a single switching unit controlled by a master switch elected from one of the member switches. The master switch automatically creates and updates all the switching and routing tables. A working stack can accept new members or delete old members without service interruption.

**Addition of IP Communications**

Cisco Catalyst 3750 Series PoE models support Cisco IP phones and Cisco Aironet® wireless LAN (WLAN) access points, as well as any IEEE 802.3af-compliant end device. The Catalyst 3750 24-port models can support 24 simultaneous full-powered PoE ports at 15.4 watts (W) for maximum powered device support. The 48-port versions can deliver the necessary power to support 24 ports at 15.4W, 48 ports at 7.3W, or any combination in between.

**Product Overview****CATALYST 3750 SERIES 10/100/1000, GbE, 10 GbE WORKGROUP SWITCH**

Product Number	Description
<b>WS-C3750G-24T-S</b>	24 10/100/1000T ports; IP Base Image
<b>WS-C3750G-24T-E</b>	24 10/100/1000T ports; IP Services Image
<b>WS-C3750G-24TS-S1U</b>	24 10/100/1000 ports + 4 SFP ports; IP Base Image; 1RU
<b>WS-C3750G-24TS-E1U</b>	24 10/100/1000 ports + 4 SFP ports; IP Services Image; 1RU
<b>WS-C3750G-24PS-S</b>	24 10/100/1000T PoE ports + 4 SFP ports; IP Base Image
<b>WS-C3750G-24PS-E</b>	24 10/100/1000T PoE ports + 4 SFP ports; IP Services Image
<b>WS-C3750G-48TS-S</b>	48 10/100/1000T ports + 4 SFP ports; IP Base Image
<b>WS-C3750G-48TS-E</b>	48 10/100/1000T ports + 4 SFP ports; IP Services Image
<b>WS-C3750G-48PS-S</b>	48 10/100/1000T PoE ports + 4 SFP ports; IP Base Image
<b>WS-C3750G-48PS-E</b>	48 10/100/1000T PoE ports + 4 SFP ports; IP Services Image
<b>WS-C3750G-16TD-S</b>	16 10/100/1000BT ports + 1 10 GbE port (req. XENPAK); IP Base Image
<b>WS-C3750G-16TD-E</b>	16 10/100/1000BT ports + 1 10 GbE port (req. XENPAK); IP Services Image
<b>WS-C3750G-12S-S</b>	12 SFP ports; IP Base Image
<b>WS-C3750G-12S-E</b>	12 SFP ports; IP Services Image
<b>WS-C3750G-12S-SD</b>	12 SFP ports; IP Base Image; DC power supply

**Product Overview** *continued***CATALYST 3750 SERIES 10/100 WORKGROUP SWITCHES**

Product Number	Description
WS-C3750-24FS-S	24 100BASE-FX ports + 2 SFP ports; IP Base Image
WS-C3750-24PS-S	24 10/100 PoE ports + 2 SFP ports; IP Base Image
WS-C3750-24PS-E	24 10/100 PoE ports + 2 SFP ports; IP Services Image
WS-C3750-24TS-S	24 10/100 ports + 2 SFP ports; IP Base Image
WS-C3750-24TS-E	24 10/100 ports + 2 SFP ports; IP Services Image
WS-C3750-48PS-S	48 10/100 PoE ports + 4 SFP ports; IP Base Image
WS-C3750-48PS-E	48 10/100 PoE ports + 4 SFP ports; IP Services Image
WS-C3750-48TS-S	48 10/100 ports + 4 SFP ports; IP Base Image
WS-C3750-48TS-E	48 10/100 ports + 4 SFP ports; IP Services Image

**CATALYST 3750 RIGHT ANGLE POWER CORDS**

Product Number	Description
CAB-AC-RA=	Power Cord, Right Angle
CAB-AC-RA	Power Cord, 110V, Right Angle
CAB-ACR-RA=	Power Cord, Argentina, Right Angle
CAB-ACA-RA=	Power Cord, Australia, Right Angle
CAB-ACC-RA=	Power Cord, China, Right Angle
CAB-ACE-RA=	Power Cord, Europe, Right Angle
CAB-ACI-RA=	Power Cord, Italy, Right Angle
CAB-JPN-RA=	Power Cord, Japan, Right Angle
CAB-JPN-RA	Power Cord, Japan, Right Angle
CAB-ACS-RA=	Power Cord, Switzerland, Right Angle
CAB-ACU-RA=	Power Cord, United Kingdom, Right Angle

**CATALYST 3750 RPS**

Product Number	Description
PWR675-AC-RPS-N1=	675W redundant power supply with 1 connector cable
CAB-RPS-1614=	1 RPS 675 connector cable 16/14
CAB-16AWG-AC	AC power cord, 16AWG
CAB-16AWG-AC=	AC power cord, 16AWG

**Product Overview** *continued***CATALYST 3750 METRO SERIES SWITCHES**

Product Number	Description
ME-C3750-24TE-M	ME C3750 24 10/100 PoE ports + 2SFP + 2SFP ports ES Prt (no power): Std. ME SW Image

**CATALYST 3750 METRO CONFIGURABLE POWER SUPPLIES**

Product Number	Description
PWR-ME3750-AC	Configurable ME-C3750 AC power supply
PWR-ME3750-DC	Configurable ME-C3750 DC power supply
PWR-ME3750-AC-R	Metro Catalyst 3750 redundant AC power supply (configurable)
PWR-ME3750-DC-R	Metro Catalyst 3750 redundant DC power supply (configurable)

**CATALYST 3750 METRO SPARE POWER SUPPLIES**

Product Number	Description
PWR-ME3750-AC=	Metro Catalyst 3750 AC power supply (spare)
PWR-ME3750-DC=	Metro Catalyst 3750 DC power supply (spare)

**Product Transitions**

Current Product	Recommended Product
WS-C1924-A	WS-C3560-24PS-S
	WS-C3750G-24PS-S
WS-C2924-XL-EN	WS-C3560-24PS-S
	WS-C3750G-24T-E
	WS-C3750-24PS-S
WS-C2924M-XL-EN	WS-C3560-48-PS-S
	WS-C3750-24PS-S
WS-C3524-XL-EN	WS-C3750-24PS-S
	WS-C3750G-24T-E
	WS-C3750G-24TS-E
WS-C3548-XL-EN	WS-C3750G-24T-S
	WS-C3750-48PS-S

## Product Transitions

Current Product	Recommended Product
WS-C3550-12G	WS-C3750G-12S-S
	WS-C3750G-12S-E
WS-C3550-12T	WS-C3750G-24T-S
	WS-C3750G-24T-E
	WS-C3750G-24TS-S1U
	WS-C3750G-24TS-E1U
	WS-C3560G-24TS-S
WS-C3560G-24TS-E	WS-C3560G-24TS-E
	WS-C3750-24TS-S
WS-C3550-24-SMI	WS-C3750-24TS-S
	WS-C3560-24TS-S
WS-C3550-24-EMI	WS-C3750-24TS-E
	WS-C3560-24TS-E
WS-C3550-24-FX-SMI	WS-C3750-24FS-S
WS-C3550-48-SMI	WS-C3750-48TS-S
	WS-C3560-48TS-S
WS-C3550-48-EMI	WS-C3750-48TS-E
	WS-C3560-48TS-E
WS-C3550-24PWR-SMI	WS-C3750-24PS-S
	WS-C3750-48PS-S
	WS-C3560-24PS-S
WS-C3560-48PS-S	WS-C3560-48PS-S
	WS-C3750-24PS-E
WS-C3550-24PWR-EMI	WS-C3750-48PS-E
	WS-C3560-24PS-E
	WS-C3560-48PS-E
WS-C3750G-24-TS-S	WS-C3750G-24-TS-S1U
WS-C3750G-24-TS-E	WS-C3750G-24-TS-E1U

For more product information on Cisco Catalyst Switches, go to:  
<http://www.cisco.com/en/US/products/hw/switches/index.html>

For more product ordering information, go to:  
<http://www.cisco.com/cgi-bin/front.x/pricing?Request=Home>

## Notes



## Cisco Catalyst 3560 Series

**Fixed-configuration switches combining Gigabit Ethernet connectivity and PoE for small enterprise LAN access and branch office deployments.**

The Cisco Catalyst 3560 Series combines multilayer Fast Ethernet and Gigabit Ethernet switching with integrated Power over Ethernet (PoE), simplifying the deployment of converged IP telephony, wireless access, video surveillance, and other new applications.

These standalone, fixed-configuration switches offer up to 48 10/100/1000 ports and support network-wide intelligent services such as advanced quality of service (QoS), rate limiting, access control lists (ACLs), multicast management, and high-performance IP routing.

Cisco Catalyst 3560 switches can be purchased with the IP Base (formerly called SMI) or IP Services (formerly called EMI) licenses, and can be upgraded in the field to Advanced IP Services licenses. The IP Base license offers advanced QoS, rate-limiting, ACLs, and basic routing functionality. The IP Services license provides a richer set of enterprise-class features, including advanced hardware-based IP Unicast and IP Multicast routing as well as Policy-based Routing (PBR). The Advanced IP Services license adds IPv6 routing.

## Hardware Features

	WS-C3560-24TS	WS-C3560-48TS	WS-C3560-24PS		WS-C3560-48PS	WS-C3560G-24TS	WS-C3560G-48TS	WS-C3560G-24PS	WS-C3560G-48PS
Switching Fabric (Gbps)	32	32	32		32	32	32	32	32
Maximum stack members	0	0	0		0	0	0	0	0
Total bandwidth of stack (Gbps)	0	0	0		0	0	0	0	0
Packets per second per box (Mpps)	6.5	13.1	6.5		13.1	38.7	38.7	38.7	38.7
MAC addresses supported	12,000	12,000	12,000		12,000	12,000	12,000	12,000	12,000
Routes supported	11,000	11,000	11,000		11,000	11,000	11,000	11,000	11,000
Onboard memory (DRAM MB)	128	128	128		128	128	128	128	128
10 GbE density	0	0	0		0	0	0	0	0
Gigabit Ethernet GBIC/SFP density	2	4	2		4	4	4	4	4
10 GbE XENPAK/X2 port density	0	0	0		0	0	0	0	0
10/100/1000 density	0	0	0		0	24	48	24	48
10/100 density	24	48	24		48	0	0	0	0
100BASE-FX density	0	0	0		0	0	0	0	0
Max. watt power consumption	45	65	485		530	100	160	540	590
PoE: Max. 802.3af Class 3 devices (15.4W)	0	0	24		24	0	0	24	24
PoE: Max. 802.3af Class 2 devices (7.3W)	0	0	24		48	0	0	24	48
AC/DC support	AC only	AC only	AC only		AC only	AC only	AC only	AC only	AC only
Dimensions (H x W x D) inches	1.73 x 17.5 x 11.8	1.73 x 17.5 x 11.8	1.73 x 17.5 x 11.8		1.73 x 17.5 x 14.9	1.73 x 17.5 x 14.9	1.73 x 17.5 x 16.1	1.73 x 17.5 x 14.9	1.73 x 17.5 x 16.1
Dimensions (H x W x D) centimeters	4.4 x 44.5 x 30.1	4.4 x 44.5 x 30.1	4.4 x 44.5 x 30.1		4.4 x 44.5 x 37.8	4.4 x 44.5 x 37.8	4.4 x 44.5 x 40.9	4.4 x 44.5 x 37.8	4.4 x 44.5 x 40.9
Unit weight pounds (kilograms)	8.5 (3.9)	9.1 (4.1)	11.3 (5.1)		13.2 (6.0)	12 (5.4)	13.5 (6.1)	14 (6.4)	15.5 (7.0)

## Series Spotlight

### Converged Services

The Cisco Catalyst 3560 Series includes switches that deliver Gigabit Ethernet speed with integrated PoE, supporting both Cisco pre-standard and IEEE 802.3af PoE devices. At speeds of 1000Mbps, Gigabit Ethernet provides the bandwidth to meet new and evolving network demands, alleviate bottlenecks, and boost performance, while increasing the return on existing infrastructure investments. PoE removes the cost of extending wall power to each IP phone, wireless access point, or other PoE devices.

### Integrated Security

With a wide range of security features, businesses can protect important information, keep unauthorized people off the network, prevent malicious viruses and worms from infecting the network, guard privacy, and maintain uninterrupted operation. Cisco Network Admission Control (NAC) helps implement network-wide security policies by validating the security posture of hosts seeking to connect to the network. Cisco Identity-based Network Services (IBNS) prevents unauthorized access and helps ensure that users get only their designated privileges. And features like DHCP Snooping, Dynamic ARP Inspection, and IP Source Guard help prevent against man-in-the-middle attacks.

## Product Overview

### CATALYST 3560 SERIES 10/100/1000 WORKGROUP SWITCHES

Product Number	Description
WS-C3560G-48PS-S	48 10/100/1000T PoE ports + 4 SFP ports; IP Base Image
WS-C3560G-48PS-E	48 10/100/1000T PoE ports + 4 SFP ports; IP Services Image
WS-C3560G-24PS-S	24 10/100/1000T PoE ports + 4 SFP ports; IP Base Image
WS-C3560G-24PS-E	24 10/100/1000T PoE ports + 4 SFP ports; IP Services Image
WS-C3560G-48TS-S	48 10/100/1000T ports + 4 SFP ports; IP Base Image
WS-C3560G-48TS-E	48 10/100/1000T ports + 4 SFP ports; IP Services Image
WS-C3560G-24TS-S	24 10/100/1000T ports + 4 SFP ports; IP Base Image
WS-C3560G-24TS-E	24 10/100/1000T ports + 4 SFP ports; IP Services Image

## Product Overview continued

### CATALYST 3560 SERIES 10/100 WORKGROUP SWITCHES

Product Number	Description
WS-C3560-48PS-S	48 10/100 PoE ports + 4 SFP ports; IP Base Image
WS-C3560-48PS-E	48 10/100 PoE ports + 4 SFP ports; IP Services Image
WS-C3560-24PS-S	24 10/100 PoE ports + 2 SFP ports; IP Base Image
WS-C3560-24PS-E	24 10/100 PoE ports + 2 SFP ports; IP Services Image
WS-C3560-48TS-S	48 10/100 ports + 4 SFP ports; IP Base Image
WS-C3560-48TS-E	48 10/100 ports + 4 SFP ports; IP Services Image
WS-C3560-24TS-S	24 10/100 ports + 2 SFP ports; IP Base Image
WS-C3560-24TS-E	24 10/100 ports + 2 SFP ports; IP Services Image

### CATALYST 3560 RIGHT ANGLE POWER CORDS

Product Number	Description
CAB-AC-RA=	Power Cord, Right Angle
CAB-AC-RA	Power Cord, 110V, Right Angle
CAB-ACR-RA=	Power Cord, Argentina, Right Angle
CAB-ACA-RA=	Power Cord, Australia, Right Angle
CAB-ACC-RA=	Power Cord, China, Right Angle
CAB-ACE-RA=	Power Cord, Europe, Right Angle
CAB-ACI-RA=	Power Cord, Italy, Right Angle
CAB-JPN-RA=	Power Cord, Japan, Right Angle
CAB-JPN-RA	Power Cord, Japan, Right Angle
CAB-ACS-RA=	Power Cord, Switzerland, Right Angle
CAB-ACU-RA=	Power Cord, United Kingdom, Right Angle

### CATALYST 3560 RPS

Product Number	Description
PWR675-AC-RPS-N1=	675W redundant power supply with 1 connector cable
CAB-RPS-1614=	1 RPS 675 connector cable 16/14



## Product Transitions

Current Product	Recommended Product
WS-C1924-A	WS-C3560-24PS-S
	WS-C3750-24PS-S
WS-C1912-A	WS-C3560-24PS-S
WS-C1924C-EN	WS-C3750G-24T-S
WS-C2924-XL-EN	WS-C3560-24PS-S
	WS-C3750G-24T-E
	WS-C3750-24PS-S
WS-C2924M-XL-EN	WS-C3560-48-PS-S
	WS-C3750-48PS-S
WS-C2950G-48-EI	WS-C3560-48PS
	WS-C3560-48TS
	WS-C2960-48TC-L
WS-C2950G-24-EI	WS-C3560-24PS
	WS-C3560-24TS
	WS-C2960-24TC-L
WS-C2950G-12-EI	WS-C3560-24PS
	WS-C3560-24TS
	WS-C2960-24TC-L
WS-C2950T-24	WS-C2960-24TT-L
	WS-C2960-48TT-L
WS-C2950T-48-SI	WS-C2960-48TT-L
WS-C3550-12G	WS-C3750G-12S-S
	WS-C3750G-12S-E
WS-C3550-12T	WS-C3750G-24T-S
	WS-C3750G-24T-E
	WS-C3750G-24TS-S1U
	WS-C3750G-24TS-E1U
	WS-C3560G-24TS-S
	WS-C3560G-24TS-E

Product Transitions continued

Current Product	Recommended Product
WS-C3550-24-SMI	WS-C3750-24TS-S
	WS-C3560-24TS-S
WS-C3550-24-EMI	WS-C3750-24TS-E
	WS-C3560-24TS-E
WS-C3550-24-FX-SMI	WS-C3750-24FS-S
WS-C3550-48-SMI	WS-C3750-48TS-S
	WS-C3560-48TS-S
WS-C3550-48-EMI	WS-C3750-48TS-E
	WS-C3560-48TS-E
WS-C3550-24PWR-SMI	WS-C3750-24PS-S
	WS-C3750-48PS-S
	WS-C3560-24PS-S
	WS-C3560-48PS-S
WS-C3550-24PWR-EMI	WS-C3750-24PS-E
	WS-C3750-48PS-E
	WS-C3560-24PS-E
WS-C2970G-24T-E	WS-C3560-48PS-E
	WS-C2960G-24TC-L
WS-C2970G-24TS-E	WS-C3560G-24TS-S
	WS-C2960G-24TC-L
	WS-C3560G-24TS-S

For more product information on Cisco Catalyst Switches, go to:  
<http://www.cisco.com/en/US/products/hw/switches/index.html>

For more product ordering information, go to:  
<http://www.cisco.com/cgi-bin/front.x/pricing?Request=Home>



## Cisco Catalyst 2960 Series

**Fixed-configuration switches offering Fast Ethernet and Gigabit Ethernet connectivity with enhanced LAN services for mid-market and branch office networks.**

Cisco Catalyst 2960 Series switches combine Fast Ethernet and Gigabit Ethernet desktop connectivity with advanced intelligent services, enabling organizations to extend the operational benefits of increased security, availability, resiliency, and scalability to the network edge.

The Cisco Catalyst 2960 Series is available in the LAN Base software image. The LAN Base feature set includes a rich Layer 2+ suite of intelligent services, including advanced quality of service, rate limiting, and access control lists (ACLs). These switches are also equipped with a robust set of features that increase network scalability and availability. These include multicast filtering as well as a complete suite of Spanning Tree Protocol enhancements designed to maximize availability in a Layer 2 network.

The series includes four configurations featuring dual-purpose (alternative wired) uplinks for Gigabit Ethernet, allowing the network manager to use either a copper or a fiber uplink. Each dual-purpose uplink offers one 10/100/1000 port and one SFP-based port, with one active at a time. The series includes 24-port and 48-port Gigabit Ethernet switches which drive cost-effective Gigabit to the Desktop (GTTD) across the network.

## Hardware Features

	WS-C2960-24TC-L	WS-C2960-24TT-L	WS-C2960-48TC-L	WS-C2960-48TT-L	WS-C2960G-24TC-L	WS-C2960G-48TC-L
Switching Fabric (Gbps)	16	16	32	32	32	32
Maximum stack members	0	0	0	0	0	0
Total bandwidth of stack (Gbps)	0	0	0	0	0	0
Packets per second per box (Mpps)	6.6	6.6	10.1	10.1	35.7	39.0
MAC addresses supported	8,000	8,000	8,000	8,000	8,000	8,000
Routes supported	0	0	0	0	0	0
Onboard memory (DRAM MB)	64	64	64	64	64	64
10 GbE density	0	0	0	0	0	0
Gigabit Ethernet GBIC/SFP density	2	0	2	0	4	4
10 GbE XENPAK/X2 port density	0	0	0	0	0	0
10/100/1000 density	2*	2	2*	2	24	48
10/100 density	24	24	48	48	0	0
100BASE-FX density	0	0	0	0	0	0
Max. watt power consumption	30	30	45	45	75	140
PoE: Max. 802.3af Class 3 devices (15.4W)	0	0	0	0	0	0
PoE: Max. 802.3af Class 2 devices (7.3W)	0	0	0	0	0	0
AC/DC support	AC only	AC only	AC only	AC only	AC only	AC only
Dimensions (H x W x D) inches	1.73 x 17.5 x 9.3	1.73 x 17.5 x 9.3	1.73 x 17.5 x 9.3	1.73 x 17.5 x 9.3	1.73 x 17.5 x 12.9	1.73 x 17.5 x 12.9
Dimensions (H x W x D) centimeters	4.4 x 44.5 x 23.6	4.4 x 44.5 x 23.6	4.4 x 44.5 x 23.6	4.4 x 44.5 x 23.6	4.4 x 44.5 x 32.8	4.4 x 44.5 x 32.8
Unit weight pounds (kilograms)	8 (3.6)	8 (3.6)	8 (3.6)	8 (3.6)	10 (4.5)	12 (5.4)

\*Dual purpose uplinks, only one SFP port or one 10/100/1000 BT port is active at any one time.

## Series Spotlight

### Gigabit Ethernet

At speeds of 1000Mbps, Gigabit Ethernet provides the bandwidth to meet new and evolving network demands, alleviate bottlenecks, and boost performance while increasing the return on existing infrastructure investments. Today's workers are placing higher demands on networks by running multiple, concurrent applications. The Cisco Catalyst 2960 provides a means to intelligently scale the network beyond 100Mbps over existing Category 5 copper cabling.

### Enhanced Security

Security is delivered through a wide range of authentication methods, data encryption technologies, and Network Admission Control (NAC) based on users, ports, and MAC addresses. Through these features, the Catalyst 2960 offers security to protect users and devices from attack.

## Product Overview

### CATALYST 2960 SERIES WORKGROUP SWITCHES

Product Number	Description
WS-C2960-24TT-L	24 10/100 ports + 2 10/100/1000 uplinks; LAN Base Image
WS-C2960-48TT-L	48 10/100 ports + 2 10/100/1000 uplinks; LAN Base Image
WS-C2960-24TC-L	24 10/100 ports + 2 dual-purpose uplinks; LAN Base Image
WS-C2960-48TC-L	48 10/100 ports + 2 dual-purpose uplinks; LAN Base Image
WS-C2960G-24TC-L	20 10/100/1000 ports + 4 dual-purpose uplinks; LAN Base Image
WS-C2960G-48TC-L	44 10/100/1000 ports + 4 dual-purpose uplinks; LAN Base Image

### CATALYST 2960 RIGHT ANGLE POWER CORDS

Product Number	Description
CAB-AC-RA=	Power Cord, Right Angle
CAB-AC-RA	Power Cord, 110V, Right Angle
CAB-ACR-RA=	Power Cord, Argentina, Right Angle
CAB-ACA-RA=	Power Cord, Australia, Right Angle
CAB-ACC-RA=	Power Cord, China, Right Angle
CAB-ACE-RA=	Power Cord, Europe, Right Angle
CAB-ACI-RA=	Power Cord, Italy, Right Angle

## Product Overview continued

### CATALYST 2960 RIGHT ANGLE POWER CORDS continued

Product Number	Description
CAB-JPN-RA=	Power Cord, Japan, Right Angle
CAB-JPN-RA	Power Cord, Japan, Right Angle
CAB-ACS-RA=	Power Cord, Switzerland, Right Angle
CAB-ACU-RA=	Power Cord, United Kingdom, Right Angle

### CATALYST 2960 RPS

Product Number	Description
PWR675-AC-RPS-N1=	675W redundant power supply with 1 connector cable
CAB-RPS-1614=	1 RPS 675 connector cable 16/14

## Product Transitions

Current Product	Recommended Product
WS-C2948G-GE-TX	WS-C2960G-48TC-L
WS-C2950G-12-EI	WS-C2960-24TC-L
WS-C2950G-24-EI	WS-C2960-24TC-L
WS-C2950G-48-EI	WS-C2960-48TC-L
WS-C2950T-24-EI	WS-C2960-24TT-L
WS-C2950T-48-SI	WS-C2960-48TT-L
WS-C2970G-24T-E	WS-C2960G-24TC-L
	WS-C3560G-24TS-E
WS-C2970G-24TS-E	WS-C2960G-24TC-L
	WS-C3560G-24TS-E

For more product information on Cisco Catalyst Switches, go to:  
<http://www.cisco.com/en/US/products/hw/switches/index.html>

For more product ordering information, go to:  
<http://www.cisco.com/cgi-bin/front.x/pricing?Request=Home>



## Cisco Catalyst 2950 Series

**Fixed-configuration switches offering Fast Ethernet and Gigabit Ethernet connectivity for branch offices, small wiring closets, and industrial deployments.**

The Cisco Catalyst 2950 Series switch is a fixed-configuration switch that provides wire-speed Fast Ethernet and Gigabit Ethernet connectivity. This switch offers two distinct sets of software features and a range of configurations to allow small, midsize, and enterprise branch offices and industrial environments to select the right combination for the network edge.

Standard Image Software (SI) offers Cisco IOS Software functions for basic data, voice, and video services. For networks with requirements for additional security, advanced quality of service (QoS), and high availability, Enhanced Image Software (EI) delivers intelligent services such as rate limiting and security filtering for deployment at the network edge.

By adding intelligent services to their networks, companies gain the availability required to accommodate time-critical needs, the scalability needed to accommodate growth, the advanced security essential to protecting confidential information, and the ability to differentiate and control traffic flows to optimize network operations.

## Hardware Features

	WS-C2950-12	WS-C2950-24	WS-C2950-SX-24	WS-C2950-C-24	WS-C2950G-24-EI-DC	WS-C2950SX-48-SI
Forwarding bandwidth per box (Gbps)	2.4	4.8	8.8	5.2	8.8	13.6
Maximum stack members	0	0	0	0	0	0
Total bandwidth of stack (Gbps)	0	0	0	0	0	0
Packets per second per box (Mpps)	1.8	3.6	6.6	3.9	6.6	10.1
MAC addresses supported	8,000	8,000	8,000	8,000	8,000	8,000
Routes supported	0	0	0	0	0	0
Onboard memory (DRAM MB)	16	16	16	16	16	32
10 GbE density	0	0	0	0	0	0
Gigabit Ethernet GBIC density	0	0	0	0	2	0
10 GbE XENPAK/X2 port density	0	0	0	0	0	0
10/100/1000 density	0	0	2 (1000BASE-SX)	0	0	2 (1000BASE-SX)
10/100 density	12	24	24	24	24	48
100BASE-FX density	0	0	0	2	0	0
Max. watt power consumption	30	30	30	30	30	45
PoE: Max. 802.3af Class 3 devices (15.4W)	0	0	0	0	0	0
PoE: Max. 802.3af Class 2 devices (7.3W)	0	0	0	0	0	0
AC/DC support	AC only	AC only	AC only	AC only	DC only	AC only
Dimensions (H x W x D) inches	1.73 x 17.5 x 9.52	1.73 x 17.5 x 9.52	1.73 x 17.5 x 9.52	1.73 x 17.5 x 9.52	1.73 x 17.5 x 9.52	1.73 x 17.5 x 13
Dimensions (H x W x D) centimeters	4.4 x 44.5 x 24.18	4.4 x 44.5 x 24.18	4.4 x 44.5 x 24.18	4.4 x 44.5 x 24.18	4.4 x 44.5 x 24.18	4.4 x 44.5 x 33.02
Unit weight pounds (kilograms)	6.5 (3.0)	6.5 (3.0)	6.5 (3.0)	6.5 (3.0)	6.5 (3.0)	10 (4.5)

**Hardware Features** *continued*

	WS-C2955S-12	WS-C2955C-12	WS-C2955T-12
Forwarding bandwidth per box (Gbps)	2.8	2.8	6.4
Maximum stack members	0	0	0
Total bandwidth of stack (Gbps)	0	0	0
Packets per second per box (Mpps)	2	2	4.8
MAC addresses supported	8,000	8,000	8,000
Routes supported	0	0	0
Onboard memory (DRAM MB)	32	32	32
10 GbE density	0	0	0
Gigabit Ethernet GBIC density	0	0	0
10 Gigabit Ethernet XENPAK/X2 port density	0	0	0
10/100/1000 density	0	0	2
10/100 density	12	12	12
100BASE-FX density	0	2	0
Max. watt power consumption	23	23	23
PoE: Max. 802.3af Class 3 devices (15.4W)	0	0	0
PoE: Max. 802.3af Class 2 devices (7.3W)	0	0	0
AC/DC support			
Dimensions (H x W x D) inches	3.78 x 8.07 x 5.03	3.78 x 8.07 x 5.03	3.78 x 8.07 x 5.03
Dimensions (H x W x D) centimeters	9.60 x 20.5 x 12.78	9.60 x 20.5 x 12.78	9.60 x 20.5 x 12.78
Unit weight pounds (kilograms)	3 (1.4)	3 (1.4)	3 (1.4)

**Series Spotlight****Simplified Management**

Like many other Cisco fixed-configuration switches, Cisco 2950 Series switches feature embedded Graphical User Interface (GUI)-based Device Manager, enabling network managers to quickly and easily configure their switches. With Cisco Network Assistant, a PC-based software application, customers can also simultaneously configure and troubleshoot multiple Cisco Catalyst switches using a standard Web browser. Cisco Network Assistant provides configuration wizards that greatly simplify the implementation of converged networks and intelligent network services.

**Specialized Models**

The Cisco Catalyst 2950 Series includes special models that extend intelligent Ethernet services to far-flung locations and harsh environments. Cisco Catalyst 2955 switches feature industrial-grade components designed to withstand extreme vibrations, shocks, and temperatures (-40° to 140° F), enabling manufacturers to extend Ethernet to the factory floor to improve communication and increase productivity.

**Product Overview****CATALYST 2950 WORKGROUP SWITCHES**

Product Number	Description
<b>WS-C2950-12</b>	12 10/100 ports; Standard Image
<b>WS-C2950-24</b>	24 10/100 ports; Standard Image
<b>WS-C2950C-24</b>	24 10/100 ports + 2 100BASE-FX uplinks; Enhanced Image
<b>WS-C2950G-24-EI-DC</b>	24 10/100 ports + 2 GBIC slots; Enhanced Image; DC version
<b>WS-C2950SX-24</b>	24 10/100 ports + 2 1000BASE-SX ports; Standard Image
<b>WS-C2950SX-48-SI</b>	48 10/100 ports + 2 1000BASE-SX uplink ports; Standard Image
<b>WS-C2955C-12</b>	2955 12 TX ports + 2 multimode uplinks
<b>WS-C2955S-12</b>	2955 12 TX + 2 single-mode uplinks
<b>WS-C2955T-12</b>	2955 12 TX ports + 2 copper uplinks

**Product Overview** *continued***CATALYST 2950 — POWER OPTIONS**

Product Number	Description
<b>PWR-2955-AC=</b>	AC to 24 V DC DIN rail power brick

**CATALYST 2950 — REDUNDANT POWER SUPPLIES**

Product Number	Description
<b>PWR675-AC-RPS-N1=</b>	675W redundant power supply with 1 connector cable
<b>CAB-RPS-1614=</b>	1 RPS 675 connector cable 16/14

**CATALYST 2950 — GBIC CABLE**

Product Number	Description
<b>WS-X3500-XL</b>	GigaStack Stacking GBIC and 50 cm cable

**Product Transitions**

Current Product	Recommended Product
WS-C2950G-48-EI	WS-C3560-48PS
	WS-C3560-48TS
	WS-C2960-48TC-L
WS-C2950G-24-EI	WS-C3560-24PS
	WS-C3560-24TS
	WS-C2960-24TC-L
WS-C2950G-12-EI	WS-C3560-24PS
	WS-C3560-24TS
	WS-C2960-24TC-L
WS-C2950T-24	WS-C2960-24TT-L
WS-C2950T-48-SI	WS-C2960-48TT-L

For more product information on Cisco Catalyst Switches, go to:  
<http://www.cisco.com/en/US/products/hw/switches/index.html>

For more product ordering information, go to:  
<http://www.cisco.com/cgi-bin/front.x/pricing?Request=Home>

**Notes**





## Cisco Catalyst 2940 Series

**Compact fixed-configuration switches delivering Fast Ethernet connectivity for workgroup, conference room, and classroom deployments.**

Cisco Catalyst 2940 Series switches are small, standalone, managed switches with eight Fast Ethernet ports and a single integrated Fast Ethernet or Gigabit Ethernet uplink. These switches are designed for deployments outside the wiring closet in the end-user workspace, such as classrooms or conference rooms.

They feature a durable metal shell, no fan for silent operation, a magnet for easy wall or under-the-desk mounting, a security lock slot to prevent theft, and an available cable guard to lock down cables and help prevent theft. The Cisco Catalyst 2940 runs Cisco IOS Software with comprehensive security and manageability, delivering network intelligence all of the way to the network edge.

Easy to install and manage, built to last, and receiving periodic software updates for life, these switches provide outstanding investment protection and the lowest total cost of ownership in their product class.

## Hardware Features

	WS-C2940-8TT-S	WS-C2940-8TF-S
Forwarding bandwidth per box (Gbps)	3.6	3.6
Maximum stack members	0	0
Total bandwidth of stack (Gbps)	0	0
Packets per second per box (Mpps)	2.7	2.7
MAC addresses supported	8,192	8,192
Routes supported	0	0
Onboard memory (DRAM MB)	16	16
10 GbE density	0	0
Gigabit Ethernet GBIC/SFP density	0	1
10 GbE XENPAK/X2 port density	0	0
10/100/1000 density	1	0
10/100 density	8	8
100BASE-FX density	0	1
Max. watt power consumption	15	15
PoE: Max. 802.3af Class 3 devices (15.4W)	0	0
PoE: Max. 802.3af Class 2 devices (7.3W)	0	0
AC/DC support	AC only	AC only
Dimensions (H x W x D) inches	1.55 x 10.6 x 6.42	1.55 x 10.6 x 6.42
Dimensions (H x W x D) centimeters	3.94 x 26.9 x 16.3	3.94 x 26.9 x 16.3
Unit weight pounds (kilograms)	3 (1.36)	3 (1.36)

## Series Spotlight

### Comprehensive Management

The Cisco Catalyst 2940 Series has robust SNMP Management Information Base (MIB) support and is fully manageable by the CiscoWorks suite of network management tools. The Catalyst 2940 Series feature an embedded Graphical User Interface (GUI)-based Device Manager, enabling network managers to quickly and easily configure their switches. With Cisco Network

Assistant, a PC-based software application, customers can also simultaneously configure and troubleshoot multiple Cisco Catalyst switches using a standard Web browser. Cisco Network Assistant provides configuration wizards that greatly simplify the implementation of converged networks and intelligent network services.

## Series Spotlight continued

### Investment Protection

In contrast to low-end unmanaged switches that often have high failure rates and do not stay current with new technologies, Cisco Catalyst 2940 Series switches are engineered for long-term value. A durable all-metal shell, an exceptionally high meantime between failure (MTBF) of over 70 years, and a Limited Lifetime Warranty

all help to ensure that this switch will outlast most deployment time frames.

Finally, the switches provide a smooth migration to Gigabit Ethernet uplinks.

## Product Overview

### CATALYST 2940 SERIES WORKGROUP SWITCHES

Product Number	Description
WS-C2940-8TF-S	8 10/100 ports + 1 100BASE-FX or SFP port
WS-C2940-8TT-S	8 10/100 ports + 1 10/100/1000 port

### CATALYST 2940 SPARE RIGHT ANGLE POWER CORDS AND ACCESSORIES

Product Number	Description
CAB-AC-RA=	Power Cord, Right Angle
CAB-AC-RA	Power Cord, 110V, Right Angle
CAB-ACR-RA=	Power Cord, Argentina, Right Angle
CAB-ACA-RA=	Power Cord, Australia, Right Angle
CAB-ACC-RA=	Power Cord, China, Right Angle
CAB-ACE-RA=	Power Cord, Europe, Right Angle
CAB-ACI-RA=	Power Cord, Italy, Right Angle
CAB-JPN-RA=	Power Cord, Japan, Right Angle
CAB-JPN-RA	Power Cord, Japan, Right Angle
CAB-ACS-RA=	Power Cord, Switzerland, Right Angle
CAB-ACU-RA=	Power Cord, United Kingdom, Right Angle
CABLEGUARD-C9240=	Cableguard for the Catalyst 2940
RACKMOUNT-C2940=	Rack mount for the Catalyst 2940

For more product information on Cisco Catalyst Switches, go to:  
<http://www.cisco.com/en/US/products/hw/switches/index.html>

For more product ordering information, go to:  
<http://www.cisco.com/cgi-bin/front.x/pricing?Request=Home>



## Cisco Catalyst Express 500 Series

Cisco-class switches that make advanced network services and IP Communications easy to manage for businesses from 20 to 250 employees.

This series of Layer 2 managed Fast Ethernet and Gigabit Ethernet switches offers nonblocking, wire-speed performance that provides a secure network foundation optimized for data, wireless, and voice. Built-in advanced security features help ensure that all devices on the network are protected.

An intuitive GUI simplifies setting up, running, and troubleshooting a network. With Cisco Smartports technology, mission-critical traffic is prioritized, voice conversations are clear, bandwidth-intensive video traffic does not impact other applications on the network, and your wireless network is secure. Integrated intelligence helps detect device and network problems before they impact your business.

The Cisco Catalyst Express 500 Series switches also offer Power over Ethernet (PoE), reducing the cost and complexity of IP Communications and wireless LAN deployments by supplying power and Ethernet connectivity over the same Category 5 cables. This eliminates the need to provide separate power outlets and cables for wireless access points, closed-circuit TV cameras, and IP phones.

## Hardware Features

	WS-CE500-24TT	WS-CE500-24LC	WS-CE500-24PC	WS-CE500G-12TC
Forwarding bandwidth per box (Gbps)	8.8	8.8	8.8	24
Maximum stack members	0	0	0	0
Total bandwidth of stack (Gbps)	0	0	0	0
Packets per second per box (Mpps)	6.6	6.6	6.6	18
MAC addresses supported	8,000	8,000	8,000	8,000
Routes supported	0	0	0	0
Onboard memory (DRAM MB)	32	32	32	32
10 GbE density	0	0	0	0
Gigabit Ethernet GBIC/SFP density	0	2*	2*	4*
10 GbE XENPAK/X2 port density	0	0	0	0
10/100/1000 density	2	2*	2*	12
10/100 density	24	24	24	0
100BASE-FX density	0	0	0	0
Max. watt power consumption	30	45	90	45
PoE: Max. 802.3af Class 3 devices (15.4W)	0	4	24	0
PoE: Max. 802.3af Class 2 devices (7.3W)	0	4	24	0
AC/DC support	AC only	AC only	AC only	AC only
Dimensions (H x W x D) inches	1.73 x 17.5 x 9.9	1.73 x 17.5 x 9.9	1.73 x 17.5 x 14.4	1.73 x 17.5 x 9.9
Dimensions (H x W x D) centimeters	4.39 x 44.45 x 25.15	4.39 x 44.45 x 25.15	4.39 x 44.45 x 36.58	4.39 x 44.45 x 25.15
Unit weight pounds (kilograms)	8 (3.7)	8 (3.7)	12 (5.5)	8 (3.7)

\*Dual purpose uplinks, only one SFP port or one 10/100/1000 BT port is active at any one time.

## Series Spotlight

## Simplified Deployments

The Cisco Catalyst Express 500 Series switches are designed for ease of use. The switch is initialized through the GUI device manager—no console cable or terminal emulation application is needed. Integrated intelligence optimizes the switch at the system level. Optimal configuration for each port can be applied by choosing from 10 preset Cisco Smartports roles. All ports support autonegotiation of port speed and duplex, and all PoE ports can supply up to the IEEE standard maximum of 15.4W simultaneously.

## Integrated Security

The Cisco Catalyst Express 500 Series offers several layers of security to protect your network, including a choice of three business-optimized levels. Management traffic to and from the GUI device manager can be encrypted with Secure Sockets Layer (SSL). Tight integration with Cisco wireless access points allows businesses to quickly and easily deploy a secure wireless LAN network. With the Cisco Self-Defending Network strategy and Cisco Clean Access solutions, the Cisco Catalyst Express 500 Series raises antivirus and overall security protection to the next level.

## Product Overview

## CATALYST EXPRESS 500 10/100/1000 SWITCHES

Product Number	Description
<b>WS-CE500-24TT</b>	24 10/100 ports + 2 10/100/1000BASE-T ports
<b>WS-CE500-24LC</b>	20 10/100 ports + 4 10/100 ports with PoE + 2 10/100/1000BASE-T or SFP ports
<b>WS-CE500-24PC</b>	24 10/100 ports with PoE + 2 10/100/1000BASE-T or SFP ports
<b>WS-CE500G-12TC</b>	8 10/100/1000BASE-T ports + 4 10/100/1000BASE-T or SFP ports

## CATALYST EXPRESS 500 RIGHT ANGLE POWER CORDS

Product Number	Description
<b>CAB-AC-RA=</b>	Power Cord, Right Angle
<b>CAB-AC-RA</b>	Power Cord, 110V, Right Angle
<b>CAB-ACR-RA=</b>	Power Cord, Argentina, Right Angle
<b>CAB-ACA-RA=</b>	Power Cord, Australia, Right Angle
<b>CAB-ACC-RA=</b>	Power Cord, China, Right Angle
<b>CAB-ACE-RA=</b>	Power Cord, Europe, Right Angle
<b>CAB-ACI-RA=</b>	Power Cord, Italy, Right Angle
<b>CAB-JPN-RA=</b>	Power Cord, Japan, Right Angle
<b>CAB-JPN-RA</b>	Power Cord, Japan, Right Angle
<b>CAB-ACS-RA=</b>	Power Cord, Switzerland, Right Angle
<b>CAB-ACU-RA=</b>	Power Cord, United Kingdom, Right Angle

## Product Overview continued

### CATALYST EXPRESS 500 RPS

Product Number	Description
PWR675-AC-RPS-N1=	675W Redundant power supply with 1 connector cable
CAB-RPS-1614=	1 RPS 675 connector cable 16/14

For more product information on Cisco Catalyst Switches, go to:  
<http://www.cisco.com/en/US/products/hw/switches/index.html>

For more product ordering information, go to:  
<http://www.cisco.com/cgi-bin/front.x/pricing?Request=Home>

## Notes

# Cisco Optics

Cisco offers a wide variety of pluggable transceiver modules across Cisco switches and router platforms. Cisco pluggable transceivers provide a convenient and cost-effective solution for the adoption of Fast Ethernet, Gigabit Ethernet, and 10 Gigabit Ethernet in data center, campus, metro access, and storage area networks.



### Cisco 10 Gigabit Modules

Cisco offers a range of XENPAK, X2, and XFP modules for 10 Gigabit Ethernet deployments. These Cisco transceivers meet Cisco specifications and are compliant with industry standards. Cisco XENPAK, X2, and XFP offer a convenient and cost-effective solution for the adoption of 10 Gigabit Ethernet in data center, campus, metropolitan area access, and ring networks. XENPAKs are offered for several reaches and transmission media and are supported on the Catalyst 6500, 3750 Series switches, and 7600 and CRS-1 routers today. X2s are also offered for several reaches and transmission media and are supported on the Catalyst 4500 and 4948-10GE Series switches today. The Cisco XFP Module offers customers a dual rate interface for 10 Gigabit Ethernet and Packet-over-SONET/SDH (POS) connectivity. XFPs are currently supported on Cisco routers based on Shared Port Adapter (SPA).



### Cisco Gigabit Ethernet SFP Modules

Cisco offers a range of GBIC transceivers and Small Form-factor Pluggable (SFP) transceivers for Gigabit Ethernet and Fibre Channel applications. These small, modular optical interface transceivers offer a convenient and cost-effective solution for the adoption of Gigabit Ethernet and Fibre Channel in data center, campus, metropolitan area access and ring networks, and storage area networks.



### Cisco Fast Ethernet SFP Modules

Cisco offers a range of Fast Ethernet SFP Interface Transceivers. The product portfolio includes 100BASE-FX, 100BASE-LX, and 100BASE-BX SFPs.

- 100BASE-FX: SFP operates on ordinary multimode fiber optic link spans of up to 2 km in length.
- 100BASE-LX: SFP operates on ordinary single-mode fiber optic link spans of up to 10 km in length.
- 100BASE-BX: SFP operates on ordinary single-mode SINGLE STRAND fiber optic link spans of up to 10 km in length. A 100BASE-BX-D and a 100BASE-BX-U SFP is needed for the single strand deployment.

Cisco offers two types of 100M SFP:

- 100M SFP for Fast Ethernet (FE) SFP Port. The SFP product name contains a "FE".
- 100M SFP for Gigabit Ethernet (GbE) SFP Port. The SFP product name contains a "GE".



### Cisco CWDM Modules

Cisco Course Wave Division Multiplexing (CWDM) Solution allows scalable and easy-to-deploy Gigabit Ethernet (GbE) and Fibre Channel services. The combination of CWDM GBICs and CWDM SFPs and CWDM Optical Add-Drop Modules (OADMs) and Multiplexers enables the design of a flexible and highly available multiservice network. The Cisco CWDM Solution offers a convenient and cost-effective solution for the adoption of optical Gigabit Ethernet in campus, data center, and metropolitan-area access networks.

Cisco CWDM Solution consists of a set of eight different Cisco CWDM GBICs (one for each of the eight different colors or wavelengths), eight different SFPs, a set of eight single wavelength/dual channel OADMs, two four-channel OADM/MUX and an eight-channel MUX along with a CWDM rack-mountable chassis.



### Cisco DWDM Transceiver Modules

The Cisco Dense Wave Division Multiplexing (DWDM) XENPAKs allow users to integrate WDM transport directly with Cisco 10 Gigabit Ethernet switches and routers. The DWDM XENPAKs and DWDM optical filter and amplifier products (Cisco ONS15216 series) enable the design of a flexible and highly available multiservice network. The DWDM XENPAKs support 100GHZ ITU grid and match the 4-skip-1 channel plan of Cisco ONS 100GHZ products. The DWDM XENPAKs can be used for unamplified and amplified designs to transmit up to 320 Gigabit over the same pair of SMF.

The Cisco Dense Wave Division Multiplexing (DWDM) GBICs allow users to integrate WDM transport directly with Cisco Gigabit Ethernet switches and routers. Just like DWDM XENPAK, the DWDM GBICs interoperate with the same ONS equipment. They can be used for unamplified and amplified designs to transmit up to 32 Gigabit over the same pair of SMF.

## General Overview

OPTICS	CABLE TYPE							
Speed	Copper	MMF		SMF				
<b>Fast Ethernet (FE)</b>								
Optics Type		100BASE-FX		100BASE-LX		100BASE-BX-D/U		
Max. Distance		2 km		10 km		10 km		
Form Factor		SFP		SFP		SFP		
<b>Gigabit Ethernet (GE)</b>								
Optics Type	100BASE-T	1000BASE-SX		1000BASE-LX		1000BASE-BX-D/U	1000BASE-ZX	1000BASE-CWDM
Max. Distance	100 m	550 m		10 km		10 km	~70 km	~70 to 100 km
Form Factor	SFP/GBIC	SFP/GBIC		SFP/GBIC		SFP	SFP/GBIC	SFP/GBIC
<b>10 Gigabit Ethernet (10 GbE)</b>								
Optics Type	10GBASE-CX4	10GBASE-SR	10GBASE-LX4	10GBASE-LR		10GBASE-ER	10GBASE-ZR	10GBASE-DWDM
Max. Distance	15 m	26 to 300 m	300 m	10 km		40 km	~80 km	~80 km
Form Factor	XENPAK/X2	XENPAK/X2	XENPAK/X2	XENPAK/X2		XENPAK	XENPAK	XENPAK

		MODULAR SWITCHES		FIXED-CONFIGURATION SWITCHES							
Model	Description	Catalyst 6500	Catalyst 4500		Catalyst 4900	Catalyst 3750	Catalyst 3560	Catalyst 2960	Catalyst 2950	Catalyst 2940	Catalyst Express 500
<b>Fast Ethernet (FE)</b>											
<b>GLC-GE-100FX=</b>	100BASE-FX SFP for GbE port					▪	▪	▪			▪
<b>GLC-FE-100FX</b>	100BASE-FX SFP for FE port	▪	▪					▪			▪
<b>GLC-FE-100LX</b>	100BASE-LX SFP for FE port	▪	▪					▪			▪
<b>GLC-FE-100BX-U</b>	100BASE-BX10-U SFP for FE port	▪	▪					▪			▪
<b>GLC-FE-100BX-D</b>	100BASE-BX10-D SFP for FE port	▪	▪					▪			▪
<b>Gigabit Ethernet (GbE)</b>											
<b>GLC-LH-SM</b>	1000BASE-LX/LH SFP (no DOM)	▪	▪		▪	▪	▪	▪		▪	▪
<b>GLC-SX-MM</b>	1000BASE-SX SFP (no DOM)	▪	▪		▪	▪	▪	▪		▪	▪
<b>GLC-ZX-SM</b>	1000BASE-ZX SFP (no DOM)	▪	▪		▪	▪	▪	▪			
<b>GLC-T</b>	1000BASE-T SFP	▪	▪		▪	▪	▪				
<b>GLC-BX-D=*</b>	1000BASE-BX-D SFP (DOM)	▪	▪		▪	▪	▪	▪			
<b>GLC-BX-U=*</b>	1000BASE-BX-U SFP (DOM)	▪	▪		▪	▪	▪	▪			
<b>WS-G5483</b>	1000BASE-T GBIC	▪	▪						▪		
<b>WS-G5484</b>	1000BASE-SX GBIC	▪	▪						▪		
<b>WS-G5486</b>	1000BASE-LX/LH GBIC	▪	▪						▪		
<b>WS-G5487</b>	1000BASE-ZX GBIC	▪	▪						▪		
<b>CWDM-SFP-1470=</b>	CWDM 1470 nm SFP GbE and 1G/2G FC	▪	▪		▪	▪	▪	▪			
<b>CWDM-SFP-1490=</b>	CWDM 1490 nm SFP GbE and 1G/2G FC	▪	▪		▪	▪	▪	▪			
<b>CWDM-SFP-1510=</b>	CWDM 1510 nm SFP GbE and 1G/2G FC	▪	▪		▪	▪	▪	▪			
<b>CWDM-SFP-1530=</b>	CWDM 1530 nm SFP GbE and 1G/2G FC	▪	▪		▪	▪	▪	▪			
<b>CWDM-SFP-1550=</b>	CWDM 1550 nm SFP GbE and 1G/2G FC	▪	▪		▪	▪	▪	▪			
<b>CWDM-SFP-1570=</b>	CWDM 1570 nm SFP GbE and 1G/2G FC	▪	▪		▪	▪	▪	▪			
<b>CWDM-SFP-1590=</b>	CWDM 1590 nm SFP GbE and 1G/2G FC	▪	▪		▪	▪	▪	▪			
<b>CWDM-SFP-1610=</b>	CWDM 1610 nm SFP GbE and 1G/2G FC	▪	▪		▪	▪	▪	▪			
<b>CWDM-GBIC-1470=</b>	1000BASE-CWDM 1470 nm GBIC	▪	▪						▪		
<b>CWDM-GBIC-1490=</b>	1000BASE-CWDM 1490 nm GBIC	▪	▪						▪		
<b>CWDM-GBIC-1510=</b>	1000BASE-CWDM 1510 nm GBIC	▪	▪						▪		
<b>CWDM-GBIC-1530=</b>	1000BASE-CWDM 1530 nm GBIC	▪	▪						▪		
<b>CWDM-GBIC-1550=</b>	1000BASE-CWDM 1550 nm GBIC	▪	▪						▪		
<b>CWDM-GBIC-1570=</b>	1000BASE-CWDM 1570 nm GBIC	▪	▪						▪		
<b>CWDM-GBIC-1590=</b>	1000BASE-CWDM 1590 nm GBIC	▪	▪						▪		
<b>CWDM-GBIC-1610=</b>	1000BASE-CWDM 1610 nm GBIC	▪	▪						▪		

		MODULAR SWITCHES		FIXED-CONFIGURATION SWITCHES							
Model	Description	Catalyst 6500	Catalyst 4500		Catalyst 4900	Catalyst 3750	Catalyst 3560	Catalyst 2960	Catalyst 2950	Catalyst 2940	Catalyst Express 500
<b>Gigabit Ethernet (GbE)</b> <i>continued</i>											
<b>CWDM-OADM1-1470=</b>	Dual Single Channel OADM Module (1470 nm)	▪	▪		▪	▪	▪	▪	▪		
<b>CWDM-OADM1-1490=</b>	Dual Single Channel OADM Module (1490 nm)	▪	▪		▪	▪	▪	▪	▪		
<b>CWDM-OADM1-1510=</b>	Dual Single Channel OADM Module (1510 nm)	▪	▪		▪	▪	▪	▪	▪		
<b>CWDM-OADM1-1530=</b>	Dual Single Channel OADM Module (1530 nm)	▪	▪		▪	▪	▪	▪	▪		
<b>CWDM-OADM1-1550=</b>	Dual Single Channel OADM Module (1550 nm)	▪	▪		▪	▪	▪	▪	▪		
<b>CWDM-OADM1-1570=</b>	Dual Single Channel OADM Module (1570 nm)	▪	▪		▪	▪	▪	▪	▪		
<b>CWDM-OADM1-1590=</b>	Dual Single Channel OADM Module (1590 nm)	▪	▪		▪	▪	▪	▪	▪		
<b>CWDM-OADM1-1610=</b>	Dual Single Channel OADM Module (1610 nm)	▪	▪		▪	▪	▪	▪	▪		
<b>CWDM-MUX8A=</b>	8-channel CWDM MUX/DMX Module	▪	▪		▪	▪	▪	▪	▪		
<b>CWDM-OADM4-1=</b>	4-channel CWDM OADM Module (1470, 1490, 1510, 1530)	▪	▪		▪	▪	▪	▪	▪		
<b>CWDM-OADM4-2=</b>	4-channel CWDM OADM Module (1550, 1570, 1590, 16100)	▪	▪		▪	▪	▪	▪	▪		
<b>CWDM-MUX-4-SF1=</b>	Single Fiber 4-Channel MUX/DMX	▪	▪		▪	▪	▪	▪	▪		
<b>CWDM-MUX-4-SF2=</b>	Single Fiber 4-Channel MUX/DMX	▪	▪		▪	▪	▪	▪	▪		
<b>WDM-1300-1550-S=</b>	1300 nm/1550 nm WDM Splitter Cable	▪	▪		▪	▪	▪	▪	▪		
<b>CWDM-CHASSIS-2=</b>	2-slot Chassis for CWDM MUX Plug-in Modules	▪	▪		▪	▪	▪	▪	▪		
<b>10 Gigabit Ethernet (10 GbE)</b>											
<b>XENPAK-10GB-CX4</b>	10GBASE-CX4 XENPAK Module	▪									
<b>XENPAK-10GB-SR</b>	10GBASE-SR XENPAK Module	▪									
<b>XENPAK-10GB-ER</b>	10GBASE-ER XENPAK Module	▪				▪					
<b>XENPAK-10GB-LX4</b>	10GBASE-LX4 XENPAK Module	▪									
<b>XENPAK-10GB-LR</b>	10GBASE-LR XENPAK Module	▪									
<b>XENPAK-10GB-ZR</b>	10GBASE-ZR XENPAK Module	▪									
<b>XENPAK-10GB-LW</b>	10BASE-LW XENPAK Module	▪									
<b>C3-XENPAK10GB-LR</b>	10GBASE-LR XENPAK Module for Catalyst 3750					▪					
<b>X2-10GB-CX4</b>	10GBASE-CX4 X2 Module		▪		▪						
<b>X2-10GB-SR</b>	10GBASE-SR X2 Module		▪		▪						
<b>X2-10GB-LR</b>	10GBASE-LR X2 Module		▪		▪						
<b>X2-10GB-LX4</b>	10GBASE-LX4 X2 Module		▪		▪						
<b>DWDM-XENPAK-xx.xx=</b>	10GBASE-DWDM XENPAK xx.xx wavelength (see datasheet)	▪									
<b>WDM-XENPAK-REC=</b>	Receive-only WDM XENPAK	▪									



Notes

Notes

**Notes**



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