



Q&A

## CISCO CATALYST 3560 SERIES SWITCHES

### PRODUCT OVERVIEW

**Q.** What are the Cisco® Catalyst® 3560 Switches?

**A.** The Cisco Catalyst 3560 Series is a line of fixed configuration, enterprise-class switches that include IEEE 802.3af and Cisco prestandard Power over Ethernet (PoE) functionality in Fast Ethernet and Gigabit Ethernet configurations. The Catalyst 3560 is an ideal access layer switch for small enterprise LAN access or branch offices, combining both 10/100/1000 and PoE configurations for maximum productivity and investment protection while enabling the deployment of new applications such as IP telephony, wireless access, video surveillance, building management systems, and remote video kiosks. Customers can deploy network-wide intelligent services—such as advanced QoS, rate limiting, access control lists, multicast management, and high-performance IP routing—while maintaining the simplicity of traditional LAN switching. Available for the Cisco Catalyst 3560 Series at no charge, the Cisco Network Assistant is a centralized management application that simplifies the administration tasks for Cisco switches, routers, and wireless access points. Cisco Network Assistant provides configuration wizards that greatly simplify the implementation of converged networks and intelligent network services.

The Catalyst 3560 is part of a larger and more scalable family of Cisco Catalyst switches that include the Catalyst 3750 Series switches with StackWise™ Technology, and the Cisco Catalyst 4500 and 6500 modular switches. The entire family is united by Cisco IOS software and offers industry-leading availability, integrated security, optimized delivery, and manageability.

Table 1 shows the complete list of Cisco Catalyst 3560 Series switches.

**Table 1.** Cisco Catalyst 3560 Series Switches

Product Name	Part Number	Description
Catalyst 3560-24TS	WS-C3560-24TS-S	<ul style="list-style-type: none"><li>• 24 Ethernet 10/100 ports and 2 SFP-based Gigabit Ethernet ports</li><li>• 1 Rack Unit (RU) fixed configuration, multilayer switch</li><li>• Enterprise-class intelligent services delivered to the network edge</li><li>• Standard Multilayer Software Image (SMI) installed</li><li>• Basic RIP and static routing, upgradable to full dynamic IP routing</li></ul>
Catalyst 3560-24TS	WS-C3560-24TS-E	<ul style="list-style-type: none"><li>• 24 Ethernet 10/100 ports and 2 SFP-based Gigabit Ethernet ports</li><li>• 1 RU fixed configuration, multilayer switch</li><li>• Enterprise-class intelligent services delivered to the network edge</li><li>• Enhanced Multilayer Software Image (EMI) installed</li><li>• Advanced IP routing</li></ul>
Catalyst 3560-48TS	WS-C3560-48TS-S	<ul style="list-style-type: none"><li>• 48 Ethernet 10/100 ports and 4 SFP-based Gigabit Ethernet ports</li><li>• 1 RU fixed configuration, multilayer switch</li><li>• Enterprise-class intelligent services delivered to the network edge</li><li>• Standard Multilayer Software Image (SMI) installed</li><li>• Basic RIP and static routing, upgradable to full dynamic IP routing</li></ul>

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<b>Catalyst 3560-24PS</b>	WS-C3560-24PS-S	<ul style="list-style-type: none"> <li>• 24 Ethernet 10/100 ports and 2 SFP-based Gigabit Ethernet ports</li> <li>• 1 Rack Unit (RU) fixed configuration, multilayer switch</li> <li>• Enterprise-class intelligent services delivered to the network edge</li> <li>• IEEE 802.3af and Cisco prestandard Power over Ethernet</li> <li>• Standard Multilayer Software Image (SMI) installed</li> <li>• Basic RIP and static routing, upgradable to full dynamic IP routing</li> </ul>
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<b>Catalyst 3560G-24TS</b>	WS-C3560G-24TS-S	<ul style="list-style-type: none"> <li>• 24 Ethernet 10/100/1000 ports and 4 SFP-based Gigabit Ethernet ports</li> <li>• 1 RU fixed configuration, multilayer switch</li> <li>• Enterprise-class intelligent services delivered to the network edge</li> <li>• Standard Multilayer Software Image (SMI) installed</li> <li>• Basic RIP and static routing, upgradable to full dynamic IP routing</li> </ul>
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<b>Catalyst 3560 EMI Upgrade Kit</b>	CD-3560-EMI=	<ul style="list-style-type: none"> <li>• Enhanced Multilayer Software Image (EMI) upgrade kit for SMI versions of the Catalyst 3560-24TS, Catalyst 3560-24PS, Catalyst 3560-48TS, and Catalyst 3560-48PS</li> <li>• Provides advanced IP routing</li> </ul>
<b>Catalyst 3560G EMI Upgrade Kit</b>	CD-3560G-EMI=	<ul style="list-style-type: none"> <li>• Enhanced Multilayer Software Image (EMI) upgrade kit for SMI versions of the Catalyst 3560G-24TS, Catalyst 3560G-24PS, Catalyst 3560G-48TS, and Catalyst 3560G-48PS</li> <li>• Provides advanced IP routing</li> </ul>

Product Name	Part Number	Description
<b>Catalyst 3560 Advanced IP Services License</b>	3560-AISK9-LIC-B	SMI to Advanced IP Services License for FE models
<b>Catalyst 3560 Advanced IP Services License</b>	3560-AISK9-LIC-S	EMI to Advanced IP Services License for FE models
<b>Catalyst 3560 Advanced IP Services License</b>	3560G-AISK9-LIC-B	SMI to Advanced IP Services License for GE models
<b>Catalyst 3560 Advanced IP Services License</b>	3560G-AISK9-LIC-S	EMI to Advanced IP Services License for GE models

**Q.** What are the benefits of Power over Ethernet?

**A.** Power over Ethernet can provide a lower total cost of ownership for deployments that incorporate Cisco IP phones and Cisco Aironet wireless LAN access points, as well as any IEEE 802.3af compliant end device. Power over Ethernet removes the need for wall power to each PoE enabled device and eliminates the cost for additional electrical cabling that would otherwise be necessary in IP phone and wireless LAN deployments.

**Q.** How many devices can the Catalyst 3560 Series power?

**A.** The Catalyst 3560 24-port PoE configurations can support 24 simultaneous full powered PoE ports at 15.4 Watts for maximum powered device support. Leveraging Catalyst Intelligent Power Management, the 48-port version can deliver the necessary power to support 24 ports at 15.4 W, 48 ports at 7.7 W, or any combination in-between.

**Q.** Does the Catalyst 3560 Series support standards-based Power over Ethernet?

**A.** Yes. The Catalyst 3560 supports IEEE 802.3af. The Catalyst 3560 provides investment protection for the installed base of Cisco IP phones and Cisco Aironet wireless LAN access points by also supporting the Cisco pre-standard Power over Ethernet (inline power).

**Q.** Can the Catalyst 3560 provide power to IEEE 802.3af and Cisco pre-standard Power over Ethernet simultaneously?

**A.** Yes. The Catalyst 3560 will automatically detect the end point to provide the appropriate power without any user intervention.

**Q.** What software images do the Cisco Catalyst 3560 switches support?

**A.** The Catalyst 3560 Series is available in the Standard Multilayer Software Image (SMI) or the Enhanced Multilayer Software Image (EMI). The SMI feature set includes advanced QoS, rate limiting, ACLs, and basic static and RIP routing functionality. The EMI 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). After initial deployment, the Catalyst 3560 EMI Upgrade Kit gives users the flexibility to upgrade to the EMI. More details on the EMI feature set are provided later in this document.

**Q.** Does it cost more for a Layer 3 or special-features license?

**A.** The Catalyst 3560-24PS-E, 3560-48PS-E, 3560G-24TS-E, 3560G-24PS-E, 3560G-48TS-E, and 3560G-48PS-E are loaded with the Enhanced Multilayer Software Image, so all feature license fees are part of the standard list price. However, the Catalyst 3560-24PS-S, 3560-48PS-S, 3560G-24TS-S, 3560G-24PS-S, 3560G-48TS-S, and 3560G-48PS-S switches are loaded with the Standard Multilayer Software Image. The Catalyst 3560-24PS-S and 3560-48PS-S switches can be upgraded to the Enhanced Multilayer Software Image with the purchase of the Catalyst 3560 Enhanced Multilayer Software Image upgrade kit (part number CD-3560-EMI=) for \$1995. The Catalyst 3560G-24TS-S, 3560G-24PS-S, 3560G-48TS-S, and 3560G-48PS-S switches can be upgraded to the Enhanced Multilayer Software Image with the purchase of the Catalyst 3560 Enhanced Multilayer Software Image upgrade kit (part number CD-3560-EMI=) for \$3995. The Standard Multilayer Software Image includes RIP and static routing.

**Q.** What features are only supported on the EMI?

**A.** The following features and functionality are supported with the Enhanced Multilayer Software Image:

- Dynamic IP routing protocols for load balancing and constructing scalable LANs:
  - Open Shortest Path First (OSPF)
  - Interior Gateway Routing Protocol (IGRP) and Enhanced IGRP (EIGRP)
  - Border Gateway Protocol (BGPv4)
- Policy-based Routing (PBR) allows superior control by enabling flow redirection regardless of the routing protocol configured
- Protocol-Independent Multicast (PIM) for IP multicast routing within a network that enables the network to receive the multicast feed requested and for switches not participating in the multicast to be pruned—support for PIM sparse mode (PIM-SM), PIM dense mode (PIM-DM), and PIM sparse-dense mode
- Distance Vector Multicast Routing Protocol (DVMRP) tunneling for interconnecting two multicast-enabled networks across non-multicast networks
- Private VLAN (PVLAN) provides the ability to restrict communications between hosts at layer 2 through the use of primary and secondary VLANs.

**Q.** Is the EMI required to allow Layer 3 and Layer 4 lookups for QoS and security?

**A.** No. Both the SMI and the EMI allow for Layer 3 and Layer 4 lookups for QoS and security.

**Q.** Can the Cisco Catalyst 3560 Series switches support the GigaStack<sup>®</sup> or StackWise<sup>™</sup> technology?

**A.** The Cisco Catalyst 3560 switches do not support the Cisco GigaStack Technology on the Catalyst 3550, 2950G, and 3500 XLs or the Cisco StackWise technology available on the Catalyst 3750. However, a cluster of any combination of these platforms can be managed via a single IP address using the Cisco Network Assistant (CAN) software. There are more details on CNA later in this document.

**Q.** Do the Cisco Catalyst 3560 switches support Inter-Switch Link (ISL) virtual LAN (VLAN) trunking?

**A.** Yes, the Cisco Catalyst 3560 switches support both 802.1Q trunking and ISL trunking. VLAN trunks can be created from any port using either standards-based 802.1Q tagging or the Cisco ISL VLAN architecture.

**Q.** What are Small Form-Factor Pluggables (SFPs)?

**A.** Small Form-Factor Pluggables (SFPs) are transceivers that provide Gigabit Ethernet connectivity from the Cisco Catalyst 3560 switches to distribution layer switches. They are functionally equivalent to Gigabit Interface Converters (GBICs), but are much smaller.

**Q.** What SFPs are supported on Cisco Catalyst 3560 switches?

**A.** Cisco Catalyst 3560 switches support 1000BASE-SX, 1000BASE-LX/LH, 1000BASE-ZX, 1000BASE-T, 1000BASE-CWDM and 100BASE-FX (supported after 12.2(20)SE) SFP transceivers. In addition, the Catalyst 3560 switches support the Cisco Catalyst 3560 SFP Interconnect Cable for establishing a low-cost Gigabit Ethernet point-to-point connection.

**Q.** What is the Cisco Catalyst 3560 SFP Interconnect Cable?

**A.** The Cisco Catalyst 3560 SFP Interconnect Cable provides for a low-cost point-to-point Gigabit Ethernet connection between Catalyst 3560 switches. The 50cm cable is an alternative to using SFP transceivers when interconnecting Catalyst 3560 switches through their SFP ports over a short distance.

**Q.** Is there a limit to the number of SFPs that can be used on a Cisco Catalyst 3560 Switch?

**A.** No. Users can populate all the SFP ports of any Catalyst 3560 Switch with the same SFP or with a combination of different SFPs.

**Q.** Do the Cisco Catalyst 3560 switches have Redundant Power Supply (RPS) support?

**A.** Yes. Maximum power availability for a converged voice and data network is attainable when a Catalyst 3560 Switch is combined with the Cisco Redundant Power System 675 (RPS 675) for seamless protection against internal power supply failures and an uninterruptible power supply (UPS) system to safeguard against power outages. For more information on the RPS 675 go to <http://www.cisco.com/en/US/products/hw/routers/ps2883/ps5066/index.html>.

## INTELLIGENT SWITCHING

**Q.** Why do I need intelligence at the edge of my network?

**A.** Networks are evolving to address four new developments at the network edge:

- Increase in desktop computing power
- Introduction of bandwidth-intensive applications
- Expansion of highly sensitive data on the network
- Presence of multiple device types, such as IP phones and wireless LAN access points

These new demands are contending for resources with many existing mission-critical applications. As a result, IT professionals must view the edge of the network as critical to effectively manage the delivery of information and applications. As companies increasingly rely on networks as the strategic business infrastructure, it is more important than ever to ensure their high availability, security, scalability, and control. By adding Cisco intelligent functions to the wiring closet, customers can now deploy networkwide intelligent services that address these requirements in a consistent way from the desktop to the core and through the WAN.

With Cisco Catalyst Intelligent Ethernet switches, Cisco helps companies to realize the full benefits of adding intelligent services to their networks. Deploying capabilities that make the network infrastructure highly available to accommodate time-critical needs, scalable to accommodate growth, secure enough to protect confidential information, and capable of differentiating and controlling traffic flows are key to further optimizing network operations.

**Q.** Can you provide more details on how Cisco intelligent switching will help my network?

**A.** New applications are requiring higher bandwidth and the need to differentiate and control the traffic flow. Applications such as enterprise resource planning (ERP) (Oracle, SAP, etc.), voice (IP telephony traffic) and CAD/CAM require prioritization over less time-sensitive applications such as FTP or Simple Mail Transfer Protocol (SMTP). It would be highly undesirable to have a large file download destined to one port on a wiring closet switch and have quality implications such as increased latency in voice traffic, destined to another port on this switch. This condition is avoided by ensuring that voice traffic is properly classified and prioritized throughout the network. Cisco Intelligent Ethernet switches implement superior quality of service (QoS) to ensure that network traffic is classified, prioritized, and congestion is avoided.

## SECURITY

**Q.** How will the security needs of a network be handled?

**A.** With the rise in internal threats to a network, Cisco Ethernet switches enhance data security through a wide range of features including Secure Shell (SSH) and Simple Network Management Protocol version 3 (SNMPv3) protocols, ACLs, 802.1x, port security, private VLAN edge, Dynamic Host Configuration Protocol (DHCP) interface tracker, Private VLAN, Dynamic ARP Inspection, IP Source Guard, MAC address notification, and RADIUS/TACACS+. Depending on your security needs, the Catalyst 3560 Series complements devices such as firewalls, VPNs, and Intrusion Detection Systems.

**Q.** For security purposes, how can I protect unauthorized users from accessing my network?

**A.** The Catalyst 3560 supports 802.1x that works in conjunction with a RADIUS server to authenticate users as they access a network. The 802.1x standard is considered port-level security and is commonly used for wireless LANs. Additionally, portions of the network can be restricted by using

ACLs. Access can be denied based on Media Access Control (MAC) addresses, IP addresses, or Transmission Control Protocol (TCP)/User Datagram Protocol (UDP) ports. ACL lookups are done in hardware—forwarding and routing performance is not compromised when implementing ACL-based security. An additional protection method is to use port security, which ensures the appropriate user is on the network by limiting access to the port based on MAC addresses.

**Q.** For security purposes, how can I monitor or track activities in my network?

**A.** Intrusion detection systems are tailored to monitor and track activities in a network. The Catalyst 3560 can complement this through features such as MAC address notification, which will send an alert to a management station so that network administrators know when and where users came on to the network and can take appropriate actions. The DHCP Interface Tracker (Option 82) feature will track where a user is physically connected on a network by providing both switch and port ID to a DHCP server. With the Dynamic ARP Inspection feature, the switch will log denied or dropped ARP packets and it will also give the administrator the ability to look at statistics for forwarded, dropped, MAC validation failure, IP validation failure, ACL permitted and denied, and DHCP permitted and denied packets for all VLANs configured on the switch, for a specified VLAN, or for a range of VLANs. In addition, DHCP snooping combined with IP Source Guard enables the administrator to keep track of both dynamic and static IP/MAC mapping tables.

**Q.** For security purposes, how do I protect administration passwords and traffic going to the switch during configuration or troubleshooting?

**A.** To protect administration traffic during the configuration or troubleshooting of a switch (such as passwords or device configuration settings), the best approach is to encrypt the data. Both SSH and SNMPv3 provide encryption of data during Telnet sessions and SNMP sessions.

**Q.** Does the Catalyst 3560 support SSHv2?

**A.** Yes.

**Q.** What is the difference between the Private VLAN Edge (Protected Port) and Private VLAN features?

**A.** The Private VLAN Edge feature is also known as the Protected Port feature, which is a limited subset of the full Private VLAN feature. The full Private VLAN feature supports primary and secondary VLANs and Community and Isolated VLANs, while Private VLAN Edge only supports the equivalent of Isolated VLANs.

## NETWORK MANAGEMENT

**Q.** Do the Cisco Catalyst 3560 switches support Cisco Switch Clustering technology?

**A.** Yes, the Catalyst 3560 switches can be managed using the Cisco Network Assistant software, which uses Cisco Switch Clustering technology. Cisco Network Assistant is a PC-based network management application optimized for LANs of small and medium-sized businesses with up to 250 users. Cisco Network Assistant offers centralized management of Cisco Systems® switches, routers, and WLAN access points. It supports a wide range of Cisco Catalyst® Intelligent switches from Cisco Catalyst 2950 through Cisco Catalyst 4506. Through a user-friendly GUI, users can configure and manage a wide array of switch functions and start the device manager of Cisco routers and Cisco wireless access points. Cisco Network Assistant is available at no cost and can be downloaded from Cisco.com.

Cisco Network Assistant provides an integrated management interface for delivering intelligent services, enabling users to manage their entire LAN with one robust tool. By bringing the simplicity of traditional LAN switching to intelligent services such as multilayer switching, QoS, multicast, and security ACLs, Cisco Network Assistant allows administrators to take advantage of benefits formerly reserved for only the most complex networks. The Guide Mode in Cisco Network Assistant leads the user step-by-step through the configuration of high-end features and provides enhanced online help for context-sensitive assistance. In addition, a Solution Wizard provides automated configuration of the switch for video streaming or videoconferencing. Future software will provide Solution Wizards for voice over IP (VoIP), mission-critical applications, and security.

Cisco Network Assistant supports standards-based connectivity options such as Ethernet, Fast Ethernet, Fast EtherChannel®, Gigabit Ethernet, and Gigabit EtherChannel connectivity. Because Cisco Switch Clustering technology is not limited by proprietary stacking modules, stacking cables or

interconnection media, Cisco Network Assistant expands the traditional cluster domain beyond a single wiring closet and lets users mix and match interconnections to meet specific management, performance, and cost requirements.

Cisco Catalyst 3560 switches can be configured either as command or member switches in a Cisco switch cluster. Cisco Network Assistant also allows the network administrator to designate a standby or redundant command switch, which takes the commander duties should the primary command switch fail. Other important features include the ability to configure multiple ports and switches simultaneously, as well as perform software updates across the entire cluster at once. Bandwidth graphs and link reports provide useful diagnostic information and the topology map gives network administrators a quick view of the network status.

## POSITIONING

**Q.** What is the positioning of the Catalyst 3560 Series switches relative to the Catalyst 3550 Series switches?

**A.** The Catalyst 3560 Series switches extend Cisco's Power over Ethernet (PoE) and 10/100/1000 offerings. Both product families are designed for deployments in similar topological positions in the network and allow customers to deploy network-wide intelligent services such as advanced QoS, rate-limiting, access control lists, multicast management, and high performance routing. In contrast to the Catalyst 3550 Series, the Catalyst 3560 Series offers 10/100/1000 models as well as the flexibility of several uplink options through small form-factor pluggable (SFP)-based GE ports instead of GBIC-based GE ports. The smaller form factor has allowed a design with 48 10/100 ports with PoE and 4 SFP-based uplink ports in a 1 rack unit (RU) form factor. Also, the Catalyst 3560 Series supports the IEEE 802.3af PoE implementation in addition to Cisco's pre-standard PoE (in-line power) implementation. The Catalyst 3550 Series is a broader product family with AC and DC powered 10/100 configurations, low port density GE configurations, and a 100FX aggregator switch. Along with the Catalyst 3500 XL and 2950G, all of the Catalyst 3550 configurations support the Cisco GigaStack GBIC for stacking connections.

**Q.** What is the positioning of the Catalyst 3560 Series switches relative to the Catalyst 3750 Series switches?

**A.** The Catalyst 3550 and 3560 are Cisco's mainstream products for fixed configuration enterprise 10/100 and 10/100/1000 applications. The Catalyst 3750 switches are ideal when a group of interconnected switches requires higher levels of availability, redundancy, performance, and ease-of-use inherent in the StackWise Technology. The Catalyst 3750 also has Fast Ethernet configurations that support IEEE 802.3af and Cisco pre-standard Power over Ethernet.

## SERVICE AND WARRANTY

**Q.** What is the warranty for the Cisco Catalyst 3560 Series Switches?

**A.** Cisco Catalyst 3560 switches come with the Cisco Limited Lifetime Hardware Warranty.

### Limited Lifetime Warranty

The hardware warranty available on Catalyst 3560 is the Limited Lifetime Hardware Warranty. This warranty automatically comes with the purchase of eligible Catalyst products, free of charge. For specific details on the Limited Lifetime Hardware Warranty visit

[http://www.cisco.com/univercd/cc/td/doc/es\\_inpk/lh2cen\\_.htm](http://www.cisco.com/univercd/cc/td/doc/es_inpk/lh2cen_.htm).

**Q.** What types of service and support are available for the Cisco Catalyst 3560 Series switches?

**A.** A full complement of life-cycle service and support is available for the Cisco Catalyst 3560 Series. From implementation to operation and optimization, Cisco offers Technical Support Service and Advanced Service delivered either directly or through one of its best-in-class partners.

### Technical Support Service

Technical Support Service is available through SMARTnet<sup>®</sup> and SMARTnet Onsite. SMARTnet augments the resources of your operations staff by providing them with access to expertise, both online and on the telephone, and a range of hardware Advance Replacement options. SMARTnet Onsite complements the hardware Advance Replacement feature by adding the services of a field engineer, services that can be critical for those



locations where staffing is insufficient or unavailable to perform parts replacement activities. For more information about SMARTnet, visit [http://www.cisco.com/en/US/products/svcs/ps3034/ps2827/ps2978/serv\\_home.html](http://www.cisco.com/en/US/products/svcs/ps3034/ps2827/ps2978/serv_home.html).

## Advanced Services

Total Implementation Solutions (TIS) offers a full range of implementation solutions including project management, project engineering, configuration, staging, and rollout coordination, and ensuring correct installation and deployment. Configuration services now include development and verification of configuration for intelligent services such as QoS and multicast. For more information about Total Implementation Solutions, visit <http://www.cisco.com/warp/public/cc/serv/mkt/sup/advsv/index.shtml>.

## PRODUCT AND CONTACT INFORMATION

- Q.** Where can I find technical and product specifications and other additional information about the Cisco Catalyst 3560 switches?
- A.** For product literature including data sheets and product specifications, see the Catalyst 3560 Web site at <http://www.cisco.com/go/catalyst3560>.
- Q.** What are the part numbers for the Cisco Catalyst 3560 switches? When does it become orderable?
- A.** The part number and orderability information for the new Cisco Catalyst 3560 switches is available at <http://www.cisco.com/go/catalyst3560>.



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