

Cisco Catalyst 3750 Series Switches

Product Overview

Q. What are the Cisco® Catalyst® 3750 Series Switches?

A. The Cisco Catalyst 3750 Series Switches are a premier line of enterprise-class, stackable, multilayer switches that provide high availability, security, and quality of service (QoS) to enhance the operation of the network. Their innovative unified stack architecture sets the standard in stack management, redundancy, and failover.

With a range of Fast Ethernet, Gigabit Ethernet, and an integrated wireless LAN controller configurations, the Cisco Catalyst 3750 Series can serve as both a powerful access layer switch for medium enterprise wiring closets and as a backbone switch for mid-sized networks. Customers can deploy network-wide intelligent services, such as advanced QoS, rate-limiting, Cisco Systems® security access control lists (ACLs) at L2, L3, and L4, multicast management, and high-performance IP routing-while maintaining the simplicity of traditional LAN switching. Embedded in the Cisco Catalyst 3750 Series is the switch device manager which allows users to configure and troubleshoot the Cisco Catalyst 3750 Switch using a standard Web browser.

The Cisco Network Assistant, available for the Cisco Catalyst 3750 Series at no charge, 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.

Table 1 shows the complete list of Cisco Catalyst 3750 Series Intelligent Ethernet Switches.

Table 1. Cisco Catalyst 3750 Series Switches

Part Number	Description
WS-C3750G-24TS-E1U	<ul style="list-style-type: none"> • 24 Ethernet 10/100/1000 ports • 4 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 rack unit (RU) stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Services Image installed • Full IP routing with BGPv4, EIGRP, OSPF, and PIM
WS-C3750G-24TS-S1U	<ul style="list-style-type: none"> • 24 Ethernet 10/100/1000 ports • 4 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Base Image installed • Basic RIP and static routing, upgradeable to full dynamic IP routing

WS-C3750G-24TS-E	<ul style="list-style-type: none"> • 24 Ethernet 10/100/1000 ports • 4 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1.5 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Services Image installed • Full dynamic IP routing
WS-C3750G-24TS-S	<ul style="list-style-type: none"> • 24 Ethernet 10/100/1000 ports • 4 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1.5 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Base Image installed • Basic Routing Information Protocol (RIP) and static routing, upgradeable to full dynamic IP routing
WS-C3750G-24T-E	<ul style="list-style-type: none"> • 24 Ethernet 10/100/1000 ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Services Image installed • Full dynamic IP routing
WS-C3750G-24T-S	<ul style="list-style-type: none"> • 24 Ethernet 10/100/1000 ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Base Image installed • Basic RIP and static routing, upgradeable to full dynamic IP routing
WS-C3750G-12S-E	<ul style="list-style-type: none"> • 12 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Services Image installed provides full dynamic IP routing
WS-C3750G-12S-S	<ul style="list-style-type: none"> • 12 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Base Image installed • SMI provides basic RIP and static routing, upgradeable to full dynamic IP routing
WS-C3750G-12S-SD	<ul style="list-style-type: none"> • 12 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable multilayer switch • DC Power Supply • Enterprise-class intelligent services delivered to the network edge • IP Base Image installed • SMI provides basic RIP and static routing, upgradeable to full dynamic IP routing

WS-C3750G-16TD-E	<ul style="list-style-type: none"> • Sixteen 10/100/1000 Gigabit Ethernet ports • One IEEE 802.3ae 10 Gigabit Ethernet XENPAK port • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Services Image installed provides full dynamic IP routing • IEEE 802.3ae 10 Gigabit Ethernet port is 1.25:1 oversubscribed
WS-C3750G-16TD-S	<ul style="list-style-type: none"> • Sixteen 10/100/1000 Gigabit Ethernet ports • One IEEE 802.3ae 10 Gigabit Ethernet XENPAK port • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable multilayer switch • Delivers enterprise-class intelligent services to the network edge • IP Base Image installed provides basic RIP and static routing, upgradeable to full dynamic IP routing • IEEE 802.3ae 10 Gigabit Ethernet port is 1.25:1 oversubscribed
WS-C3750G-24PS-E	<ul style="list-style-type: none"> • 24 Ethernet 10/100/1000 ports with IEEE 802.3af and Cisco prestandard PoE • 4 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Services Image installed • Full IP routing with BGP-4, EIGRP, OSPF, PIM
WS-C3750G-24PS-S	<ul style="list-style-type: none"> • 24 Ethernet 10/100/1000 ports with IEEE 802.3af and Cisco prestandard PoE • 4 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Base Image installed • Basic RIP and static routing, upgradeable to full dynamic IP routing
WS-C3750G-48TS-E	<ul style="list-style-type: none"> • 48 Ethernet 10/100/1000 ports • 4 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Services Image installed • Full IP routing with BGPv4, EIGRP, OSPF, PIM
WS-C3750G-48TS-S	<ul style="list-style-type: none"> • 48 Ethernet 10/100/1000 ports • 4 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Base Image installed • Basic RIP and static routing, upgradeable to full dynamic IP routing
WS-C3750G-48PS-E	<ul style="list-style-type: none"> • 48 Ethernet 10/100/1000 with IEEE 802.3af and Cisco prestandard PoE ports • 4 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Services Image installed • Full IP routing with BGPv4, EIGRP, OSPF, PIM

WS-C3750G-24WS-S25	<ul style="list-style-type: none"> • 24 Ethernet 10/100/1000 ports with IEEE 802.3af and Cisco prestandard PoE • 2 SFP-based Gigabit Ethernet ports • Integrated Wireless LAN Controller • Supports up to 25 access points • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 2 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Base Image installed • Basic RIP and static routing, upgradeable to full dynamic IP routing
WS-C3750G-24WS-S50	<ul style="list-style-type: none"> • 24 Ethernet 10/100/1000 ports with IEEE 802.3af and Cisco prestandard PoE • 2 SFP-based Gigabit Ethernet ports • Integrated Wireless LAN Controller • Supports up to 50 access points • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 2 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Base Image installed • Basic RIP and static routing, upgradeable to full dynamic IP routing
WS-C3750-48PS-E	<ul style="list-style-type: none"> • 48 Ethernet 10/100 ports with IEEE 802.3af and Cisco prestandard PoE • 4 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Services Image installed • Full dynamic IP routing
WS-C3750-48PS-S	<ul style="list-style-type: none"> • 48 Ethernet 10/100 ports with IEEE 802.3af and Cisco prestandard PoE • 4 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Base Image installed • Basic RIP and static routing, upgradeable to full dynamic IP routing
WS-C3750-48TS-E	<ul style="list-style-type: none"> • 48 Ethernet 10/100 ports • 4 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Services Image installed • Full dynamic IP routing
WS-C3750-48TS-S	<ul style="list-style-type: none"> • 48 Ethernet 10/100 ports • 4 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Base Image installed • Basic RIP and static routing, upgradeable to full dynamic IP routing

WS-C3750-24PS-E	<ul style="list-style-type: none"> • 24 Ethernet 10/100 ports with IEEE 802.3af and Cisco prestandard PoE • 2 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Services Image installed • Full dynamic IP routing
WS-C3750-24PS-S	<ul style="list-style-type: none"> • 24 Ethernet 10/100 ports with IEEE 802.3af and Cisco prestandard PoE • 2 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Base Image installed • Basic RIP and static routing, upgradeable to full dynamic IP routing
WS-C3750-24TS-E	<ul style="list-style-type: none"> • 24 Ethernet 10/100 ports • 2 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Services Image installed • Full dynamic IP routing
WS-C3750-24TS-S	<ul style="list-style-type: none"> • 24 Ethernet 10/100 ports • 2 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Base Image installed • Basic RIP and static routing, upgradeable to full dynamic IP routing
WS-C3750-24FS-S	<ul style="list-style-type: none"> • 24 100BASE-FX ports • 2 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Base Image installed • Basic RIP and static routing, upgradeable to full dynamic IP routing

Q. What software images do the Cisco Catalyst 3750 Series Switches support?

A. The Cisco Catalyst Switches are available with the IP Base Image or the IP Services Image.

The IP Services Image enables a richer set of enterprise-class features including:

- Dynamic Routing Protocols:
 - Open Shortest Path First (OSPF)
 - Enhanced IGRP (EIGRP)
 - Border Gateway Protocol Version 4 (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.

Cisco provides the flexibility to upgrade to the IP Services Image after the initial deployment through an IP Services Image upgrade kit. Additional details are provided later in this document.

Q. Can I enable static IP routing using the IP Base Image?

A. Yes, RIP and static routing are supported on the IP Base Image. Dynamic IP routing protocols (OSPF, BGPv4, EIGRP) are available only on the IP Services Image.

Q. Is the IP Services Image required to allow Layer 3 and Layer 4 lookups for QoS and security?

A. No. Both the IP Base Image and the IP Services Image allow for Layer 3 and Layer 4 lookups for QoS and security.

Q. Do the Cisco Catalyst 3750 Series Switches support Inter-Switch Link (ISL) virtual LAN (VLAN) trunking?

A. Yes, the Cisco Catalyst 3750 Series 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. Can the Cisco Catalyst 3750 Series Switches stack with the Cisco Catalyst 3550 Series Switches?

A. No, the Cisco Catalyst 3750 Series Switches cannot stack with the Cisco Catalyst 3550 Series Switches. The Cisco Catalyst 3750 Series Switches' new innovative Cisco StackWise™ technology with a 32 Gbps high-speed stack interconnect is not compatible with the Cisco Catalyst 3550 Series Switches' GigaStack® stacking.

Q. What is the difference between the 3750G-24TS and the 3750G-24TS-1U?

A. Physically, the 3750G-24TS is a 1.5 RU unit while the 3750G-24TS-1U is 1 RU in height.

The 3750G-24TS-1U has a larger Flash memory (32Mb vs. 16Mb) and consumes less power (100W vs. 190W) than the 3750G-TS. There are no differences in features or functionality between the 2 SKUs.

Q. Are the Cisco Catalyst 3750G 48-port units oversubscribed?

A. Yes. There's a 52 to 32 Gbps oversubscription.

Q. What is the difference between the 3560G and the 3750G?

A. The 3560G SKUs are the standalone versions of 3750G. The 3560G SKUs do not implement the Cisco StackWise technology found on the Cisco Catalyst 3750 Series.

Q. What is the difference between the 4948G, 3750G, and 3560G 48 port units?

A. The 4948G is a full wire-rate box with a 96 Gbps, non-blocking, full-duplex switching fabric based on the Cisco Catalyst 4500 K-2 architecture, providing 72 million packets-per-second of switching capacity. It has removable redundant power supplies and a removable automatic variable speed fan tray. The 4948G series is also available with DC power supplies which aren't available on most 3750 or 3560 SKU's. The 3750G and 3560G 48 port units have oversubscribed switching backplane (52-to-32 Gbps oversubscription) and only have 1 power supply and fixed fan units. The 3750G units can stack together with other Cisco Catalyst 3750 Series or 3750G units using StackWise technology to form a single virtual switching unit. The 3560G is a standalone switch.

Q. Is the Cisco Catalyst 3750G-12S-SD the only DC powered model planned for the Cisco Catalyst 3750 Series family?

A. Yes. There are no plans for additional DC powered models in the Cisco Catalyst 3750 Series family.

Technology Overview**Q. What is Cisco StackWise technology?**

A. Cisco StackWise technology provides an innovative method for collectively using and extending the resources of a stack of units. Up to nine switches can be joined together to create a single switching unit with a virtual 32 Gbps stack interconnect. Furthermore, the entire stack can be managed as one unit with a single IP address. To the rest of the network, the stack operates as a single switch. With a unified management interface, the customer can with one command load a single image to all compatible switches on the stack. Cisco StackWise technology is optimized for Gigabit Ethernet deployment bringing customers new levels of performance through the high speed interconnect, resiliency through advanced failover mechanisms and ease of use through automated configuration and a single management interface.

Because of the Cisco StackWise technology, the Cisco Catalyst 3750 Series is highly scalable. There can be up to 468 Gigabit Ethernet ports in a stack. Switches within the stack can be added and removed without affecting user network access. New devices get the global configuration from the stack master, and replacement devices get the exact configuration of the old device. There is one configuration file with all stack member configurations. Its innovative design sets the bar of availability in stackable switches. It supports link and switch level redundancy. The Cisco Catalyst 3750 Series supports cross-stack EtherChannel[®] as well as Cross-Stack UplinkFast (with subsecond failover), and cross-stack equal cost routes across different switches in the stack. These features eliminate the need of relying on HSRP for router failures. In the case of Master switch failure, another Master switch takes over with minimal disruption within 2 to 3 seconds.

For more information about Cisco StackWise technology, go to:

<http://www.cisco.com/go/catalyst3750>.

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 3750 Series 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 3750 Series Switches?**A.** Cisco Catalyst 3750 Series Switches support the following SFPs:

- 1000BASE-LX/LH (GLC-LH-SM=)
- 1000BASE-SX (GLC-SX-SM=)
- 1000BASE-ZX (GLC-ZX-SM=)
- 1000BASE-T (GLC-T=)
- 1000BASE-BX 1490nm (GLC-BX-D=) (12.2(25)SEB and later)
- 1000BASE-BX 1310nm (GLC-BX-U=) (12.2(25)SEB and later)
- CWDM (supported after 12.1(14) EA release)
 - CWDM-SFP-1470
 - CWDM-SFP-1490
 - CWDM-SFP-1510
 - CWDM-SFP-1530
 - CWDM-SFP-1550
 - CWDM-SFP-1570
 - CWDM-SFP-1590
 - CWDM-SFP-1610
- 100Base FX (12.2(20)SE and later)

Q. Can the 1000BASE-T SFP support 10/100/1000 speeds?**A.** Yes, the 1000BASE-T SFP can support 10/100/1000 speeds on the Cisco Catalyst 3750 Series Switches. Please refer to the 1000BASE-T SFP Compatibility Matrix for information about support on other Cisco products.**Q. Do the Cisco Catalyst 3750 Series Switches interoperate with SFPs from other vendors?****A.** Yes, starting from 12.2(25)SE release, the user has the option via CLI to turn on the support for 3rd party SFPs. However, the Cisco TAC will not support such 3rd party SFPs. In the event of any link error involving such 3rd party SFPs the customer will have to replace 3rd party SFPs with Cisco SFPs before any troubleshooting can be done by TAC.**Q. Is there a limit to the number of SFPs that can be used on a Cisco Catalyst 3750 Series Switch?****A.** No. Users can populate all the SFP ports of any Cisco Catalyst 3750 Series Switch with the same SFP or with a combination of different Cisco SFPs.**Q. What are XENPAKS?****A.** XENPAKs are transceivers that provide Ten Gigabit Ethernet connectivity on the Cisco Catalyst WS-C3750G-16TD switches.**Q. Which XENPAKs are supported on the Cisco Catalyst WS-C3750G-16TD switches?****A.** The Cisco Catalyst WS-C3750G-16TD switches currently support ER, LR, and SR (limited orderability) XENPAKs.**Q. What performance of the 10 Gigabit Ethernet port on the Cisco Catalyst WS-C3750G-16TD switches?****A.** The Ten Gigabit Ethernet uplink on the Cisco Catalyst WS-C3750G-16TD switches is 1.25:1 oversubscribed and provides maximum throughput of 8Gb/s.

Q. Do the Cisco Catalyst WS-C3750G-16TD switches use the same XENPAKs as other Cisco products?

A. Sometimes, The correct XENPAK product IDs for Cisco Catalyst WS-C3750G-16TD switches are:

- XENPAK-10GB-ER
- C3-XENPAK10GB-LR=
- C3-XENPAK10GB-SR= (limited orderability)

Q. Do the Cisco Catalyst 3750 Series Switches have Redundant Power Supply (RPS) support?

A. Yes. The Cisco Catalyst 3750 Series Switches can be supported by the Cisco RPS 675 and the Cisco RPS 300.

Both the Cisco RPS 675 and RPS 300 provide superior internal power source redundancy for up to six Cisco networking devices. This results in improved fault tolerance and network uptime. For more information go to

<http://www.cisco.com/univercd/cc/td/doc/product/lan/c3550/rps675/index.htm>.

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

A. The Cisco Catalyst 3750-24TS-E, 3750-24PS-E, 3750-48TS-E, 3750-48PS-E, 3750G-24T-E, 3750G-24TS-E, 3750G-24TS-E1U, 3750G-24PS-E, 3750G-48TS-E, 3750G-48PS-E, 3750G-16TD-E, and 3750G-12S-E are loaded with the IP Services Software Image which is included in the standard list price. However, the Cisco Catalyst 3750-24TS-S, 3750-24PS-S, 3750-24FS-S, 3750-48TS-S, 3750-48PS-S, 3750G-24T-S, 3750G-24TS-S, 3750G-24TS-S1U, 3750G-24PS-S, 3750G-48TS-S, 3750G-48PS-S, 3750G-16TD-S, 3750G-12S-S, and 3750G-12S-SD switches are loaded with the IP Base Software Image. Cisco Catalyst 3750-24TS-S, 3750-24TS-S1U, and 3750-48TS-S can be upgraded to the IP Services Software Image with the purchase of the IP Services Software Image upgrade kit (part number CD-3750-EMI=) for \$1995. The Cisco Catalyst 3750G-24T-S, 3750G-24TS-S, 3750G-16TD-S, 3750G-12S-S, and 3750G-12S-SD can be upgraded to the IP Services Software Image with the purchase of the IP Services Software Image upgrade kit for 24 port or less 3750GE models (part number CD-3750G-EMI=) for \$3995. The Cisco Catalyst 3750G-48T-S and the 3750G-48PS-S can be upgraded to the IP Services Software Image with the purchase of the IP Services Software Image upgrade kit for 48 port 3750GE models (part number CD-3750G-48EMI=) for \$7995. The IP Base Software Image includes RIP and static routing. For dynamic IP routing features (BGPv4, OSPF, EIGRP, IGRP), the IP Services Image is required.

Q. What features are only supported on the IP Services Image?

A. The following features and functionality are supported with the IP Services Image:

- Dynamic IP routing protocols for load balancing and constructing scalable LANs:
 - Open Shortest Path First (OSPF)
 - Enhanced IGRP (EIGRP)
 - Border Gateway Protocol (BGPv4)
- Equal-cost routing for load balancing and redundancy
- Fallback bridging for forwarding of non-IP traffic between two or more VLANs

- 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
- Policy-based Routing (PBR) allows superior control by enabling flow redirection regardless of the routing protocol configured
- Private VLAN (PVLAN) provides the ability to restrict communications between hosts at layer 2 through the use of primary and secondary VLANs.

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:

- Increased 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 help ensure their high availability, security, scalability, and control. By adding Cisco intelligent functions to the wiring closet, customers can now deploy network-wide 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 helping ensure that voice traffic is properly classified and prioritized throughout the network. Cisco Intelligent Ethernet switches implement superior quality of service (QoS) to help ensure that network traffic is classified, prioritized, and congestion is avoided.

Integrated Wireless LAN Controller

Q. What is the Cisco® Catalyst® 3750G Integrated Wireless LAN Controller?

A. The Cisco Catalyst 3750G Integrated Wireless LAN Controller is a Cisco 4400 Series Wireless LAN (WLAN) Controller integrated into the Cisco Catalyst 3750G switch. It works in conjunction with Cisco Aironet® Series lightweight access points, the Cisco Wireless Control System (WCS), and the Cisco Wireless Location Appliance to deliver a highly secure and unified wireless solution that supports mission-critical wireless data, voice, and video applications.

Q. Is the Cisco Catalyst 3750G Integrated WLAN Controller part of the Cisco Wireless LAN Controller product line?

A. Yes. The Cisco Wireless LAN Controller product line also includes Cisco 2000, 4100, and 4400 series wireless LAN controllers as well as the Cisco Wireless LAN Controller Module for Cisco Integrated Services Routers and Wireless Services Module for Cisco Catalyst 6500 Series Switches.

Q. What features are supported by the Cisco Catalyst 3750G Integrated Wireless LAN Controller?

A. The Cisco Catalyst 3750G Integrated Wireless LAN Controller supports the following features:

- Integrates WLAN controller functions into the highest resiliency stackable Cisco Catalyst 3750G Switch delivering improved operating efficiency, unparalleled WLAN security, intelligent protection switching (IPS), RF management, quality of service (QoS), and Layer 3 fast secure roaming
- Intelligent, adaptive real-time RF management for self-configuration, self-healing, and self-optimization
- Enterprise reliability for automated recovery from failures and mission-critical wireless networks
- Enterprise scalability for business-critical wireless services for deployments of all sizes
- Enterprise-class security with support for Wi-Fi security standards and flexible security policies that are adaptable to changing corporate security needs
- Intrusion detection, location, and containment to preserve the integrity of wireless networks and sensitive corporate information
- Mobility management that allows users to roam between access points and across bridged and routed subnets without requiring changes to the underlying infrastructure
- Simplified deployment and management with zero-configuration deployment and intuitive management interfaces that provide better visibility and control of the air space for reduced operating costs
- High performance to support real-time applications such as voice

Q. What are the benefits of the Cisco Catalyst 3750G Integrated Wireless LAN Controller?

A. The Cisco Catalyst 3750G Integrated Wireless LAN Controller provides the control and reliability that IT managers need to build highly secure, business-class indoor and outdoor 802.11 wireless networks. From voice and data services and location tracking to wireless mesh networks, the Cisco Catalyst 3750G Integrated Wireless LAN Controller enables medium-sized organizations and enterprise branch offices to create and enforce policies that support business-critical applications.

Q. What is the scalability of the Cisco Catalyst 3750G Integrated Wireless LAN Controller?

A. The Cisco Catalyst 3750G Integrated Wireless LAN Controller scales to support up to 200 lightweight access points in one logical unit.

Q. Does the Cisco Catalyst 3750G Integrated Wireless LAN Controller support the same features as the Cisco 4400 Series Wireless LAN Controller?

A. The Cisco Catalyst 3750G Integrated Wireless LAN Controller supports the same features as the Cisco 4400 Series Wireless LAN Controller with the exception of the optional VPN module.

Q. What is the advantage of deploying the Cisco Catalyst 3750G Integrated Wireless LAN Controller?

A. Advantages of deploying the Cisco Catalyst 3750G Integrated Wireless LAN Controller include:

- Lower costs for deployments up to 200 access points
- Continued investment protection for existing users of Cisco Catalyst 3750G Switches with their high availability, high security, and QoS
- Ability of new wireless deployments to purchase a WLAN controller integrated into Cisco Catalyst 3750G Switches
- Fewer managed nodes in the network
- Tighter wired and wireless integration

Q. What is the available data throughput for the Cisco Catalyst 3750G Integrated Wireless LAN Controller?

A. The Cisco Catalyst 3750G Integrated Wireless LAN Controller has a 2-Gbps interface to the switch.

Q. How many Cisco Catalyst 3750G Integrated Wireless LAN Controllers are supported in a stack?

A. Up to four controllers are supported in one stack. Up to nine switches can be joined together to create a single switching unit with a virtual 32-Gbps stack interconnect.

Q. What fast secure roaming protocol is supported by the Cisco Catalyst 3750G Integrated Wireless LAN Controller?

A. Cisco Catalyst 3750G Integrated Wireless LAN Controller supports Proactive Key Caching (PKC), an extension to the 802.11i standard and precursor to the 802.11r standard that facilitates secure roaming with AES encryption and RADIUS authentication.

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

A. With the rise in internal threats to a network, Cisco Intelligent 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, MAC address notification, and RADIUS/TACACS+. Depending on your security needs, the Cisco Catalyst 3750 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 Cisco Catalyst 3750 Series 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 helps ensure 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 Cisco Catalyst 3750 Series 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.
- 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 Cisco Catalyst 3750 Series support SSH v2?**
- A.** Yes.
- Q. Is the private VLAN feature supported?**
- A.** Yes, private VLAN is supported in the IP Services software image as of release 12.2(20)SE and in the IP Base software images as of release 12.2(25)SEB.
- Q. Is full private VLAN feature supported?**
- A.** Yes, IP Base Image supports full private VLAN feature starting 12.2(25)SEB. Prior to this release, full private VLAN was only available in IP Services.
- Q. What is the difference between the Private VLAN Edge (Protected Port) and Private VLAN features?**
- A.** Private VLAN Edge feature is also known as Protected Port. It is roughly 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 VLAN.
- Q. Are DAI (Dynamic ARP Inspection) and IPSG (IP Source Guard) supported?**
- A.** Yes. Both of these features are supported in the IP Base Image as of release 12.2(25)SEB.

Power over Ethernet (PoE)

Q. Why do I need GE PoE?

A. Gigabit Ethernet over copper technology delivers all the benefits of Ethernet, while providing far greater speeds to support today's most demanding applications. In addition, customers can use their existing Category 5 wiring infrastructure that they use for 10/100 Mbps connections. Since the PDs such as Phones and Access points are migrating to Gigabit Ethernet as well, the demand of GE PoE is increasing rapidly.

Q. How is Cisco Catalyst 3750G PoE delivered over GE pairs? How is that different than PoE over FE pairs?

A. The Cisco Catalyst 3750G POE switch delivers -48V DC power over GE data pairs 2 and 3 (i.e. pins 1, 2, 3 and 6) to the PDs, just as it would do over FE pairs.

Q. What PD devices support 10/100/1000 speeds?

A. The Cisco IP Phone 7971G-GE IP Phone supports 10/100/100 and 802.3af POE. It does not support Cisco pre-standard POE.

Q. Is there PoE on the SFP port if I use the 10/100/1000 SFP?

A. No, PoE supported on the 10/100/1000 copper ports, not on the SFP ports.

Q. What is Bi-directional CDP (PNP Power Negotiation Protocol) and is it supported on the DSBU PoE switches?

A. PNP enables High Power PDs to operate in high power mode on the Cisco Catalyst 3560 and the Cisco Catalyst 3750 PoE family switches. This protocol is supported on the Cisco Catalyst 3750 Series and the Cisco Catalyst 3560 PoE family switches. PNP is supported currently on Cisco 7970G Phones and is being phased into all high power PDS. When the High Power PDs are connected to the Cisco Catalyst 3560/3750 PoE family switches, the PD boots up in low power mode, and requests to move into high power mode by incrementing the request ID and sending a list of possible power modes. Upon receiving this request the switch will select the highest mode possible from the list of power modes. The decision on which power mode to select is based on hardware limits, current power available in the global power budget, and user configuration. The switch will set the available power CDP field to the chosen value and respond to the PD request. If a PD is denied transition to high power mode, it will not request again to transition, unless it is unplugged and re-plugged into the port.

Q. How does the static <max-wattage> CLI command work, does <max-wattage> override the PD's advertised class?

A. The static cli command helps ensure that the high priority ports always have power available. This command enables the user to pre-allocate power per port at configuration time, before the switch discovers the powered device on that port. The switch reserves power for this port even when no device is connected and guarantees that power will be provided upon device detection. The default value of <max-wattage> is 15.4W per port. The power allocation is not readjusted when the switch finds out through IEEE classification or CDP protocol that a PD connected to the port is consuming less than configured <max-wattage>; However, if the PD requires more power than the configured <max-wattage>, the PD will shutdown and a Syslog message is issued. If there is not enough power in the power budget then the switch cannot pre-allocate the power when a port is configured as "static". In this case the switch will reject the cli command and a Syslog message is issued.

Q. What is Discovery and Disconnect timing restriction required by IEEE802.3af

- A.** The Cisco Catalyst 3560/3750 PoE switches detect the connected PD within 500ms. Upon successful detection, the switch turns on the power within 400ms. At the time of disconnect, power is removed from the port within 500ms.
- Q. Does Cisco Catalyst 3750 PoE switch support the IEEE 802.3af standards-based implementation?**
- A.** Yes, Cisco Catalyst 3750 PoE switches support both the Cisco pre-standard Power over Ethernet implementation as well as the IEEE 802.3af Power over Ethernet implementation.
- Q. What method of disconnect does the Cisco Catalyst 3750 PoE support?**
- A.** The Cisco Catalyst 3750 PoE switches support AC disconnect detection for both IEEE802.3af standard compliance and pre-standard Cisco PDs.
- Q. What method of detection does the Cisco Catalyst 3750 PoE support?**
- A.** The Cisco Catalyst 3750 PoE switches support both Cisco pre-standard Power over Ethernet and IEEE802.3af standards based detection method of detecting a PD. Both detection methods are active at the same time and either one can be used to detect a valid PD.
- Q. Does the Cisco Catalyst 3750 PoE switches support power classification?**
- A.** Yes, each Cisco Catalyst 3750-24PS or Cisco Catalyst 3750-48PS switch can optionally detect the PD Power Classification signature and budget the appropriate power. This reduces the maximum power that must be budgeted by the switch and provisioned in the wiring closet. The Cisco Catalyst 3750 PoE switches have 370W available for Power over Ethernet, which is shared by all 24/48 ports. The switch allocates the maximum power a PD needs.
- Q. What is the maximum power per port that the Cisco Catalyst 3750 PoE can supply?**
- A.** The maximum power supplied at the Cisco Catalyst 3750 PoE is 15.4W per port.
- Q. How does Power Management work in the Cisco Catalyst 3750 PoE switches?**
- A.** The Cisco Catalyst 3750-24PS switch supports a maximum of 15.4W per port of -48V DC power on all 24 ports over standard Category 3 and 5 unshielded twisted-pair (UTP) cable up to 100 meters, however all 48 10/100 ports in Cisco Catalyst 3750-48PS switch will be able to deliver 7.7W simultaneously and any given port can be configurable to support up to the maximum of 15.4 watts as long as the switch's - 48V power capacity is not exceeded. The Cisco Catalyst 3750 PoE switches monitor and track the requests for power, and only grants power when it is available. If the connected PD draws more power, which results in exceeding the system power budget that is available on the switch, then power will be denied to that port and the PD will not power up. If power is denied, the switch re-checks the power budget periodically (every 15 seconds), and continues to attempt to grant the request for power. If power is granted, the switch updates the power budget. Additional power management features are described later in this section.
- Q. What pair set is used to support DC power in the Cisco Catalyst 3750 PoE switches?**
- A.** The pairs 2 and 3 (pins 1, 2, 3, and 6) of the four pairs in Category 3 and 5 cables are used for both the Ethernet data signals and the DC power at the same time. The PD must accept either polarity of power from either pair set. This allows both crossover and straight cables to be used. Only straight cables should be used with the pre-standard Cisco PDs.

Q. What is the time delay from disconnecting to power removal on the port?

- A.** Power removal occurs between 300ms to 400ms from when the port is disconnected from the PD. Typical time delay from disconnect to power off is 350 ms.

Q. What procedure will get triggered when supply voltage exceeds critical value?

- A.** If the switch detects a fault such as under-voltage, over-voltage, over-temp, or oscillator fault, the PD is denied power and the power is turned off to the port. The switch also generates a syslog message and updates System LEDs.

Q. What is the Power over Ethernet default configuration on the Cisco Catalyst 3750 PoE switches?

- A.** All the 10/100 or 10/100/1000 Ethernet ports are by default configured as "Auto". This means that PD discovery is enabled and PDs are powered up first come, first served. The 10/100 or 10/100/1000 ports can also be configured as "never". This means that the PD discovery is disabled on that port.

Q. How do the Cisco Catalyst 3750 PoE switches behave if the PD is connected to a wall power?

- A.** If Cisco Catalyst 3750 Series is powering a PD, and if the PD then gets connected to Electrical wall outlet, the switch will continue to report that the PD is powered inline. If a PD is being wall powered first (a wall plug is connected before an Ethernet cable), then if wall power is disconnected, the PD will reset and discovery begins.

Q. What kind of safety protection does the Cisco Catalyst 3750 PoE offer if a port gets an over-current condition?

- A.** Each port on the Cisco Catalyst 3750 Series has an individual over-current and short circuit protection designs. Each port is designed for 350 mAmps, and will shut off if current exceeds 400 mAmps for more than 75 ms. A low ohm short circuit will be detected in less than 1ms and power will be shut off immediately. Each port is designed to recover from an over-current or short circuit condition automatically when the fault is removed. Each port is independent and a fault on one port does not affect other ports.

Q. Is the power consumption cli command supported on this platform?

- A.** The catalyst 3750 PoE family switches do not support the power consumption cli command.

The PoE switches support a maximum of 370 W PoE. Since there is no way to monitor that the 370W supply rating is not exceeded and due to compliance safety concerns this feature is not supported on the DSBU PoE switches.

Q. Is Auto MDIX supported on PoE ports?

- A.** Yes, Auto-MDIX is supported on the fast Ethernet PoE ports and as well as 10/100/1000 port. Auto-MDIX operates the same for a PoE port as for a non-PoE port. When Auto-MDIX is enabled, and legacy PD is connected to the Cisco Catalyst 3750/3560 PoE switches with crossover cable, the PD is detected and power is granted, followed by an AC disconnect. This behavior happens repeatedly until cable is changed. Auto- MDIX will only works if the port is configured for auto speed and auto duplex.

Q. What are the Discovery and Disconnect timing restriction required by IEEE802.3af?

- A.** The Cisco Catalyst 3750/3560 PoE switches detect the connected PD within 500 ms. After successful detection, the switch turns on the power within 400 ms. At the time of disconnect, power is removed from the port within 500 ms.

- Q. How much power is budgeted for a powered device that does not support IEEE power classification?**
- A.** 15.4 W
- Q. Will the RPS provide sufficient power for data + PoE on all switches?**
- A.** Yes
- Q. Can you support 15.4 W on all 48 ports?**
- A.** The Cisco Catalyst 3750/3560 PoE switches have 370 W available for Power over Ethernet, which is shared by all 48 ports. The 48 port POE switches have the ability to support all 48 ports at 7.5 watts or 24 ports at 15.4 W simultaneously and any given port could be configured up to maximum of 15.4 watts to support 802.3af classification.
- Q. What is the “Power Inline Consumption Feature” and how does it work?**
- A.** The “Power Inline Consumption” feature on the Cisco Catalyst 3560 and 3750 Series PoE products allows the network administrator to configure the actual power requirements of the powered device (PD), overriding the powered device classification setting. This is a feature that has been requested by many large Enterprise customers and is supported beginning with release 12.2(25)SEC.

Following are two scenarios where the Consumption CLI can be used to manually configure the PoE allocation much more efficiently than the automatic algorithms:

- Currently, the Cisco Catalyst 3750 Series budgets 15.4 W for Class 0 PDs. However, some of these PDs require a maximum of much less than 15.4 W (e.g., the Siemens IP phone requires 5 W). Without the “Power Inline Consumption” feature, customers could only deploy 24 of these devices, whereas customers can deploy up to 48 of these devices using the Power Inline Consumption command to configure the power requirements on the switchports.
- Class 3 PDs are allocated 15.4W normally. Some IEEE Class 3 PDs (8-15 W range) use considerably less than 15.4 W maximum. An example is the Avaya 2620SW, which uses 8W worst case. If the ‘Consumption’ CLI configured ports supporting this phone to 8 W, a 3750-48PS could power 46 phones instead of 24, and do it safely.

A customer who misconfigures the switch (by over-subscribing the power supply) may reduce its reliability or damage the switch. If the power supply is over-subscribed by up to about 20%, the switch will continue to operate but its reliability may be reduced. Above about 20%, the short-circuit protection circuitry will trigger and shut the switch down.

Network Management

- Q. Does the Cisco Catalyst 3750 Series support Cisco Switch Clustering technology?**
- A.** Yes, the Cisco Catalyst 3750 Series can be managed using the Cisco Network Assistant (CNA) software, which uses Cisco Switch Clustering technology. Through CNA software, users can manage unlimited number of switch clusters with up to 16 switches in each of these clusters.
- Q. What is Cisco Network Assistant (CNA)?**
- A.** Cisco Network Assistant is a PC-based network management application that manages standalone devices and clusters of devices from anywhere in your intranet. It is optimized for LANs of small and medium-sized businesses with up to 250 users. It supports a wide range of

Cisco Catalyst Intelligent switches from Cisco Catalyst 2950 through Cisco Catalyst 4506. Through its graphical user interface (GUI), Cisco Network Assistant manages many of the switch critical functions and allows the user to launch the device manager of Cisco Systems access routers and wireless access points.

The Network Assistant offers:

- Graphical display of network topology
- Auto discovery of network devices
- Topology view
- Front panel view
- Application update
- Software upgrade
- Switch configuration
- Feature configuration

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

Network Assistant gives you two graphical views of a cluster:

- A topology view, showing devices that are eligible to join the cluster, link information between devices, and other connected clusters.
- A front-panel view from which you can monitor the real-time status of the devices and perform many configuration tasks. The devices and port LEDs in the view look like the physical devices and port LEDs.

A cluster can contain up to 16 connected, cluster-capable Cisco Catalyst devices. The devices belong exclusively to the cluster; they do not participate in other clusters. You assign an IP address to a device that will become the command device. The IP address is the single point of access that Network Assistant uses to configure, manage, and monitor the command device and the member devices.

The main reasons for creating a cluster are:

- You can manage Cisco cluster-capable devices regardless of their interconnection media and physical locations. The devices can be in the same location, or they can be distributed across a Layer 2 or Layer 3 network.
- You can designate devices to take the place of a failed command device. By having standby command devices you can safeguard against a loss of contact with cluster members.

Network Assistant features can identify a device as the command device, add members to the cluster, and identify standby command devices.

Q. What Cisco devices are supported by CNA?

A. As of November, 2004, the following Cisco switches, routers, Access points and IP phones are supported by CNA:

Fixed configuration Cisco Catalyst switch families:

- Cisco Catalyst:
 - 2900XL
 - 2940
 - 2950
 - 2900/2950LRE
 - 2955
 - 2970
 - 3500XL
 - 3550
 - 3560
 - 3750

Modular Cisco Catalyst switches:

- Cisco Catalyst 4500 Series
 - Chassis: 4503, 4506
 - Supervisors: Sup II+, Sup II+ TS, Sup IV
 - Line cards: 4124, 4148, 4224, 4248, 4424, 4548
 - Power Supplies: C45-1000, C45-1300
 - Routers: All (CDP discoverable)
- Access Points:
 - 350
 - 1100
 - 1200
- IP Phones:
 - All (CDP discoverable)

Q. How much does CNA software cost?

A. Cisco Network Assistant software is free of charge.

Q. Where can I get the CNA software?

A. CNA software can be downloaded from Cisco.com using your CCO login ID:
<http://www.cisco.com/go/NetworkAssistant>

Q. Can the Network Assistant manage a multivendor network?

A. No, Cisco Network Assistant exclusively manages Cisco devices.

Q. What are the dependencies on Cisco Network Assistant?

A. None. Cisco Network Assistant is a standalone Windows application that resides on the PC and does not require any other software or plug-in.

Q. What are the system requirements for Cisco Network Assistant?

- A.** The minimum requirements are:
- PC with a 233 MHz Pentium III processor
 - 128 MB RAM total

- 50 MB free hard drive space
- Windows 98*, NT 4.0, 2000, XP

*Cisco Catalyst 4500 administration is not supported under Windows 98.

Q. Can the Cisco Network Assistant function under other operating systems (UNIX, Linux, Mac OS)?

A. No, the Cisco Network Assistant only runs on Microsoft Windows.

Q. Can Cisco Network Assistant be used by Cisco customers that have networks larger than 250 users?

A. Yes, but Cisco Network Assistant is optimized for LANs of small and medium-sized businesses of up to 250 users and the Cisco devices that are typically used in these networks.

Q. Who would benefit most from using Cisco Network Assistant?

A. The network administrator or specialist will benefit the most from using Cisco Network Assistant. This could be a Cisco partner or reseller that services the SMB network or the SMB staff network support specialist.

Q. Do I need networking experience to use Cisco Network Assistant?

A. Although Cisco Network Assistant is a simple, intuitive, and GUI-based application, relevant knowledge of the networking principles will help maximize the value of the application.

Q. Is there a MIB that can be used to monitor the StackWise port status?

A. Currently, No. However, such MIB will be available in future software releases.

Software Updates

Q. How do I get a Cisco IOS Software update?

A. Please refer to the product bulletin for the latest on Catalyst 3750 software updates http://www.cisco.com/en/US/products/hw/switches/ps5023/prod_bulletins_list.html.

Warranty and Service

Q. What is the warranty for the Cisco Catalyst 3750 Series Switches?

A. Cisco Catalyst 3750 Series Switches come with the Cisco Limited Lifetime Hardware Warranty.

Limited Lifetime Warranty

The hardware warranty available on Cisco Catalyst 3750-E, 3560-E, 3750, 3560, 3550, 2970, 2960, 2950, 2940, Cisco Catalyst Express 500, and 3500 XL Series Switches is the Limited Lifetime Hardware Warranty. This warranty automatically comes with the purchase of eligible Cisco Catalyst products, free of charge. Additionally, it offers free advanced replacement of products within 10 business days. For specific details on the Limited Lifetime Hardware Warranty visit http://www.cisco.com/univercd/cc/td/doc/es_inpk/lh2ben.htm.

Technical Support Service

Technical Support Service is available through SMARTnet[®] 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/serv_category_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 helping ensure 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/go/services>. For more information about configuration services for QoS and multicast, contact gps-pds-west@cisco.com.

Product & Contact Information

Q. Where can I find technical and product specifications and other additional information about the Cisco Catalyst 3750 Series Switches?

A. For product literature including data sheets and product specifications, see the Cisco Catalyst 3750 Series Website at <http://www.cisco.com/go/catalyst3750>.

Q. What are the part numbers for the Cisco Catalyst 3750 Series Switches? When does it become orderable?

A. The part number and orderability information for the new Cisco Catalyst 3750 Series Switches is available at <http://www.cisco.com/go/catalyst3750>.

Q. How can I get additional questions about the Cisco Catalyst 3750 Series answered?

A. You can send inquiries about the Cisco Catalyst 3750 Series Switches to ask-c3750-pm@cisco.com.

Technical Q&As

Performance

Q. Will the Cisco Catalyst 3750 Series Switches forward traffic at wire rate for all frame sizes at Layer 2 and Layer 3?

A. These switches will forward traffic at wire rate for all frame sizes on all ports, except for Cisco Catalyst 3750G-24TS, 3750G-24TS-1U, 3750G-48TS, 3750G-24PS and 3750G-48PS with 64-byte and 128-byte packets.

Q. What is the performance when packets are forwarded by the CPU instead of the switching subsystem?

A. Performance is on the order of 2500 to 3000 packets per second.

Q. What is the latency on Cisco Catalyst 3750 Series Switches?

A. Latency ranges from 7 us to 26 us depending on the frame sizes.

Centralized vs. Distributed Features

Q. What do centralized feature and distributed feature mean?

A. A centralized feature is a feature that is processed primarily by the Master switch. For a distributed feature, the processing is performed primarily by the local switch. For Cisco Catalyst 3750 Series Switches, most Layer 3 features are centralized, and most Layer 2 features are distributed. However, whether the feature is centralized or distributed, the feature

information is propagated to all switches in the stack. The following table lists whether the feature is centralized or distributed.

Table 2. Centralized or Distributed Features in Cisco Catalyst 3750 Series Switches

Feature	Centralized/Distributed
Layer 2 Features	
VLANs/VTP/VTP Pruning	Distributed
802.1D Spanning Tree Protocol, PVST, PVST+	Distributed for all ports, except AgPorts
Spanning Tree Protocol Enhancements (CSUF, BPDU Guard, Root Guard etc)	Distributed for all ports, except AgPorts
802.1D Bridging-address learning, static addresses, dynamic addresses	Distributed
802.1X	Distributed processing, communication with RADIUS server is centralized
Voice VLAN	Distributed
VQP, Dynamic VLANs	Distributed VQP processing, communication with VMPS server is centralized server is centralized
Port security, protected port, port blocking	Distributed
CDP	Centralized
Fallback Bridging	Centralized
Routing	
IP Routing protocols-RIPv1, RIPv2, OSPF, IGRP, EIGRP	Centralized
HSRP	Centralized
Telnet, DNS, TFTP, FTP, BOOTP, DHCP, HTTP, NTP, TACACS, RADIUS	Centralized
QoS/ACLs	
VLAN ACLs, router ACLs	Centralized
QoS-Egress scheduling using SRR (shaped round robin)	Centralized
Multicast	
IGMP snooping, MVR, IGMP filtering	Distributed
IGMPv1, v2, v3	Centralized
Multicast routing protocols-PIM (Sparse, dense and sparse-dense modes), DVMRP (tunneling)	Centralized
Management	
CLI	Centralized
SNMPv2, RMON	Centralized

Layer 2 Features

Q. Are CrossStack Fast EtherChannel and Cross-Stack UplinkFast supported on Cisco Catalyst 3750 Series Switches?

A. Yes, the Cisco Catalyst 3750 Series supports both CrossStack Fast EtherChannel and Cross-Stack Uplink Fast. The two features raise the bar of availability in stackable switches. By allowing users to form EtherChannel connections and supporting UplinkFast across different switches in the stack, the Cisco Catalyst 3750 Series provides not only link redundancy, but switch-level redundancy.

Q. How many Spanning Tree Protocol instances, bridge groups, VLANs, user configurable VLAN IDs, EtherChannel connections, members per EtherChannel connection, MAC addresses, SPAN session can a stack of Cisco Catalyst 3750 Series Switches support?

A. See Table 3.

Table 3. Feature Numbers Supported per Stack

Feature	Centralized/Distributed
Spanning Tree Protocol Instances	128
Bridge Groups	63
VLANs	1024
User Configurable VLAN IDs	4K
EtherChannel Connections	48 (12.2(25)SE and later)
Members per EtherChannel	8
MAC Addresses	<ul style="list-style-type: none"> • Desktop Default SDM template: 6K • Desktop Routing SDM template: 3K Desktop VLAN SDM template: 12K • Aggregator Default SDM template: 6K Aggregator Routing SDM template: 6K • Aggregator VLAN SDM template: 12K • WS-C3750G-12S Aggregator VLAN SDM template: 20K
SPAN Sessions	2

Q. How is MAC address learning different on the Cisco Catalyst 3750 Series Switches from the Cisco Catalyst 3550 Series Switches?

A. MAC address learning is distributed on the Cisco Catalyst 3750 Series.

MAC address tables are synchronized across the stack. A switch that learns an address will send a message to other switches in the stack. The switch that learns an address will own that address, and each switch runs an aging algorithm for addresses owned by them. When an address is aged-out by a switch, it sends a message to all other switches in the stack to remove the address.

Q. How is Spanning Tree Protocol handled by the Cisco Catalyst 3750 Series compared to the Cisco Catalyst 3550 Series?

A. In both the Cisco Catalyst 3750 Series and Cisco Catalyst 3550 Series, each switch in the stack runs its own spanning tree instance per VLAN. However, in the Cisco Catalyst 3750 Series, a link from one switch to another switch within a stack is treated as a self loop, and results in blocking one of the ports. When the Master switch is removed, the bridge-ID will be changed based on the new Master switch's MAC address, and based on the network topology, this could result in re-convergence.

Q. Does the Cisco Catalyst 3750 Series support UplinkFast or CrossStack UplinkFast?

A. UplinkFast and CrossStack UplinkFast are the same in the Cisco Catalyst 3750 Series. By enabling UplinkFast, CrossStack UplinkFast is also enabled.

Q. Is the storm control feature available?

A. Yes, on the Cisco Catalyst 3750 Series, suppression is based on percentage of bandwidth as opposed to packets per second.

Q. What is the Flexlink feature?

A. Flex Links are a pair of a Layer 2 interfaces (switchports or port channels), where one interface is configured to act as a backup to the other. The feature provides an alternative solution to the Spanning Tree Protocol, allowing users to turn off Spanning Tree Protocol and still provide basic link redundancy.

Q. Will Spanning Tree Protocol run on interfaces configured as Flex Links?

A. No. Flexlink and Spanning Tree Protocol are mutually exclusive. Once interfaces are configured as Flex Links, Spanning Tree Protocol states on these interfaces become disabled.

Q. Will metro features like QinQ and L2PT be supported on the Cisco Catalyst 3750 Series?

A. Yes. Starting in 12.2(25)SE release these QinQ and L2PT features will be supported in the IP Base Image.

Layer 3 Features

Q. Are BGP and IS-IS routing protocols supported?

A. BGP is supported in the IP Services Image. There are no plans to support IS-IS.

Q. Is Cross-Stack Equal Cost Routes supported on Cisco Catalyst 3750 Series Switches? How many?

A. Yes, the Cisco Catalyst 3750 Series supports Cross-Stack Equal Cost Routes. The Cisco Catalyst 3750 Series can support eight Equal Cost Routes.

Q. Is there a road map for support of IPX and AppleTalk routing?

A. No, there are currently no plans to support either IPX or AppleTalk routing. Fallback bridging can be configured to allow bridging of non-IP traffic between VLANs.

Q. How many routed ports can a stack of Cisco Catalyst 3750 Series Switches support?

A. A stack of Cisco Catalyst 3750 Series Switches can support 468 routed ports per stack.

Q. How many SVIs can be created on the Cisco Catalyst 3750 Series Switches?

A. Up to 1000 SVIs can be created. However, the maximum number of SVIs is dependent on the number of routes and multicast entries. For example, the switch can support 64 SVIs with 8000 routes and 250 multicast entries.

Q. How many HSRP groups does the Cisco Catalyst 3750 Series support?

A. The Cisco Catalyst 3750 Series supports up to 32 HSRP groups.

Q. Will the Cisco Catalyst 3750 Series support IPv6?

A. IPv6 unicast routing is supported as of release 12.2(25)SEIPv6 multicast support will come in a future release.

Q. Does the Cisco Catalyst 3750 Series support GRE tunneling?

A. No. The Cisco Catalyst 3750 Series can switch "transient" GRE tunneled traffic in hardware at wire-rate but it cannot act as GRE tunnel end-points.

Q. Does the Cisco Catalyst 3750 Series support WCCP?

A. Yes WCCP is supported with release 12.2 (37) SE in IP Services.

Q. Does the Cisco Catalyst 3750 Series support VRRP?

A. No. In certain situations HSRP can be used instead.

Q. Does the Cisco Catalyst 3750 Series support VRFs?

A. Yes, VRF-lite is supported beginning with release 12.2(25)SEC

Q. How many VRF instances does the Cisco Catalyst 3750 Series support?

A. The Cisco Catalyst 3750 Series supports 1 global routing table and up to 26 VRF tables.

Q. Is NAT supported?

A. No. There are no plans to support NAT.

Architecture

Q. Will mini-giants be supported? Are jumbo frames supported? Can they be bridged or routed?

A. Yes. Maximum transmission units (MTUs) of up to 9018 bytes (jumbo frames) are supported on Cisco Catalyst 3750G-24T, 3750G-24TS, 3750G-24TS-x1U, 3750G-24PS, 3750G-48TS, 3750G-48PS, 3750G-16TD, 3750G-12S, 3750G-12S-SD, and all Gigabit Ethernet ports on Cisco Catalyst 3750-24TS, 3750-24PS, 3750-24FS, 3750-48TS, and 3750-48PS products.

Jumbo frames cannot be routed, they can only be bridged. MTUs of up to 1546 bytes are supported on the Fast Ethernet ports of Cisco Catalyst 3750-24TS, Cisco Catalyst 3750-24FS, and Cisco Catalyst 3750-48TS. MTUs of up to 1546 bytes can be bridged or routed.

To change the size of the MTU, issue the following command:

```
Config t System mtu <mtu_size>
```

Q. What is the maximum forwarding bandwidth at Layer 2 and Layer 3 switching fabric?

A. The maximum forwarding bandwidth is 32 Gbps.

Q. What is the stack-forwarding rate for 64-byte packets?

A. The stack-forwarding rate is 38.7 Mpps.

Q. Is there dedicated TCAM for QoS and security?

A. No, all QoS and security tables are kept on the same TCAM subsystem. Depending on the SDM template used, a different amount of space will be allocated to QoS and security entries.

Q. What types of packets are not hardware-forwarded?

A. The Cisco Catalyst 3750 Series Switches will completely hardware-forward only IPv4 packets with no options set in Ethernet II encapsulation. This includes bridging, routing, security, and QoS lookups. Packets that do not conform to all three criteria will be forwarded using a combination of hardware or software forwarding.

Quality of Service

Q. What are the QoS capabilities of the Cisco Catalyst 3750 Series Switches?

A. Refer to the following:

Classification

Layer 2: MAC SA, DA, 802.1p, Ethertype, ingress port number
Layer 3: IP DA, IP SA, Layer 4 port number, IP ToS

Policing

Policer range is 8 Kbps to 1 Gbps, and support for burst is 8 KB to 1 MB.

- Cisco Catalyst 3750G-24T, 3750G-24TS, 3750G-12S: Supports up to 64 policers per port. There are 256 policers shared among quadruplets of ports: ports 0-3, 4-7, 8-11, 12-15, 16-19, 20-23, and the 4 uplink ports.
- Cisco Catalyst 3750-24TS and 3750-48TS: Supports up to 64 policers per port. The Cisco Catalyst 3750-24 supports 256 policers. The Cisco Catalyst 3750-48 supports 512 policers; 256 policers are shared among the first 24 ports, and the other 256 policers are shared among the second set of 24 ports.

Ingress Queues Scheduling

Two ingress queues per switch rate limited by Shaped/Shared Round Robin (SRR). One of the queues is dedicated for strict priority queuing.

Ingress/Egress Congestion Management

Weighted Tail Drop (WTD) with three programmable buffer thresholds.

Egress Queue Scheduling

Four queues shaped by SRR.

Q. Does the Cisco Catalyst 3750 Series support peak information rate (PIR) policing like the Cisco Catalyst 6500 Series with PFC2 or PFC3?

A. No. The policers on the Cisco Catalyst 3750 Series Switches support rate, burst, and exceed action only.

Q. How granular can the policing be done?

A. CIR rate is 8 KB to 1 GB and the burst rate is 8 KB to 1 MB. This compares to a CIR of 32 KB to 4 GB and a burst rate of 1 KB to 512 MB, respectively, on the Cisco Catalyst 6 x 00.

Q. Is rate limiting supported? Is traffic shaping supported?

A. Rate limiting is supported on the ingress (policing required), and traffic shaping is supported on the egress.

Q. Is ingress queuing available? Are there drop thresholds if only a single receive queue? How about on egress?

A. There are two ingress queues per switch, and four egress queues per port. There are three thresholds on both the ingress queues and egress queues. Two of the thresholds are user programmable. The third threshold is set at 100 percent.

Q. Can packets being forwarded by the CPU (software forwarding) be rate limited?

A. No, packets being forwarded by the CPU cannot be rate limited.

Multicast

Q. What is smart multicast?

A. The Cisco Catalyst 3750 Series supports smart multicast. There is only one copy of the multicast in the stack interconnect, thereby conserving bandwidth. Each data packet has a 24-byte header with an activity list for the packet as well as a QoS designator. The activity list specifies the port destination or destinations and what should be done with the packet. In the case of multicast, the master switch identifies which of the ports should receive a copy of the packets and adds a destination index for each port. One copy of the packet is put on the stack interconnect. Each switch port that owns one of the destination index addresses then copies this packet. This creates a much more efficient mechanism for the stack to receive and manage multicast information.

Q. Is IGMPv3 supported on the Cisco Catalyst 3750 Series Switches?

A. Yes, IGMPv3 is supported.

Q. How many IGMP groups and multicast routes are supported on the Cisco Catalyst 3750 Series Switches?

A. The total number of IGMP groups and multicast routes supported is 1000.

Q. What are the differences in multicast management features between the Cisco Catalyst 3750 Series and Cisco Catalyst 3550 Series Switches?

- A.** The Cisco Catalyst 3750 Series Switches have multilayer-aware forwarding application-specific integrated circuits (ASICs).

Consequently, it can make forwarding decisions based on Layer 3 (IP) addresses (Layer 2 addresses are not used.). With these capabilities, the Cisco Catalyst 3750 Series Switches can implement IGMP snooping natively in hardware without performance limitations. Therefore, it doesn't need to synchronize with an upstream Layer 3 router through Cisco Group Management Protocol (GMP). It can, however, serve as a Cisco GMP server for other downstream Layer 2 Cisco GMP clients.

Q. How is the multicast mrouter command learning done when multicast routing is enabled or disabled?

- A.** Enabling or disabling multicast routing does not change the multicast mrouter learning behavior.

Q. How does multicast address aliasing affect CPU load?

- A.** As long as the IP multicast group addresses do not overlap with protocol MAC addresses (that is, 0x01005e0000xx), the groups will be learned using the regular IGMP group reports that are received after an IGMP query (every 120 seconds). This should not affect the CPU. If the IP multicast addresses overlap with the protocol MAC addresses and if there is a client in the network for the group, once again, the groups will be learned using the IGMP reports. This also should not affect the CPU. If the IP multicast group addresses overlap with the protocol MAC addresses, and if it is the only network source for the group, the groups are learned using the IP multicast data packets. The effect on the CPU load in this case is minimal. After the groups are learned and hardware is updated, all subsequent packets will be forwarded in hardware.

Other

Q. How many SPAN/RSPAN sessions does the Cisco Catalyst 3750 Series support?

- A.** The Cisco Catalyst 3750 Series supports two SPAN/RSPAN sessions per stack. Any port can be a SPAN destination.

Q. Are reflexive/dynamic ACLs supported?

- A.** No, neither are supported.

Q. Does the Cisco Catalyst 3750 Series interoperate with the Cisco LocalDirector?

- A.** Yes, the Cisco Catalyst 3750 Series supports per-SVI router MAC addresses.

Q. How does the Cisco Catalyst 3750 Series prioritize control packets that do not already have priority information in the DSCP or 802.1p field?

- A.** The hardware does not automatically prioritize control packets such as bridge protocol data unit (BPDU) and routing updates. VACLs can be used to classify these packets to high priority to help ensure they are not dropped during congestion.

Q. How is Cisco StackWise technology different from GigaStack?

- A.** GigaStack is a 1 Gbps stacking mechanism that allows traffic to pass between individual switches. Cisco StackWise technology is a 32 Gbps stack interconnect that unites all of the switches in a stack into one logical unit for switching and routing.

Q. Does Cisco Catalyst 3750 Series support TDR?

A. Yes. Cisco Catalyst 3750 Series Switches support TDR on its 10/100/1000 interfaces. TDR is not supported on 10/100 or 1000base SFP ports.

Q. What marketing programs support the Cisco Catalyst 3750 Series Switch?

A. Please see the promotional bulletin at http://www.cisco.com/en/US/products/hw/switches/ps5023/prod_literature.html.

Q. Can I use the Cisco Catalyst 3750 Series to upgrade the installed base?

A. Yes. The Cisco Catalyst 3750 Series offers an excellent platform for you to help your customers migrate to a more secure access environment, as well as evolve to a Gigabit Ethernet environment. Customers can receive up to 15% trade-to credit as part of the Cisco Technology Migration Program (CTMP).

Q. Are there five packs or multipacks for the Cisco Catalyst 3750 Series Switches?

A. No, there are no five-packs or multipacks for the Cisco Catalyst 3750 Series Switches.

Q. Are there GBIC to SFP trade-in credits/programs?

A. No, there are no GBIC to SFP trade-in credits/program.



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