

Cisco Catalyst 3500 Series XL

The Cisco Systems Catalyst® 3500 series XL is a scalable line of stackable 10/100 and Gigabit Ethernet switches that deliver premium performance, manageability, and flexibility, with unparalleled investment protection. This line of low-cost, high-performance switching solutions provides next-generation stackable switching. It allows management of all Cisco switched ports from a single IP address and provides interconnected switches with an independent high-speed stack bus that preserves valuable desktop ports.

With the introduction of the Catalyst 3500 series XL and Cisco Switched Clustering technology, Cisco takes stacking to a new level. With Switch Clustering supported on all Catalyst 3500 XL, 2900 XL and Catalyst 1900 switches, users can manage over 380 ports from a single IP address, and connect all switches with a broad range of Ethernet, Fast Ethernet, and Gigabit Ethernet media regardless of physical location.

Catalyst 3500 series XL high-performance switches feature Cisco IOS® software and Cisco Visual Switch Manager (CVSM) software, an easy-to-use Web-based management interface. All Catalyst 3500 series XL switches are available in either Standard or Enterprise Editions. Enterprise Edition switches offer advanced software features, including complete 802.1Q and ISL VLAN support, TACACS+ security, and fault tolerance through Uplink Fast.

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The Catalyst 3500 series XL family includes three switch models and the Cisco GigaStack™ Gigabit Interface Converter (GBIC):

- **Catalyst 3512 XL**—A single rack unit (RU) stackable 10/100 and Gigabit Ethernet switch with 12 10BaseT/100BaseTX ports and two GBIC-based Gigabit Ethernet ports. The two Gigabit ports accommodate a range of industry-standard GBICs, including the Cisco GigaStack GBIC, 1000BaseSX, and 1000BaseLX/LH GBICs. The Catalyst 3512 XL is a high-performance, nonblocking switch, ideal for aggregating a small group of Catalyst 2900 series XL or Catalyst 1900 switches in a clustered configuration. In a standalone or stacked configuration, the Catalyst 3512 XL offers low port density at a low entry price.

- **Catalyst 3524 XL**—A single RU stackable 10/100 and Gigabit Ethernet switch with 24 10BaseT/100BaseTX ports and two GBIC-based Gigabit Ethernet ports. The Catalyst 3524 XL is ideal for delivering dedicated 10 or 100 Mbps to individual users and servers in a stack or cluster configuration. Built-in dual GBIC-based Gigabit Ethernet ports provide users with a flexible and scalable solution for Gigabit Ethernet uplinks or GigaStack GBIC stacking.
- **Catalyst 3508G XL**—A single RU stackable Gigabit Ethernet switch with eight GBIC-based Gigabit Ethernet ports. The Catalyst 3508G XL is ideal for aggregating a group of 10/100 and Gigabit Ethernet switches and Gigabit Ethernet servers through Cisco GigaStack GBICs or standard 1000BaseX GBICs.
- **GigaStack GBIC**—A versatile, low-cost, Gigabit Ethernet stacking GBIC that offers high-speed interconnectivity between Catalyst 3500 series XL and gigabit-enabled Catalyst 2900 series XL switches. The GigaStack GBIC is ideal for performance- and cost-conscious customers who require an independent stack bus to interconnect multiple Catalyst 3500 XL and gigabit-enabled Catalyst 2900 XL switches.

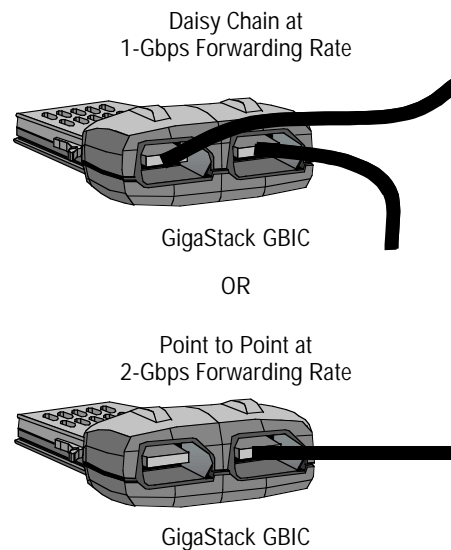
The Cisco Scalable Stacking Architecture

Cisco Systems, the leader in internetworking solutions, provides the industry's most flexible, scalable, and manageable stacking architecture for Catalyst 3500 series XL and gigabit-enabled Catalyst 2900 series XL switches.

Flexible Stacking

The Catalyst 3500 series XL and gigabit-enabled Catalyst 2900 series XL switches can be stacked using the low-cost Cisco GigaStack GBIC. The two-port GigaStack GBIC offers a range of highly flexible stacking and performance options. It delivers 1-Gbps connectivity in a daisy-chained configuration or up to 2-Gbps full-duplex connectivity in a dedicated switch-to-switch configuration.

Figure 1 GigaStack GBIC Connection Options



Cisco Switch Clustering

Breakthrough Cisco Switch Clustering technology enables up to 16 interconnected Catalyst 3500 XL, 2900 XL, and Catalyst 1900 switches, regardless of geographic proximity, to form a managed single IP address network. These switches can be clustered using a broad range of standards-based connectivity options, to deliver varying levels of performance to meet customer requirements. Clustering connectivity options for the Catalyst 3500 series XL include Ethernet, Fast Ethernet, Fast EtherChannel®, low-cost Cisco GigaStack GBIC, Gigabit Ethernet, and Gigabit EtherChannel. Because the technology is not limited by proprietary stacking modules and stacking cables, Cisco Switch Clustering expands the traditional stacking domain beyond a single wiring closet and lets users “mix and match” interconnections to meet specific management, performance, and cost requirements as shown in Figure 1.

In a Cisco Switch Cluster, one Catalyst 3500 series XL or 2900 XL switch is specified as the “command” switch and all other switches in the cluster are designated as “member” switches. The command switch serves as the single IP address management point and disburses all management action dictated by the network administrator. Command switches can cluster up to additional 15 interconnected member switches regardless of their interconnection media. Cisco Switch Clustering command software is preinstalled on all Catalyst 3500 series XL switches and is available as an upgrade for Catalyst 2900 series XL switches with the Catalyst 2900 XL Command Software upgrade kit.

Web-Based Switch Management:

Cisco Visual Switch Manager

The Catalyst 3500 series XL features the Cisco Web-based management tool, Cisco Visual Switch Manager (CVSM), which allows network administrators to view and manage a switch from anywhere on the network through a standard browser such as Microsoft Internet Explorer or Netscape Navigator. CVSM is launched from the switch itself and delivers simple network- and device-level management, including port configuration, VLAN setup, network views, and port monitoring. CVSM is an integral part of the Cisco scalable stacking architecture, allowing users to easily configure and manage stacks and switch clusters and administer software upgrades across multiple switches.

Standard Edition Software

Cisco Catalyst 3500 series XL Standard Edition switches include several exceptional features to increase network performance, manageability, and security. The command switch feature delivers single-IP managed Cisco Switch Clustering technology to up to 16 interconnected Catalyst 3500 XL, 2900 XL, or Catalyst 1900 switches. Fast EtherChannel and Gigabit EtherChannel technology offer from 400-Mbps to 4-Gbps high-performance bandwidth among Catalyst switches, routers, and servers. The Cisco Group Management Protocol (CGMP) enhances performance of multimedia applications and reduces network traffic by allowing a switch to selectively and dynamically forward IP multicast traffic to targeted end stations. Up to 250 port-based VLANs per switch allow data packets to be forwarded only to stations within a specific VLAN, creating a virtual firewall between groups of ports on the network. Network Time Protocol (NTP) provides a unified clock across the network, ensuring accurate time stamps for troubleshooting all network events. MAC-based port level security prevents unauthorized stations from accessing the switch. Multilayer security on the switch console prevents unauthorized users from accessing or altering switch configuration. All Standard Edition switches can be upgraded with the purchase of an optional Catalyst 3500 XL Enterprise Edition upgrade kit.

Enterprise Edition Software

Enterprise Edition software includes all of the features of the Standard Edition and adds enhanced end-to-end VLAN support to your Catalyst 3500 series XL switch. Virtual LAN trunks can be created from any port using either 802.1Q trunking or the Cisco Inter-Switch Link (ISL) VLAN architecture. VLANs using standards-based 802.1Q and ISL trunking provide broadcast control and enhanced security, and simplify adds, moves, and changes. TACACS+ authentication enables centralized access control of the switch and restricts unauthorized users from altering the configuration. Uplink Fast technology ensures quick failover recovery, enhancing overall network stability and reliability. An Enterprise Edition switch is the best choice for use in a network with the requirement of higher level of security, superior fail safe redundancy, and end-to-end VLANs spanning multiple routers, switches, and access servers.

Applications

The three major product applications of the Catalyst 3500 series XL are defined as follows:

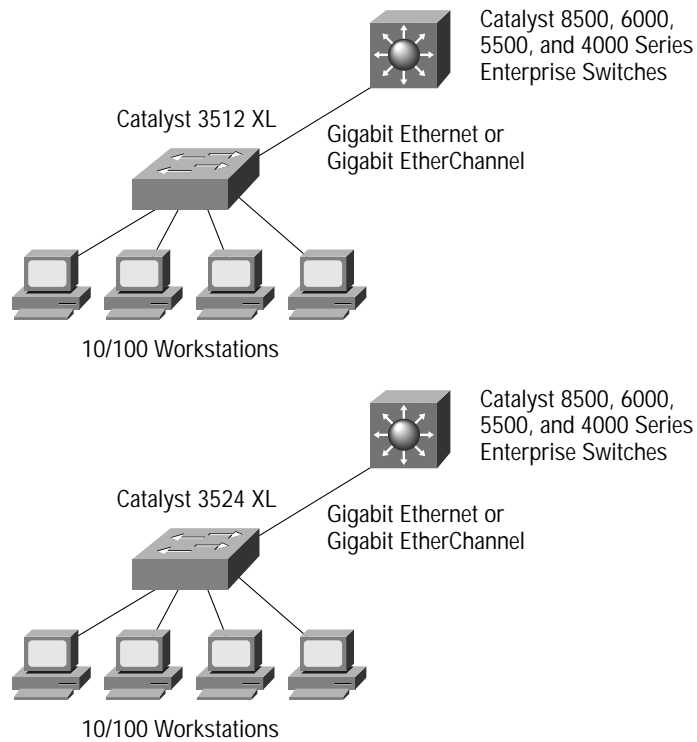
- **Desktop**—The switch is used for desktop connectivity providing dedicated 10 or 100 Mbps to workstations and servers and deployed as a standalone unit with a unique IP address. This application typically requires a higher density switch to achieve a lower per port cost. Gigabit Ethernet ports will be used for uplink connections to the corporate backbone.
- **Stacking/Clustering**—Several Catalyst 3500 XL, 2900 XL, and Catalyst 1900 switches deployed in a switch clustering or GigaStack GBIC configuration and managed with a single IP address. The switches are used mostly for desktop connectivity with limited aggregation. Gigabit Ethernet ports will be used for uplinks to corporate backbone or connections to a Gigabit aggregation switch.
- **Aggregation**—The 10/100 and Gigabit Ethernet Catalyst 3500 series XL switches are used to aggregate several 10BaseT and 100BaseTX switches and hubs, and servers into a common backbone. This application typically requires a lower-density, high-performance 10/100 switch with 12 to 24 ports. Some customers may require dedicated Gigabit Ethernet switches (Catalyst 3508G XL) to aggregate several 10/100 switches with Gigabit Ethernet uplinks.

Desktop

10/100 Desktop Connectivity

Catalyst 3500 series XL switches can be deployed as high-performance 10/100 and Gigabit Ethernet desktop solutions as shown in Figure 2. The Catalyst 3512 XL offers a low entry price 10/100 solution, while the Catalyst 3524 XL offers the lowest price-per-port. Both switches offer 2 Gigabit Ethernet uplinks in a fixed, single RU configuration.

Figure 2 Catalyst 3512 XL or Catalyst 3524 XL for Desktop Connectivity



Stacking and Clustering

Stacking

The Cisco GigaStack GBIC technology offers customers a range of performance levels, scaling from a 1-Gbps forwarding rate in a daisy-chain configuration up to a 2-Gbps forwarding rate in a point-to-point connection.

GigaStack Stacking: Independent Stack Bus

With the GigaStack GBIC installed, all Catalyst 3500 series XL and gigabit-enabled Catalyst 2900 series XL switches can be deployed in a stacking configuration, as

shown in Figure 3. The GigaStack GBIC delivers a 1-Gbps independent stack bus through standard Gigabit Ethernet connections, allowing up to nine switches to be stacked and managed through a single IP address. Support for a redundant loopback connection is achieved through secondary GigaStack GBICs in the top and bottom switches, as shown in Figure 4.

Figure 3 Creating an Independent Stack Bus Using the GigaStack GBIC, Catalyst 3500 Series XL, and Gigabit-Enabled Catalyst 2900 Series XL Switches

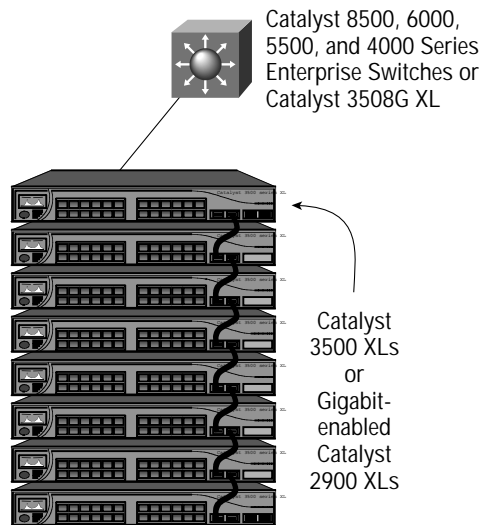
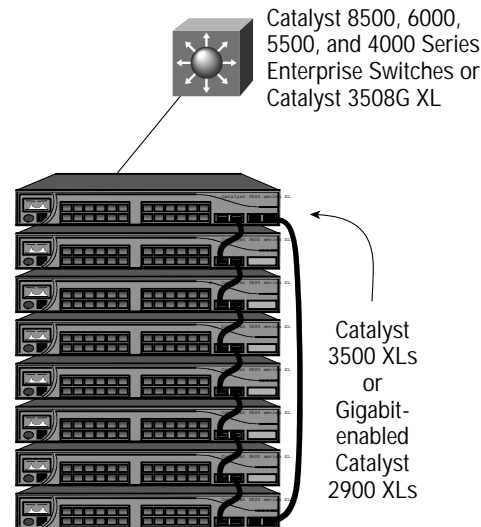


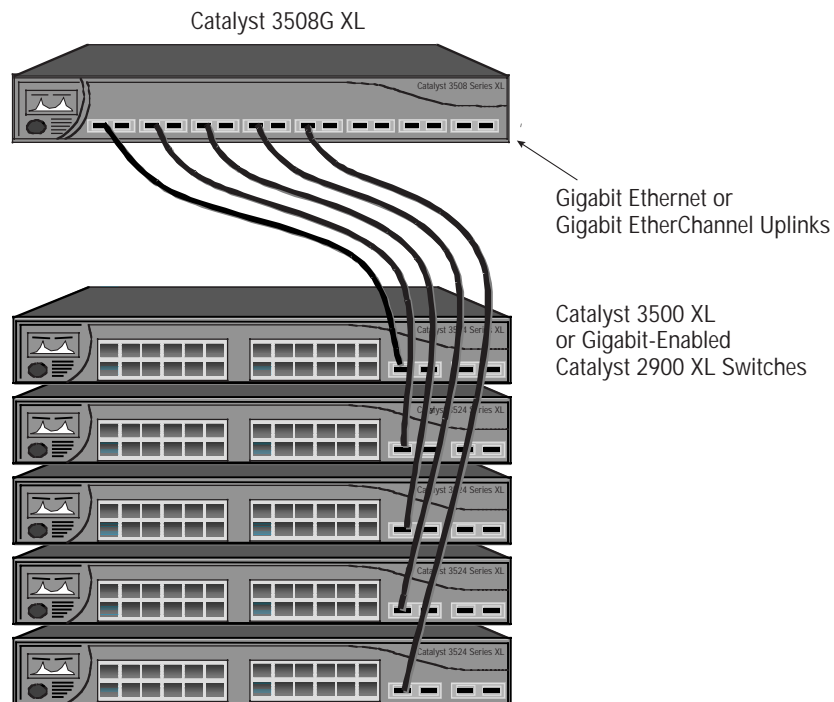
Figure 4 Creating a Redundant Loopback Connection Using GigaStack GBICs



GigaStack Stacking: Point-to-Point Connections

The Cisco GigaStack GBIC also offers users a high-performance option in a point-to-point configuration, as shown in Figure 5. Using the eight-port Catalyst 3508G XL Gigabit Ethernet switch, up to eight switches can be stacked to deliver 2-Gbps full-duplex bandwidth between the Catalyst 3508G XL and each connected switch. The Catalyst 3508G XL provides a 5-Gbps forwarding rate for the entire stack of Catalyst 3512 XL, 3524 XL, and gigabit-enabled Catalyst 2900 series XL switches.

Figure 5 Point-to-point Stacking Using GigaStack GBICs, Catalyst 3500 Series XL, and Gigabit-Enabled Catalyst 2900 Series XL Switches

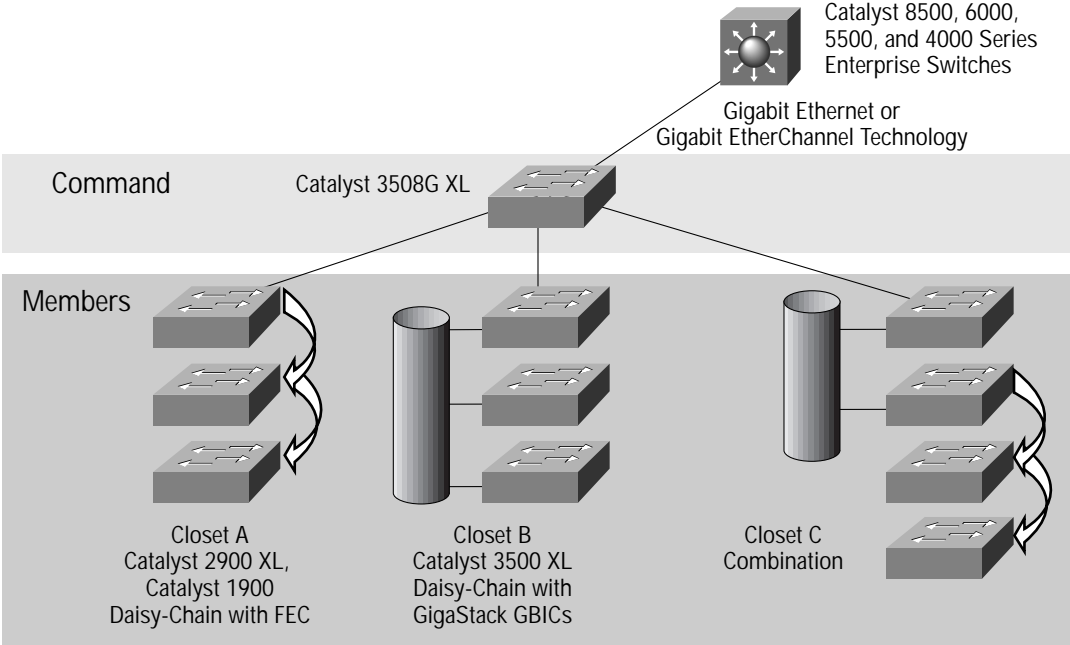




Cisco Switch Clustering

Cisco Catalyst 3500 XL, 2900 XL, and Catalyst 1900 switches can be deployed in an interconnected, switch-clustering configuration managed from a single IP address, as shown in Figure 6. One switch is designated as the command switch for single point of management for the cluster. The remaining switches are designated as member switches. Customers can use Ethernet, Fast Ethernet, Fast EtherChannel, low-cost Cisco GigaStack GBIC, Gigabit Ethernet, or Gigabit EtherChannel connections in this clustering configuration. Cisco Switch Clustering gives customers tremendous flexibility because all switches in the cluster may be located in different physical locations and connected with standards-based media.

Figure 6 Cisco Switch Clustering Using Catalyst 3500 XL, 2900 XL, and Catalyst 1900 Switches

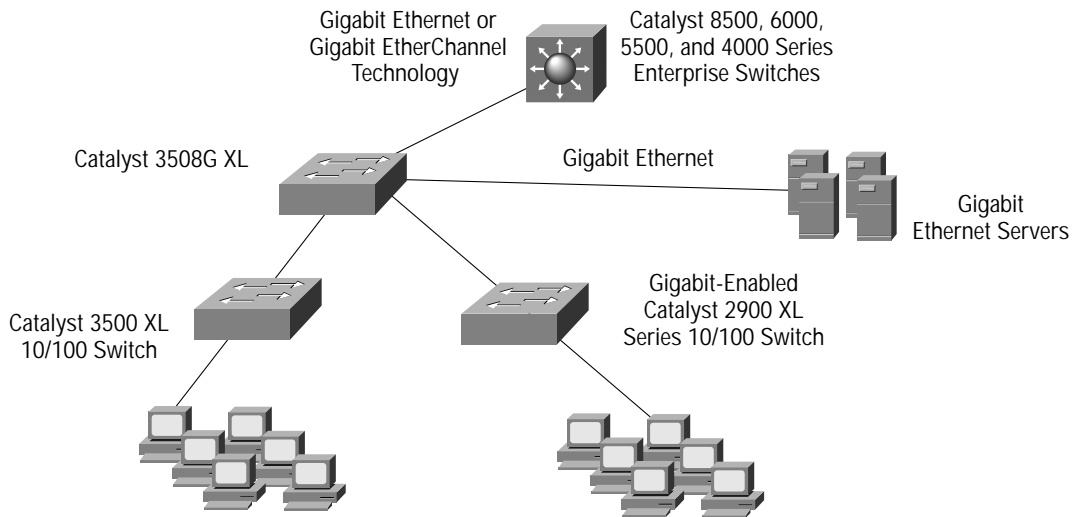


Aggregation

Enterprise Workgroup Aggregation

The Catalyst 3500 XL switches can be deployed in wiring closets to aggregate workgroup networking devices such as Ethernet and 10/100 switches; 10BaseT and 10/100 hubs; and workgroup servers, as shown in Figure 7. The Catalyst 3524 XL and 3512 XL are well suited for customers who need a 10/100 aggregation switch with Gigabit Ethernet uplinks to backbone or servers. The eight Gigabit Ethernet ports on the Catalyst 3508G XL make the switch ideal for aggregating a group of 10/100 switches with Gigabit Ethernet uplinks and Gigabit Ethernet servers in a high-performance wiring closet aggregation configuration.

Figure 7 Enterprise Workgroup Aggregation





SMB Workgroup Aggregation
The Catalyst 3512 XL can be used in a small to medium-sized business (SMB) as a network backbone. It can aggregate various Ethernet and Fast Ethernet network resources in the organization, and provides 1000BaseX connections to Gigabit Ethernet servers.

Figure 8 SMB Workgroup Aggregation

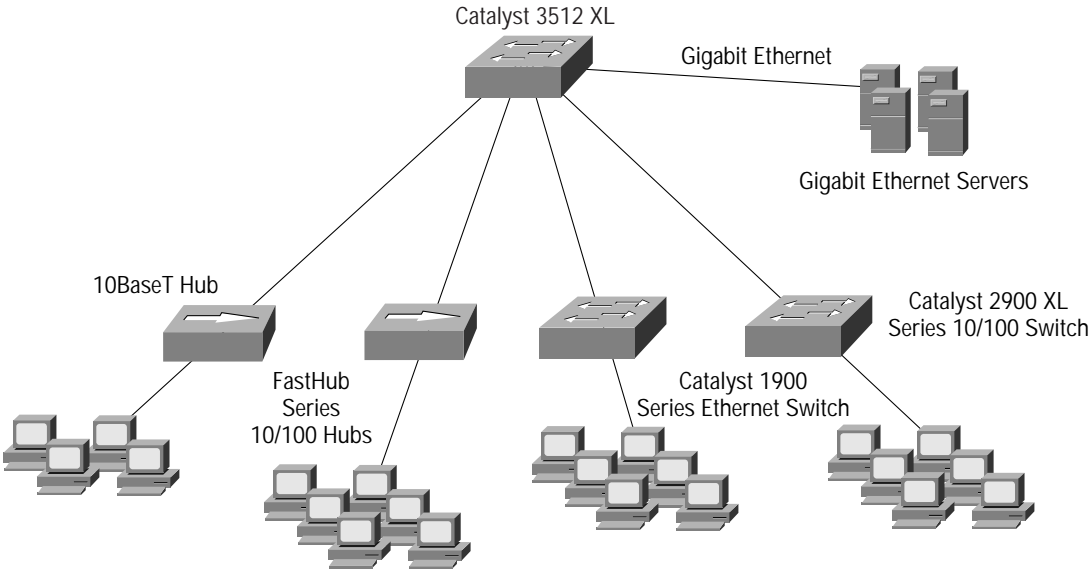


Table 1 Features and Benefits Summary: Catalyst 3500 Series XL

Feature	Description	Benefit
10BaseT/100BaseTX support	12 or 24 autosensing 10BaseT/100BaseTX ports (Catalyst 3512 XL and 3524 XL)	Delivers wire-speed performance with up to 200 Mbps of bandwidth per port for individual users, server farms, or workgroups to support bandwidth-intensive applications
Gigabit Ethernet Support	Two built-in, GBIC-based Gigabit Ethernet ports (Catalyst 3512 XL and 3524 XL)	Delivers up to 4-Gbps aggregated bandwidth to Gigabit Ethernet backbone, to Gigabit Ethernet-connected server farms or between switches
GBIC-Based Gigabit Ethernet Aggregation	Eight fixed Gigabit Ethernet ports (Catalyst 3508G XL)	Delivers up to 5-Gbps aggregated forwarding bandwidth to connected switches in a point-to-point configuration
Virtual LANs on All Ports	Up to 250 port-based VLANs per Catalyst 3500 series XL support	Improve performance and scalability by assigning users to VLANs associated with appropriate network resources, traffic patterns, and bandwidth
	Support for standards-based IEEE 802.1Q and Cisco ISL VLAN trunking protocols (Enterprise Editions only)	Enables deployment of up to 250 enterprise-wide, end-to-end VLANs per 3500 series XL switch, spanning multiple routers, switches, and access routers
		Reduces administrative costs and simplifies network moves, adds, and changes
		Enables better management and control of broadcast and multicast traffic
Outstanding Performance	10-Gbps switching fabric and up to 7.5 million packets-per-second forwarding rate	Delivers wire-speed performance to each 10BaseT/100BaseTX port
	4-MB shared-memory architecture	Ensures the highest-possible throughput by eliminating head-of-line blocking; minimizes packet loss and reduces congestion from multicast and broadcast traffic
	8-MB DRAM and 4-MB Flash memory onboard	Enables delivery of a continuous stream of software upgrades and enhancements, maximizing customers' return on investment
	Full-duplex operation on switched 10/100 ports	Delivers up to 200 Mbps of bandwidth to end stations and servers, and between switches
	CGMP Fast Leave	Allows quick stoppage of multicasts to end stations that want to drop a data stream, reducing superfluous traffic on the network
Flexible and Scalable Switch Clustering Technology	Hardware-based independent stacking bus delivered through the GigaStack GBIC supports multiple stacking options	Delivers up to 1-Gbps forwarding bandwidth when daisy-chaining up to nine Catalyst 3500 series XL and gigabit-enabled Catalyst 2900 series switches or 2-Gbps forwarding bandwidth in a point-to-point configuration
	High-performance aggregation using the Catalyst 3508G XL	Delivers up to 5-Gbps aggregated forwarding rate to a stack of switches in a point-to-point configuration
	Cisco Switch Clustering technology	Delivers flexibility, scalability, and ease of management with a broad range of connectivity options to up to 16 interconnected Catalyst 3500 XL, 2900 XL, and Catalyst 1900 switches managed from a single IP address
Ease of Use and Ease of Deployment	Cluster software upgrade	Allows a network administrator to quickly and easily upgrade system software for up to 16 interconnected Catalyst 3500 XL, 2900 XL, and Catalyst 1900 switches through a single CLI command or an easy-to-use CVSM interface
	IEEE 802.3z-compliant 1000BaseSX and 1000BaseLX/LH physical interface support through a field-replaceable GigaBit Interface Converter (GBIC)	Provides standards-based technology and unprecedented flexibility in switch deployment
	Cisco Visual Switch Manager interface	Easy-to-use, Web-based interface allows switch management from anywhere in the Intranet with a Web browser
	Autosensing on each 10/100 port	Detects attached device speed and automatically configures the port for 10- or 100-Mbps operation, easing switch deployment in mixed 10BaseT and 100BaseTX environments
	Autonegotiating on each 10/100 port	Automatically selects half- or full-duplex transmission mode to optimize bandwidth
	Default configuration stored in Flash memory	Ensures that a switch can be connected to a network and can pass traffic with minimal user intervention
	19-inch, rack-mountable Catalyst 3508G XL, 3512 XL, and 3524 XL are each available in one rack-unit-high (1.73 in.) enclosure	Compliant with standard 19-inch, rack-mount scheme for easy installation; allows high-density port allocation while conserving valuable rack space in the wiring closet



Table 1 Features and Benefits Summary: Catalyst 3500 Series XL (Continued)

Feature	Description	Benefit
Integrated Cisco IOS Switching Solution	Cisco Group Management Protocol (CGMP)	Enables a switch to selectively and dynamically forward routed IP multicast traffic to targeted multimedia end stations, reducing overall network traffic
	Bandwidth aggregation through Fast EtherChannel technology or Gigabit EtherChannel	Delivers up to 8 Gbps of bandwidth between switches, routers, and individual servers
		Enhances fault tolerance
	Per-port broadcast storm control	Prevents faulty end stations from degrading overall systems performance with broadcast storms
	Command-line interface (CLI)-based management console	Simplifies administration by using the same management interface as Cisco routers
	Cisco Discovery Protocol (CDP)	Enables a CiscoWorks network management station to automatically discover the switch in a network topology without user intervention
IEEE 802.1p ready	Provides two priority queues on 10/100 ports and 8 priority queues on Gigabit Ethernet ports allowing users to prioritize data packets	
Superior Manageability	Cisco Visual Switch Manager (CVSM)	Built-in HTTP server enables Web-based management interface through a standard browser such as Netscape Navigator or Microsoft Explorer
		Provides cluster and network topology views of a group of Catalyst 3500 XL, 2900 XL, and Catalyst 1900 switches
	Simple Network Management Protocol (SNMP) and Telnet interface support	Delivers comprehensive in-band management
	Telnet support for up to five simultaneous sessions	Allows multiple management CLI-based sessions over the network
	Support for CiscoWorks 2000 network management software	Provides a common management interface for Cisco routers, switches, and hubs
	Four groups of embedded RMON (History, Statistics, Alarm, and Events)	Provides enhanced manageability, network monitoring, and traffic analysis
	Network statistics gathered on a per-port basis or by using an RMON probe	Facilitates troubleshooting and capacity planning by characterizing each port's utilization, errors, and other key statistics
	Support for all nine RMON groups through use of a switch port analyzer port	Permits traffic monitoring of a single port, a group of ports, or the entire switch from a single network analyzer or RMON probe
	Autoconfiguration	Eases deployment of switches in the network by automatically configuring multiple switches across a network via a boot server
	Domain Name Services (DNS)	Provides IP address resolution with user-defined device names
	Trivial File Transfer Protocol (TFTP)	Reduces the cost of administering software upgrades by downloading from a centralized location
	Network Time Protocol (NTP)	Provides an accurate and consistent timestamp to all switches within the intranet
	Address Resolution Protocol (ARP) discovers the MAC address that corresponds to the IP address for any given host on the network	Allows the network manager, from a central console, to identify a host IP address and its corresponding MAC address
Multifunction LEDs per port for port status, half-duplex/full-duplex, and 10BaseT/100BaseT indication as well as switch-level status LEDs for system, RPS, and bandwidth utilization	Provide a comprehensive and convenient visual management system	
Security and Redundancy	MAC-based port level security	Secures a port to an individual MAC address group of up to 132 MAC addresses; addresses can be learned or manually entered; can prevent unauthorized stations from accessing the switch
	Password-protected in-band and out-of-band management	Provides protection against unauthorized configuration changes and secures against unwanted intruders
		Provides administrators the choice of level of security, notification, and resulting actions
	User-selectable address learning mode	Simplifies configuration and enhances security
	Multilevel security on console access	Prevents unauthorized users from altering the switch configuration
TACACS+ authentication (Enterprise Edition only)	Enables centralized control of the switch and restricts unauthorized users from altering the configuration (Enterprise Edition switches only)	

Table 1 Features and Benefits Summary: Catalyst 3500 Series XL (Continued)

Feature	Description	Benefit
Security and Redundancy (continued)	Redundant stacking connections	Support for a redundant loopback connection through secondary GigaStack GBICs in top and bottom switches in a stack
	IEEE 802.1D Spanning-Tree Protocol	Supports redundant backbone connections and loop-free networks, simplifies network configuration, and improves fault tolerance
	Cisco Uplink Fast technology (Enterprise Edition only)	Ensures quick failover recovery, enhancing overall network stability and reliability
	MTBF exceeds 150,000 hours	Designed to provide the highest reliability for maximum network uptime
	Cisco 600-watt redundant AC power system option	Provides a backup power source for up to four separate units for improved fault tolerance and network uptime
Warranty	Lifetime limited warranty	Backed by Cisco's service and support and the technology leadership that extends the reach of networks worldwide

Table 2 Availability and Orderability

Model	Description	Limited Availability	General Availability
Base Units			
WS-C3512 XL-A	Catalyst 3512 XL-A: 12-port 10/100 switch with two fixed GBIC-based 1000BaseX uplinks (Standard Edition)	May 27, 1999	Late June 1999
WS-C3512 XL-EN	Catalyst 3512 XL-EN: 12-port 10/100 switch with two fixed GBIC-based 1000BaseX uplinks (Enterprise Edition)	May 27, 1999	Late June 1999
WS-C3524 XL-A	Catalyst 3524 XL-A: 24-port 10/100 switch with two fixed GBIC-based 1000BaseX uplinks (Standard Edition)	May 27, 1999	Late June 1999
WS-C3524 XL-EN	Catalyst 3524 XL-EN: 24-port 10/100 switch with two fixed GBIC-based 1000BaseX uplinks (Enterprise Edition)	May 27, 1999	Late June 1999
WS-C3508G-XL-A	Catalyst 3508 XL-A: eight-port GBIC-based 1000BaseX Gigabit switch (Standard Edition)	May 27, 1999	Late June 1999
WS-C3508G-XL-EN	Catalyst 3508 XL-EN: eight-port GBIC-based 1000BaseX Gigabit switch (Enterprise Edition)	May 27, 1999	Late June 1999
GBICs			
WS-X3500-XL	GigaStack GBIC: Gigabit Ethernet Stacking GBIC for Catalyst 3500 XL and gigabit-enabled Catalyst 2900 XL switches	June 11, 1999	Early August 1999
WS-G5484=	SX GBIC: 1000BaseSX short wavelength GBIC (multimode fiber only)	Now	Now
WS-G5486=	LX/LH GBIC: 1000BaseLX/LH, long wavelength/long haul GBIC (single or multimode fiber)	Now	Now
CAB-GS-1M	1 meter cable for GigaStack GBIC	June 11, 1999	Early August 1999
Software Upgrade Kits			
WS-C3500-SA6-EN	Catalyst 3500 XL Enterprise Edition Software Upgrade, single system license	May 27, 1999	Late June 1999
WS-C3500-SA6-10-EN	Catalyst 3500 XL Enterprise Edition Software Upgrade, ten system license	May 27, 1999	Late June 1999
WS-C2900-SA6-CM	Catalyst 2900 XL Command Software Upgrade	May 27, 1999	Late June 1999



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