CISCO SYSTEMS

Catalyst
2900 Series XL

The Cisco Catalyst® 2900 Series XL is a full line of 10/100 autosensing Fast Ethernet switches from the leader in networking that combines outstanding performance, ease of use, and integrated Cisco IOS® software. The Catalyst 2900 Series XL includes six models, each with different port densities, configuration options, and pricing to meet a broad range of network design requirements.

The 24-port Catalyst 2924M XL switch is an excellent aggregation device, as well as the perfect solution for providing dedicated 10- or 100-Mbps bandwidth to individual users. The 12-port Catalyst 2912MF XL switch is ideal for aggregating small and mid-sized campus networks over 100BaseFX fiber connections. The two versatile module slots of the Catalyst 2912MF XL and Catalyst 2924M XL provide expansion capabilities, higher-speed connectivity, and support for feature modules, allowing you the flexibility to upgrade your network and preserve your initial investment. The 12-port Catalyst 2912 XL, 24-port Catalyst 2924 XL and Catalyst 2924C XL switches are ideal for delivering low-cost, high-performance, and 10- or 100-Mbps bandwidth to individual users and servers. A special version of the Catalyst 2900 Series XL, the Catalyst 2924M DC for central office networks, is designed especially for Telcos and other service providers that require 48-volt DC Power.

Flexible Stacking with the GigaStack GBIC

Gigabit Ethernet-enabled Catalyst 2900 Series XL switches and Catalyst 3500 Series XL and can be stacked using the low-cost two-port Cisco GigaStack GBIC, which offers a range of highly flexible stacking and performance options. Customers can deploy a 1-Gbps independent stack backplane in a cascade configuration, or scale up to 5-Gbps of bandwidth in a star configuration using the Catalyst 3508G Gigabit Ethernet aggregation switch. Network managers may use one or both of the available GBIC ports on a Gigabit Ethernet-enabled Catalyst 2900 Series XL switch to create high-speed uplinks to the network core, using standard Gigabit Ethernet or Gigabit EtherChannel technology. High resiliency can also be implemented by deploying dual Gigabit Ethernet uplinks, a redundant GigaStack loopback cable, Cisco Uplink Fast technology for high-speed uplink failover, and PVST+ (Per VLAN Spanning Tree) for uplink load balancing.

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 single IP management domain. Switch Clustering supports a broad range of standards-based connectivity options and configurations to deliver levels of performance that are scalable to meet customer requirements. Switch Clustering connectivity options for the Catalyst 2900 Series XL include

Ethernet, Fast Ethernet, Fast EtherChannel ports, low-cost Cisco GigaStack GBIC, Gigabit Ethernet, and Gigabit EtherChannel ports. 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.

A command switch, either a Catalyst 2900 XL or 3500 XL, provides the proxy and redirection services for single IP address management for each cluster. All cluster management commands are targeted to the command switch IP address. For redundancy, a second switch can be assigned an IP address, and the overall cluster can then be managed using a single virtual IP address. If the primary command switch fails, the backup or secondary command switch seamlessly takes over the management of the cluster while a user still accesses the cluster via the virtual IP address.
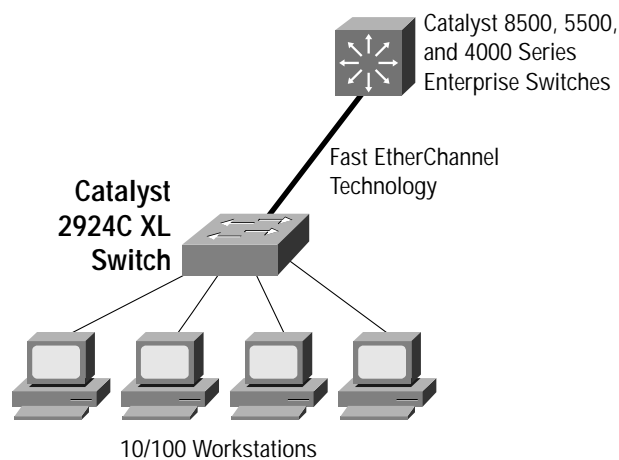
Cisco Switch Clustering can be accessed via Cisco Cluster Management Suite (CMS), a Web-based management interface, which allows network administrators to configure, monitor, and manage a switch from anywhere on the network through a standard browser such as Microsoft Internet Explorer or Netscape Navigator. Network administrators simply point their Web-browsers to the IP address of the cluster Command switch and access all management capabilities. The CMS interface is launched from the switch itself and delivers simple, cluster-wide, device-level management, including port configuration, VLAN setup, network views, and port monitoring—all from a single graphical interface. Web-based management is an integral part of the Cisco Switch Clustering architecture, allowing users to easily configure and manage stacks and switch clusters, and administer software upgrades across multiple switches. Command switch and cluster management redundancy are ensured via an automatic failover scheme in the rare event of a command switch failure.

Applications

High-Performance Desktop Connectivity (10/100 to the Desktop)

The Catalyst 2912 XL, Catalyst 2924 XL, Catalyst 2924C XL, and Catalyst 2924M XL can all be deployed as high-performance solutions to provide 10/100 bandwidth directly to the desktop. The Catalyst 2912 XL and Catalyst 2924 XL offer the lowest price per port in a fixed configuration. The Catalyst 2924C XL contains two 100BaseFX ports for networks that need to deploy high-performance 100-Mbps desktop connectivity over an extended distance (up to 2 kilometers) with fiber-optic cabling. The Catalyst 2924M XL switch accepts 10Base-T/100BaseTX, 100Base FX Gigabit Ethernet, or Asynchronous Transfer Mode (ATM) (OC-3) modules to increase port density and provide fiber connectivity over extended distances. All Catalyst 2900 XL products support the aggregation of multiple ports via Fast EtherChannel® or Gigabit EtherChannel to provide redundant, high bandwidth connections between switches, servers, and other key network stations using Fast Ethernet or Gigabit Ethernet links.

Figure 1 The Catalyst 2912 XL, Catalyst 2924 XL, Catalyst 2924C XL and Catalyst 2924M XL for High-Performance Desktop Connectivity

Catalyst 8500, 5500, and 4000 Series Enterprise Switches

Fast EtherChannel Technology

Catalyst 2924C XL Switch

10/100 Workstations

Enterprise Workgroup and Server Aggregation

The Catalyst 2924M XL will be deployed in wiring closets to aggregate workgroup networking devices such as Fast Ethernet hubs, Ethernet hubs and switches, and workgroup servers. EtherChannel technology allows customers to logically "bond" multiple Fast Ethernet or Gigabit Ethernet links, creating a high-capacity uplink to the corporate or campus backbone.

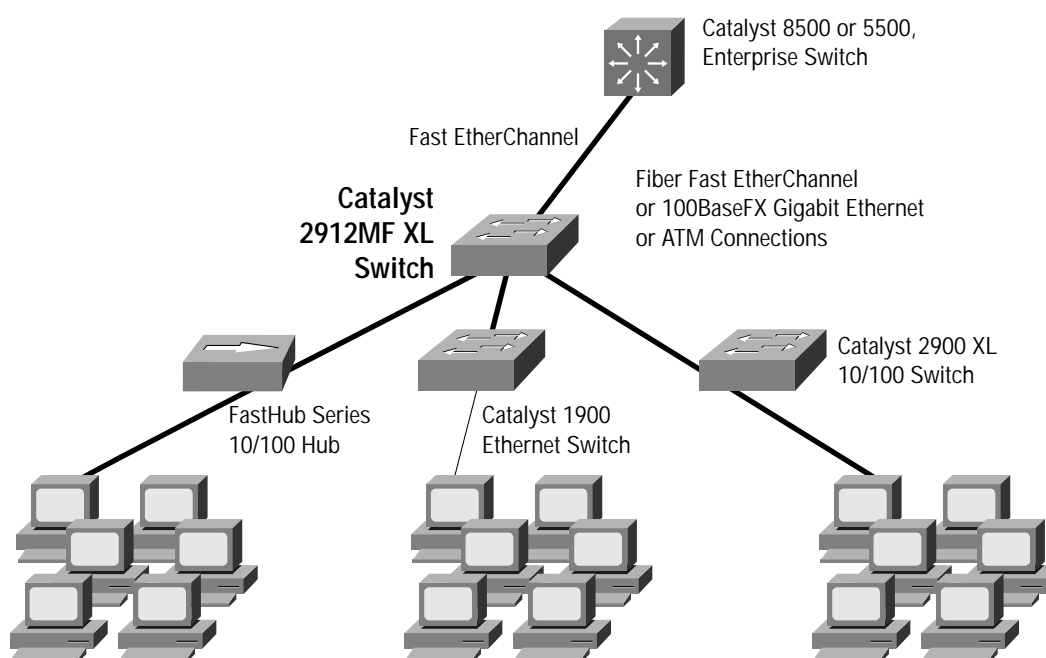**Figure 2** The Catalyst 2924M XL for Enterprise Workgroup Aggregation
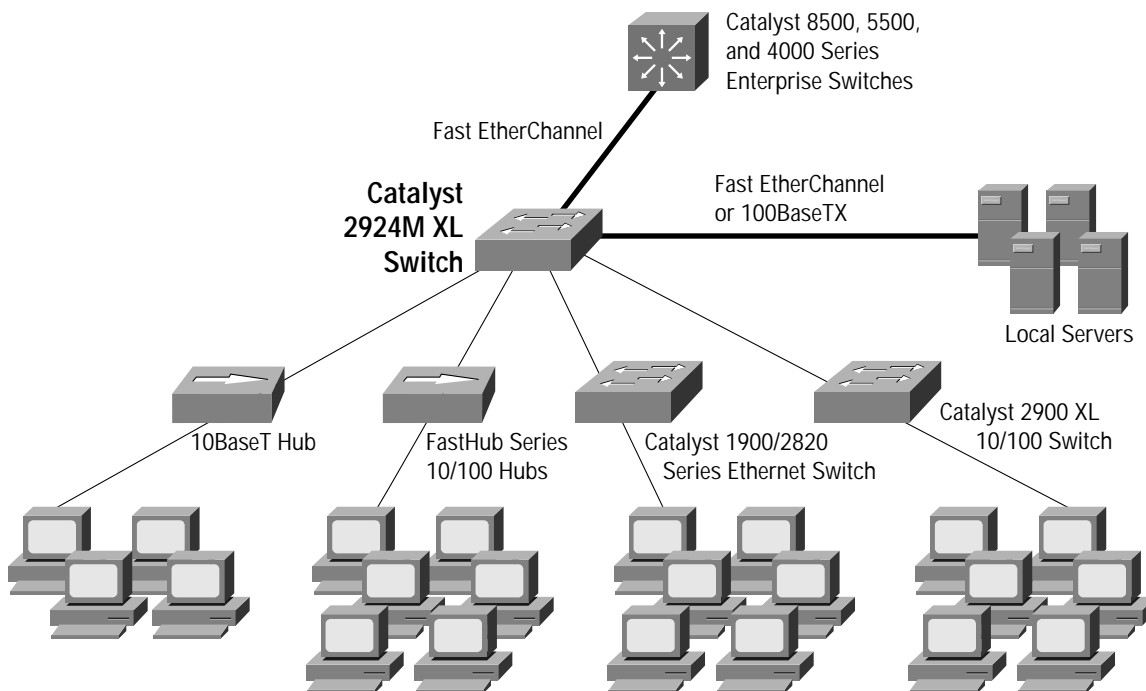
Disbursed Midsized Campus Aggregation

The 12-port Catalyst 2912MF XL is ideal for aggregating geographically disbursed Fast Ethernet workgroups over 100Base-FX fiber connections on a small or midsized campus environment. Two high-speed uplink slots enable users to add additional 100Base-FX, 10Base-T/100Base-T, Gigabit Ethernet, or ATM ports.

Figure 3　The Catalyst 2912MF XL for Disbursed Small Campus Aggregation

Catalyst 8500 or 5500, Enterprise Switch

Fast EtherChannel

Catalyst 2912MF XL Switch

Fiber Fast EtherChannel or 100BaseFX Gigabit Ethernet or ATM Connections

FastHub Series 10/100 Hub

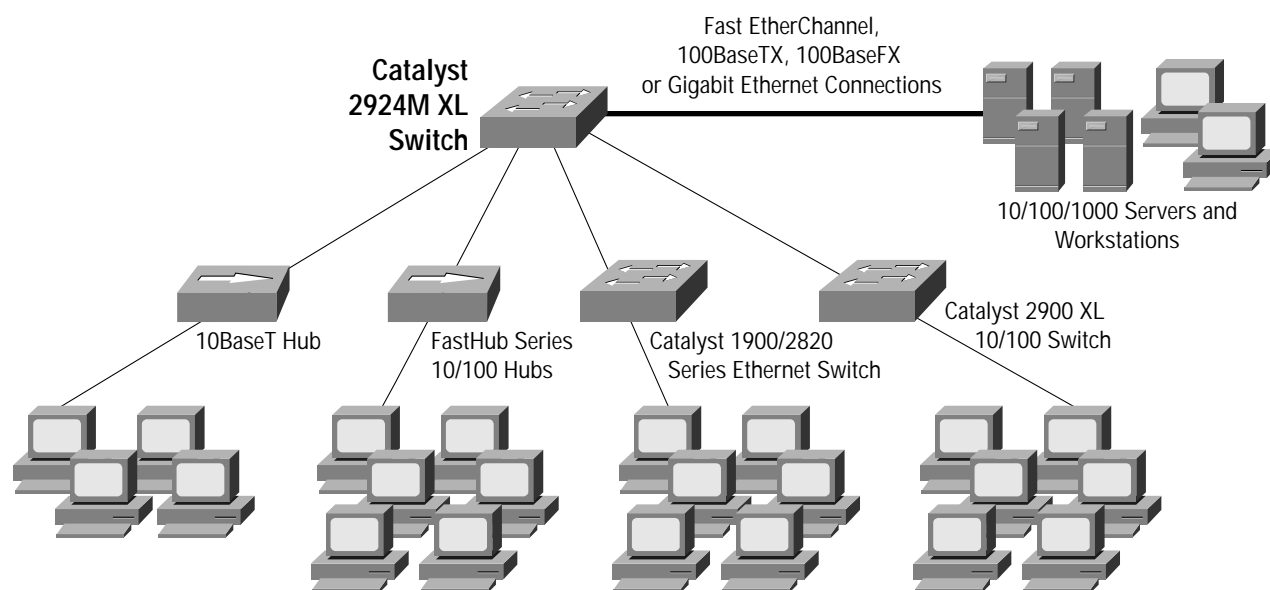Catalyst 1900 Ethernet Switch

Catalyst 2900 XL 10/100 Switch

Workgroup and Server Aggregation for Small to Medium-Sized Networks

The 24-port Catalyst 2924M XL may be used as a flexible, scalable, network backbone for a small to medium-sized business (SMB). The switch is an effective solution for aggregating network resources and delivering dedicated 10- or 100-Mbps connectivity to individual users and workgroups in an SMB. Two high-speed uplink slots enable users to add additional 100Base-FX, or 10Base-T/100Base-T, Gigabit Ethernet or ATM ports.

Figure 4   The Catalyst 2924M XL as SMB Aggregator and Backbone

Table 1 Features and Benefits Summary

Feature	Description	Benefit
10Base-T/100Base-TX Support	12, 22, and 24 autosensing switched 10BaseT/100Base-TX ports	Delivers performance where required, such as server farms, power workgroups, and individual users
		Preserves investment in legacy 10BaseT equipment, such as NIC cards, hubs, and switches
	Four-port 10Base-T/100Base-TX switch module (Catalyst 2912MF XL and 2924M XL only)	Provides a cost-effective means to increase the port density of the Catalyst 2912MF XL and 2924M XL
100Base-FX Support	Two switched 100Base-FX ports (Catalyst 2924C XL only) and 12 switched 100Base-FX ports (Catalyst 2912MF XL only)	Delivers high-speed connectivity between Catalyst 2912MF XL, Catalyst 2924C XL, and another device over an extended distance of up to 2 kilometers
	2-port and 4-port 100Base-FX switch modules	Cost-effective means to deliver connectivity between a Catalyst 2912MF XL or 924M XL and another device over an extended distance of up to 2 kilometers
QoS	IEEE 802.1p combined with two priority queues on 10/100 ports	Provides quality-of-service and ability to prioritize mission critical and time sensitive traffic from data, voice, and telephony applications
	Trusted extension settings	Allows the switch to set trusted port settings for the PC port on Cisco IP phones, ensuring voice traffic receives highest priority
Versatile Module Slots (Catalyst 2912MF XL and 2924 M XL)	Two versatile module slots accommodate future network expansion plans	Provides a flexible means to enhance the base switch offering without the need for a forklift upgrade
Virtual LANs on all Ports	Up to 64 port-based VLANs per Catalyst 2900 XL switch enable groups of devices on a LAN to communicate as if they are on the same wire, even if they are on different LAN segments	Improve performance and scalability by evaluating network traffic patterns and assigning users to VLANs associated with appropriate network resources and bandwidth
		Reduce administrative costs and simplify network moves, adds, and changes
		Enable better management and control of broadcast and multicast traffic
		Improve network security by establishing separate VLAN groups for high-security users and relocating workgroup servers into secured, centralized areas
	Support for standards-based IEEE 802.1Q and Cisco ISL VLAN trunking protocols	Enables deployment of up to 64 enterprise-wide VLAN trunks per Catalyst 2900 XL switch, spanning multiple routers, chassis switches, and access servers
Autosensing on Each 10/100 Port	Detects the speed of the attached device and automatically configures the port for 10 or 100 Mbps	Eases deployment of the switch in mixed 10Base-T and 100Base-T environments
Autonegotiating on Each 10/100 Port	Automatically selects half- or full-duplex transmission mode	Optimizes bandwidth utilization

Table 1 Features and Benefits Summary (Continued)

Feature	Description	Benefit
Outstanding Performance	3.2-Gbps switching fabric and 3.0 million packets-per-second forwarding rate	Meets the demands of the most intensive network applications
		Ensures full wire-speed operation for each 10Base-T/100Base-TX port
	Full-duplex operation on switched 100BaseT ports	Delivers up to 200 Mbps of bandwidth to end stations and servers, and between switches
	4-MB shared memory architecture	Ensures highest possible throughput by eliminating head-of-line blocking, minimizing packet loss, and reducing congestion from multicast and broadcast traffic
	Bandwidth aggregation through Fast EtherChannel or Gigabit EtherChannel or Gigabit EtherChannel technology	Delivers up to 800-Mbps or 4-Gbps connectivity between switches, and to routers and individual servers
		Enhances fault tolerance
	Per-port broadcast storm control	Prevents faulty end stations from degrading overall system performance with broadcast storms
	Cisco Group Management Protocol (CGMP)	Enables the switch to selectively forward routed IP multicast traffic to targeted multimedia end stations, reducing overall network traffic
	CGMP Fast Leave	Allows quick stoppage of multicasts to end stations that want to drop a data stream, reducing superfluous traffic on the network
	Traffic storm controls	Limits broadcasts, multicasts and unicasts on a per port basis when set thresholds are exceeded
Flexible Stacking and Scalable Switch Clustering Technology	Hardware-based independent stacking bus delivered through GigaStack GBIC supports multiple stacking options	Delivers up to 1-Gbps forwarding bandwidth to a cascade of 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
	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 1900 switches managed from a single IP address
	Cluster wide software administration	Allows a network administrator to quickly and easily upgrade system software for up to 16 interconnected Catalyst 3500 XL, 2900 XL, and 1900 switches through a single CLI command or an easy-to-use CMS Web-based interface

Table 1 Features and Benefits Summary (Continued)

Feature	Description	Benefit
Management and System Setup	Simple Network Management Protocol (SNMP) and Telnet interface support	Delivers comprehensive in-band management
	Telnet support for five simultaneous sessions	Allows menu-based management by terminal emulation software over the network
	Command-line interface (CLI)-based management console	Provides detailed out-of-band management
		Uses the same management interface as Cisco routers
	Cisco Cluster Management Suite (CMS)	Built-in HTTP server enables Web-based management interface through standard browser such as Netscape Navigator or Microsoft Explorer
		Provides stack and network topology views of a group of Catalyst 3500 XL, 2900 XL, and 1900 switches with one easy-to-use management interface
	Support for CiscoWorks2000 network management software	Provides a common management interface for Cisco routers, switches, and hubs
	Cisco Discovery Protocol (CDP)	Enables a CiscoView network management station to automatically discover the switch in a network topology without user intervention
	Four groups of embedded RMON (history, statistics, alarms, 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
	SPAN support for connection to a network analyzer or RMON probe	Offers complete monitoring of a single port, group of ports, or the entire switch from a single network analyzer or RMON probe attached to a switch port
	Multifunction per-port LEDs for port status, half-duplex/full-duplex, and 10Base-T/100Base-T indication, as well as switch-level status LEDs for system, RPS, module status, and bandwidth utilization	Provides comprehensive and convenient visual management of the switch
	Autoconfiguration	Eases deployment of switches in the network by automatically configuring multiple switches across a network via a boot server
	Trivial File Transfer Protocol (TFTP)	Reduces the cost of administering software upgrades by downloading from a centralized location
	Default configuration stored in Flash memory	Ensures that the switch can be connected to the network and can pass traffic with minimal user intervention
	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
	Domain Name Services (DNS)	Provides IP address resolution with user-defined device names
	Network Time Protocol (NTP)	Provides an accurate and consistent timestamp to all switches within the intranet

Table 1 Features and Benefits Summary (Continued)

Feature	Description	Benefit
Management and System Setup (continued)	Spanning Tree Root Guard (STRG)	Prevents devices not in the network administrator's or service provider's control from becoming STP root nodes by configuring STRG on device ports it does control.
	VTP Pruning	Limits broadcasts on VTP trunks. When VTP pruning is enabled, broadcast traffic is flooded only on trunk links required to reach the destination devices.
	19-inch rack-mountable Catalyst 2912 XL, 2924 XL, and 2924C XL are available in one rack-unit-high (1.73 in.) enclosure. Catalyst 2912MF XL and 2924M XL are available in two rack-unit-high enclosures (3.46 in.)	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
Fault Tolerance	IEEE 802.1d Spanning-Tree Protocol	Supports redundant backbone connections and loop-free networks for improved fault tolerance
	Cisco Uplink Fast technology	Ensures quick failover recovery, enhancing overall network stability and reliability
	Cross-stack Uplink Fast	Provides increased redundancy and network resiliency through fast spanning-tree convergence (less than 2 seconds) across a stack of switches using GigaStack GBICs
	Redundant stacking connections	Support for a redundant loopback connection in top and bottom switches in a stack
	Command Switch Redundancy	Allows customers to designate a backup command switch, which takes over cluster management functions in the event of a failure of the primary command switch.
	Unidirectional Link Detection (UDLD)	Detects and disables unidirectional links caused by incorrect wiring or interface faults, preventing Spanning Tree loops
	Cisco 600-watt redundant AC power system option	External RPS provides a redundant power source for up to four units for improved fault tolerance
	MTBF exceeds 164,000 hours	Designed to provide the highest reliability for maximum network uptime
Security	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
	TACACS+ authentication	Enables centralized control of the switch and restricts unauthorized users from altering the configuration
	Private VLAN Edge	Provides security and isolation between ports on a switch, ensuring that voice traffic travels directly from its entry point to the aggregation device through a virtual path and cannot be directed to a different port
Warranty	Limited Lifetime 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	
Base Units	
WS-C2912-XL-EN	12-port 10BASE-T/100BASE-TX autosensing Fast Ethernet switch
WS-C2924-XL-EN	24-port 10BASE-T/100BASE-TX autosensing Fast Ethernet switch
WS-C2924C-XL-EN	24-port switch with 22 10BASE-T/100BASE-TX autosensing Fast Ethernet ports and two 100BASE-FX ports
WS-C2912MF-XL	12-port 100BASE-FX Fast Ethernet switch with two expansion slots
WS-C2924M-XL-EN	24-port 10BASE-T/100BASE-TX autosensing Fast Ethernet switch with two expansion slots
WS-C2924M-XL-EN-DC	24-port 10BASE-T/100BASE-TX autosensing Fast Ethernet DC-powered switch with two expansion slots
Modules and GBICs	
WS-X2931-XL	1000BaseX Module (without GBIC)
WS-X2932-XL	1000BaseT Module (without GBIC)
WS-X3500-XL	GigaStack Stacking GBIC and 50cm cable (for the Catalyst 2900 Series XL and 3500 Series XL)
WS-G5484=	1000BASE-SX "Short Wavelength" GBIC (multimode only)
WS-G5486=	1000BASE-LX/LH "Long Haul" GBIC (singlemode or multimode)
WS-X2951-XL	ATM 155 UTP Module
WS-X2961-XL	ATM 155 Multimode Fiber Module
WS-X2971-XL	ATM 155 Single Mode (medium) Module
WS-X2972-XL	ATM 155 Single Mode (long) Module

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