Catalyst 4000 Family — Desktop/Server Switches

Product Overview

The Catalyst 4000 family provides an advanced enterprise switching solution for wiring closets and data centers. The Catalyst 4000 family provides intelligent Layer 2 and Layer 3 services leveraging a 24 Gbps bandwidth architecture for 10/100/1000-Mbps Ethernet Switching. The modular Catalyst 4000 family extends the same feature set with identical software code base along with the same enterprise functionality as the Catalyst 5500/5000 Series, delivering a consistent end-to-end solution.

Catalyst 4000 Family Ethernet switches offer a broad range of density and functionality. These switches are available in a chassis-based form factor with flexible modular configurations that provide a broad range of port densities for 10/100 Mbps to 1000 Mbps speeds.

Catalyst 4006 Series

The Catalyst 4000 family has a proven track record for wiring closet connectivity. Cisco introduces the Catalyst 4006 system, expanding the breadth and depth of the advanced Catalyst 4000 family to further enhance the premier Cisco enterprise wiring-closet offerings. The Catalyst 4006 system provides a cost-effective flexible network solution that scales to meet today's high-performance needs and provides investment protection for the future.

The Catalyst 4000 family, now with two chassis alternatives, provides a common architecture that scales from 32 ports all the way to 240 ports of 10/100 Fast Ethernet. The Catalyst 4006 enhances the Cisco commitment to affordable enterprise and branch scalability.

The Catalyst 4006 chassis offers:

- Flexible six-slot modular chassis, with one slot reserved for a supervisor engine and five remaining slots for switched port modules
- Three power supply bays that support redundant (option), load-sharing, fault-tolerant AC power supplies
- Hot-swappable fan tray bay
- Familiar Catalyst 5500/5000 look and feel with consistent interfaces and indicators.
- Up to 240 10/100 Fast Ethernet ports, with dual Gigabit Ethernet Uplink ports, can be installed intone chassis.
- Blazingly fast: 18 million packets-per-second throughput, with 24 Gbps switching bandwidth.
- Modular chassis flexibility and the variety of module speed mixes
- Meets requirements for device redundancy, link resiliency and network availability
- Dedicated bandwidth directly to individual users, as well as servers, printers and high-speed connections to company servers
- Minimizes congestion from growth and improves your network's response time

Catalyst 4003 Series

The Catalyst 4003 chassis offers:

- Flexible three-slot modular chassis, with one slot reserved for a supervisor engine and two remaining slots for switched port modules
- Two power supply bays that support redundant (option), load-sharing, fault-tolerant AC power supplies
- Hot-swappable fan tray bay
- Familiar Catalyst 5500/5000 look and feel with consistent interfaces and indicators.
- Up to 96 10/100 Fast Ethernet ports, or up to 36 Gigabit Ethernet ports, can be installed intone chassis.
- Blazingly fast: 18 million packets-per-second throughput, with 24 Gbps switching bandwidth.
- Modular chassis flexibility and the variety of module speed mixes

- Meets requirements for device redundancy, link resiliency and network availability
- Dedicated bandwidth directly to individual users, as well as servers, printers and high-speed connections to company servers
- Minimizes congestion from growth and improves your network's response time

Introducing the Catalyst 4000 Integrated Layer 3 Services Module

The Catalyst 4000 Layer 3 services engine is packaged on a switching line card with 32-port, 10/100 Mbps Fast Ethernet and two-port 1000 Mbps Gigabit Ethernet using modular gigabit interface converter (GBIC) flexibility. When this Layer 3 services engine is installed in a chassis, silicon-based multiprotocol routing and Layer 3 QoS is possible for all ports in the system (including legacy switching line cards). This solution is ideal for wiring closet deployment in small, medium-sized, or large networks that require wire speed Layer 3 system uplink performance. Another application for the Catalyst 4003 is for server farm aggregation where Layer 3 services are required.

Catalyst 4000 Layer 3 Services Engine Overview

The Catalyst 4000 family Layer 3 engine provides an aggregate throughput of 6 million packets per second (pps) for Layer 3 switching that can scale higher by adding multiple Layer 3 services modules. This data rate applies tIP, IPX, IP multicast and bridged traffic, and is a result of using high-speed application-specific integrated circuit (ASIC) technology to perform true Layer 3 switching. The Catalyst 4000 family's Layer 3 services engine supports a high-performance architecture with 8 Gbps bandwidth. The switch fabric is capable of supporting all system ports with high-speed Layer 3 routing and QoS marking. The switch fabric is capable of supporting Layer 3 on dual Gigabit Ethernet uplinks simultaneously at wire rate.

The Catalyst 4000 family Layer 3 router is supported in both the Catalyst 4003 or Catalyst 4006 chassis. It supports a highperformance RISC processor, which provides the routing intelligence and optimized GE ASICs for the Layer 3 switching. The Catalyst 4000 family Layer 3 engine uses Cisco Express Forwarding (CEF). This technology provides Layer 3 switching based on a topology map of the entire network that is distributed to multiple ASICs, allowing autonomous switching decisions without the involvement of a centralized CPU.

Catalyst 4000 Family with Integrated Layer 3 Services Features at a Glance

- High-performance, scalable 6 Mpps Layer 3 services engine of IP, IPX, and IP multicast protocols
- Up to 224 ports 10/100 Mbps Fast Ethernet plus dual Gigabit Ethernet uplinks (GBIC slot), including previously deployed Catalyst 4000 line cards
- High-performance CPU with Cisco IOS, system software
- Quality of service (QoS), multiple queues with Weighted Round Robin (WRR) scheduling
- Comprehensive management tools based on standard CiscoWorks2000 applications
- Hardware-based Access Control List (ACL) support on dual Gigabit Ethernet uplinks
- Inter-switch link (ISL) and 802.1Q trunking on dual Gigabit Ethernet uplinks

Quality of Service

The Catalyst 4000 family Layer 3 enhances the Catalyst 4000 family's centralized, nonblocking 24 Gbps shared-memory switching fabric. The rich QoS capabilities of the switching fabric enable network managers to protect mission-critical applications by supporting delay-sensitive traffic, while managing bandwidth in the campus network. The switching fabric supports Per-Flow Queuing (PFQ), differentiated delay priorities using a Weighted Round Robin (WRR) scheduler for delay-sensitive applications, and differentiated loss priorities for managing congestion and traffic policing and shaping. The fast packet memory embedded in the switching fabric is allocated dynamically on a per-queue (flow) basis. This dynamic allocation used in conjunction with user- defined queue thresholds and configurable queue scheduling weights ensures that time-sensitive traffic is handled properly with no packet loss. These thresholds and queuing weights can be dynamically adjusted with CiscoAssure Policy Networking, allowing an end-to-end QoS solution.

IP at Millions of Packets per Second

The Catalyst 4000 family Layer 3 provides a complete IP routing solution without sacrificing any of the services required to build a scalable network. The Catalyst 4000 family includes feature-rich switches with integrated full Cisco IOS implementations that allow network managers to continue to administer and manage their networks as they do today, while scaling their wiring closet QoS bandwidths to gigabit speeds. The Catalyst 4000 family supports all the routing protocols that are used today in campus networks. These protocols include:

- Interior Gateway Routing Protocol (IGRP)
- Enhanced IGRP (EIGRP)
- Open Shortest Path First (OSPF)
- Routing Information Protocol (RIP) Versions 1 and 2
- Static routes
- Route redistribution

In addition to these routing protocols, the Catalyst 4000 family Layer 3 Services supports all the additional protocols necessary to build scalable, reliable networks, including:

- Hot Standby Router Protocol (HSRP)
- Internet Group Management Protocol (IGMP) 1 and 2
- Dynamic Host Configuration Protocol (DHCP) Relay
- Cisco Group Management Protocol (CGMP)
- Internet Control Message Protocol (ICMP)
- Gateway Discovery Protocol (GDP)
- ICMP Router Discovery Protocol (IRDP)
- Bootstrap Protocol (BOOTP) Relay

IPX Switching Feature Set

The Catalyst 4000 family Layer 3 services is also a full-fledged Cisco IPX, router with the enhancements only Cisco IOS can offer. It provides basic services such as Novell NetWork RIP and Service Advertising Protocols (SAPs), value-added routing protocols such as Netware Link

Services Protocol (NLSP) and Novell Enhanced IGRP, as well as route distribution among all of these protocols. In addition, the Catalyst Layer 3 services support features that help scale a large Novell network. These features include:

- Get Nearest Server (GNS) response filtering and round-robin GNS support
- Novell RIP
- SAP, protocol, and NetBIOS name filtering
- Equal-cost path load sharing
- Variable RIP and SAP timers
- Novell NetBIOS type 20 propagation support for legacy applications that continue to be mission critical
- Novell-compliant IPX ping utility

This feature set, as well as the wire-speed IPX switching uplinks, make the Catalyst 4000 family Layer 3 unique in terms of wiring closet switching solutions.

IP Multicast Switching and Routing

The Catalyst 4000 family switches support IP multicast at high-speeds across all ports. As multicast applications such as Microsoft NetShow and NetMeeting become more widely deployed, end-to-end multicast support becomes increasingly important with multicast routing protocols that are integral to a consistent end-to-end multicast solution. The Catalyst 4000

family with Layer 3 services switching supports both Protocol Independent Multicast (PIM) sparse and dense modes and Distance Vector Multicast Routing Protocol (DVMRP) interoperability for legacy applications. The Catalyst 4000 family Layer 3 provides support for IGMP, Versions 1 and 2, and CGMP server capabilities for integrating IP multicast support. These protocols are necessary not only for IP multicast clients to join groups but also for efficient leave processing, which saves bandwidth and end-station CPU cycles.

Security

The Catalyst 4000 family Layer 3 Services module has the ability to prevent security breaches via the use of both IP and IPX access lists. This is useful in preventing users from accessing certain applications or services. The Catalyst 4000 family Layer 3 Services module supports both inbound and outbound access lists on both its Gigabit Ethernet interfaces on the Layer 3 Services switching line card. These access lists can be defined similar to any Cisco IOS router as standard IPX access lists as well as standard and extended IP based access lists. Having both inbound and outbound control of packets on the line card-based Gigabit Ethernet ports (i.e. two internal and two external ports) allows network managers to prevent traffic both on egress as well as ingress.

VLAN Trunking

The Catalyst 4000 family Layer 3 supports both inter-switch link (ISL) and 802.1Q trunking on the Layer 3 module's dual Gigabit Ethernet uplink ports. In addition, 802.1Q trunking is supported on all 10/100 ports.

Fast EtherChannel and Gigabit EtherChannel Technologies

The Catalyst 4000 family Layer 3 supports Fast EtherChannel® and Gigabit EtherChannel technologies, allowing network managers to group up to eight of the Ethernet ports into an intelligent high-speed channel.

Comprehensive Network Management of CiscoWorks2000

Catalyst 4003 and 4006 switches are managed by the powerful CiscoWorks2000 network management suite (option). The Essentials product suite leverages the power of the intranet with browser-based access anywhere within the network. Network managers can walk up to any browser console, simply identify who they are via the access control interface, and immediately begin checking on the uptime of each device, the active software versions that are running the Catalyst 4003 or 4006. For drill-down real-time device status information, the network operations staff can launch the award-winning CiscoView application from their fault-management stations and at a glance check on power supplies, line cards, and the operational status of each port.

Key Features and Benefits

• Proven, End-to-End Software Architecture

Emerging applications such as video, web and multimedia require advanced functionality in the wiring closet by leveraging comprehensive software integration and extending Layer-2 and Layer-3 services from the network core. The Catalyst 4000 family delivers these advanced wiring closet features by utilizing the same software image as the Catalyst 5000/5500 series switches. By leveraging the Catalyst 5000/5500 IOS software, network administrators can take advantage of years of real world network deployment and experience at networks ranging in size from 10-20 users to over 10,000. The result is a scalable, time proven software architecture with a minimum of training requirements.

Advanced Network Services for the Wiring Closet

Exponential growth in network traffic due to emerging applications has driven the development of Cisco's software architecture, making it the reference standard for switched enterprise LANs. It lets network managers build a fully integrated switched LAN infrastructure that handles wire-speed Layer-2 and Layer-3 switching from end tend. The result is the elimination of bottlenecks in key areas of the enterprise LAN - desktops, servers and the core. Cisco delivers specific software features for the wiring closet that deliver on this promise, including the following: multimedia support, scalability, protocol filtering, high availability, and superior network management. Let's look at these in more detail.

Multimedia Support via IP Multicast

The need for distance learning, video and audio to the desktop, large file transfers, and financial market data feeds, drives many corporations to new levels. The architecture of the Catalyst 4000 Family of campus LAN switches is especially suited to handle the IP unicast and multicast traffic support these applications demand. The Catalyst 4003 can transmit traffic from multiple multicast sessions at wirespeed out of all ports simultaneously, using Cisco's Group Multicast Protocol (CGMP) in conjunction with industry standard IP Multicast protocols such as Internet Group Multicast Protocol (IGMP) and Protocol Independent Multicasting (PIM).

• Scalability

As the demand for network bandwidth increases, network administrators require the ability to intelligently provide differentiated services based upon protocol or application.

Protocol Filtering

Catalyst 4000 family switches automatically detect what type of client stations (i.e., IP and IPX) are attached, by reading the header of all packets originating from the client stations. The switch will automatically shield client stations from unnecessary protocol broadcasts. For example, an IP-only client station will no longer see IPX broadcasts from IPX stations within the same Layer-2 broadcast domain. Protocol filtering in the wiring closet improves bandwidth efficiency and end-station performance, by freeing the end-station CPU from interrupts, to process unnecessary broadcast traffic.

• Quality- of- Service: Content Networking Ready

Quality-of-service (QoS) functionality must be supported from the wiring closet through the Wide Area Network to be an effective tool; the Catalyst 4000 delivers QoS with two priorities. Managing the Catalyst 4000 with the upcoming Content Networking management applications allows network managers to map business requirements to networking policies. This secures access to network resources, and quality of service (QoS) from the wiring closet to the backbone.

• High Availability

Layer-2 wiring closet switches use the Spanning-Tree Protocol to recover from link failure and guard against data loop formation in the network. When the primary link fails, the spanning tree algorithm selects a new path, and ensures there is never more than one path connecting two points. The convergence time of the Spanning-Tree Protocol is normally 50 seconds. This long delay can cause many client/server sessions to time-out. Cisco has developed mechanisms to greatly improve recovery from failure, using Spanning-Tree Protocol convergence on its LAN switches. With the Cisco features PortFast, Fast/Gigabit Etherchannel and UplinkFast, network failure from the wiring closet to the backbone will converge in less than 3 seconds after a fault on an uplink.

Network Management

Cisco's powerful CiscoWorks 2000 network management products manage Catalyst 4000 family products. These management products focus on day-to-day network operation functions such as:

- -Checking on device availability and configuration changes
- -Provisioning of VLANs across multiple devices concurrently
- -Representation of Layer-2 networks both physically and logically

The Essentials product suite leverages the power of the intranet with browser-based access anywhere within the network. Network managers can walk up to any browser console, simply identify who they are via the access control interface, and immediately begin checking the up-time of each device, the active software versions that are running the Catalyst 4000s, and print a year 2000 compliant report. For drill down real-time device status information, the network operations staff can launch Cisco's award winning CiscoView application from their fault management station, and at a glance check on the health of the power supplies, line cards, and the operational status of each port.

For more sophisticated network-wide information, network managers can launch the CiscoWorks for Switched Internetworks-Campus (CWSI-Campus) product bundle, which automatically discovers the physical and logical representations of the Catalyst switch networks. This object-based discovery system offers detailed information on the location and type of each switch within the network, the type of links that connect the switches together, and displays integrity reports on the configurations between each switch. All of this information is provided graphically within the topology interface with search and location utilities. This topology interface offers a convenient launching point for other applications within CWSI-Campus including the RMON based traffic analysis application, the network-wide user location application, and the VLAN application which displays the logical configuration and spanning tree forwarding path information. All Catalyst switches are fully integrated into Cisco's CWSI network management platform, enabling complete Simple Network Management Protocol (SNMP) and Remote Monitoring (RMON) control.

Benefits

- Low Entry Cost and Flexible Growth
- Scalability and Resiliency evolving to Gigabit Ethernet, either now or in the future, is easy because of the modular chassis flexibility and the variety of module speed mixes
- Standards Based
- Power Fault Protection with redundant, load-sharing power supplies
- High-Speed Server Farm Connections as a Gigabit Ethernet switch for network server farm applications: 3-slot up to 36 connections
- Feature-Rich and Proven Software Heritage building on the familiar features and interfaces of the award-winning Catalyst 5500/5000 series switches
- Modular Chassis
- Single IP-Address Management
- Port, Power and Link redundancy
- Modular Scalability and Flexibility

Applications

Switch or Hub Replacement/Desktop Switch: The Catalyst 4003 is ideally suited as a wiring closet switch providing highspeed switching performance and advanced enterprise-rich features. As a wiring closet switch, the Catalyst 4003 is well suited for shared-media hub replacement, eliminating the growing network meltdown problems initiated by end stations downloading new multimedia applications or enabling multicasting services from the Internet. Simply plug it in, provide an IP address, and it automatically learns the MAC addresses of the attached devices.



Network users will appreciate the improved network efficiency enabled by the Catalyst 4003 advanced hardware and software services. Deployed within a wiring closet, workstations can connect directly to 10/100/1000 Mbps interfaces. Standard features, such as line-speed autosensing and duplex auto-configuring, ease desktop migration as the end stations change and grow through various Ethernet network interface cards (NIC).

Figure 21-4: Cisco Solution

Switch/Server Aggregator: Switch/Server Aggregator

As a wiring closet Layer-2 device, the Catalyst is well suited for small and large networks as a switch/server aggregator with EtherChannel aggregation. The enterprise switching features, such as Fast EtherChannel, provide critical intelligent "fat pipe" connections built with industry standard ports and cabling, guarding against congestion to the desktop access devices. The Gigabit EtherChannel down-links provide high-speed backbone connections, well-suited for consistency with modular Catalyst 5500 series switches that can be deployed with integrated Layer-3 route switch modules (RSMs).





Redundant links can be used to inter multiple wiring closets with Catalyst 4003 switches, the Uplink Fast feature enables Spanning Tree to converge deterministically in under five seconds. Per-VLAN spanning tree enables Layer-2 load-balancing over multiple links to the wiring closet.

Configuration Alternatives

The Catalyst 4000 family, with the new Catalyst 4006 chassis, Supervisor II, 10/100 Autosensing Fast Ethernet, and 100 Mbps Fast Ethernet fiber line cards, now offers an even more powerful and flexible network solution. Enabling specific network configurations (.) to be mixed and matched to meet the specific needs of any campus network.

		Maximum Interfaces pe	er Chassis
Catalyst 4000 Family Switching Modules	Number of Interfaces Supported per Line Card	Catalyst 4003 with Supervisor I	Catalyst 4006 with Supervisor II
Number of Gigabit Ethernet Uplinks on Supervisor	N/A	0	2
Switched 10/100 Fast Ethernet (RJ-45)	32 or 48	96	240
Switched 10/100 Fast Ethernet (Telco)	48	96	240
Switched 100 Fast Ethernet (MT-RJ)	4 or 24	48	120
Switched 1000 Gigabit Ethernet	2, 6, 14 or 18	36	(Network traffic patterns should determine acceptable oversubscription)

Catalyst 4000 family solutions are now available with two powerful Supervisor Engine alternatives. Each option provides a high-performance, centralized, shared-memory switch fabric while at the same time it protects your line card investment by supporting the addition of optional higher-layer functionality engines (.).

Feature	Supervisor Engine I	Supervisor Engine II
Dual Gigabit Ethernet Uplinks		YES
Support for 16,000 MAC Addresses Dynamically Allocated between Active Ports	YES	YES
Catalyst 4003 Chassis Support	YES	
Catalyst 4006 Chassis Support		YES
Hardware Support for 1024 VLANs	YES	YES
Environmental Status of Switch	YES	YES
SNMP	YES	YES
RMON	YES	YES
Console/Telnet Interface	YES	YES
10 Mbps Out-of-Band Management (RJ-45)	YES	
10/100 Mbps Out-of-Band Management (RJ-45)		YES
Fast EtherChannel and Gigabit EtherChannel Technology	YES	YES
24 Gbps Capacity, 18 mpps Layer 2 Engine	YES	YES
Scalable 6 Mpps Layer 3 Multiprotocol Router Support (option)	YES	YES

Catalyst 4000 family solutions now can be built with two powerful chassis alternatives. Each providing enterprise-class functionality (.), yet optimized in ways to ensure cost-effective pricing.

Features	Catalyst 4003 Chassis	Catalyst 4006 Chassis
Total Number of Slots	3	6
Supervisor Engine Supported	Supervisor I	Supervisor II
Number of Hot-Swappable Switching Module Slots	2	5
Switching Modules Supported	All	All
Integrated Inline DC-Power IP-Phone Support	No	Yes (Future)
External Inline DC-Power IP-Phone Support	Yes (Future)	Yes (Future)
Number of PS Bays	2	3
AC Input Power	Yes	Yes
DC Input Power	Yes	Yes
Minimum Power Supplies	1	2
Number of Fan Tray Bays	1	1
Rack-Mount	Center, front	Center, front

The mature Cisco IOS network service strategy spans years of customer-suggested evolution to meet the most demanding network needs. Catalyst 4000 family products benefit from the breadth and depth of these network services and mature protocols.

Supervisor Engine I Memory Upgrade

Supervisor Engine I originally shipped with 32MB memory. During 2HC99 Cisco began shipping all Supervisor Engine I with 64MB memory standard. An additional 32MB memory option exists (item MEM-C4K-32-RAM=) as a field upgrade which will increase the on-board memory to 64MB. This is a single DIMM that is easily inserted into an existing connector if desired.

Specifications

Hardware

Switch Module	WS-X4148-RJ	48-port 10BaseT/100BaseTX autosensing Fast EtherChannel (RJ-45) Linecard
Switch Module	WS-X4148-RJ21	48-port 10/100 auto FE Telc(4x RJ-21)
Switch Module	WS-X4232-L3	Layer 3 Services Module, 32-port 10/100 (RJ-45) + 2-port GE (GBIC Slot)
Switch Module	WS-X4232-GB-RJ	32-port 10BaseT/100BaseTX autosensing Fast EtherChannel (RJ-45), plus 2-port 1000BaseX (GBIC Slot) Linecard
Switch Base Module	WS-X4232-RJ-XX	32-port 10BaseT/100BaseTX autosensing Fast EtherChannel (RJ-45), with daughter card uplink support
Switch Uplink Daughter Card	WS-U4504-FX-MT	4-port 100BaseFX Fast EtherChannel (MT-RJ) Daughter Card module
Switch Module	WS-X4306-GB	6-port 1000BaseX Gigabit EtherChannel (GBIC Slot) Linecard
Switch Module	WS-X4412-2GB-T	14-port 1000BaseT Gigabit Ethernet, 12-port GE (RJ-45) + 2-port GE (GBIC Slot)
Switch Module	WS-X4418-GB	18-port Server Switching 1000BaseX Gigabit Ethernet (GBIC Slot)

Table 21-73: Switching Modules Overview for Catalyst 4000 Family

Catalyst 4006 Port Density Configuration Ranges

The fully loaded Catalyst 4006 will support one Supervisor Engine II and five switching port modules. The Supervisor Engine II with dual Gigabit Ethernet uplink ports is included with the chassis common equipment and is required in slot 1. The Catalyst 4006 will support a wide variety of useful configurations for both the midrange and high-end wiring closet (up to 240 Fast Ethernet). The minimum and maximum number of ports for each Ethernet type, as well as the port density alternatives and interface types, are listed in .

Catalyst 4003 Port Density Configuration Ranges

The Catalyst 4003, fully loaded, will support one supervisor engine and two switching modules. The supervisor engine, which is included with the chassis, is required in slot one. The minimum and maximum number of ports for each Ethernet type, as well as the port density alternatives and interface types, are listed in .

Table 21-74: 10/100 Port Density Configuration Options for Catalyst 4006

Ethernet	Fast Ethernet
32	4
240	240
RJ-45, RJ-21	RJ-45, RJ-21, MT-RJ
32 and 48 ports	4, 24, 32, and 48 ports
	Ethernet 32 240 RJ-45, RJ-21 32 and 48 ports

Table 21-75: Linecard Configuration Worksheet for Catalyst 4003

Switching Module	Product Number	Slot 1	Slot 2	Slot 3
Common Equipment. with Supervisor Engine 1, AC Power	WS-C4003-S1	1	Х	Х
Common Equipment with Supervisor Engine I, DC Power	WS-C4003-S1-DC		Х	Х
Switched 24-10/100 Mbps (MT-RJ)	WS-X4124-FX-MT	Х		
Switched 48-10/100 Mbps (RJ-45)	WS-X4148-RJ(=)	Х		
Switched 48-10/100 Mbps (Telco)	WS-X4148-RJ21	Х		
Layer 3 Engine with 32-10/100 (RJ45) + 2 GE (GBIC slot)	WS-X4232-L3	Х		
Switched 32-10/100 Mbps (RJ-45)+2-GE	WS-X4232-GB-RJ	Х		
Switched 32-10/100 Mbps (RJ-45) with Daughter Card Uplink Support	WS-X4232-RJ-XX	Х		
Uplink Daughter Card module with 4-100 Mbps fiber (MT-RJ) Multimode	WS-U4504-FX-MT	Х		
Switched 6-1000 Mbps Gigabit Ethernet	WS-X4306-GB(=)	Х		
Switched 1000BaseT with 12-1000 Mbps (RJ45)+2 GE (GBIC Slot)	WS-X4412-2GB-TX	Х		
Switched 18-1000 Mbps GE (Server Switching)	WS-X4418-GB(=)	Х		

1. Write "1" next to the product number intended for each slot

Table 21-76: Catalyst 4006 Linecard Configuration Worksheet

Switching Module	Product Number	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
Common Equipment with Supervisor Engine 1, AC Power	WS-C4006-S2		Х	Х	Х	Х	Х
Common Equipment with Supervisor Engine I, DC Power	WS-C4006-S2-DC		Х	Х	Х	Х	Х
Switched 24-10/100 Mbps (MT-RJ)	WS-X4124-FX-MT	Х					
Switched 48-10/100 Mbps (RJ-45)	WS-X4148-RJ	Х					
Switched 48-10/100 Mbps (Telco)	WS-X4148-RJ21	Х					
Layer 3 Engine with 32-10/100 (RJ45) + 2 GE (GBIC slot)	WS-X4232-L3	Х					
Switched 32-10/100 Mbps (RJ-45)+2-GE	WS-X4232-GB-RJ	Х					
Switched 32-10/100 Mbps (RJ-45) with Daughter Card Uplink Support	WS-X4232-RJ-XX	Х					
Uplink Daughter Card module with 4-100 Mbps fiber (MT-RJ) Multimode	WS-U4504-FX-MT	Х					
Switched 6-1000 Mbps Gigabit Ethernet	WS-X4306-GB	Х					
Switched 1000BaseT with 12-1000 Mbps (RJ45)+2 GE (GBIC Slot)	WS-X4412-2GB-TX	Х					
Switched 18-1000 Mbps GE (Server Switching)	WS-X4418-GB	Х					
Backplane Channel Module (max 2)	WS-X4019	Х					

1. Write "1" next to the product number intended for each slot

Software

For information on software options for the Catalyst 4000 Family, see Ordering Information section below:

Ordering Information

Where to buy Cisco products

Visit http://www.cisco.com/public/ordering_info.shtml

Standard Configuration Information

Standard common equipment includes one chassis, one supervisor engine I, one AC power supply and one fan tray in a single manageable unit when you order item WS-C4003-S1.

Standard common equipment includes one chassis, one supervisor engine I, one DC power supply and one fan tray in a single manageable unit when you order item WS-C4003-S1-DC.

Standard common equipment includes one chassis, one supervisor engine II, two AC power supplies and one fan tray in a single manageable unit when you order item WS-C4006-S2.

Standard common equipment includes one chassis, one supervisor engine II, two DC power supplies and one fan tray in a single manageable unit when you order item WS-C4006-S2-DC.

Product and Part Numbers

Part Numbers for the Catalyst 4000 LAN Switches

Part Description	Part Number
Catalyst 4000	
Catalyst 4000 - Base Configuration	
Cat4000 Chassis(3-slot), Supervisor,1 AC PS, Fan Tray	WS-C4003-S1
Catalyst 4003 chassis, AC P/S,Sup.Eng.I, 80 10/100 FE + 2 GE	WS-C4003-S1-82
Catalyst 4000 Chassis (3-Slot), Supervisor I, 1 DC P/S, Fans	WS-C4003-S1-DC
Catalyst 4000 Chassis (3-Slot),Single AC Power Supply(Spare)	WS-C4003=
Catalyst 4006 Chassis (6-Slot), 2 AC PS, Fan Tray (Spare)	WS-C4006=
Catalyst 4000 Chassis (6-Slot),Suprvsr II,(2)AC PS, Fans	WS-C4006-S2
Catalyst 4000 Chassis(6-Slot),SupII w/2 GE, 2 DC P/S, Fans	WS-C4006-S2-DC
Catalyst 4000 Dual AC Power Supply Option	WS-X4008/2
Catalyst 4000 DC Power Supply	WS-X4008-DC
Catalyst 4000 DC Power Supply	WS-X4008-DC=
Catalyst 4003 DC Power Supply Redundant	WS-X4008-DC/2
Catalyst 4006 DC Power Supply Redundant	WS-X4008-DC/3
Catalyst 4908G-L3 Layer 3 Switch, 8 port 1000X GBIC Slots	WS-C4908G-L3
Catlayst 4000 AC PS Redundant	WS-X4008/3
Catalyst 4000 AC Power Supply (Spare)	WS-X4008=
Catalyst 4000 Aux. Power Shelf (3 slot) (spare)	WS-P4603=
Catalyst 4000 Aux. Power Shelf (3 slot), inc. two WS-X4608	WS-P4603-2PSU
Catalyst 4000 Aux. Power Shelf (3 slot), inc. two WS-X4608	WS-P4603-2PSU=
Catalyst 4603 Power Supply Unit for WS- P4603	WS-X4608
Catalyst 4603 Power Supply Unit for WS- P4603	WS-X4608=
Catalyst Web Switch	WS-C4840G
Catalyst Gigabit Ethernet Switch, 12- 1000BaseX (GBIC slots)	WS-C4912G
Catalyst 4000 Modules	
Catalyst 4000 Supervsr. I,Console(DB- 25)& Mgt.(RJ-45)(spare)	WS-X4012=

Part Description	Part Number
Catalyst 4000 Supervisor II,Console(RJ- 45),Mgt(RJ-45)(Spare)	WS-X4013=
Catalyst 4006 Backplane Channel Module	WS-X4019
Catalyst 4006 Backplane Channel Module (Spare)	WS-X4019=
Catalyst 4000 DC Power Entry Module	WS-X4095-PEM
Catalyst 4000 DC Power Entry Module (Spare)	WS-X4095-PEM=
Catalyst 4000 FE Switching Module, 24- 100FX (MTRJ)	WS-X4124-FX-MT
Catalyst 4000 FE Switching Module, 24- 100FX (MTRJ)(Spare)	WS-X4124-FX-MT=
Catalyst 4000 10/100 Auto Module, 48- Ports (RJ-45)	WS-X4148-RJ
Catalyst 4000 10/100 Auto Module, 48- Ports (RJ-45) (Spare)	WS-X4148-RJ=
FE switch module,48-port 10/100 auto Telco(4xRJ21)	WS-X4148-RJ21
Telco switch module,48-port 10/100 auto (4xRJ21)(spare)	WS-X4148-RJ21=
CATALYST 4000 Inline Power 10/100, 48- PORTS (RJ45)	WS-X4148-RJ45V
CATALYST 4000 Inline Power 10/100, 48- PORTS (RJ45)	WS-X4148-RJ45V=
Catalyst 4000 E/FE/GE Module,2- GE(GBIC),32- 10/100 (RJ-45)	WS-X4232-GB-RJ
Cat 4000 E/FE/GE Module,2- GE(GBIC),32-10/100, RJ-45(Spare)	WS-X4232-GB-RJ=
Catalyst 4000 E/FE/GE L3 Module, 2- GE(GBIC),32-10/100	WS-X4232-L3
Cat 4000 E/FE/GE L3 Module, 2- GE(GBIC),32-10/100 (Spare)	WS-X4232-L3=
FE Base Module,32- 10/100(RJ45)+ Modular Uplinks	WS-X4232-RJ-XX
FE Base Module,32- 10/100(RJ45)+ Modular Uplinks(spare)	WS-X4232-RJ-XX=
Catalyst 4000 Gigabit Ethernet Module, 6- Ports (GBIC)	WS-X4306-GB
Catalyst 4000 Gigabit Ethernet Module, 6- Ports(GBIC) (Spare)	WS-X4306-GB=
GE Switch Module, 12- 1000T(RJ45)+2- 1000X (GBIC Slot)	WS-X4412-2GB-T
GE Switch Module, 12- 1000T(RJ45)+2- 1000X (GBIC Slot)	WS-X4412-2GB-T=
Catalyst 4000 GE Module, Server Switching 18-Ports (GBIC)	WS-X4418-GB
Cat 4000 GE Module,Server Switching 18- Ports (GBIC) (Spare)	WS-X4418-GB=
FE Uplink Daughter Card,4-port 100FX (MTRJ)	WS-U4504-FX-MT
FE Uplink Daughter Card,4-port 100FX (MTRJ)(spare)	WS-U4504-FX-MT=

Part Description	Part Number
Catalyst 4000 Access Gateway Module with IP/FW software	WS-X4604-GWY
Catalyst 4000 Access Gateway Module with IP/FW software	WS-X4604-GWY=
Catalyst 4000 DSP Set, 4x6 SIMMs for AGM	WS-U4604-DSP
Catalyst 4000 DSP Set, 4x6 SIMMs for AGM	WS-U4604-DSP=
1000BASE-SX "Short Wavelength" GBIC (Multimode only)	WS-G5484
1000BASE-SX	WS-G5484=
1000BASE-LX/LH "long haul" GBIC (singlemode or multimode)	WS-G5486
1000BASE-LX/LH	WS-G5486=
1000Base-ZX extended reach GBIC(singlemode)	WS-G5487
1000Base-ZX extended reach GBIC(singlemode)	WS-G5487=
Catalyst 4003 Memory Options	
Catalyst 4003 Supervisor I 32MB Memory Upgrade (Spare)	MEM-C4K-32-RAM=
Catalyst 4000 Software Options	
Catalyst 4000 Supervisor Flash Image, Release 4.5(1)	SFC4K-SUP-4.5.1
Catalyst 4000 Supervisor Flash Image, Release 4.5(2)	SFC4K-SUP-4.5.2
Catalyst 4000 Supervisor Flash Image, Release 4.5(5)	SFC4K-SUP-4.5.5
Catalyst 4000 Supervisor Flash Image, Release 4.5(5)	SWC4K-SUP-4.5.5=
Catalyst 4000 Supervisor Flash Image, Release 4.5(9)	SC4K-SUP-4.5.9
Catalyst 4000 Supervisor Flash Image, Release 4.5(9)	SC4K-SUP-4.5.9=
Catalyst 4K Supervisor Flash Image, Release 5.1(1)	SFC4K-SUP-5.1.1
Catalyst 4000 Supervisor Flash Image, Release 5.2(5)	SFC4K-SUP-5.2.5
Catalyst 4000 Supervisor Flash Image, Release 5.2(5)	SWC4K-SUP-5.2.5=
Catalyst 4K Supervisor Flash Image, Release 5.2(6)	SC4K-SUP-5.2.6
Catalyst 4K Supervisor Flash Image, Release 5.2(6)	SC4K-SUP-5.2.6=
Catalyst 4K Supervisor Flash Image, Release 5.4(2)	SC4K-SUP-5.4.2
Supervisor Flash Image, Release 5.4(2)	SC4K-SUP-5.4.2=
Catalyst 4K Supervisor Flash Image, Release 5.4(3)	SC4K-SUP-5.4.3
Catalyst 4K Supervisor Flash Image, Release 5.4(3)	SC4K-SUP-5.4.3=

Part Description	Part Number
Catalyst 4000 Supervisor Flash Image, Release 5.5(1)	SC4K-SUP-5.5.1
Catalyst 4000 Supervisor Flash Image, Release 5.5(1)	SC4K-SUP-5.5.1=
Catalyst 4K Supervisor Flash Image, Release 5.5(3)	SC4K-SUP-5.5.3
Catalyst 4K Supervisor Flash Image, Release 5.5(3)	SC4K-SUP-5.5.3=
Cat4K Supervisor Flash Image w/ CiscoView, Release 5.5(3)	SC4K-SUPCV-5.5.3=
Catalyst 4KSupervisor Flash Image, Release 6.1.1	SC4K-SUP-6.1.1
Catalyst 4KSupervisor Flash Image, Release 6.1.1	SC4K-SUP-6.1.1=
Cisco IOS BASIC SOFTWARE FOR CATALYST 4232	SC42Z-12.0.7W=
Cisco Catalyst 4840g IOS BASIC SOFTWARE (Diskette)	SC48I-12.0.11WX
Cisco Catalyst 4840g IOS BASIC SOFTWARE (Diskette)	SC48I-12.0.11WX=
Catalyst 4000 AGM IOS upgrade IP/FW to IP/FW/DSP Plus	FL4KAGM-CH-CU=
Catalyst 4000 AGM IOS IP/Firewall feature set	S4KAGMCH-12103XI
Catalyst 4000 AGM IOS IP/Firewall feature set	S4KAGMCH-12103XI=
Catalyst 4000 AGM IOS IP/FW/DSP Plus feature set	S4KAGMCU-12103XI
Catalyst 4000 AGM IOS IP/FW/DSP Plus feature set	S4KAGMCU-12103XI=
Catalyst 4912G Switch	
Catalyst Gigabit Ethernet Switch, 12- 1000BaseX (GBIC slots)	WS-C4912G
Catalyst 4xxx Agent Licenses	
Catalyst 4003 RMON Agent License	WS-C4003-EMS-LIC
Catalyst 4006 RMON Agent License	WS-C4006-EMS-LIC
Catalyst 4006 RMON Agent License	WS-C4006-EMS-LIC=
RMON License	WS-C4900-EMS-LIC
RMON License	WS-C4900-EMS-LIC=
Catalyst 4912G RMON Agent License	WS-C4912G-EMS-LIC
Catalyst 4000 Layer3 Enhanced IP License	FR4232-L3-IP
Catalyst 4000 Layer3 Enhanced IP License	FR4232-L3-IP=
Catalyst 4000 L3 Enhanced IPX License	FR4232-L3-IPX
Catalyst 4000 L3 Enhanced IPX License	FR4232-L3-IPX=
Catalyst 4xxx Accessories	
Catalyst 4000 Fan Tray (Spare)	WS-X4004=
Catalyst 4006 Fan Tray (Spare)	WS-X4005-
Catalyst 4006 Chassis (6 Slot) 2 AC DS	WS C4006-
Fan Tray (Spare)	w 5-C4000=

Part Description	Part Number
Catalyst 4000 Aux. Power Shelf (3 slot) (spare)	WS-P4603=
Catalyst 4000 Aux. Power Shelf (3 slot), inc. two WS-X4608	WS-P4603-2PSU
Catlayst 4000 AC PS Redundant	WS-X4008/3
Catalyst 4006 Backplane Channel Module	WS-X4019
Catalyst 4006 Rack Mount Kit (Spare)	WS-X4098=
Catalyst 4000 Rack Mount Kit (Spare)	WS-X4099=
Catalyst 4603 Power Supply Unit for WS- P4603	WS-X4608
Catalyst 4603 Power Supply Unit for WS- P4603	WS-X4608=
Catalyst 4912G Rack Mount Kit (spare)	WS-X4912G-RACK=
Catalyst 4000 UPLINK COVER	C4K-UPLINK-CVR
Catalyst 4000 Licenses	
Catalyst 4000 Layer3 Enhanced IP License	FR4232-L3-IP
Catalyst 4000 Layer3 Enhanced IP License	FR4232-L3-IP=
Catalyst 4000 L3 Enhanced IPX License	FR4232-L3-IPX
Catalyst 4000 L3 Enhanced IPX License	FR4232-L3-IPX=
Catalyst 4000 Access Gateway Module Interface Cards	
Two-port Voice Interface Card - BRI (Terminal)	VIC-2BRI-S/T-TE
Two-port Voice Interface Card - BRI (Terminal)	VIC-2BRI-S/T-TE=
Two-port Voice Interface Card - FXO	VIC-2FXO
Two-port Voice Interface Card - FXO- Spare	VIC-2FXO=
Two-port Voice Interface Card - FXO (for Europe)	VIC-2FXO-EU
Two-port Voice Interface Card - FXO (for Europe)	VIC-2FXO-EU=
Two-port Voice Interface Card - FXS	VIC-2FXS
Two-port Voice Interface Card - FXS- Spare	VIC-2FXS=
2-Port RJ-48 Multiflex Trunk - E1 With Drop and Insert	VWIC-2MFT-E1-DI
2-Port RJ-48 Multiflex Trunk - E1 With Drop and Insert	VWIC-2MFT-E1-DI=
2-Port RJ-48 Multiflex Trunk - T1 With Drop and Insert	VWIC-2MFT-T1-DI
2-Port RJ-48 Multiflex Trunk - T1 With Drop and Insert	VWIC-2MFT-T1-DI=
2-Port RJ-48 Multiflex Trunk - E1	VWIC-2MFT-E1
2-Port RJ-48 Multiflex Trunk - E1	VWIC-2MFT-E1=
2-Port RJ-48 Multiflex Trunk - T1	VWIC-2MFT-T1
2-Port RJ-48 Multiflex Trunk - T1	VWIC-2MFT-T1=
1-port 4-WIRE 56/64 KBPS WAN INTERFACE CARD	WIC-1DSU-56K4

Part Description	Part Number
1-Port 4-Wire 56Kbps DSU/CSU WAN Interface Card	WIC-1DSU-56K4=
2-Port Async/Sync Serial WAN Interface Card	WIC-2A/S
2-Port Async/Sync Serial WAN Interface Card spare	WIC-2A/S=

Documentation

For part numbers for product specific documentation, visit

http://www.cisco.com/univercd/cc/td/doc/pcat/swdo_d1.htm