



## Preface

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This preface describes who should read the *Software Configuration Guide*, how it is organized, and its document conventions.

## Audience

This publication is for experienced network administrators who are responsible for configuring and maintaining Catalyst enterprise LAN switches.

## Organization

This publication is organized as follows:

Chapter	Title	Description
Chapter 1	<a href="#">Product Overview</a>	Presents an overview of the Catalyst enterprise LAN switches.
Chapter 2	<a href="#">Using the Command-Line Interface</a>	Describes how to use the different command-line interfaces (CLIs).
Chapter 3	<a href="#">Configuring the Switch IP Address and Default Gateway</a>	Describes how to perform a baseline configuration of the switch.
Chapter 4	<a href="#">Configuring Ethernet and Fast Ethernet Switching</a>	Describes how to configure Ethernet and Fast Ethernet switching on the switch.
Chapter 5	<a href="#">Configuring Gigabit Ethernet Switching</a>	Describes how to configure Gigabit Ethernet switching on the switch.
Chapter 6	<a href="#">Configuring Fast EtherChannel and Gigabit EtherChannel</a>	Describes how to configure Fast EtherChannel and Gigabit EtherChannel port bundles.
Chapter 7	<a href="#">Configuring Spanning Tree</a>	Describes how to configure the Spanning Tree Protocol and explains how spanning tree works.
Chapter 8	<a href="#">Configuring Spanning Tree PortFast, BPDU Guard, BPDU Filter, UplinkFast, BackboneFast, and Loop Guard</a>	Describes how to configure the spanning tree PortFast, UplinkFast, and BackboneFast features.

Chapter	Title	Description
Chapter 9	<a href="#">Configuring VTP</a>	Describes how to configure VLAN Trunking Protocol (VTP) on the switch.
Chapter 10	<a href="#">Configuring VLANs</a>	Describes how to configure VLANs and private VLANs on the switch.
Chapter 11	<a href="#">Configuring VLAN Trunks on Fast Ethernet and Gigabit Ethernet Ports</a>	Describes how to configure Inter-Switch Link (ISL) and IEEE 802.1Q VLAN trunks on Fast Ethernet and Gigabit Ethernet ports.
Chapter 12	<a href="#">Configuring Dynamic VLAN Membership with VMPS</a>	Describes how to configure VLAN Membership Policy Server (VMPS) and dynamic ports on the switch.
Chapter 13	<a href="#">Configuring GVRP</a>	Describes how to configure GARP VLAN Registration Protocol (GVRP) on the switch.
Chapter 14	<a href="#">Configuring QoS</a>	Describes how to configure quality of service (QoS).
Chapter 15	<a href="#">Configuring Multicast Services</a>	Describes how to configure Cisco Group Management Protocol (CGMP), Internet Group Management Protocol (IGMP) snooping, and GARP Multicast Registration Protocol (GMRP) on the switch.
Chapter 16	<a href="#">Configuring Port Security</a>	Describes how to configure port security on the switch.
Chapter 17	<a href="#">Configuring Unicast Flood Blocking</a>	Describes how to configure unicast flood blocking on the switch.
Chapter 18	<a href="#">Configuring the IP Permit List</a>	Describes how to configure IP permit list on the switch.
Chapter 19	<a href="#">Configuring Protocol Filtering</a>	Describes how to configure protocol filtering on Ethernet, Fast Ethernet, and Gigabit Ethernet ports.
Chapter 20	<a href="#">Checking Status and Connectivity</a>	Describes how to display information about modules and switch ports and how to check connectivity using ping, Telnet, and IP traceroute.
Chapter 21	<a href="#">Configuring CDP</a>	Describes how to configure Cisco Discovery Protocol (CDP) on the switch.
Chapter 22	<a href="#">Using Switch TopN Reports</a>	Describes how to generate switch TopN reports on the switch.
Chapter 23	<a href="#">Configuring UDLD</a>	Describes how to configure the UniDirectional Link Detection (UDLD) protocol on the switch.
Chapter 24	<a href="#">Configuring SNMP</a>	Describes how to configure the Simple Network Management Protocol (SNMP) on the switch.
Chapter 25	<a href="#">Configuring RMON</a>	Describes how to configure Remote Monitoring (RMON) on the switch.
Chapter 26	<a href="#">Configuring SPAN and RSPAN</a>	Describes how to configure the Switched Port Analyzer (SPAN) and Remote SPAN (RSPAN) on the switch.

Chapter	Title	Description
Chapter 27	<a href="#">Administering the Switch</a>	Describes how to set the system name, create a login banner, and perform other administrative tasks on the switch.
Chapter 28	<a href="#">Power Management</a>	Describes power management on the Catalyst 4000 series switches and the Catalyst 4500 series switches, and explains how to configure inline power.
Chapter 29	<a href="#">Configuring VoIP</a>	Describes how to configure your Voice-over-IP (VoIP) network.
Chapter 30	<a href="#">Configuring Switch Access Using AAA</a>	Describes how to configure local and TACACS+ authentication on the switch.
Chapter 31	<a href="#">Configuring 802.1x Authentication</a>	Describes how to configure IEEE 802.1x authentication on the switch.
Chapter 32	<a href="#">Modifying the Switch Boot Configuration</a>	Describes how to modify the switch boot configuration, including the BOOT environment variable and the configuration register.
Chapter 33	<a href="#">Working with System Software Images</a>	Describes how to download and upload system software images.
Chapter 34	<a href="#">Working With the Flash File System</a>	Describes how to work with the Flash file system available on some switch platforms.
Chapter 35	<a href="#">Working with Configuration Files</a>	Describes how to create, download, and upload switch configuration files.
Chapter 36	<a href="#">Configuring Switch Acceleration</a>	Describes the Backplane Channel module and the switch acceleration feature.
Chapter 37	<a href="#">Configuring System Message Logging</a>	Describes how to configure system message logging (syslog) on the switch.
Chapter 38	<a href="#">Configuring DNS</a>	Describes how to configure Domain Name System (DNS) on the switch.
Chapter 39	<a href="#">Configuring NTP</a>	Describes how to configure Network Time Protocol (NTP) on the switch.

## Related Documentation

The following publications are available for the Catalyst enterprise LAN switches:

- *Catalyst 4000 Series Switch Installation Guide*
- *Catalyst 4500 Series Switch Installation Guide*
- *Catalyst 4912G Installation Guide*
- *Catalyst 2948G and 2980G Installation Guide*
- *Catalyst 4000 Family, 2948G, and 2980G Switches Quick Software Configuration*
- *Catalyst 4500 Series, Catalyst 2948G, and Catalyst 2980G Switches Command Reference*
- *System Message Guide—Catalyst 6500 Series, Catalyst 4500 Series, Catalyst 2948G, and Catalyst 2980G Switches*
- *Release Notes for Catalyst 4000 Family Supervisor Engine Software Release 7.x*

# Conventions

Throughout this publication, these conventions are used in reference to switch platforms:

- Catalyst enterprise LAN switches—Refers to the Catalyst 4000 series and Catalyst 4500 series switches, Catalyst 2948G, and Catalyst 2980G switches.
- Catalyst 4000 family switches—Refers to the Catalyst 4000 series and Catalyst 4500 series switches. The Catalyst 4000 series includes the Catalyst 4003, Catalyst 4006, and Catalyst 4912G switches. The Catalyst 4500 series includes the Catalyst 4503 and Catalyst 4506 switches.

Command descriptions use these conventions:

<b>boldface font</b>	Commands, command options, and keywords are in <b>boldface</b> .
<i>italic font</i>	Arguments for which you supply values are in <i>italics</i> .
[ ]	Elements in square brackets are optional.
{ x   y   z }	Alternative keywords are grouped in braces and separated by vertical bars.
[ x   y   z ]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.

Instructions and screen examples use these conventions:

<i>screen font</i>	Terminal sessions and information that the system displays are in <i>screen font</i> .
<b>boldface screen font</b>	Information you must enter is in <b>boldface screen font</b> .
<i>italic screen font</i>	Arguments for which you supply values are in <i>italic screen font</i> .
Ctrl-D	The key combination Ctrl-D means to hold down the Control key while you press the D key.
< >	Nonprinting characters, such as passwords are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.
.	Indicates that screen output not relevant to the example was removed to save space and preserve clarity.

Notes use these conventions:



## Note

Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the publication.

Cautions use these conventions:



**Caution**

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

## Obtaining Documentation

Cisco provides several ways to obtain documentation, technical assistance, and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

### Cisco.com

You can access the most current Cisco documentation on the World Wide Web at this URL:

<http://www.cisco.com/univercd/home/home.htm>

You can access the Cisco website at this URL:

<http://www.cisco.com>

International Cisco websites can be accessed from this URL:

[http://www.cisco.com/public/countries\\_languages.shtml](http://www.cisco.com/public/countries_languages.shtml)

### Documentation CD-ROM

Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which may have shipped with your product. The Documentation CD-ROM is updated regularly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual or quarterly subscription.

Registered Cisco.com users can order a single Documentation CD-ROM (product number DOC-CONDOCCD=) through the Cisco Ordering tool:

[http://www.cisco.com/en/US/partner/ordering/ordering\\_place\\_order\\_ordering\\_tool\\_launch.html](http://www.cisco.com/en/US/partner/ordering/ordering_place_order_ordering_tool_launch.html)

All users can order monthly or quarterly subscriptions through the online Subscription Store:

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

### Ordering Documentation

You can find instructions for ordering documentation at this URL:

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

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Networking Products MarketPlace:

<http://www.cisco.com/en/US/partner/ordering/index.shtml>

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, U.S.A.) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

## Documentation Feedback

You can submit comments electronically on Cisco.com. On the Cisco Documentation home page, click **Feedback** at the top of the page.

You can e-mail your comments to [bug-doc@cisco.com](mailto:bug-doc@cisco.com).

You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems  
Attn: Customer Document Ordering  
170 West Tasman Drive  
San Jose, CA 95134-9883

We appreciate your comments.

## Obtaining Technical Assistance

Cisco provides Cisco.com, which includes the Cisco Technical Assistance Center (TAC) website, as a starting point for all technical assistance. Customers and partners can obtain online documentation, troubleshooting tips, and sample configurations from the Cisco TAC website. Cisco.com registered users have complete access to the technical support resources on the Cisco TAC website, including TAC tools and utilities.

## Cisco.com

Cisco.com offers a suite of interactive, networked services that let you access Cisco information, networking solutions, services, programs, and resources at any time, from anywhere in the world.

Cisco.com provides a broad range of features and services to help you with these tasks:

- Streamline business processes and improve productivity
- Resolve technical issues with online support
- Download and test software packages
- Order Cisco learning materials and merchandise
- Register for online skill assessment, training, and certification programs

To obtain customized information and service, you can self-register on Cisco.com at this URL:

<http://tools.cisco.com/RPF/register/register.do>

## Technical Assistance Center

The Cisco TAC is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two types of support are available: the Cisco TAC website and the Cisco TAC Escalation Center. The type of support that you choose depends on the priority of the problem and the conditions stated in service contracts, when applicable.

We categorize Cisco TAC inquiries according to urgency:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration. There is little or no impact to your business operations.
- Priority level 3 (P3)—Operational performance of the network is impaired, but most business operations remain functional. You and Cisco are willing to commit resources during normal business hours to restore service to satisfactory levels.
- Priority level 2 (P2)—Operation of an existing network is severely degraded, or significant aspects of your business operations are negatively impacted by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.
- Priority level 1 (P1)—An existing network is “down,” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

### Cisco TAC Website

The Cisco TAC website provides online documents and tools to help troubleshoot and resolve technical issues with Cisco products and technologies. To access the Cisco TAC website, go to this URL:

<http://www.cisco.com/tac>

All customers, partners, and resellers who have a valid Cisco service contract have complete access to the technical support resources on the Cisco TAC website. Some services on the Cisco TAC website require a Cisco.com login ID and password. If you have a valid service contract but do not have a login ID or password, go to this URL to register:

<http://tools.cisco.com/RPF/register/register.do>

If you are a Cisco.com registered user, and you cannot resolve your technical issues by using the Cisco TAC website, you can open a case online at this URL:

<http://www.cisco.com/tac/caseopen>

If you have Internet access, we recommend that you open P3 and P4 cases online so that you can fully describe the situation and attach any necessary files.

### Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses priority level 1 or priority level 2 issues. These classifications are assigned when severe network degradation significantly impacts business operations. When you contact the TAC Escalation Center with a P1 or P2 problem, a Cisco TAC engineer automatically opens a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to this URL:

<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

Before calling, please check with your network operations center to determine the Cisco support services to which your company is entitled: for example, SMARTnet, SMARTnet Onsite, or Network Supported Accounts (NSA). When you call the center, please have available your service agreement number and your product serial number.

## Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- The *Cisco Product Catalog* describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the *Cisco Product Catalog* at this URL:

[http://www.cisco.com/en/US/products/products\\_catalog\\_links\\_launch.html](http://www.cisco.com/en/US/products/products_catalog_links_launch.html)

- Cisco Press publishes a wide range of networking publications. Cisco suggests these titles for new and experienced users: *Internetworking Terms and Acronyms Dictionary*, *Internetworking Technology Handbook*, *Internetworking Troubleshooting Guide*, and the *Internetworking Design Guide*. For current Cisco Press titles and other information, go to Cisco Press online at this URL:

<http://www.ciscopress.com>

- *Packet* magazine is the Cisco quarterly publication that provides the latest networking trends, technology breakthroughs, and Cisco products and solutions to help industry professionals get the most from their networking investment. Included are networking deployment and troubleshooting tips, configuration examples, customer case studies, tutorials and training, certification information, and links to numerous in-depth online resources. You can access *Packet* magazine at this URL:

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

- iQ Magazine is the Cisco bimonthly publication that delivers the latest information about Internet business strategies for executives. You can access iQ Magazine at this URL:

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

- Internet Protocol Journal is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

[http://www.cisco.com/en/US/about/ac123/ac147/about\\_cisco\\_the\\_internet\\_protocol\\_journal.html](http://www.cisco.com/en/US/about/ac123/ac147/about_cisco_the_internet_protocol_journal.html)

- Training—Cisco offers world-class networking training. Current offerings in network training are listed at this URL:

[http://www.cisco.com/en/US/learning/le31/learning\\_recommended\\_training\\_list.html](http://www.cisco.com/en/US/learning/le31/learning_recommended_training_list.html)