



Preface

This preface describes who should read this document, how it is organized, and its conventions. The preface also tells you how to obtain Cisco documents, as well as how to obtain technical assistance.

Audience

This guide is for experienced network administrators who are responsible for configuring and maintaining Catalyst 4500 series switches.

Organization

This guide is organized into the following chapters:

Chapter	Title	Description
Chapter 1	Product Overview	Presents an overview of the Cisco IOS software for the Catalyst 4500 series switches
Chapter 2	Command-Line Interfaces	Describes how to use the CLI
Chapter 3	Configuring the Switch for the First Time	Describes how to perform a baseline configuration of the switch
Chapter 4	Administering the Switch	Describes how to administer the switch.
Chapter 5	Configuring the Cisco IOS In Service Software Upgrade Process	Describes how to configure ISSU on the switch.
Chapter 6	Configuring Interfaces	Describes how to configure non-layer-specific features on Fast Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces
Chapter 7	Checking Port Status and Connectivity	Describes how to check module and interface status
Chapter 8	Configuring Supervisor Engine Redundancy Using RPR and SSO	Describes how to configure RPR and SSO on the Catalyst 4507R and 4510R switches
Chapter 9	Configuring Cisco NSF with SSO Supervisor Engine Redundancy	Describes how to configure supervisor engine redundancy using Cisco nonstop forwarding (NSF) with stateful switchover (SSO).

Chapter	Title	Description
Chapter 10	Environmental Monitoring and Power Management	Describes how to configure power management and environmental monitoring features
Chapter 11	Configuring Power over Ethernet	Describes how to configure Power over Ethernet (PoE)
Chapter 12	Configuring the Catalyst 4500 Series Switch with Cisco Network Assistant	Describes how to install and configure Network Assistant and Embedded CiscoView
Chapter 13	Configuring VLANs, VTP, and VMPS	Describes how to configure VLANs, VTP, and VMPS.
Chapter 14	Configuring IP Unnumbered Interface	Describes how to configure IP Unnumbered support.
Chapter 15	Configuring Layer 2 Ethernet Interfaces	Describes how to configure interfaces to support Layer 2 features, including VLAN trunks
Chapter 16	Configuring SmartPort Macros	Describes how to configure SmartPort macros
Chapter 17	Configuring STP and MST	Describes how to configure the Spanning Tree Protocol (STP) and the Multiple Spanning Tree (MST) protocol and explains how they work.
Chapter 18	Configuring Optional STP Features	Describes how to configure the spanning-tree PortFast, UplinkFast, BackboneFast, and other STP features
Chapter 19	Configuring EtherChannel	Describes how to configure Layer 2 and Layer 3 EtherChannel port bundles
Chapter 20	Configuring IGMP Snooping and Filtering	Describes how to configure Internet Group Management Protocol (IGMP) snooping
Chapter 21	Configuring 802.1Q and Layer 2 Protocol Tunneling	Describes how to configure 802.1Q and Layer 2 protocol Tunneling
Chapter 22	Configuring CDP	Describes how to configure the Cisco Discovery Protocol (CDP)
Chapter 23	Configuring UDLD	Describes how to configure the UniDirectional Link Detection (UDLD) protocol
Chapter 24	Configuring Unidirectional Ethernet	Describes how to configure unidirectional Ethernet
Chapter 25	Configuring Layer 3 Interfaces	Describes how to configure interfaces to support Layer 3 features
Chapter 26	Configuring Cisco Express Forwarding	Describes how to configure Cisco Express Forwarding (CEF) for IP unicast traffic
Chapter 27	Understanding and Configuring IP Multicast	Describes how to configure IP Multicast Multilayer Switching (MMLS)
Chapter 28	Configuring Policy-Based Routing	Describes how to configure policy-based routing
Chapter 29	Configuring VRF-lite	Describes how to configure multiple VPN routing/forwarding (multi-VRF) instances in customer edge (CE) devices

Chapter	Title	Description
Chapter 30	Configuring Quality of Service	Describes how to configure quality of service (QoS).
Chapter 31	Configuring Voice Interfaces	Describes how to configure multi-VLAN access ports for use with Cisco IP phones
Chapter 32	Configuring 802.1X Port-Based Authentication	Describes how to configure 802.1X port-based authentication
Chapter 33	Configuring Port Security	Describes how to configure port security and trunk port security.
Chapter 34	Configuring Control Plane Policing	Describes how to protect your Catalyst 4500 series switch using control plane policing (CoPP).
Chapter 35	Configuring DHCP Snooping and IP Source Guard	Describes how to configure DHCP snooping and IP Source Guard
Chapter 36	Configuring Dynamic ARP Inspection	Describes how to configure Dynamic ARP Inspection
Chapter 37	Configuring Network Security with ACLs	Describes how to configure ACLs, VACLs, and MACLS
Chapter 38	Configuring Private VLANs	Describes how to set up and modify private VLANs
Chapter 39	Port Unicast and Multicast Flood Blocking	Describes how to configure unicast flood blocking
Chapter 40	Configuring Storm Control	Describes how to configure storm control suppression
Chapter 41	Configuring SPAN and RSPAN	Describes how to configure the Switched Port Analyzer (SPAN)
Chapter 42	Configuring System Message Logging	Describes how to configure system message logging.
Chapter 43	Configuring SNMP	Describes how to configure the Simple Network Management Protocol (SNMP).
Chapter 44	Configuring NetFlow	Describes how to configure NetFlow statistics gathering
Chapter 45	Configuring RMON	Describes how to configure Remote Network Monitoring (RMON).
Chapter 46	Diagnostics on the Catalyst 4500 Series Switch	Describes various types of diagnostics on the Catalyst 4500 series switch.
Chapter 47	Configuring WCCP Version 2 Services	Describes how to configure the Catalyst 4500 series switches to redirect traffic to cache engines (web caches) using the Web Cache Communication Protocol (WCCP), and describes how to manage cache engine clusters (cache farms).
Chapter 48	Configuring MIB Support	Describes how to configure configure SNMP and MIB support.
Chapter 49	Troubleshooting the Catalyst 4500 Series Switch	Describes how to troubleshooting the switch.

Chapter	Title	Description
Chapter 50	ROM Monitor	Describes the ROM Monitor.
Appendix A	Acronyms and Abbreviations	Defines acronyms and abbreviations used in this book

Related Documentation

The following publications are available for the Catalyst 4500 series switches:

Catalyst 4500 Series Switch Documentation Home

- http://www.cisco.com/en/US/products/hw/switches/ps4324/tsd_products_support_series_home.html

Catalyst 4500 Series Switches Installation Guide (DOC-7814409=)

- http://www.cisco.com/en/US/products/hw/switches/ps4324/products_installation_guide_book09186a0080126d3d.html

Catalyst 4500 Series Module Installation Guide (DOC-786444=)

- http://www.cisco.com/en/US/products/hw/switches/ps4324/products_module_installation_guide_book09186a008009c17d.html

Catalyst 4500 Series Regulatory Compliance and Safety Information (DOC-7813233=)

- http://www.cisco.com/en/US/products/hw/switches/ps4324/products_regulatory_approvals_and_compliance09186a00800d7676.html

Installation notes for specific supervisor engines or for accessory hardware are available at:

- http://www.cisco.com/en/US/products/hw/switches/ps4324/prod_installation_guides_list.html

Cisco IOS configuration guides and command references—Use these publications to help you configure Cisco IOS software features not described in the preceding publications:

- *Configuration Fundamentals Configuration Guide*
- *Configuration Fundamentals Command Reference*
- *Interface Configuration Guide*
- *Interface Command Reference*
- *Network Protocols Configuration Guide, Part 1, 2, and 3*
- *Network Protocols Command Reference, Part 1, 2, and 3*
- *Security Configuration Guide*
- *Security Command Reference*
- *Switching Services Configuration Guide*
- *Switching Services Command Reference*
- *Voice, Video, and Fax Applications Configuration Guide*
- *Voice, Video, and Fax Applications Command Reference*
- *Cisco IOS IP Configuration Guide*
- *Cisco IOS IP Command Reference*

The Cisco IOS configuration guides and command references are at <http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122cgcr/index.htm>

For information about MIBs, refer to <http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>

Software Documentation

The abilities of your switch and the modules supported depend greatly on the software you have installed. Each software release typically has each of the following:

- Release Note
http://www.cisco.com/en/US/products/hw/switches/ps4324/prod_release_notes_list.html
- Configuration Guide
http://www.cisco.com/en/US/products/hw/switches/ps4324/products_installation_and_configuration_guides_list.html
- Command Reference
http://www.cisco.com/en/US/products/hw/switches/ps4324/prod_command_reference_list.html
- System Message Guide
http://www.cisco.com/en/US/products/hw/switches/ps4324/products_system_message_guides_list.html

You may want to bookmark the guides appropriate to your software release.

- For information about MIBs, go to the following URL:
<http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>

Conventions

This document uses the following typographical conventions:

Convention	Description
boldface font	Commands, command options, and keywords are in boldface .
<i>italic font</i>	Command arguments for which you supply values are in <i>italics</i> .
[]	Command elements in square brackets are optional.
{ x y z }	Alternative keywords in command lines 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 because the string will include the quotation marks.
screen font	System displays are in <i>screen font</i> .
boldface screen font	Information you must enter verbatim is in boldface screen font .
<i>italic screen font</i>	Arguments for which you supply values are in <i>italic screen font</i> .

Convention	Description
→	This pointer highlights an important line of text in an example.
^	Represents the key labeled Control—for example, the key combination ^D in a screen display means hold down the Control key while you press the D key.
< >	Nonprinting characters such as passwords are in angle brackets.

Notes use the following conventions:



Note

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

Cautions use the following conventions:



Caution

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

Commands in Task Tables

Commands listed in task tables show only the relevant information for completing the task and not all available options for the command. For a complete description of a command, refer to the command in the *Catalyst 4500 Series Switch Cisco IOS Command Reference*.

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. This section explains the product documentation resources that Cisco offers.

Cisco.com

You can access the most current Cisco documentation at this URL:

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

You can access the Cisco website at this URL:

<http://www.cisco.com>

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

Product Documentation DVD

The Product Documentation DVD is a library of technical product documentation on a portable medium. The DVD enables you to access installation, configuration, and command guides for Cisco hardware and software products. With the DVD, you have access to the HTML documentation and some of the PDF files found on the Cisco website at this URL:

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

The Product Documentation DVD is created and released regularly. DVDs are available singly or by subscription. Registered Cisco.com users can order a Product Documentation DVD (product number DOC-DOCDVD= or DOC-DOCDVD=SUB) from Cisco Marketplace at the Product Documentation Store at this URL:

<http://www.cisco.com/go/marketplace/docstore>

Ordering Documentation

You must be a registered Cisco.com user to access Cisco Marketplace. Registered users may order Cisco documentation at the Product Documentation Store at this URL:

<http://www.cisco.com/go/marketplace/docstore>

If you do not have a user ID or password, you can register at this URL:

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

Documentation Feedback

You can provide feedback about Cisco technical documentation on the Cisco Technical Support & Documentation site area by entering your comments in the feedback form available in every online document.

Cisco Product Security Overview

Cisco provides a free online Security Vulnerability Policy portal at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

From this site, you will find information about how to do the following:

- Report security vulnerabilities in Cisco products
- Obtain assistance with security incidents that involve Cisco products
- Register to receive security information from Cisco

A current list of security advisories, security notices, and security responses for Cisco products is available at this URL:

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

To see security advisories, security notices, and security responses as they are updated in real time, you can subscribe to the Product Security Incident Response Team Really Simple Syndication (PSIRT RSS) feed. Information about how to subscribe to the PSIRT RSS feed is found at this URL:

http://www.cisco.com/en/US/products/products_psirt_rss_feed.html

Reporting Security Problems in Cisco Products

Cisco is committed to delivering secure products. We test our products internally before we release them, and we strive to correct all vulnerabilities quickly. If you think that you have identified a vulnerability in a Cisco product, contact PSIRT:

- For emergencies only — security-alert@cisco.com

An emergency is either a condition in which a system is under active attack or a condition for which a severe and urgent security vulnerability should be reported. All other conditions are considered nonemergencies.

- For nonemergencies — psirt@cisco.com

In an emergency, you can also reach PSIRT by telephone:

- 1 877 228-7302
- 1 408 525-6532



Tip

We encourage you to use Pretty Good Privacy (PGP) or a compatible product (for example, GnuPG) to encrypt any sensitive information that you send to Cisco. PSIRT can work with information that has been encrypted with PGP versions 2.x through 9.x.

Never use a revoked encryption key or an expired encryption key. The correct public key to use in your correspondence with PSIRT is the one linked in the Contact Summary section of the Security Vulnerability Policy page at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

The link on this page has the current PGP key ID in use.

If you do not have or use PGP, contact PSIRT to find other means of encrypting the data before sending any sensitive material.

Product Alerts and Field Notices

Modifications to or updates about Cisco products are announced in Cisco Product Alerts and Cisco Field Notices. You can receive Cisco Product Alerts and Cisco Field Notices by using the Product Alert Tool on Cisco.com. This tool enables you to create a profile and choose those products for which you want to receive information.

To access the Product Alert Tool, you must be a registered Cisco.com user. (To register as a Cisco.com user, go to this URL: <http://tools.cisco.com/RPF/register/register.do>) Registered users can access the tool at this URL: <http://tools.cisco.com/Support/PAT/do/ViewMyProfiles.do?local=en>

Obtaining Technical Assistance

Cisco Technical Support provides 24-hour-a-day award-winning technical assistance. The Cisco Technical Support & Documentation website on Cisco.com features extensive online support resources. In addition, if you have a valid Cisco service contract, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not have a valid Cisco service contract, contact your reseller.

Cisco Technical Support & Documentation Website

The Cisco Technical Support & Documentation website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day at this URL:

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

Access to all tools on the Cisco Technical Support & Documentation website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

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



Note

Use the **Cisco Product Identification Tool** to locate your product serial number before submitting a request for service online or by phone. You can access this tool from the Cisco Technical Support & Documentation website by clicking the **Tools & Resources** link, clicking the **All Tools (A-Z)** tab, and then choosing **Cisco Product Identification Tool** from the alphabetical list. This tool offers three search options: by product ID or model name; by tree view; or, for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.



Tip

Displaying and Searching on Cisco.com

If you suspect that the browser is not refreshing a web page, force the browser to update the web page by holding down the Ctrl key while pressing F5.

To find technical information, narrow your search to look in technical documentation, not the entire Cisco.com website. On the Cisco.com home page, click the **Advanced Search** link under the Search box and then click the **Technical Support & Documentation** radio button.

To provide feedback about the Cisco.com website or a particular technical document, click **Contacts & Feedback** at the top of any Cisco.com web page.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco engineer. The TAC Service Request Tool is located at this URL:

<http://www.cisco.com/techsupport/servicerequest>

For S1 or S2 service requests, or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411

Australia: 1 800 805 227

EMEA: +32 2 704 55 55

USA: 1 800 553 2447

For a complete list of Cisco TAC contacts, go to this URL:

<http://www.cisco.com/techsupport/contacts>

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—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.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operations are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of the network is impaired while most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

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

- The Cisco Online Subscription Center is the website where you can sign up for a variety of Cisco e-mail newsletters and other communications. Create a profile and then select the subscriptions that you would like to receive. To visit the Cisco Online Subscription Center, go to this URL:

<http://www.cisco.com/offer/subscribe>

- The *Cisco Product Quick Reference Guide* is a handy, compact reference tool that includes brief product overviews, key features, sample part numbers, and abbreviated technical specifications for many Cisco products that are sold through channel partners. It is updated twice a year and includes the latest Cisco channel product offerings. To order and find out more about the *Cisco Product Quick Reference Guide*, go to this URL:
<http://www.cisco.com/go/guide>
- Cisco Marketplace provides a variety of Cisco books, reference guides, documentation, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:
<http://www.cisco.com/go/marketplace/>
- Cisco Press publishes a wide range of general networking, training, and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:
<http://www.ciscopress.com>
- *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/ipj>
- Networking products offered by Cisco Systems, as well as customer support services, can be obtained at this URL:
<http://www.cisco.com/en/US/products/index.html>
- Networking Professionals Connection is an interactive website where networking professionals share questions, suggestions, and information about networking products and technologies with Cisco experts and other networking professionals. Join a discussion at this URL:
<http://www.cisco.com/discuss/networking>
- “What’s New in Cisco Documentation” is an online publication that provides information about the latest documentation releases for Cisco products. Updated monthly, this online publication is organized by product category to direct you quickly to the documentation for your products. You can view the latest release of “What’s New in Cisco Documentation” at this URL:
<http://www.cisco.com/univercd/cc/td/doc/abtunicd/136957.htm>
- World-class networking training is available from Cisco. You can view current offerings at this URL:
<http://www.cisco.com/en/US/learning/index.html>

