



## Preface

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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	<a href="#">Product Overview</a>	Presents an overview of the Cisco IOS software for the Catalyst 4500 series switches.
Chapter 2	<a href="#">Command-Line Interfaces</a>	Describes how to use the CLI.
Chapter 3	<a href="#">Configuring the Switch for the First Time</a>	Describes how to perform a baseline configuration of the switch.
Chapter 4	<a href="#">Administering the Switch</a>	Describes how to administer the switch.
Chapter 5	<a href="#">Configuring Virtual Switching Systems</a>	Describes how to configure Virtual Switching Systems
Chapter 6	<a href="#">Configuring the Cisco IOS In-Service Software Upgrade Process</a>	Describes how to configure the IOS ISSU process on the switch.
Chapter 7	<a href="#">Configuring the Cisco IOS XE In Service Software Upgrade Process</a>	Describes how to configure the IOS XE ISSU process on the switch.
Chapter 8	<a href="#">Configuring Interfaces</a>	Describes how to configure non-layer-specific features on Fast Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces.
Chapter 9	<a href="#">Checking Port Status and Connectivity</a>	Describes how to check module and interface status.

Chapter	Title	Description
Chapter 10	Configuring Supervisor Engine Redundancy Using RPR and SSO on Supervisor Engine 6-E and Supervisor Engine 6L-E	Describes how to configure RPR and SSO on Supervisor Engines 6-E and 6L-E.
Chapter 11	Configuring Supervisor Engine Redundancy Using RPR and SSO on Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E	Describes how to configure RPR and SSO on Supervisor Engines 7-E, 7L-E, and 8-E.
Chapter 12	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 13	Environmental Monitoring and Power Management	Describes how to configure power management and environmental monitoring features.
Chapter 14	Configuring Power over Ethernet	Describes how to configure Power over Ethernet (PoE).
Chapter 15	Configuring the Catalyst 4500 Series Switch with Cisco Network Assistant	Describes how to install and configure Network Assistant and Embedded CiscoView.
Chapter 16	Configuring VLANs, VTP, and VMPS	Describes how to configure VLANs, VTP, and VMPS.
Chapter 17	Configuring IP Unnumbered Interface	Describes how to configure IP Unnumbered support.
Chapter 18	Configuring Layer 2 Ethernet Interfaces	Describes how to configure interfaces to support Layer 2 features, including VLAN trunks.
Chapter 19	Configuring EVC-Lite	Describes how to enable EVC-Lite.
Chapter 20	Configuring SmartPort Macros	Describes how to configure SmartPort macros.
Chapter 20	Configuring Cisco IOS Auto Smartport Macros	Describes how to configure Auto SmartPort Macros
Chapter 22	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 23	Configuring Flex Links and MAC Address-Table Move Update	Describes how to how to configure Flex Links on a switch.
Chapter 24	Configuring Resilient Ethernet Protocol	Describes how to configure Resilient Ethernet Protocol (REP).
Chapter 25	Configuring Optional STP Features	Describes how to configure the spanning-tree PortFast, UplinkFast, BackboneFast, and other STP features
Chapter 26	Configuring EtherChannel and Link State Tracking	Describes how to configure Layer 2 and Layer 3 EtherChannel port bundles.
Chapter 27	Configuring IGMP Snooping and Filtering, and MVR	Describes how to configure Internet Group Management Protocol (IGMP) snooping and Multicast VLAN Registration (MVR).

Chapter	Title	Description
Chapter 28	<a href="#">Configuring IPv6 Multicast Listener Discovery Snooping</a>	Describes how to configure IPv6 MLD Snooping.
Chapter 29	<a href="#">Configuring 802.1Q Tunneling, VLAN Mapping, and Layer 2 Protocol Tunneling</a>	Describes how to configure 802.1Q and Layer 2 protocol Tunneling.
Chapter 30	<a href="#">Configuring CDP</a>	Describes how to configure the Cisco Discovery Protocol (CDP).
Chapter 31	<a href="#">Configuring LLDP, LLDP-MED, and Location Service</a>	Describes how to configure Link Layer Discovery Protocol (LLDP).
Chapter 32	<a href="#">Configuring UDLD</a>	Describes how to configure the UniDirectional Link Detection (UDLD) protocol.
Chapter 33	<a href="#">Configuring Unidirectional Ethernet</a>	Describes how to configure Unidirectional Ethernet
Chapter 34	<a href="#">Configuring Layer 3 Interfaces</a>	Describes how to configure interfaces to support Layer 3 features.
Chapter 35	<a href="#">Configuring Cisco Express Forwarding</a>	Describes how to configure Cisco Express Forwarding (CEF) for IP unicast traffic.
Chapter 36	<a href="#">Configuring Unicast Reverse Path Forwarding</a>	Describes how to configure Unicast Reverse Path Forwarding.
Chapter 37	<a href="#">Configuring IP Multicast</a>	Describes how to configure IP Multicast Multilayer Switching (MMLS).
Chapter 38	<a href="#">Configuring ANCP Client</a>	Describes how to configure ANCP.
Chapter 39	<a href="#">Configuring Bidirection Forwarding Detection</a>	Describes how to configure Bidirectional Forwarding Detection
Chapter 40	<a href="#">Configuring Policy-Based Routing</a>	Describes how to configure policy-based routing.
Chapter 41	<a href="#">Configuring VRF-lite</a>	Describes how to configure multiple VPN routing/forwarding (multi-VRF) instances in customer edge (CE) devices.
Chapter 42	<a href="#">Configuring Quality of Service</a>	Describes how to configure quality of service (QoS).
Chapter 43	<a href="#">Configuring Voice Interfaces</a>	Describes how to configure voice interfaces.
Chapter 44	<a href="#">Configuring Private VLANs</a>	Describes how to set up and modify private VLANs.
Chapter 45	<a href="#">Configuring MACsec Encryption</a>	Describes how to configure MACsec encryption.
Chapter 46	<a href="#">Configuring 802.1X Port-Based Authentication</a>	Describes how to configure 802.1X port-based authentication.
Chapter 47	<a href="#">Configuring the PPPoE Intermediate Agent</a>	Describes how to configure PPPoE Intermediate Agent.
Chapter 48	<a href="#">Configuring Web-Based Authentication</a>	Describes how to configure web-based authentication.
Chapter 49	<a href="#">Configuring Wired Guest Access</a>	Describes how to connect to the guest access network from a wired Ethernet connection.

Chapter	Title	Description
Chapter 50	<a href="#">Configuring Port Security</a>	Describes how to configure port security and trunk port security.
Chapter 51	<a href="#">Configuring Auto Security</a>	Describes how to configure auto security.
Chapter 52	<a href="#">Configuring Control Plane Policing and Layer 2 Control Packet QoS</a>	Describes how to protect your Catalyst 4500 series switch using control plane policing (CoPP).
Chapter 53	<a href="#">Configuring Dynamic ARP Inspection</a>	Describes how to configure Dynamic ARP Inspection.
Chapter 54	<a href="#">Configuring DHCP Snooping, IP Source Guard, and IPSG for Static Hosts</a>	Describes how to configure DHCP snooping and IP Source Guard.
Chapter 55	<a href="#">Configuring Network Security with ACLs</a>	Describes how to configure ACLs, VACLs, and MACLS.
Chapter 56	<a href="#">Support for IPv6</a>	Describes the support for IPv6 on the switch.
Chapter 57	<a href="#">Port Unicast and Multicast Flood Blocking</a>	Describes how to configure unicast flood blocking.
Chapter 58	<a href="#">Configuring Storm Control</a>	Describes how to configure storm control suppression.
Chapter 59	<a href="#">Configuring SPAN and RSPAN</a>	Describes how to configure the Switched Port Analyzer (SPAN).
Chapter 60	<a href="#">Configuring Wireshark</a>	Describes how to configure Wireshark, the Ethernet Analyzer on the Catalyst 4500 series switch.
Chapter 61	<a href="#">Configuring Enhanced Object Tracking</a>	Describes how to configure Enhanced Object Tracking
Chapter 62	<a href="#">Configuring System Message Logging</a>	Describes how to configure system message logging.
Chapter 63	<a href="#">Onboard Failure Logging (OBFL)</a>	Describes how to enable OBFL.
Chapter 64	<a href="#">Configuring SNMP</a>	Describes how to configure the Simple Network Management Protocol (SNMP).
Chapter 65	<a href="#">Configuring NetFlow-lite</a>	Describes how to configure NetFlow-lite.
Chapter 66	<a href="#">Configuring Flexible NetFlow</a>	Describes how to configure Flexible NetFlow,
Chapter 67	<a href="#">Configuring Ethernet OAM and CFM</a>	Describes how to configure Ethernet OAM and CFM.
Chapter 68	<a href="#">Configuring Y.1731 (AIS and RDI)</a>	Describes how to configure Y.1731.
Chapter 69	<a href="#">Configuring Call Home</a>	Describes how to configure Call Home.
Chapter 70	<a href="#">Configuring Cisco IOS IP SLA Operations</a>	Describes how to configure Cisco IOS IP SLA operations.
Chapter 71	<a href="#">ROM Monitor</a>	Describes how to configure Remote Network Monitoring (RMON).
Chapter 72	<a href="#">Performing Diagnostics</a>	Describes various types of diagnostics on the Catalyst 4500 series switch.

Chapter	Title	Description
Chapter 73	<a href="#">Configuring WCCP Version 2 Services</a>	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 74	<a href="#">Configuring MIB Support</a>	Describes how to configure SNMP and MIB support.
Chapter 75	<a href="#">ROM Monitor</a>	Describes the ROM Monitor.
Appendix A	<a href="#">Acronyms and Abbreviations</a>	Defines acronyms and abbreviations used in this book.

## Conventions

This document uses the following typographical conventions:

Convention	Description
<b>boldface</b> font	Commands, command options, and keywords are in <b>boldface</b> .
<i>italic</i> font	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 unquoted 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</i> font.
<b>boldface screen font</b>	Information you must enter verbatim is in <b>boldface screen</b> font.
<i>italic screen font</i>	Arguments for which you supply values are in <i>italic screen</i> font.
→	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.

## Related Documentation

Refer to the following documents for additional Catalyst 4500 series information:

- Catalyst 4500 Series Switch Documentation Home  
[http://www.cisco.com/en/US/products/hw/switches/ps4324/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/hw/switches/ps4324/tsd_products_support_series_home.html)
- Catalyst 4900 Series Switch Documentation Home  
<http://www.cisco.com/en/US/products/ps6021/index.html>

## Hardware Documents

Installation guides and notes including specifications and relevant safety information are available at the following URLs:

- *Catalyst 4500 Series Switches Installation Guide*  
<http://www.cisco.com/en/US/docs/switches/lan/catalyst4500/hardware/installation/guide/78-14409-08/4500inst.html>
- *Catalyst 4500 E-series Switches Installation Guide*  
<http://www.cisco.com/en/US/docs/switches/lan/catalyst4500/hardware/catalyst4500e/installation/guide/Eseries.html>
- For information about individual switching modules and supervisors, refer to the *Catalyst 4500 Series Module Installation Guide* at:  
[http://www.cisco.com/en/US/docs/switches/lan/catalyst4500/hardware/configuration/notes/OL\\_25315.html](http://www.cisco.com/en/US/docs/switches/lan/catalyst4500/hardware/configuration/notes/OL_25315.html)
- *Regulatory Compliance and Safety Information for the Catalyst 4500 Series Switches*  
[http://www.cisco.com/en/US/docs/switches/lan/catalyst4500/hardware/regulatory/compliance/78\\_13233.html](http://www.cisco.com/en/US/docs/switches/lan/catalyst4500/hardware/regulatory/compliance/78_13233.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](http://www.cisco.com/en/US/products/hw/switches/ps4324/prod_installation_guides_list.html)
- Catalyst 4900 and 4900M hardware installation information is available at:  
[http://www.cisco.com/en/US/products/ps6021/prod\\_installation\\_guides\\_list.html](http://www.cisco.com/en/US/products/ps6021/prod_installation_guides_list.html)
- Catalyst 4500-X hardware installation information is available at:  
[http://www.cisco.com/en/US/products/ps12332/prod\\_installation\\_guides\\_list.html](http://www.cisco.com/en/US/products/ps12332/prod_installation_guides_list.html)

## Software Documentation

Software release notes, configuration guides, command references, and system message guides are available at the following URLs:

- Cisco 4500-X release notes are available at:  
[http://www.cisco.com/en/US/products/ps12332/prod\\_release\\_notes\\_list.html](http://www.cisco.com/en/US/products/ps12332/prod_release_notes_list.html)
- Catalyst 4500E release notes are available at:  
[http://www.cisco.com/en/US/products/hw/switches/ps4324/prod\\_release\\_notes\\_list.html](http://www.cisco.com/en/US/products/hw/switches/ps4324/prod_release_notes_list.html)
- Catalyst 4500 release notes are available at:  
[http://www.cisco.com/en/US/products/hw/switches/ps4324/prod\\_release\\_notes\\_list.html](http://www.cisco.com/en/US/products/hw/switches/ps4324/prod_release_notes_list.html)
- Catalyst 4900 release notes are available at:  
[http://www.cisco.com/en/US/products/ps6021/prod\\_release\\_notes\\_list.html](http://www.cisco.com/en/US/products/ps6021/prod_release_notes_list.html)

Software documents for the Catalyst 4500 Classic, Catalyst 4500 E-Series, Catalyst 4900 Series, and Catalyst 4500-X Series switches are available at the following URLs:

- *Catalyst 4500 Series Software Configuration Guide*  
[http://www.cisco.com/en/US/products/hw/switches/ps4324/products\\_installation\\_and\\_configuration\\_guides\\_list.html](http://www.cisco.com/en/US/products/hw/switches/ps4324/products_installation_and_configuration_guides_list.html)
- *Catalyst 4500 Series Software Command Reference*  
[http://www.cisco.com/en/US/products/hw/switches/ps4324/prod\\_command\\_reference\\_list.html](http://www.cisco.com/en/US/products/hw/switches/ps4324/prod_command_reference_list.html)
- *Catalyst 4500 Series Software System Message Guide*  
[http://www.cisco.com/en/US/products/hw/switches/ps4324/products\\_system\\_message\\_guides\\_list.html](http://www.cisco.com/en/US/products/hw/switches/ps4324/products_system_message_guides_list.html)

## Cisco IOS Documentation

Platform-independent Cisco IOS documentation may also apply to the Catalyst 4500 and 4900 switches. These documents are available at the following URLs:

- Cisco IOS configuration guides, Release 12.x  
[http://www.cisco.com/en/US/products/ps6350/products\\_installation\\_and\\_configuration\\_guides\\_list.html](http://www.cisco.com/en/US/products/ps6350/products_installation_and_configuration_guides_list.html)
- Cisco IOS command references, Release 12.x  
[http://www.cisco.com/en/US/products/ps6350/prod\\_command\\_reference\\_list.html](http://www.cisco.com/en/US/products/ps6350/prod_command_reference_list.html)

You can also use the Command Lookup Tool at:

<http://tools.cisco.com/Support/CLILookup/cltSearchAction.do>

- Cisco IOS system messages, version 12.x  
[http://www.cisco.com/en/US/products/ps6350/products\\_system\\_message\\_guides\\_list.html](http://www.cisco.com/en/US/products/ps6350/products_system_message_guides_list.html)

You can also use the Error Message Decoder tool at:

<http://www.cisco.com/cgi-bin/Support/Errordecoder/index.cgi>

## 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 reference guide.

## Notices

The following notices pertain to this software license.

### OpenSSL/Open SSL Project

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (<http://www.openssl.org/>).

This product includes cryptographic software written by Eric Young (eay@cryptsoft.com).

This product includes software written by Tim Hudson (tjh@cryptsoft.com).

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This product includes cryptographic software written by Eric Young (eay@cryptsoft.com). This product includes software written by Tim Hudson (tjh@cryptsoft.com).

**Original SSLeay License:**

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This package is an SSL implementation written by Eric Young (eay@cryptsoft.com).

The implementation was written so as to conform with Netscapes SSL.

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## Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

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