



## 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 the Cisco IOS In Service Software Upgrade Process</a>	Describes how to configure ISSU on the switch.
Chapter 6	<a href="#">Configuring Interfaces</a>	Describes how to configure non-layer-specific features on Fast Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces
Chapter 7	<a href="#">Checking Port Status and Connectivity</a>	Describes how to check module and interface status
Chapter 8	<a href="#">Configuring Supervisor Engine Redundancy Using RPR and SSO</a>	Describes how to configure RPR and SSO on the Catalyst 4507R and 4510R switches
Chapter 9	<a href="#">Configuring Cisco NSF with SSO Supervisor Engine Redundancy</a>	Describes how to configure supervisor engine redundancy using Cisco nonstop forwarding (NSF) with stateful switchover (SSO).

Chapter	Title	Description
Chapter 10	<a href="#">Environmental Monitoring and Power Management</a>	Describes how to configure power management and environmental monitoring features
Chapter 11	<a href="#">Configuring Power over Ethernet</a>	Describes how to configure Power over Ethernet (PoE)
Chapter 12	<a href="#">Configuring the Catalyst 4500 Series Switch with Cisco Network Assistant</a>	Describes how to install and configure Network Assistant and Embedded CiscoView
Chapter 13	<a href="#">Configuring VLANs, VTP, and VMPS</a>	Describes how to configure VLANs, VTP, and VMPS.
Chapter 14	<a href="#">Configuring IP Unnumbered Interface</a>	Describes how to configure IP Unnumbered support.
Chapter 15	<a href="#">Configuring Layer 2 Ethernet Interfaces</a>	Describes how to configure interfaces to support Layer 2 features, including VLAN trunks
Chapter 16	<a href="#">Configuring SmartPort Macros</a>	Describes how to configure SmartPort macros
Chapter 17	<a href="#">Configuring STP and MST</a>	Describes how to configure the Spanning Tree Protocol (STP) and the Multiple Spanning Tree (MST) protocol and explains how they work.
Chapter 18	<a href="#">Configuring Resilient Ethernet Protocol</a>	Describes how to configure Resilient Ethernet Protocol (REP).
Chapter 19	<a href="#">Configuring Optional STP Features</a>	Describes how to configure the spanning-tree PortFast, UplinkFast, BackboneFast, and other STP features
Chapter 20	<a href="#">Configuring EtherChannel</a>	Describes how to configure Layer 2 and Layer 3 EtherChannel port bundles
Chapter 21	<a href="#">Configuring IGMP Snooping and Filtering</a>	Describes how to configure Internet Group Management Protocol (IGMP) snooping
Chapter 22	<a href="#">Configuring IPv6 MLD Snooping</a>	Describes how to configure IPv6 MLD Snooping.
Chapter 23	<a href="#">Configuring 802.1Q and Layer 2 Protocol Tunneling</a>	Describes how to configure 802.1Q and Layer 2 protocol Tunneling
Chapter 24	<a href="#">Configuring CDP</a>	Describes how to configure the Cisco Discovery Protocol (CDP)
Chapter 25	<a href="#">Configuring LLDP and LLDP-MED</a>	Describes how to configure Link Layer Discovery Protocol (LLDP).
Chapter 26	<a href="#">Configuring UDLD</a>	Describes how to configure the UniDirectional Link Detection (UDLD) protocol
Chapter 31	<a href="#">Configuring Unidirectional Ethernet</a>	Describes how to configure unidirectional Ethernet
Chapter 27	<a href="#">Configuring Layer 3 Interfaces</a>	Describes how to configure interfaces to support Layer 3 features
Chapter 28	<a href="#">Configuring Cisco Express Forwarding</a>	Describes how to configure Cisco Express Forwarding (CEF) for IP unicast traffic
Chapter 29	<a href="#">Configuring Unicast Reverse Path Forwarding</a>	Describes how to configure Unicast Reverse Path Forwarding.

Chapter	Title	Description
Chapter 32	<a href="#">Configuring IP Multicast</a>	Describes how to configure IP Multicast Multilayer Switching (MMLS)
Chapter 33	<a href="#">Configuring Policy-Based Routing</a>	Describes how to configure policy-based routing
Chapter 34	<a href="#">Configuring VRF-lite</a>	Describes how to configure multiple VPN routing/forwarding (multi-VRF) instances in customer edge (CE) devices
Chapter 35	<a href="#">Configuring Quality of Service</a>	Describes how to configure quality of service (QoS)
Chapter 36	<a href="#">Configuring Voice Interfaces</a>	Describes how to configure voice interfaces
Chapter 36	<a href="#">Configuring Private VLANs</a>	Describes how to set up and modify private VLANs
Chapter 37	<a href="#">Configuring 802.1X Port-Based Authentication</a>	Describes how to configure 802.1X port-based authentication
Chapter 38	<a href="#">Configuring Port Security</a>	Describes how to configure port security and trunk port security
Chapter 1	<a href="#">Configuring Control Plane Policing</a>	Describes how to protect your Catalyst 4500 series switch using control plane policing (CoPP)
Chapter 39	<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 41	<a href="#">Configuring Dynamic ARP Inspection</a>	Describes how to configure Dynamic ARP Inspection
Chapter 42	<a href="#">Configuring Network Security with ACLs</a>	Describes how to configure ACLs, VACLs, and MACLS
Chapter 43	<a href="#">Port Unicast and Multicast Flood Blocking</a>	Describes how to configure unicast flood blocking
Chapter 44	<a href="#">Configuring Storm Control</a>	Describes how to configure storm control suppression
Chapter 45	<a href="#">Configuring SPAN and RSPAN</a>	Describes how to configure the Switched Port Analyzer (SPAN)
Chapter 46	<a href="#">Configuring System Message Logging</a>	Describes how to configure system message logging.
Chapter 47	<a href="#">Configuring SNMP</a>	Describes how to configure the Simple Network Management Protocol (SNMP).
Chapter 48	<a href="#">Configuring NetFlow</a>	Describes how to configure NetFlow statistics gathering
Chapter 50	<a href="#">Configuring RMON</a>	Describes how to configure Remote Network Monitoring (RMON).
Chapter 51	<a href="#">Performing Diagnostics</a>	Describes various types of diagnostics on the Catalyst 4500 series switch.
Chapter 52	<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	Title	Description
Chapter 53	<a href="#">Configuring MIB Support</a>	Describes how to configure configure SNMP and MIB support.
Chapter 54	<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

## Related Documentation

Although their Release Notes are unique, the 4 platforms (Catalyst 4500, Catalyst 4900, Catalyst ME 4900, and Catalyst 4900M) use the same *Software Configuration Guide*, *Command Reference Guide*, and *System Message Guide*. Refer to the following home pages for additional information:

- Catalyst 4500 Series Switch Documentation Home  
<http://www.cisco.com/go/cat4500/docs>
- Catalyst 4900 Series Switch Documentation Home  
<http://www.cisco.com/go/cat4900/docs>
- Cisco ME 4900 Series Ethernet Switches Documentation Home  
[http://www.cisco.com/en/US/products/ps7009/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/ps7009/tsd_products_support_series_home.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/module/guide/mod\\_inst.html](http://www.cisco.com/en/US/docs/switches/lan/catalyst4500/hardware/module/guide/mod_inst.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)

- Cisco ME 4900 Series Ethernet Switches installation information is available at:  
[http://www.cisco.com/en/US/products/ps7009/prod\\_installation\\_guides\\_list.html](http://www.cisco.com/en/US/products/ps7009/prod_installation_guides_list.html)

## Software Documentation

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

- 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)
- Cisco ME4900 4900 Series Ethernet Switch release notes are available at:  
[http://www.cisco.com/en/US/docs/switches/lan/catalyst4500/release/note/OL\\_11511.html](http://www.cisco.com/en/US/docs/switches/lan/catalyst4500/release/note/OL_11511.html)

Software documents for the Catalyst 4500 Classic, Catalyst 4500 E-Series, Catalyst 4900, and Cisco ME 4900 Series Ethernet 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/pegi-bin/Support/Errordecoder/index.cgi>

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

## Conventions

This document uses the following typographical conventions:

Convention	Description
<b>boldface font</b>	Commands, command options, and keywords are in <b>boldface</b> .
<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 screen font.
<b>boldface screen font</b>	Information you must enter verbatim 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> .
→	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*.

# 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).

## License Issues

The OpenSSL toolkit stays under a dual license, i.e. both the conditions of the OpenSSL License and the original SSLeay license apply to the toolkit. See below for the actual license texts. Actually both licenses are BSD-style Open Source licenses. In case of any license issues related to OpenSSL please contact [openssl-core@openssl.org](mailto:openssl-core@openssl.org).

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LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

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, Obtaining Support, and Security Guidelines

For information on obtaining documentation, obtaining support, providing documentation feedback, security guidelines, and also recommended aliases and general Cisco documents, 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>

