



Preface

Audience

The *Catalyst 2950 Desktop Switch Software Configuration Guide* is for the network manager responsible for configuring the Catalyst 2950 switches, hereafter referred to as the *switches*. Before using this guide, you should be familiar with the concepts and terminology of Ethernet and local area networking.

Purpose

This guide provides information about configuring and troubleshooting a switch or switch clusters. It includes descriptions of the management interface options and the features supported by the switch software. The Catalyst 2950 switch is supported by either the standard software image (SI) or the enhanced software image (EI). The enhanced software image provides a richer set of features, including access control lists (ACLs), enhanced quality of service (QoS) features, the Secure Shell Protocol, extended-range VLANs, IEEE 802.1W Rapid Spanning Tree Protocol (STP), and the IEEE 802.1S Multiple STP.

The enhanced software image supports these switches:

- Catalyst 2950C-24
- Catalyst 2950G-12-EI
- Catalyst 2950G-24-EI
- Catalyst 2950G-24-EI-DC
- Catalyst 2950G-48-EI
- Catalyst 2950T-24

The standard software image supports these switches:

- Catalyst 2950-12
- Catalyst 2950-24

Use this guide with other documents for information about these topics:

- Requirements—This guide assumes that you have met the hardware and software requirements and cluster compatibility requirements described in the release notes.
- Start-up information—This guide assumes that you have assigned switch IP information and passwords by using the setup program described in the release notes.

- Cluster Management Suite (CMS) information—This guide provides an overview of the CMS web-based, switch management interface. For information about CMS requirements and the procedures for browser and plug-in configuration and accessing CMS, refer to the release notes. For CMS field-level window descriptions and procedures, refer to the CMS online help.
- Cluster configuration—This guide provides information about planning for, creating, and maintaining switch clusters. Because configuring switch clusters is most easily performed through CMS, this guide does not provide the command-line interface (CLI) procedures. For the cluster commands, refer to the *Catalyst 2950 Desktop Switch Command Reference*.
- CLI command information—This guide provides an overview for using the CLI. For complete syntax and usage information about the commands that have been specifically created or changed for the Catalyst 2950 switches, refer to the *Catalyst 2950 Desktop Switch Command Reference*.

This guide does not describe system messages you might encounter or how to install your switch. For more information, refer to the *Catalyst 2950 Desktop Switch System Message Guide* for this release and to the *Catalyst 2950 Desktop Switch Hardware Installation Guide*.


Note

This guide does not repeat the concepts and CLI procedures provided in the standard Cisco IOS Release 12.1 documentation. For information about the standard IOS Release 12.1 commands, refer to the IOS documentation set available from the Cisco.com home page at **Service and Support > Technical Documents**. On the Cisco Product Documentation home page, select Release 12.1 from the Cisco IOS Software drop-down list.

Organization

This guide is organized into these chapters:

[Chapter 1, “Overview,”](#) lists the software features of this release and provides examples of how the switch can be deployed in a network.

[Chapter 2, “Using the Command-Line Interface,”](#) describes how to access the command modes, use the command-line interface (CLI), and describes CLI messages that you might receive. It also describes how to get help, abbreviate commands, use **no** and **default** forms of commands, use command history and editing features, and how to search and filter the output of **show** and **more** commands.

[Chapter 3, “Getting Started with CMS,”](#) describes the Cluster Management Suite (CMS) web-based, switch management interface. For information on configuring your web browser and accessing CMS, refer to the release notes. For field-level descriptions of all CMS windows and procedures for using the CMS windows, refer to the online help.

[Chapter 4, “Assigning the Switch IP Address and Default Gateway,”](#) describes how to create the initial switch configuration (for example, assign the switch IP address and default gateway information) by using a variety of automatic and manual methods.

[Chapter 5, “Configuring IE2100 CNS Agents,”](#) describes how to configure Cisco Intelligence Engine 2100 (IE2100) Series Cisco Networking Services (CNS) embedded agents on your switch. By using the IE2100 Series Configuration Registrar network management application, you can automate initial configurations and configuration updates by generating switch-specific configuration changes, sending them to the switch, executing the configuration change, and logging the results.

[Chapter 6, “Clustering Switches,”](#) describes switch clusters and the considerations for creating and maintaining them. The online help provides the CMS procedures for configuring switch clusters. Configuring switch clusters is most easily performed through CMS; therefore, CLI procedures are not provided. Cluster commands are described in the *Catalyst 2950 Desktop Switch Command Reference*.

[Chapter 7, “Administering the Switch,”](#) describes how to perform one-time operations to administer your switch. It describes how to prevent unauthorized access to your switch through the use of passwords, privilege levels, the Terminal Access Controller Access Control System Plus (TACACS+), the Remote Authentication Dial-In User Service (RADIUS) and the Secure Shell (SSH) Protocol. It also describes how to set the system date and time, set system name and prompt, create a login banner, and how to manage the MAC address and ARP tables.

[Chapter 8, “Configuring 802.1X Port-Based Authentication,”](#) describes how to configure 802.1X port-based authentication to prevent unauthorized devices (clients) from gaining access to the network. As LANs extend to hotels, airports, and corporate lobbies, insecure environments could be created.

[Chapter 9, “Configuring Interface Characteristics,”](#) defines the types of interfaces on the switch. It describes the **interface** global configuration command and provides procedures for configuring physical interfaces.

[Chapter 10, “Configuring STP,”](#) describes how to configure the Spanning Tree Protocol (STP) on your switch.

[Chapter 11, “Configuring RSTP and MSTP,”](#) describes how to configure the Cisco implementation of the IEEE 802.1W Rapid STP (RSTP) and the IEEE 802.1S Multiple STP (MSTP) on your switch. RSTP provides rapid convergence, and MSTP enables VLANs to be grouped into a spanning-tree instance.

[Chapter 12, “Configuring Optional Spanning-Tree Features,”](#) describes how to configure optional spanning-tree features that can be used when your switch is running the per-VLAN spanning-tree (PVST) or the MSTP.

[Chapter 13, “Configuring VLANs,”](#) describes how to create and maintain VLANs. It includes information about the VLAN database, VLAN configuration modes, extended-range VLANs, VLAN trunks, and the VLAN Membership Policy Server (VMPS).

[Chapter 14, “Configuring VTP,”](#) describes how to use the VLAN Trunking Protocol (VTP) VLAN database for managing VLANs. It includes VTP characteristics and configuration.

[Chapter 15, “Configuring Voice VLAN,”](#) describes how to configure voice VLAN on the switch for a connection to an IP phone.

[Chapter 16, “Configuring IGMP Snooping and MVR,”](#) describes how to configure Internet Group Management Protocol (IGMP) snooping. It also describes Multicast VLAN Registration (MVR), a local IGMP snooping feature available on the switch, and how to use IGMP filtering to control multicast group membership.

[Chapter 17, “Configuring Port-Based Traffic Control,”](#) describes how to reduce traffic storms by setting broadcast, multicast, and unicast storm-control threshold levels; how to protect ports from receiving traffic from other ports on a switch; how to configure port security by using secure MAC addresses; and how to set the aging time for all secure addresses.

[Chapter 19, “Configuring CDP,”](#) describes how to configure Cisco Discovery Protocol (CDP) on your switch.

[Chapter 20, “Configuring SPAN,”](#) describes how to configure Switch Port Analyzer (SPAN), which selects network traffic for analysis by a network analyzer such as a SwitchProbe device or other Remote Monitoring (RMON) probe. SPAN mirrors traffic received or sent (or both) on a source port, or traffic received on one or more source ports or source VLANs, to a destination port.

[Chapter 21, “Configuring System Message Logging,”](#) describes how to configure system message logging. It describes the message format, how to change the message display destination device, limit the type of messages sent, configure UNIX server syslog daemon, and define the UNIX system logging facility, and timestamp messages.

Chapter 22, “Configuring SNMP,” describes how to configure the Simple Network Management Protocol (SNMP). It describes how to configure community strings, enable trap managers and traps, set the agent contact and location information, and how to limit TFTP servers used through SNMP.

Chapter 23, “Configuring Network Security with ACLs,” provides the considerations and CLI procedures for configuring network security by using access control lists (ACLs). It describes how to apply ACLs to interfaces and provides examples. The online help provides the CMS procedures.

Chapter 24, “Configuring QoS,” provides the considerations and CLI procedures for configuring quality of service (QoS). With this feature, you can provide preferential treatment to certain types of traffic. The online help provides the CMS procedures.

Chapter 25, “Configuring EtherChannels,” describes how to bundle a set of individual ports into a single logical link on the interfaces.

Chapter 26, “Troubleshooting,” describes how to identify and resolve software problems related to the IOS software.

Appendix A, “Supported MIBs,” lists the supported MIBs for this release and how to use FTP to access the MIB files.

Conventions

This guide uses these conventions to convey instructions and information:

Command descriptions use these conventions:

- Commands and keywords are in **boldface** text.
- Arguments for which you supply values are in *italic*.
- Square brackets ([]) indicate optional elements.
- Braces ({ }) group required choices, and vertical bars (|) separate the alternative elements.
- Braces and vertical bars within square brackets ([{ | }]) indicate a required choice within an optional element.

Interactive examples use these conventions:

- Terminal sessions and system displays are in `screen` font.
- Information you enter is in **boldface screen** font.
- Nonprinting characters, such as passwords or tabs, are in angle brackets (<>).

Notes, cautions, and tips use these conventions and symbols:



Note

Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this manual.



Caution

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



Tip

Means *the following will help you solve a problem*. The tips information might not be troubleshooting or even an action, but could be useful information.

Related Publications

These documents provide complete information about the switch and are available from this Cisco.com site:

<http://www.cisco.com/univercd/cc/td/doc/product/lan/cat2950/index.htm>

You can order printed copies of documents with a DOC-xxxxxx= number from the Cisco.com sites and from the telephone numbers listed in the “Obtaining Documentation” section on page xxv.

- *Release Notes for the Catalyst 2950 Switch* (not orderable but is available on Cisco.com)



Note

Switch requirements and procedures for initial configurations and software upgrades tend to change and therefore appear only in the release notes. Before installing, configuring, or upgrading the switch, refer to the release notes on Cisco.com for the latest information.

- *Catalyst 2950 Desktop Switch Software Configuration Guide* (order number DOC-7811380=)
- *Catalyst 2950 Desktop Switch Command Reference* (order number DOC-7811381=)
- *Catalyst 2950 Desktop Switch System Message Guide* (order number DOC-7814233=)
- *Catalyst 2950 Desktop Switch Hardware Installation Guide* (order number DOC-7811157=)
- *Catalyst GigaStack Gigabit Interface Converter Hardware Installation Guide* (order number DOC-786460=)
- *CWDM Passive Optical System Installation Note* (not orderable but is available on Cisco.com)
- *1000BASE-T GBIC Installation Notes* (not orderable but is available on Cisco.com)

Obtaining Documentation

The following sections explain how to obtain documentation from Cisco Systems.

World Wide Web

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

<http://www.cisco.com>

Translated documentation is available at the following URL:

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 is shipped with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual subscription.

Ordering Documentation

Cisco documentation is available in the following ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Networking Products MarketPlace:
http://www.cisco.com/cgi-bin/order/order_root.pl
- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:
<http://www.cisco.com/go/subscription>
- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco corporate headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

Documentation Feedback

If you are reading Cisco product documentation on the World Wide Web, you can send us your comments by completing the online survey. When you display the document listing for this platform, click **Give Us Your Feedback**. After you display the survey, select the manual that you wish to comment on. Click **Submit** to send your comments to the Cisco documentation group.

You can e-mail your comments to bug-doc@cisco.com.

To submit your comments by mail, use the response card behind the front cover of your document, or write to the following address:

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

We appreciate your comments.

Obtaining Technical Assistance

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

Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information, networking solutions, services, programs, and resources at any time, from anywhere in the world.

Cisco.com is a highly integrated Internet application and a powerful, easy-to-use tool that provides a broad range of features and services to help you to

- 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

You can self-register on Cisco.com to obtain customized information and service. To access Cisco.com, go to the following URL:

<http://www.cisco.com>

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 through the Cisco TAC: the Cisco TAC website and the Cisco TAC Escalation Center.

Inquiries to Cisco TAC are categorized according to the urgency of the issue:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.
- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- Priority level 2 (P2)—Your production network is severely degraded, affecting significant aspects of business operations. No workaround is available.
- Priority level 1 (P1)—Your production network is down, and a critical impact to business operations will occur if service is not restored quickly. No workaround is available.

Which Cisco TAC resource you choose is based on the priority of the problem and the conditions of service contracts, when applicable.

Cisco TAC Website

The Cisco TAC website allows you to resolve P3 and P4 issues yourself, saving both cost and time. The site provides around-the-clock access to online tools, knowledge bases, and software. To access the Cisco TAC website, go to the following URL:

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

All customers, partners, and resellers who have a valid Cisco services contract have complete access to the technical support resources on the Cisco TAC website. The Cisco TAC website requires 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 the following URL to register:

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

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

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

If you have Internet access, it is recommended that you open P3 and P4 cases through the Cisco TAC website.

Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses issues that are classified as priority level 1 or priority level 2; 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 will automatically open a case.

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

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

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