Cisco Systems

SCE 1000 2xGBE Release 2.0.10

User Guide

OL-7117-02

Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

Customer Order Number: DOC-7117-02=
Text Part Number: OL-7117-02

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The following information is for FCC compliance of Class A devices: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to correct the interference at their own expense.

The following information is for FCC compliance of Class B devices: The equipment described in this manual generates and may radiate radio-frequency energy. If it is not installed in accordance with Cisco's installation instructions, it may cause interference with radio and television reception. T his equipment has been tested and found to comply with the limits for a Class B digital device in accordance with the specifications in part 15 of the FCC rules. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

Modifying the equipment without Cisco's written authorization may result in the equipment no longer complying with FCC requirements for Class A or Class B digital devices. In that event, your right to use the equipment may be limited by FCC regulations, and you may be required to correct any interference to radio or television communications at your own expense.

You can determine whether your equipment is causing interference by turning it off. If the interference stops, it was probably caused by the Cisco equipment or one of its peripheral devices. If the equipment causes interference to radio or television reception, try to correct the interference by using one or more of the following measures:

- Turn the television or radio antenna until the interference stops.
- Move the equipment to one side or the other of the television or radio.
- Move the equipment farther away from the television or radio.
- Plug the equipment into an outlet that is on a different circuit from the television or radio. (That is, make certain the equipment and the television or radio are on circuits controlled by different circuit breakers or fuses.)

Modifications to this product not authorized by Cisco Systems, Inc. could void the FCC approval and negate your authority to operate the product.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED ORIMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILTY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Printed in the USA on recycled paper containing 10% postconsumer waste.

SCE 1000 2xGBE User Guide Release 2.0.10

CONTENTS

Preface xi

Audience xi

Purpose xi

Document Content xii

Document Conventions xiii

Related Publications xiii

Obtaining Technical Assistance xiii

Cisco TAC Website xiv

Opening a TAC Case xiv

TAC Case Priority Definitions xiv

Regulatory Compliance and Safety Information xvii

Regulatory Compliance xvii

Industry EMC, Safety, and Environmental Standards xviii

EC Declaration of Conformity xviii

Federal Communications Commission (FCC) Compliance Notice: xix

CSA NRTL (Canada) xix

ULC (Canada) xix

Regulatory Symbols xix

Warning Definition Statement xx

Installation Warnings xxi

Product Disposal Warning xxi

Jewelry Removal Warning xxi

Lightning Activity Warning xxi

Service Personnel Warning xxi

Australia SA/NZS 3260 Warning xxi

Ground Connection Warning xxii

Grounded Equipment Warning xxii

Grounding Warning xxii

Protective Earth Warning xxii

Ground Conductor Warning xxii

FCC Warning xxiii

Restricted Area Warning (DC platform only) xxiii

Wrist Strap Warning xxiii

Power Disconnection Warning xxiii

Power Supply Warning xxiii

Power Supply Disconnection Warning xxiii

Chassis Power Connection Warning (DC platform only) xxiv

SELV Circuit Warning xxiv

WAN Port Static Shock Warning xxiv

Class 1/I Laser Product Warning xxiv

Battery Handling Warning xxiv

Fan Tray Removal Warning xxv

Overview 1-1

The Cisco Service Control Concept 1-1

Service Control for Wireless Service Providers 1-2

Service Control for DSL Providers and ISPs 1-2

Service Control for Cable MSOs 1-2

Service Control Capabilities 1-3

The SCE Platform 1-4

Management and Collection 1-5

Network Management 1-5

Subscriber Management 1-6

Service Configuration Management 1-6

Collection 1-6

Cisco Service Control Specific Solutions 1-6

Service Control Application Suite for Broadband 1-7

Service Control Application Suite for Mobile 1-7

Topology 2-1

Issues to Be Considered 2-1

SCE Platform Configuration 2-2

Failure Detection Mechanism 2-2

Bypass Mechanism 2-2

Functionality 2-3

Physical Installation 2-3

Bump-in-the-Wire (Inline) Topology 2-4

External Splitting (Receive-only) Topology 2-4

Redundancy 2-5

Two Platforms on Parallel Links in Bump-in-the-Wire Topology 2-5

Failure and Recovery 2-6

Physical Installation 2-7

Redundancy 2-7

Maintaining the Network Links vs Maintaining SCE 1000 Platform Functionality 2-7

Topology-Related Parameters 2-7

Connection Mode Parameter 2-8

On-Failure Mode Parameter 2-8

Link Failure Reflection Parameter 2-9

Status of the SCE 1000 After Abnormal Boot 2-9

Command Line Interface 3-1

Authorization and Command Levels (Hierarchy) 3-1

CLI Authorization Levels 3-2

CLI Command Hierarchy 3-4

Prompt Indications 3-10

CLI Help Features 3-11

Partial Help 3-11

Argument Help 3-11

The [no] Prefix 3-12

Navigational and Shortcut Features 3-13

Command History 3-13

Keyboard Shortcuts 3-13

Tab Completion 3-14
FTP User Name and Password 3-14
CLI Scripts 3-15

Installation and Startup 4-1
Pre-Installation Requirements 4-1
Step 1: Unpacking 4-1
Step 2: Checking Shipping Contents 4-2
Step 3: Preparing to Install 4-2
Installation 4-6
Installation Precautions 4-7
Installing the SCE 1000 on a Workbench or Tabletop 4-7
Mounting the SCE 1000 in a Rack 4-8
Connecting to the Power Supply 4-13
Back Panel 4-14
Attaching a Chassis Ground Connection 4-15
Connecting the AC Power Supply Cable 4-17
Connecting the DC Power Supply 4-18
Front Panel 4-19
Powering up 4-23
Connecting the Local Console 4-24
Setting Up the Local Console 4-24
System Configuration 4-26
Setup Command Parameters 4-26
Step 1: Configuring Initial Settings 4-28
Step 2: Configuring the Hostname 4-29
Step 3: Setting the Passwords 4-30
Step 4: Configuring Time Settings 4-31
Step 5: Configuring the DNS Settings 4-33
Step 6: Configuring the RDR Formatter Destination 4-34
Step 7: Configuring Access Control Lists (ACLs) 4-35
Step 8: Configuring SNMP 4-38
Step 9: Configuring the Topology-Dependent Parameters 4-41
Step 10: Completing and Saving the Configuration 4-44

Connecting the FE Management Port 4-46

Connecting the line ports to the network 4-48

Bump-in-the-Wire (Inline) Topology 4-49

External Optical Splitter (Receive-only) Topology 4-49

Configuring the GBE Interface Parameters 4-50

Testing Connectivity: Examining Link LEDs and Counters 4-53

Loading and Activating a Service Control Application 4-55

Final Tests 4-55

Verifying Operational Status 4-55

Viewing the User Log 4-56

Configuration and Management 5-1

Setup Utility 5-1

Multiple entry parameters (Lists) 5-2

File-system Operations 5-3

Working with Directories 5-3

Working with Files 5-5

Viewing Configuration and Status 5-7

Saving the Configuration Settings 5-12

Recovering a Previous Configuration 5-14

Entering and Exiting Global Configuration Mode 5-15

Passwords 5-16

Upgrading SCE Platform Firmware 5-19

The User Log 5-20

The Logging System 5-20

Generating a File for Technical Support 5-25

Rebooting and Shutting Down the SCE Platform 5-25

Rebooting the SCE Platform 5-25

Shutting Down the SCE Platform 5-26

Control Configuration 6-1

Entering and Exiting Global Configuration Mode 6-1

SCE Platform Management Interfaces 6-2

Configuring the Available Interfaces 6-2

Configuring Access Control Lists (ACLs) 6-2

Telnet Interface 6-5

SNMP Interface 6-6

IP Configuration 6-7

IP Routing Table 6-7

IP Advertising 6-9

Time Clocks and Time Zone 6-11

Showing System Time 6-11

Showing Calendar Time 6-11

Setting the Clock 6-12

Setting the Calendar 6-12

Setting the Time Zone 6-13

Removing Current Time Zone Setting 6-13

SNTP 6-13

Enabling SNTP multicast client 6-14

Disabling SNTP multicast client 6-14

Enabling SNTP unicast client 6-14

Disabling SNTP unicast client 6-15

Defining the SNTP unicast update interval 6-15

Display SNTP information 6-16

Domain Name (DNS) Settings 6-16

Name Servers 6-17

Domain Name 6-18

Host Table 6-18

show hosts 6-19

The RDR Formatter 6-19

RDR Formatter Destinations 6-20

Categories 6-21

Priority 6-21

Protocol Version 6-22

Forwarding Modes 6-22

Configuring the RDR Formatter 6-23

Displaying RDR Formatter Configuration and Statistics 6-29

Disabling the LineCard from Sending RDRs 6-30

SNMP Configuration and Management 6-31

SNMP Protocol 6-31

Configuration via SNMP 6-32

Security Considerations 6-32

SNMP Community Strings 6-33

Traps 6-34

CLI 6-38

MIBs 6-39

MIB-II 6-39

Cisco Enterprise MIB 6-40

Failure Recovery Mode 6-41

Entering FastEthernet (Management) Interface Configuration Mode 6-42

Management Interface Configuration Mode 6-43

Configuring the Management Interface Speed and Duplex Parameters 6-43

Entering LineCard Interface Configuration Mode 6-44

Configuring Applications 6-45

Line Configuration 7-1

Entering LineCard Interface Configuration Mode 7-2

Configuring Tunneling Protocols 7-2

Selecting the Tunneling Mode 7-3

Displaying Tunneling Configuration 7-5

Configuring Traffic Rules and Counters 7-5

Traffic Rules 7-6

Traffic counters 7-6

Configuring Traffic Counters 7-7

Configuring Traffic Rules 7-7

Managing Traffic Rules and Counters 7-10

Configuring TOS Marking 7-12

Enabling and Disabling TOS Marking 7-12

Modifying the TOS Table 7-13

Editing the Connection Mode 7-13

Enforcing the Link Mode 7-14

Enabling and Disabling Link Failure Reflection 7-15

Line Gigabit Ethernet Interfaces 7-15
Entering GigabitEthernet Line Interface Configuration Mode 7-16
Configuring GigabitEthernet Auto-Negotiation 7-16

Managing Subscribers 8-1
Subscriber Overview 8-1
Subscriber Modes in Service Control Solutions 8-3
Aging Subscribers 8-4
Anonymous Groups and Subscriber Templates 8-5
Subscriber Files 8-5
Importing/Exporting Subscriber Information 8-6
Importing/Exporting Subscribers 8-7
Importing/Exporting Anonymous Groups 8-7
Importing/Exporting Subscriber Templates 8-8
Removing Subscribers and Templates 8-8
Monitoring Subscribers 8-10
Monitoring the Subscriber Database 8-11
Displaying Subscribers 8-12
Displaying Subscriber Information 8-15
Displaying Anonymous Subscriber Information 8-16
Subscriber Aging 8-18

Identifying And Preventing Distributed-Denial-Of-Service Attacks 9-1
Attack Filtering 9-1
Attack Detection 9-2
Attack Detection Thresholds 9-3
Attack Handling 9-3
Subscriber Notification 9-4
Configuring Attack Detectors 9-5
Enabling Specific-IP Detection 9-7
Default Attack Detector 9-7
Specific Attack Detectors 9-8
Sample Attack Detector Configuration 9-10
Configuring Subscriber Notifications 9-11
Subscriber Notification Ports 9-11

Managing Attack Filtering 9-12

Preventing Attack Filtering 9-13

Forcing Attack Filtering 9-13

Monitoring Attack Filtering 9-14

Troubleshooting 10-1

Document Conventions 10-1

Front Panel LEDs 10-2

Management Link 10-5

RDR Reports 10-6

GBE Interfaces Connectivity 10-10

Software Package Installation 10-12

User Log 10-14

Maintenance 11-1

Replacing the Battery 11-1

Replacing the Fan Module 11-2

Replacing the Power Module 11-3

CLI Command Reference A-1

Proprietary MIB Reference B-1

Glossary of Terms 1

Index 1

Preface

This guide contains instructions on how to install and run the ***SCE 1000*** Platform. This guide assumes a basic familiarity with telecommunications equipment and installation procedures.

Throughout the book, the procedures shown are examples of how to perform typical SCE platform management functions. Because of the large number of functions available, not every possible procedure is documented in the instructional chapters. The *CLI Command Reference* (on page A-1) provides a complete listing of all possible commands. The other chapters provide examples of how to implement the most common of these commands, general information on the interrelationships between the commands and the conceptual background of how to use them.

Audience

This guide is for the networking or computer technician responsible for installing and configuring the ***SCE 1000*** Platform on-site. It is also intended for the operator who manages the ***SCE 1000*** Platform(s). This manual does not cover high-level technical support procedures available to Root administrators and Cisco technical support personnel.

Purpose

The *SCE 1000 2xGBE User Guide* documents the SCE Platform hardware and software components and how they analyze network transactions and generate the data records (RDRs). It describes the features of these components and how they interact with other components of the Cisco Service Control Solution.

Document Content

This manual covers the following topics:

Regulatory Compliance and Safety Information contains a list of the warnings and regulations applicable to the SCE Platform.

Chapter 1: *Overview* provides a general overview of the Service Control Solution and the ***SCE 1000*** Platform.

Chapter 2: *Topology* describes the possible deployment topologies of the ***SCE 1000*** and explains how various aspects of the topology determine the configuration of the system.

Chapter 3: *Command Line Interface* describes how to use the ***SCE 1000*** Command Line Interface (CLI), its hierarchical structure, authorization levels and its help features.

Chapter 4: *Installation and Startup* describes the procedures for installing the ***SCE 1000*** Platform on-site, how to configure it, and how to initiate the platform within a service provider network.

Chapter 5: *Configuration and Management* provides general guidelines for configuring and managing the ***SCE 1000*** by means of the Command Line Interface (CLI). It covers basic topics such as the setup utility, file operations, system monitoring, saving and recovering configurations, and the user log.

Chapter 6: *Control Configuration* discusses the available ***SCE 1000*** platform management interfaces and how to configure them. It explains how to configure and manage ***SCE 1000*** global parameters; including time zone, Internet Protocol, domain name settings and SNMP .It also explains how to configure and manage service-related functions, such as RDR configuration, TOS marking, and application configuration

Chapter 7: *Line Configuration* discusses how to configure and manage ***SCE 1000*** line card interfaces; including tunneling, traffic port configuration, connection mode and link mode.

Chapter 8: *Managing Subscribers* explains how to import and export various subscriber files and how to monitor subscribers.

Chapter 9: *Identifying And Preventing Distributed- Denial-Of-Service Attacks* explains how to configure the ***SCE 1000*** attack filtering functionality.

Chapter 10: *Troubleshooting* discusses the common problems and solutions when configuring the ***SCE 1000*** or one of its components.

Chapter 11: *Maintenance* gives instructions for performing periodical hardware maintenance procedures which need to be carried out to keep the ***SCE 1000*** running optimally.

Appendix A: *CLI Command Reference* provides a list of the available CLI commands that you can use to configure the ***SCE 1000***.

Appendix B*: Proprietary MIB Reference* describes the SCE platform proprietary MIB supported by the ***SCE 1000*** platform.

Glossary: Brief description of terms used throughout this guide.

Document Conventions

The following typographic conventions are used in this guide:

Typeface or Symbol	Meaning
Italics	References, new terms, field names, and placeholders.
Bold	Names of menus, options, and command buttons.
`Courier`	System output shown on the computer screen in the Telnet session.
`Courier Bold`	CLI code typed in by the user in examples.
`Courier Italic`	Required parameters for CLI code.
`[italic in brackets]`	Optional parameters for CLI code.
✎	Note. Notes contain important information.
⚠	Warning. Warning means danger of bodily injury or of damage to equipment.

The CLI commands are written in the following format:

`command` *`RequiredParameter`* **`constant`** *`[optional-parameter]`*

`[no]` is an optional parameter that may appear before the command name.

When typing commands, you may enclose parameters in double-quote marks, and you *must* do so when there is a space or a question mark within a parameter name.

Examples are shown in courier style. **Bold courier** is used to show the commands as you type them and regular courier is used for system prompts and responses.

Related Publications

This SCE 1000 2xGBE *User Guide* should be used in conjunction with the Service Control Management Suite User Guides (*Subscriber Management User Guide*, *Service Control Application Suite for Broadband User Guide*, *Service Control Application Suite for Mobile User Guide* and the *Collection Manager User Guide*).

Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, the Cisco Technical Assistance Center (TAC) provides 24-hour, award-winning technical support services, online and over the phone. Cisco.com features the Cisco TAC website as an online starting point for technical assistance.

Cisco TAC Website

The Cisco TAC website (*http://www.cisco.com/tac* (http://www.cisco.com/tac)) provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The Cisco TAC website is available 24 hours a day, 365 days a year.

Accessing all the tools on the Cisco TAC website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a login ID or password, register at this URL:

http://tools.cisco.com/RPF/register/register.do (http://tools.cisco.com/RPF/register/register.do)

Opening a TAC Case

The online TAC Case Open Tool (*http://www. cisco.com/tac/caseopen* (http://www.cisco.com/tac/caseopen)) is the fastest way to open P3 and P4 cases. (Your network is minimally impaired or you require product information). After you describe your situation, the TAC Case Open Tool automatically recommends resources for an immediate solution.

If your issue is not resolved using these recommendations, your case will be assigned to a Cisco TAC engineer.

For P1 or P2 cases (your production network is down or severely degraded) or if you do not have Internet access, contact Cisco TAC by telephone. Cisco TAC engineers are assigned immediately to P1 and P2 cases to help keep your business operations running smoothly.

To open a case 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 listing of Cisco TAC contacts, go to this URL:

http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml (http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml)

TAC Case Priority Definitions

To ensure that all cases are reported in a standard format, Cisco has established case priority definitions.

- **Priority 1 (P1)**—Your 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.
- **Priority 2 (P2)**—Operation of an existing network is severely degraded, or significant aspects of your business operation 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.
- **Priority 3 (P3)**—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

- **Priority 4 (P4)**—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Regulatory Compliance and Safety Information

This chapter provides international agency compliance, safety, and statutory information concerning the ***SCE 1000***. It also summarizes and highlights all of the safety warnings associated with handling, installing and operating the ***SCE 1000***.

Regulatory Compliance

The ***SCE 1000*** is in compliance with the national and international specification standards described in the following table:

Table 1-1 Regulatory Compliance

Specifications	Description
Regulatory Compliance	Products bear CE[1] Marking indicating compliance with the 1999/5/EEC directive, which includes the following safety and EMC standards.
Safety	UL 1950,
	CAN/CSA[2]-C22.2 No. 60950-00
	EN[3] 60950
	IEC[4] 60950
	IEC 60825-1
	EN 60825-1
	Class I laser product
EMC[5]	FCC[6] Part 15 (CFR 47) Class A
	ICES[7]-003
	EN55022
	CISPR22
	EN 55024
	EN50082-1
	EN61000-3-2
	EN61000-3-3
	VCCI Class A

[1] CE = Committee European

[2] CSA = Canadian Standards Association

[3] EN = European Norm

[4] IEC = International Electrotechnical Commission

[5] EMC = electromagnetic compatibility

[6] FCC = Federal Communications Commission

[7] ICES = Interference-Causing Equipment Standard

Industry EMC, Safety, and Environmental Standards

The ***SCE 1000*** conforms to the following list of industry EMC, safety, and environmental standards:

Table 1-2 Industry EMC, Safety, and Environmental Standards

*GR-63-Core NEBS[1] Level 3
*GR-1089-Core NEBS Level 3
ETS[2] 300 019 Storage Class 1.1
ETS 300 019 Transportation Class 2.3
ETS 300 019 Stationary Use Class 3.1

*Designed to comply

[1] NEBS=Network Equipment Building Systems

[2] ETS=European Telecommunications Standards

EC Declaration of Conformity

SCE 1000 conforms to the provisions of:

- EMC Council Directive 89/336/EEC
- EMC directive 73/23/EEC low voltage directive.

The ***SCE 1000*** has been designed to comply with CE markings in accordance with the requirements of European Council Directive 93/68 EEC.

Federal Communications Commission (FCC) Compliance Notice:

This equipment complies with the limits for digital devices, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy. If it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to take whatever measures may be necessary to correct the interference at their own expense.

This equipment complies with the UL1950, the system must be connected to secondary circuits that are electrically isolated from accesses and connected to earth.

CSA NRTL (Canada)

This equipment is designed to meet the CSA requirements of UL1950, Safety of Information Technology Equipment. CSA is listed by the American Federal OSHA as equivalent to UL and other American safety testing laboratories under the NRTL program.

ULC (Canada)

The Industry Canada (formerly known as the Department of Communications) label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. Industry Canada does not guarantee that equipment will operate to the user’s satisfaction.

Regulatory Symbols

The following table displays regulatory symbols used.

These symbols are described in IEC412.

Table 1-3 Regulatory Symbols

Symbol	Icon	Description
Power ON	▌	
	ON Position	Indicates operating
Power OFF	**O**	
	Off position	Indicates OFF
Protective ground terminal	⏚	Indicates a terminal that must be connected to earth ground prior to making any other connections to the equipment
Dangerous Voltage	⚠	Warning about high voltage

Symbol	Icon	Description
Instructions and warning	⚠	Warning sign and/or intent to alert the user to the presence of important operating and maintenance (servicing) instructions in the product documentation.

Warning Definition Statement

⚠

Warning:
This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.

The following warnings are listed in this document:

- Installation Warnings
- Product Disposal Warning
- Jewelry Removal Warning
- Lightning Activity Warning
- Service Personnel Warning
- Australia SA/NZS 3260 Warning
- Ground Connection Warning
- Grounded Equipment Warning
- Grounding Warning
- Protective Earth Warning
- Ground Conductor Warning
- FCC Warning
- Restricted Area Warning
- Wrist Strap Warning
- Power Disconnection Warning
- Power Supply Warning
- Power Supply Disconnection Warning
- Chassis Power Connection Warning
- SELV Circuit Warning
- WAN Port Static Shock Warning
- Class 1/I Laser Product Warning
- Battery Handling Warning

- *Fan Tray Removal Warning* (on page xxv)

Installation Warnings

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

Warning:
Read the installation instructions before you connect the system to its power source.

Product Disposal Warning

Warning:
Ultimate disposal of this product should be handled according to all national laws and regulations.

Jewelry Removal Warning

Warning:
Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.

Lightning Activity Warning

Warning:
Do not work on the system, or connect or disconnect cables during periods of lightning activity.

Service Personnel Warning

Warning:
This equipment is to be installed and maintained by service personnel only as defined by AS/NZS 3260 Clause 1.2.14.3 Service Personnel.

Australia SA/NZS 3260 Warning

The cores in the mains leads are colored in accordance with the following code:

Table 1-4 Australia *SCE 1000* Lead Color

Lead Color	Function
Green and Yellow	Earth
Blue	Neutral
Brown	Live

The colors of the cores in the main leads may not correspond with the colored markings identifying the terminals in the plug if power supply cord rewiring is required. Following are the colors of the main leads of this equipment:

- The green and yellow colored core must be connected to the terminal in the plug, which is marked with the letter E or by the earth symbol, or colored green and yellow.
- The blue core must be connected to the terminal, which is marked with the letter N or colored black.
- The brown core must be connected to the terminal, which is marked with the letter L or colored red.

Ground Connection Warning

Warning:
When installing the unit, always make the ground connection first and disconnect it last.

Grounded Equipment Warning

Warning:
This equipment is intended to be grounded. Ensure that the host is connected to earth ground during normal use.

Grounding Warning

Warning:
This equipment is Class 1 type and must be permanently earthed for protection and functional purposes. For safe operation and servicing, install the AC socket outlet near the equipment so that it is readily accessible .Use the appropriate AC power cord and plug, as required by national standards. This equipment must be permanently earthed.

Protective Earth Warning

Warning:
Protective earth is referred to as chassis ground in this document. To make protective earth connection, use the two-hole compression lug grounding points on the back panel.

Ground Conductor Warning

Warning:
Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.

FCC Warning

Note:
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Restricted Area Warning (DC platform only)

Warning:
This unit is intended for installation in restricted access areas. A restricted access area is where access can only be gained by service personnel through the use of a special tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.

Wrist Strap Warning

Warning:
During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the back plane with your hand or any metal tool, or you could shock yourself.

Power Disconnection Warning

Warning:
Before working on a system that has an on/off switch, turn OFF the power and unplug the power cord.

Power Supply Warning

Warning:
Do not touch the power supply when the power cord is connected. For systems with a power switch, line voltages are present within the power supply even when the power switch is off and the power cord is connected. For systems without a power switch, line voltages are present within the power supply when the power cord is connected.

Power Supply Disconnection Warning

Warning:
Before working on a chassis or working near power supplies, unplug the power cord on AC units; disconnect the power at the circuit breaker on DC units.

Warning:
This unit may have more than one power supply cord. Disconnect all power supply cords before servicing to avoid electric shock.

Chassis Power Connection Warning (DC platform only)

Warning:
Before connecting or disconnecting ground or power wires to the chassis, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position.

SELV Circuit Warning

Warning:
To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables.

WAN Port Static Shock Warning

Warning:
Hazardous network voltages are present in WAN ports regardless of whether power to the unit is OFF or ON. To avoid electric shock, use caution when working near WAN ports. When detaching cables, detach the end away from the unit first.

Class 1/I Laser Product Warning

Warning:
Class 1/I Laser product complying with 21CFR 1040.10 and 1040.11 and IEC 60825-1: 1993 + A1: 1997 + A2:2001.

Battery Handling Warning

Warning:
There is the danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer’s instructions.

Fan Tray Removal Warning

⚠ **Warning:**
When removing the fan drawer, keep hands and fingers away from the spinning fan blades. Let the fan blades stop completely before removing the fan drawer.

CHAPTER 1

Overview

This chapter provides a general overview of the Cisco Service Control solution. It introduces the Cisco Service Control concept and the Service Control capabilities. It also briefly describes the hardware capabilities of the SCE Platform, as well as the Cisco specific applications that together compose the total Cisco Service Control solution.

Step 1 This chapter contains the following sections:

- The Cisco Service Control Concept 1-1
- Service Control Capabilities 1-3
- The SCE Platform 1-4
- Management and Collection 1-5
- Cisco Service Control Specific Solutions 1-6

The Cisco Service Control Concept

The Cisco Service Control concept is delivered through a combination of purpose-built hardware and specific software solutions that address various Service Control challenges faced by service providers. The SCE Platform is designed to support observation, analysis, and control of Internet/IP traffic.

Service Control enables service providers to create profitable new revenue streams while capitalizing on their existing infrastructure. With the power of Service Control, service providers have the ability to analyze, charge for, and control IP network traffic at multi-Gigabit wire line speeds. The Cisco Service Control solution also gives service providers the tools they need to identify and target high-margin, content-based services.

As the downturn in the telecommunications industry has shown, IP service provider business models need to be reworked in order to make them profitable. Having spent billions of dollars to build ever larger data links, providers have incurred massive debts and rising costs. During the same time, access and bandwidth became a commodity where prices continually fell and profits disappeared. Service providers now realize that they must offer value-added services to derive more revenue from the traffic and services running on their networks. However, capturing real profits from IP services requires more than simply running those services over data links; it requires detailed monitoring and precision, real- time control and awareness of services as they are delivered. Cisco provides Service Control solutions that allow the service provider to bridge this gap.

Service Control for Wireless Service Providers

Wireless Service Providers are successfully rolling out 2.5G and 3G-based data services to their subscribers.

These services are expected to significantly increase much needed Average Revenue Per User (ARPU) for sustained business models and rapid rollout of new services. These data services require new ways of service offering and new ways of billing these services to the subscribers. The Cisco Service Control solutions enable:

- Support for multiple billing models
- Elimination of revenue leakage via real-time service control
- Flexible pricing plans: postpaid, prepaid, MRC, pay-per-use
- Content-based billing for various applications
- Subscription-based and tiered application services

Service Control for DSL Providers and ISPs

DSL providers and ISPs targeting residential and business broadband customers must find new ways to get maximum leverage from their existing infrastructures, while differentiating their offerings with enhanced IP services.

Cisco products add a new layer of service intelligence and control to existing networks, and will:

- Provide granular visibility into network usage
- Automatically enforce application SLAs or acceptable use policies
- Implement different service levels for different types of customers, content, or applications
- Deploy from network edge to network core for end-to-end service control
- Integrate Cisco solutions easily with existing network elements and BSS/ OSS systems

Service Control for Cable MSOs

Cable MSOs have successfully deployed high-speed cable modem services to millions of homes. Now, they must move beyond providing commodity broadband access by introducing differentiated services and by implementing the service control necessary to fully manage service delivery through their broadband infrastructure. Cisco Service Control solutions will enable:

- Ability to report/analyze network traffic at subscriber and aggregate level for capacity planning
- Identification of network abusers who are violating the Acceptable Use Policy
- Identification and management of peer-to-peer, NNTP (news) traffic, and spam abusers
- Enforcement of the Acceptable Use Policy (AUP)
- Ability to limit the use of servers in the subscriber residence, as well as the use of multiple (unpaid) computers
- Customer-intuitive tiered application services and guarantee application SLAs
- Full integration with standard or legacy OSS for subscriber management and billing

Service Control Capabilities

At the core of the Cisco Service Control Platform stands the purpose-built network hardware device: the Service Control Engine (SCE). Implementing a complete Service Control solution requires that the Service Control Engine provide certain functionalities and capabilities. The following are the core capabilities of the Cisco Service Control Engine, which support a wide range of applications for delivering Service Control solutions:

- Subscriber and application awareness: Application-level drilling into IP traffic for real-time understanding and controlling of usage and content at the granularity of a specific subscriber.
  - Subscriber awareness: The ability to map between IP flows and a specific subscriber for maintaining the state of each subscriber transmitting traffic through the platform, and enforcing the appropriate policy on this subscriber traffic.

    Subscriber awareness is achieved using dedicated integrations with subscriber management repositories, such as a DHCP or a Radius server.
  - Application awareness: The ability to understand and analyze traffic up to the application protocol layer (Layer 7).

    For an application protocol that is implemented using bundled flows (such as FTP, which is implemented using Control and Data flows), the SCE Platform understands the bundling connection between the flows and treats them accordingly.
- Stateful, real time traffic control: The ability to perform advanced control functions, including granular BW metering and shaping, quota management and redirection, utilizing stateful real-time traffic transaction processing. This requires highly adaptive protocol and application level intelligence.
- Programmability: The ability to quickly add new protocols and easily adapt to new services and applications in the ever-changing service provider environment. Programmability is achieved using the SML language.

  Programmability means that new services can be deployed quickly and provides an easy upgrade path for network, application, or service growth.
- Robust and flexible back office integration: The ability to integrate with existing 3rd party systems at the Service Provider, such as provisioning systems, subscriber repositories, billing systems, and OSS systems. The Service Control Engine provides a set of open and well-documented APIs that allows a quick and robust integration process.
- Scalable High-Performance Service Engines: The ability to execute all operations described above at wire speed.

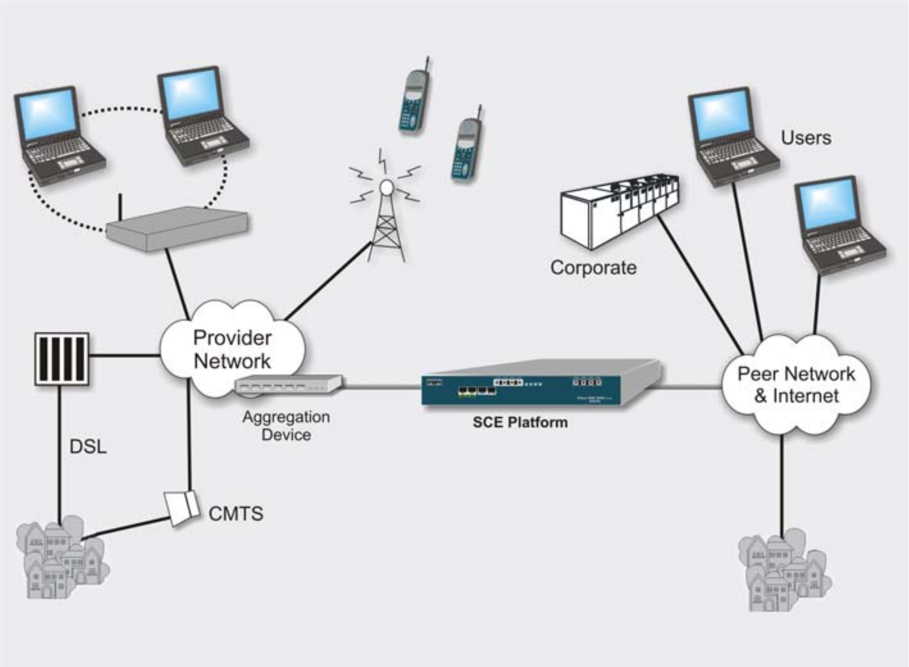
The SCE Platform

The Service Control Engine family of programmable network devices is capable of performing stateful flow inspection of IP traffic, and controlling that traffic based on configurable rules. The Service Control Engine is a purpose-built network device making use of ASIC components and RISC processors to go beyond packet counting and delve deeper into the contents of network traffic. Providing programmable, stateful inspection of bi-direction traffic flows and mapping these flows with user ownership, the Service Control Engine platforms provide a real-time classification of network usage. This information provides the basis of the Service Control Engine advanced traffic control and bandwidth shaping functionality. Where most bandwidth shaper functionality ends, the Service Control Engine provides more control and shaping options including:

- Layer 7-3 stateful wire-speed packet inspection and classification
- Robust support for over 600 protocol/applications including:
  - General: HTTP, HTTPS, FTP, TELNET, NNTP, SMTP, POP3, IMAP, WAP, and others
  - P2P: FastTrack-KazaA, Gnutella, WinMX, Winny, Hotline, eDonkey, DirectConnect, Piolet, and others
- Streaming & Multimedia: RTSP, SIP, HTTP-STREAMING, RTP/RTCP, and others
- Programmable system core for flexible reporting and bandwidth control
- Transparent network and BSS/OSS integration into existing networks
- Subscriber awareness for relating traffic and usage to specific customers

The following diagram demonstrates a deployment of an SCE Platform in the network.

Figure 1-1: SCE Platform in the Network



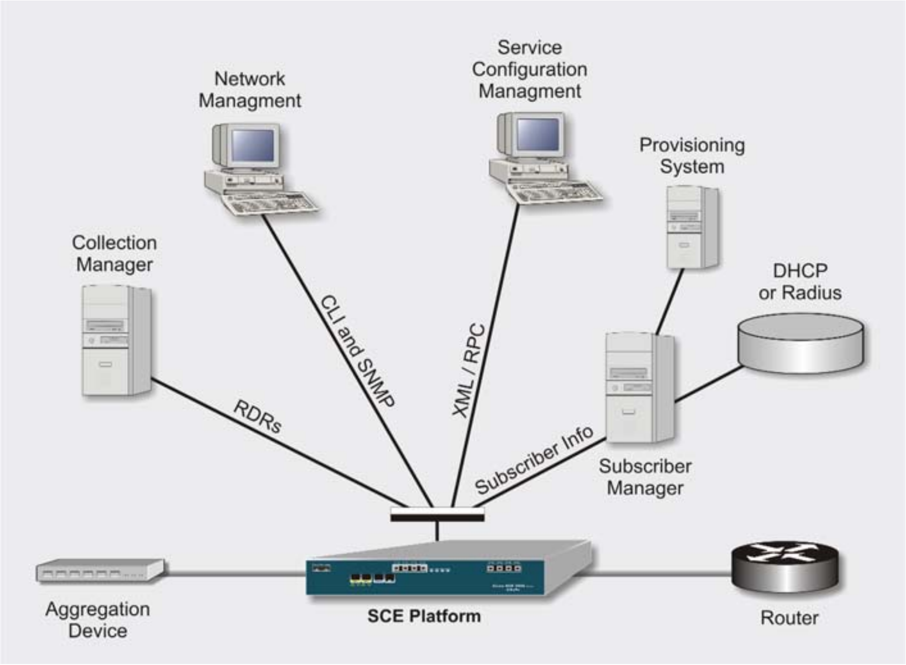
Management and Collection

The Service Control solution includes a complete management infrastructure that provides the following management components to manage all aspects of the Service Control solutions:

- Network management
- Subscriber management
- Service Control Management

These management interfaces are designed to comply with common management standards and to easily integrate with existing OSS infrastructure.

Figure 1-2: Service Control Management Infrastructure



Network Management

Cisco provides complete network FCAPS Management (Fault, Configuration, Accounting, Performance, Security).

Two interfaces are provided for network management:

- **CLI** (Command Line Interface). The CLI is accessible through the Console port or through a Telnet connection.

  CLI is used for configuration and security functions.

- **SNMP** (Simple Network Management Protocol).

  SNMP provides fault management via SNMP traps, as well as performance monitoring functionality.

Subscriber Management

The smartSUB Manager (SM) is a middleware software component used for bridging between the OSS and the SCE Platform(s). Subscriber information is stored in the SM database and can then be distributed between multiple devices according to actual subscriber placement.

The SM provides subscriber awareness, mapping network IDs to subscriber IDs. It obtains subscriber information using dedicated integration modules, which integrate with AAA devices like Radius or DHCP servers.

Subscriber information may be introduced into the SCE platform in one of two ways:

- Push Mode: The SM pushes subscriber information to the SCE Platform automatically upon logon of a subscriber.
- Pull Mode: On-demand, in response to a query from the SCE Platform to the SM.

Service Configuration Management

Service configuration management is the ability to configure the general service definitions of a Service Control application. Service Configuration is performed by creating an XML file and then applying it onto the SCE Platform using the Service Configuration utilities and management commands. This XML based approach is simple to use and easy to automate.

Collection

All the analysis and data processing functions of the SCE Platform result in the generation of Raw Data Records (RDRs). These RDRs are processed by the Collection Manager. The Collection Manager software is an implementation of a collection system, listening in on RDRs from one or more SCE Platforms. It collects these records, and processes them in one of its adapters. Each adapter performs a specific action on the RDR.

RDRs contain a wide variety of information and statistics, depending on the configuration of the system. There are three main categories of RDRs:

- Transaction RDRs: Records generated for each transaction, where a transaction is a single event detected in network traffic. The identification of a transaction will depend on the particular application/protocol.
- Subscriber RDRs: Records generated per subscriber, describing the traffic generated by that subscriber for a defined interval.
- Link RDRs: Records generated per link, describing the traffic carried on the link for a defined interval.

Cisco Service Control Specific Solutions

Cisco provides two specific solutions that run on top of the SCE Platform. Each solution addresses a different IP network control challenge that service providers face.

The Cisco specific solutions are:

- ***Service Control Application Suite for Broadband***
- ***Service Control Application Suite for Mobile***

Service Control Application Suite for Broadband

The ***Service Control Application Suite for Broadband*** allows service providers to detect complex and evasive network application protocols (such as P2P), and to control them as per their business and service delivery requirements. It also enables the creation of differentiated tiered services that the service provider uses to boost revenues and provide competitive services to end customers. ***Service Control Application Suite for Broadband***’s programmable application detection and subscriber awareness makes tiered service possible from one central point in the network. The ***Service Control Application Suite for Broadband*** requires no network changes or upgrades, and is compatible with all existing IP network switches, routers, and infrastructure.

Service Control Application Suite for Mobile

In this solution the SCE Platform is instrumental as a real-time post- and pre-paid network billing and traffic control device. It implements post-paid and pre-paid billing plans that relate subscriber access and network bandwidth consumption. The ***Service Control Application Suite for Mobile*** solution tracks detailed user specific traffic/application metrics and applies service and quota controls depending on their pre-paid balances.

CHAPTER 2

Topology

This chapter describes the possible deployment topologies of the ***SCE 1000***. The Cisco SCE solution offers a number of basic topology options that permit the user to tailor the SCE Platform to fit the needs of a particular installation. An understanding of the various issues and options is crucial to designing, deploying, and configuring the topology that best meets the requirements of the individual system.

Step 2 This chapter contains the following sections:

- Issues to Be Considered 2-1
- Functionality 2-3
- Physical Installation 2-3
- Redundancy 2-5
- Failure and Recovery 2-6
- Topology-Related Parameters 2-7

Issues to Be Considered

There are several issues that must be considered in order to arrive at the optimum configuration of the topology-related parameters:

- Functionality: Will the system be used solely to monitor traffic flow, with report functionality only, or will it be used for traffic flow control, with enforcement as well as report functionality?
- Physical installation configuration: Will the SCE Platform be installed as inline? Or will the SCE Platform use an optical splitter?
- Redundancy: Must the system be designed to guarantee uninterrupted service? If so, there must be a backup SCE Platform to assume operation in case of failure of the primary data link.
- Link failure and recovery: How should the SCE Platform respond to platform failure and subsequent recovery? Should traffic flow continue even though the unit is not operating, or be halted until the platform is repaired/replaced? Should the unit actually resume operation when it is again operational?

SCE Platform Configuration

There are four topology-related parameters:

- **Connection mode**: Can be *Inline* or *Receive-only*, depending on the physical installation of the ***SCE 1000***:

  May be configured via either the **`setup`** command or the **`connection-mode`** command.

- **Bypass mode when the *SCE 1000* is not operational (on-failure)**: This parameter determines whether the system cuts the traffic or bypasses it when the ***SCE 1000*** has failed.

  May be configured via either the **`setup`** command or the **`connection-mode`** command.

- **Status after reboot caused by fatal error or abnormal shutdown:** This parameter determines whether the ***SCE 1000*** returns to normal operational state after a failure.

  May be configured via either the **`setup`** command or the **`failure-recovery operation-mode`** command.

- **Link failure reflection:** This parameter determines the behavior of the system when there is a link problem. In some topologies it is required that link failure on one port be reflected to the other port, to allow the higher layer redundancy protocol in the network to function correctly.

  May be configured via the **`link failure-reflection`** command only.

Failure Detection Mechanism

The ***SCE 1000*** contains various mechanisms to monitor the status and to detect failures. The main mechanisms are:

- Boot time diagnostics failure. When there is a failure in diagnostics testing at boot time the system will remain in failure status.
- Watchdog mechanism. There are two types of watchdogs:
  - HW watchdog. A hardware mechanism that detects control entity failure.
  - SW watchdog. A software mechanism that periodically checks for software failures in the ***SCE 1000***. If a failure is detected, an error massage is sent and the ***SCE 1000*** reboots.
- Run time hardware tests. The system periodically tests the hardware components for error. If a hardware component is malfunctioning, it will be discovered by the system within seconds.

Bypass Mechanism

The ***SCE 1000*** includes a Network Interface Card with a bypass mechanism that is enabled upon ***SCE 1000*** failure. In addition, when connected in-line it can also be enabled in normal operation to simultaneously bypass traffic flow to the other side and direct it internally for analysis. In this case it maintains "receive-only"-like monitoring functions, when control functionality is not required.

The bypass card supports the following four modes:

- **Bypass:** The bypass mechanism preserves the network link, but traffic is not processed for monitoring or for control.

- **Forwarding:** This is the normal operational mode, in which the ***SCE 1000*** processes the traffic for monitoring and control purposes.
- **Sniffing:** The bypass mechanism preserves the network link, while in parallel allowing the ***SCE 1000*** to process the traffic for monitoring only.
- **Cutoff:** There is no forwarding of traffic, and the physical link is forced down (cutoff functionality at layer 1).

Functionality

The ***SCE 1000*** can serve one of two general functions:

- Monitoring and Control: The ***SCE 1000*** monitors and controls traffic flow. Decisions are enforced by the ***SCE 1000*** depending on the results of the monitoring functions of the ***SCE 1000*** and the configuration of the Service Control Application for Broadband or Mobile solution.

  In order to perform control functions, the ***SCE 1000*** must be physically installed as a bump-in-the-wire, and the connection mode must be “Inline”.
- Monitoring only: The ***SCE 1000*** monitors traffic flow, but cannot control it.

  Either a bump-in-the-wire installation or an optical splitter installation may be used for monitoring only. In the latter case connection mode must be “receive-only”.

Physical Installation

There are two options for the physical installation configuration of the ***SCE 1000*** Platform:

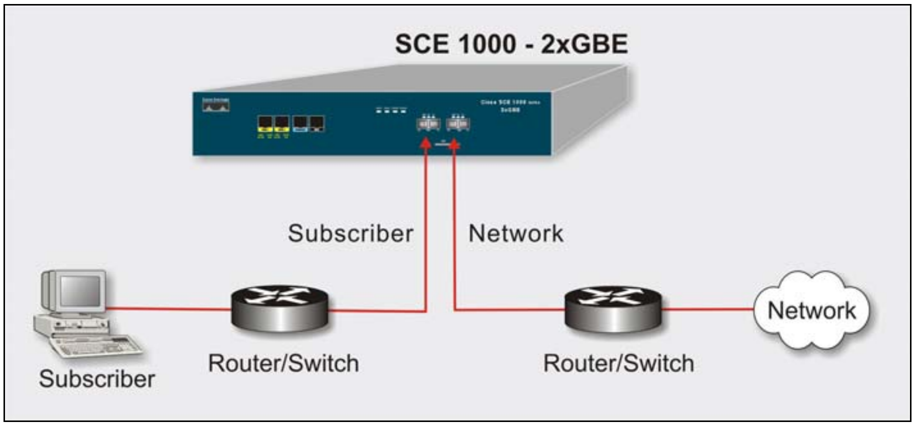
- Inline installation (provides control functionality).
- Out-of-line installation utilizing an external optical splitte

The physical installation determines the connection mode that should be configured.

Bump-in-the-Wire (Inline) Topology

Typically, the ***SCE 1000*** is connected on a full duplex line between two devices (Router, BRAS, etc.). When the ***SCE 1000*** is installed as a bump-in-the-wire, it physically resides on the data link between the subscriber side and the network side, and can both receive and transmit traffic.

Figure 2-1: Bump-in-the-Wire Installation

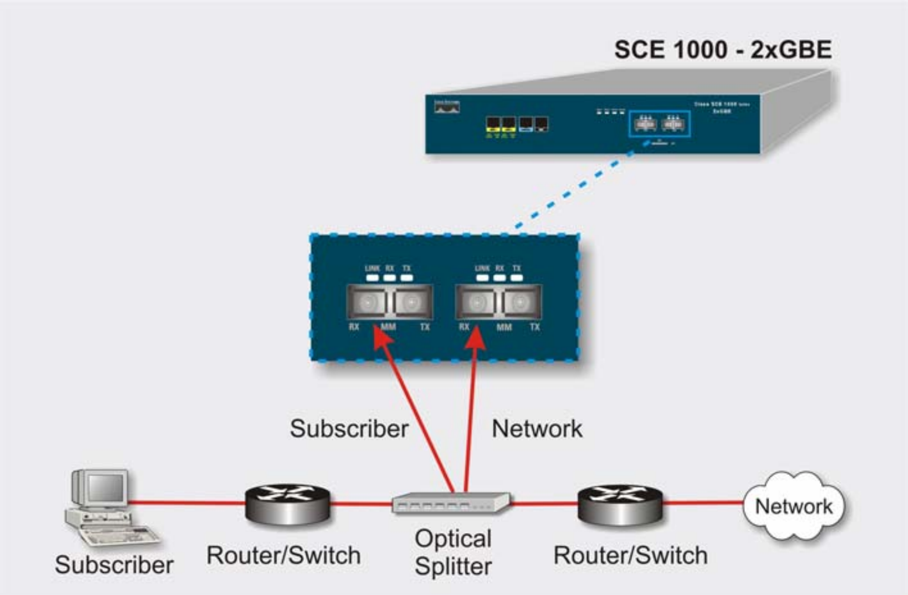


A bump-in-the-wire installation is referred to as *inline* connection mode.

External Splitting (Receive-only) Topology

In external splitting, an external optical splitter resides physically on the GBE link between the subscriber side and the network side. In this topology, the traffic passes through the external splitter, which splits traffic to the ***SCE 1000***. The external splitter is connected to the ***SCE 1000*** via Rx links only. The ***SCE 1000***, therefore, receives traffic only. It does not transmit.

Figure 2-2: External Splitting Topology



An external splitting installation is referred to as *receive-only* connection mode.

Note that in an external splitting installation, the ***SCE 1000*** has only traffic monitoring capabilities.

Note Receive-only topologies can also be implemented using a switch. Such a switch must support SPAN functionality that includes separation between ingress and egress traffic and multiple SPAN-ports destinations.

Redundancy

When a high degree of reliability is desired, a second ***SCE 1000*** Platform should be installed to provide backup operation capabilities. This redundant ***SCE 1000*** guarantees uninterrupted functioning of all ***SCE 1000*** operations.

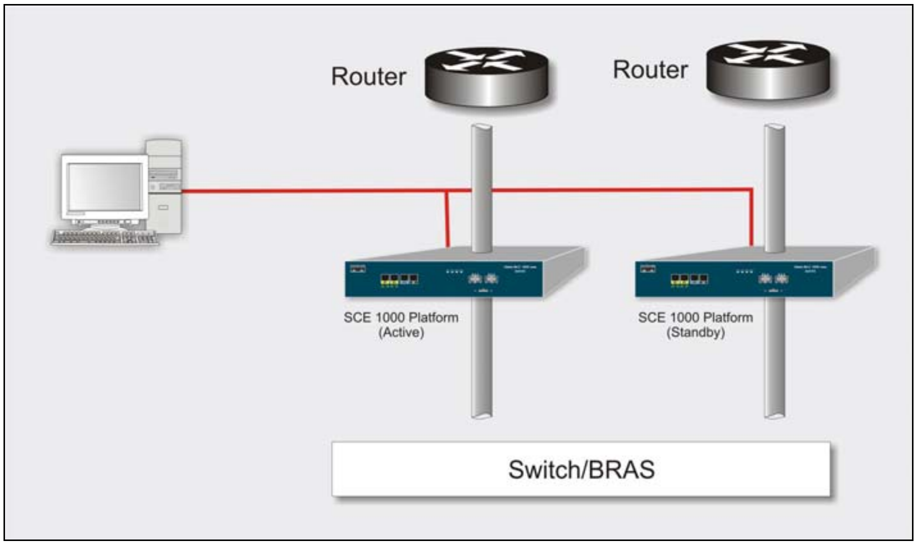
Note Redundancy is possible in inline installations only.

A single ***SCE 1000*** platform does not provide redundancy for ***SCE 1000*** control functions. In case of failure of the ***SCE 1000*** unit, the ***SCE 1000*** simply bypasses the traffic; the traffic link is not cut, but no control or monitoring functionality is available.

Two Platforms on Parallel Links in Bump-in-the-Wire Topology

Using two platforms on parallel links provides redundancy for all ***SCE 1000*** features. In case of failure in the active platform, the backup ***SCE 1000*** unit takes over.

Figure 2-3: Two Platform Redundancy



The above figure represents the ***SCE 1000*** redundant topology. It is applicable as an overlay to a customer's redundant topology, on condition that the entire traffic of a specific subscriber (end station, subnet or VLAN) is flowing through one link only. Both links may be active, providing that the subscriber traffic is mutually exclusive.

This redundancy solution addresses any failure in the ***SCE 1000*** Platform itself. It is based on the idea that any fatal hardware or software failure will cause the platform to "cut" the link. A "cut" link will cause the routers/switches on both ends to switch the traffic to the standby link. On the standby link, the traffic is analyzed and policies enforced by the standby ***SCE 1000***, which, after the failure, acts as the active ***SCE 1000***.

Note that when both links are simultaneously independently active and redundant for the other link (as is the case when HSRP with two virtual routers is used), if one link fails, its traffic is directed to the other link. However, the overall supported load in the link that is now carrying all the traffic is only equal to one link, not two.

During setup of this topology, the configuration of the two ***SCE 1000*** platforms is done through multi-box configuration. This ensures that both hold the same configurations and policies. The functional operation of switching from the active to standby, ***SCE 1000*** is contingent upon the fact that the two ***SCE 1000*** platforms are in the same Domain. All configurations performed on this Domain are automatically updated on both SCE Platforms. Both boxes should also be assigned to the same Subscriber Domain. For more information on Domains, see the *smartSUB Manager User Guide.*

The common protocols used for redundancy traffic switching between network elements such as routers and switches in networks are Spanning-Tree in layer2, HSRP in layer3 (usually used in data-centers), and other common routing protocols like OSPF or RIP.

Note When using routing/switching protocols that perform load balancing as well, the load balancing capabilities should be disabled.

The transition to the backup ***SCE 1000*** platform is transparent. Once the routers/switches detected that traffic has been cut, they start sending traffic through the redundant link. After this occurs, the failed ***SCE 1000*** can be fixed/replaced with no downtime, since the box is effectively disconnected from the network. After fixing/replacing the failed ***SCE 1000***, you must copy the configuration of the current active ***SCE 1000*** to the fixed/replaced ***SCE 1000***.

The backup and restore procedures used for copying policies and Service Configurations from one ***SCE 1000*** to the next are detailed in the *Service Control Application Suite for Broadband User Guide*.

Failure and Recovery

It is important to decide how the system should behave in case of the failure of the ***SCE 1000***, both during the time that the unit is down and after recovery. This decision is influenced by several factors:

- Physical installation (connection mode)
- Redundancy

- Relative importance of maintaining connectivity vs. the continuity of the value-added services that the ***SCE 1000*** enables.

Physical Installation

In a link connection via an external optical splitter, ***SCE 1000*** failure does not affect traffic flow, which continues through the external optical splitter. When the ***SCE 1000*** detects a failure that requires a recover by reboot, it immediately switches to Cutoff mode, stopping all traffic flow over the link until the ***SCE 1000*** unit is restored to operation.

When operation resumes, the defined operational bypass mode is automatically resumed.

The configuration of a bump-in-the-wire installation depends on the remaining two factors.

Redundancy

Redundancy requires two platforms on parallel links, one active and one standby, in inline topology. When the active ***SCE 1000*** platform detects a failure situation, it will immediately switch to Cutoff mode, causing the routers/switches on both ends to switch the traffic to the standby link and thus activate the standby ***SCE 1000*** platform.

There are two options when the failed ***SCE 1000*** platform is finished reloading:

- It may either actually resume operation in the defined operational bypass mode, returning to its status as the active ***SCE 1000*** platform.
- It may remain inactive in the failure bypass mode.

Maintaining the Network Links vs Maintaining SCE 1000 Platform Functionality

When a single ***SCE 1000*** is deployed, the user may decide that in case of a failure, maintaining the network link is more important than providing the ***SCE 1000*** functionality. In this scenario, when the ***SCE 1000*** detects a failure that requires a reboot process for recovering, it immediately switches to Bypass mode, allowing all traffic to bypass the ***SCE 1000***. The ***SCE 1000*** stays in Bypass mode maintaining the network link, albeit without ***SCE 1000*** processing, until the ***SCE 1000*** fully recovers from the failure and is ready to resume normal functioning.

Alternatively, the user may decide that the ***SCE 1000*** functionality is sufficiently crucial to require severing the link if the ***SCE 1000*** platform fails. In this case, when the ***SCE 1000*** detects a failure that requires a reboot process for recovering, it immediately switches to Cutoff mode, stopping all traffic flow. The ***SCE 1000*** stays in Cutoff mode, halting all traffic, until it fully recovers from the failure and is ready to resume normal functioning. In Cutoff the physical interface is blocked, enabling the network device connected to the ***SCE 1000*** to sense that the link is down.

Topology-Related Parameters

Refer to the following sections to determine the correct values for all topology-related parameters before beginning run the initial setup of the ***SCE 1000***.

Connection Mode Parameter

The connection mode parameter refers directly to the physical topology in which the ***SCE 1000*** is installed. Installation is possible in either of the two following modes:

- **Inline**: The ***SCE 1000*** resides on the data link between the subscriber side and the network side, thus both receiving and transmitting packets.
- **Receive-only**: The ***SCE 1000*** does not reside physically on the data link. Data is forwarded to the ***SCE 1000*** via an external optical splitter. The ***SCE 1000*** itself receives only and does not transmit.

Note Default value = **Inline**

The connection mode parameter is determined by the physical deployment of the ***SCE 1000*** as follows:

- Bump-in-the-wire installation = **Inline** connection mode.
- External optical splitter installation = **Receive-only** connection mode.

On-Failure Mode Parameter

As described in the section The Bypass Mechanism, the bypass card supports four different modes. The following two modes are possible when the ***SCE 1000*** is not operational due to platform failure or boot:

- **Bypass:** The optical splitter forwards traffic with no intervention of the control application running in the ***SCE 1000*** platform, but monitoring functions continue uninterrupted.
- **Cutoff**: There is no forwarding of traffic. The link is forced down, resulting in traffic cutoff at Layer1.

The **Forwarding** mode enables control of traffic flow and is not compatible with the non-operational status.

In a single ***SCE 1000*** topology, the value of this parameter is determined by whether or not the link can be completely cut when the ***SCE 1000*** fails, or whether traffic flow should continue across the link in spite of platform failure.

- **Cutoff** mode is required for the following:
  - Redundant bump-in-the-wire topology.
  - Non-redundant bump-in-the-wire topology if value-added services are crucial and are more important than maintaining connectivity.
- **Bypass** mode is required for the following:
  - Non-redundant bump-in-the-wire topology if connectivity is crucial.

Link Failure Reflection Parameter

The link failure reflection refers to the behavior of the ***SCE 1000*** when one of the data links fails. Some network redundant topologies require a layer 1 cutoff in order for the network element to recognize the link failure and translate it into action (switch to redundant link). In this case, if one of the ports fails, it must be reflected to the other port as well.

- **Link failure-reflection:** When one data port link fails, the ***SCE 1000*** forces the other port link down as well. The port will be forced down as long as the first port link is down. When the problematic port link goes up, the other port link will also be turned on again.
- **No link failure-reflection**: Link failure is not reflected to the other port.

Note Default value = **no link failure-reflection**

Status of the SCE 1000 After Abnormal Boot

This parameter determines whether the ***SCE 1000*** returns to normal operational state after a reboot caused by fatal error or abnormal shutdown. In general, it is desirable that the ***SCE 1000*** resume operation, and as promptly as possible. However, in a redundant topology, a recovered ***SCE 1000*** may remain non-operational. In this case the platform that had been the backup and is currently active will remain active.

The two options for this parameter are:

- **Operational**: The status of the ***SCE 1000*** after abnormal boot is operational. The platform automatically resumes functioning in the defined operational link bypass mode.
- **Not Operational**: The status of the ***SCE 1000*** after abnormal boot is not operational. The platform remains in the defined failure link bypass mode.

  This option is to be used only in a redundant topology where a second, operational platform exists.

Note Default value = **Operational** for all non-redundant systems.
Must be explicitly configured for redundant topologies.

Table 2-1 Topology Configuration Summary Table

Description	**Connection mode**	**On-failure link bypass mode**	**Admin status after abnormal boot**
Link connection via external switch with port-mirroring	Receive-only	*Bypass*	*Operational*
Bump-in-the-wire			
Bump-in-the-wire, monitor and control, not redundant	Inline	*Bypass*	*Operational*
Bump-in-the-wire, monitor only, not redundant	Inline	*Bypass*	*Operational*
Bump-in-the-wire, monitor and control, redundant	Inline	Cutoff	Operational[1]
Bump-in-the-wire, monitor only, redundant	Inline	Cutoff	Operational[1]

* Italicized values represent automatically applied defaults that are applied based on previously defined parameters. These values can be changed only via specific CLI commands.

[1]: In a redundant topology, it is also possible to configure admin status after abnormal boot to be Not operational. In this case, though, the ***SCE 1000*** would have to be manually reloaded in order to resume full functionality.

Command Line Interface

This chapter describes how to use the ***SCE 1000*** Command Line Interface (CLI), its hierarchical structure, authorization levels and its help features. The Command Line Interface (CLI) is one of the ***SCE 1000*** Platform management interfaces. The remainder of this manual describes how to manage the ***SCE 1000*** Platform using the Command Line Interface (CLI).

The CLI is accessed through a Telnet session or directly via the console port on the front panel of the ***SCE 1000***. When you enter a Telnet session, you enter as the simplest level of user, in the User Exec mode.

The ***SCE 1000*** supports up to six concurrent CLI sessions; five sessions initiated by Telnet connection, and one session on the console port.

In this chapter and throughout the book, the procedures shown are examples of how to perform typical SCE Platform management functions using the CLI. Because of the large number of functions available, not every possible procedure is documented. For a complete listing of available CLI commands for ***SCE 1000*** administrators, see *CLI Command Reference* (on page A-1). The various chapters throughout the manual give you examples of how to implement the most common of these commands, as well as general information on the interrelationships between the commands and the conceptual background of how to use them.

Step 3 This chapter contains the following sections:

- Authorization and Command Levels (Hierarchy) 3-1
- CLI Help Features 3-11
- Navigational and Shortcut Features 3-13
- CLI Scripts3-15

Authorization and Command Levels (Hierarchy)

When using the CLI there are two important concepts that you must understand in order to navigate:

- **Authorization Level:** Indicates the level of commands you can execute. A user with a simple authorization level can only view some information in the system, while a higher level administrator can actually make changes to configuration. Almost all of the procedures in this manual require an Admin authorization level. See CLI Command Hierarchy.

- **Command Hierarchy Level:** Provides you with a context for initiating commands. Commands are broken down into categories and you can only execute each command within the context of its category. For example, in order to configure parameters related to the Line Card, you need to be within the LineCard Interface Configuration Mode. See CLI Command Hierarchy.

The following sections describe the available Authorization and Command Hierarchy Levels and how to maneuver within them.

The on-screen prompt indicates both your authorization level and your command hierarchy level, as well as the assigned host name. See *Prompt Indications* (on page 3-10).

Note Throughout the manual, ***SCE 1000*** is used as the sample host name.

CLI Authorization Levels

The ***SCE 1000*** system has three authorization levels, which represent the user's access permissions. When you initially connect to the ***SCE 1000***, you automatically have the most basic authorization level, that is User, which allows minimum functionality.

In order to perform administrative functions on the ***SCE 1000***, you must have Admin or Root authorization, which means changing the level by logging in with an Admin or Root password, as described in the procedure "To log in with Admin level authorization," below. This manual covers the functions that can be performed by the Admin level user.

The commands available in each authorization level are all the commands of the lower authorization layers plus commands that are authorized only to this level.

Note This manual covers the functions that can be performed by the Admin level user, unless otherwise noted.

The following CLI commands are related to authorization levels:

- `enable`
- `disable`

Each authorization level has a value (number) corresponding to it. When using the CLI commands, use the values, not the name of the level, as shown in the following table.

Table 3-1 Authorization Levels

Level	Description	Value	Prompt
User	Password required. This level enables basic operational functionality.	0	>
Admin	Password required. For use by general administrators, the Admin authorization level enables configuration and management of the ***SCE 1000***.	10	#
Root	Password required. For use by technical field engineers, the Root authorization level enables configuration of all advanced settings, such as debug and disaster recovery. The Root level is used by technical engineers only and is not documented in this manual.	15	#>

A telnet session begins with a request for password, and will not continue until the proper user password is supplied. This enhances the security of the system by not revealing its identity to unauthorized people.

To log in with Admin level authorization:

Step 4 Initiate a telnet connection.

Step 5 A `Password:` prompt appears. Type in the user level password and press **Enter**.
The ***SCE 1000*>** prompt appears.

You now have user level authorization.

Step 6 From the ***SCE 1000*>** prompt, type **`enable 10`** and press **Enter**.
The system prompts for a password by showing the prompt `Password`:

Step 7 Type in the password for the Admin level and press **Enter**.
Note that the password is an access-level authorization setting, not an individual user password.

The system prompt changes to ***SCE 1000#*** to show you are now in Admin level.

EXAMPLE:

The following example illustrates how to change the authorization level from User to Admin, and then revert back to User. No password is required for moving to a lower authorization level.

```
SCE 1000>enable 10
Password:  cisco
SCE 1000#disable
SCE 1000>
```

CLI Command Hierarchy

The set of all CLI commands is grouped in hierarchical order, according to the type of the commands. The first two levels in the hierarchy are the User Exec and the Privileged Exec modes. These are non-configuration modes in which the set of available commands enables the monitoring of the ***SCE 1000***, file system operations, and other operations that cannot alter the configuration of the ***SCE 1000***.

The next levels in the hierarchy are the Global and Interface configuration modes, which hold a set of commands that control the global configuration of the ***SCE 1000*** and its interfaces. Any of the parameters set by the commands in these modes should be saved in the startup configuration, such that in the case of a reboot, the ***SCE 1000*** restores the saved configuration.

The following table shows the available CLI modes.

Table 3-2 CLI Modes

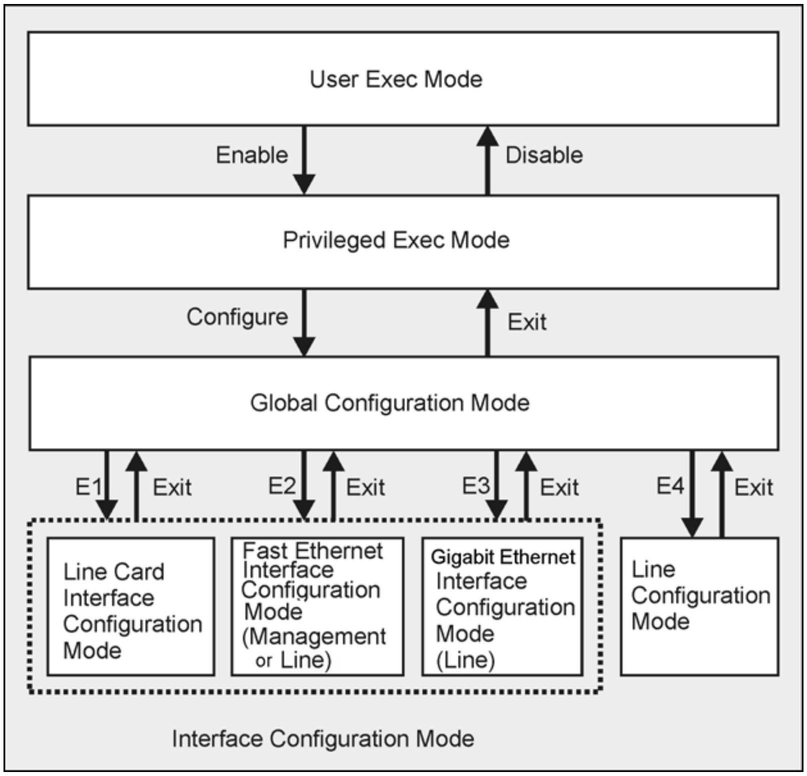
Mode	**Description**	**Level**	**Prompt indication**
UserExec	Initial mode with very limited functionality.	User	***SCE 1000>***
Privileged Exec	General administration for monitoring, file system manipulations and control of basic parameters which do not change the configuration of the ***SCE 1000***.	Admin	***SCE 1000#***
Global Configuration	Configuration of general system parameters, such as DNS, host name, and time zone.	Admin	***SCE 1000***`(config)#`
Interface configuration	Configuration of specific system interface parameters, such as the Line Card, and the FastEthernet interfaces.	Admin	***SCE 1000***`(config if)#`
Line Configuration	Configuration of Telnet lines, such as an access-list.	Admin	***SCE 1000***`(config-line)#`

When you login to the system, you have the User authorization level and enter User Exec mode. Changing the authorization level to Admin automatically moves you to Privileged Exec mode. In order to move to any of the configuration modes, you need to enter commands specific to that mode.

The list of available commands in each mode can be viewed using the question mark '?' at the end of the prompt.

The following figure illustrates the hierarchical structure of the CLI modes, and the CLI commands used to enter and exit a mode.

Figure 3-1: CLI Command Hierarchy


User Exec Mode
Enable
Disable
Privileged Exec Mode
Configure
Exit
Global Configuration Mode
E1
Exit
E2
Exit
E3
Exit
E4
Exit
Line Card Interface Configuration Mode
Fast Ethernet Interface Configuration Mode (Management or Line)
Gigabit Ethernet Interface Configuration Mode (Line)
Line Configuration Mode
Interface Configuration Mode

The following commands are used to enter the different configure interface modes and the Line Configuration Mode:

E1 **`interface LineCard 0`**

E2 **`interface FastEthernet 0/0`**

E3 **`interface GigabitEthernet`** *`0/1`* or *`0/2`*

E4 **`line vty 0`** or **`1`** or **`2`** or **`3`** or **`4`**

To move from one interface configuration mode to another you must exit the current interface configuration mode (as illustrated in the above figure).

Note Although the system supports up to five concurrent Telnet connections, you cannot configure them separately. This means that any number you enter in the **`line vty`** command (0, 1, 2, 3 or 4) will act as a 0 and configure all five connections together.

EXAMPLE:

This example illustrates moving into and out from Interface configuration mode as follows:

- Configure the ***SCE 1000*** time zone (global configuration)
- Enter Interface configuration mode
- Configure the speed of the management interface
- Define the operational bypass mode.
- Exit Interface configuration mode

```
SCE 1000#>configure
SCE 1000(config)#>clock timezone PST -10
SCE 1000(config)#>interface FastEthernet 0/0
SCE 1000(config if)#>speed 100
SCE 1000(config)#>exit
SCE 1000(config)#>interface LineCard 0
SCE 1000(config if)#>link-bypass on-operational no-bypass
SCE 1000(config if)#>exit
```

Entering and Exiting Global Configuration Mode

To enter the Global Configuration Mode:

Step 1 At the ***SCE 1000****#* prompt, type configure, and press **Enter**.
The ***SCE 1000***(config)# prompt appears.

To exit the Global Configuration Mode:

Step 1 At the ***SCE 1000***(config)# prompt, type exit and press **Enter**.
The ***SCE 1000****#* prompt appears.

Interface Configuration Modes

The interfaces that are configured by the Interface Configuration Modes are:

- LineCard: **`Interface LineCard 0`**

The LineCard interface configures the main functionality of viewing and handling traffic on the line.

- Fast Ethernet Management: **`Interface FastEthernet 0/0`**

  The FastEthernet Management Interface configures the settings for the interface to other network elements within the system. This interface should be connected to the internal Ethernet within the operator's site.

- Gigabit Ethernet Link: **`Interface GigabitEthernet 0/1 or 0/2`**

  The GigabitEthernet Interface mode configures the settings for the GigabitEthernet interface to the Internet traffic on the wire. Each of the two ports can be set individually.

- Line Configuration Mode: **`Line vty 0`**

  Line Configuration Mode enables you to configure Telnet parameters.

Configuring the Physical Network Interface Parameters

The ***SCE 1000*** system contains the following network interfaces:

- FastEthernet Management: `Interface FastEthernet (0/0)`

  The FastEthernet Management Interface mode configures the settings for the interface other network elements within the system. This interface should be connected to the internal Ethernet within the operator site.

- GigabitEthernet: `Interface GigabitEthernet (0/1 or 0/2)`

  The GigabitEthernet Interface mode configures the settings for the GigabitEthernet interface to the Internet traffic on the wire. Each of the two ports can be set individually.

Note You must specify Slot number and Interface number when referencing the FastEthernet Interface or the GigabitEthernet Interface. Slot number is always 0, and the interfaces are numbered as follows:
GigabitEthernet Line Interfaces: **1,2**
FastEthernet Management Interface: **0**

Entering FastEthernet (Management) Interface Configuration Mode

Before you can configure the FastEthernet parameters for the management interface, you must be in the FastEthernet Management Interface Configuration Mode.

To enter FastEthernet Management Interface Configuration Mode:

Step 1 To enter Global Configuration Mode, type **`configure`** and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

Step 2 Type **`interface FastEthernet 0/0`** and press **Enter**.
The ***SCE 1000***`(config if)#` prompt appears.

The system prompt changes to reflect the higher level mode.

To return to the Global Configuration mode:

Step 1 Type **`exit`**.

Entering LineCard Interface Configuration Mode

The following procedure is for entering Line Card Interface Configuration mode. The procedures for entering the other interfaces are the same except for the interface command as described above and in *CLI Command Reference* (on page A-1).

To enter LineCard Interface Configuration mode:

Step 1 To enter Global Configuration Mode, at the ***SCE 1000#*** prompt, type **`configure`**, and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

Step 2 Type **`interface LineCard`** 0, and press **Enter**.
The ***SCE 1000***`(config if)#` prompt appears.

Step 3 To return to Global Configuration Mode, type **`exit`** and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

Step 4 To exit Global Configuration Mode, type **`exit`** and press **Enter**.
The ***SCE 1000#*** prompt appears.

Entering GigabitEthernet Line Interface Configuration Mode

To enter GigabitEthernet Interface Configuration Mode:

Step 1 To enter Global Configuration Mode, type **`configure`** and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

Step 2 Type **`interface GigaBitEthernet`** *`[0/1|0/2]`* and press **Enter**.
`interface GigaBitEthernet 0/1` enables configuration of interface 1

`interface GigaBitEthernet 0/2` enables configuration of interface 2

The ***SCE 1000***`(config if)#` prompt appears.

EXAMPLE:

The following example shows how to enter Configuration Mode for the GigabitEthernet Interface number 2.

```
SCE 1000(config)#interface GigabitEthernet 0/2
SCE 1000(config if)#
```

Navigating between the Interface Configuration Modes

To navigate from one Interface Configuration Mode to another:

Step 1 Type **exit**.
You are returned to the Global Configuration Mode.

Step 2 Type the appropriate command to enter a different Interface Configuration Mode.

Interface Configuration Modes

The interfaces that are configured by the Interface Configuration Modes are:

- LineCard: **Interface LineCard 0**

  The LineCard interface configures the main functionality of viewing and handling traffic on the line.

- Fast Ethernet Management: **Interface FastEthernet 0/0**

  The FastEthernet Management Interface configures the settings for the interface to other network elements within the system. This interface should be connected to the internal Ethernet within the operator’s site.

- Gigabit Ethernet: **Interface GigabitEthernet 0/1, 0/2, 0/3, or 0/4**

  The GigabitEthernet Interface mode configures the settings for the GigabitEthernetinterface to the Internet traffic on the wire. Each of the four ports can be set individually.

- Line Configuration Mode: **Line vty 0**

  Line Configuration Mode enables you to configure Telnet parameters.

Exiting Modes

This section describes how to revert to a previous mode. When you use the exit command you revert to the general level above the current level, as shown in the figure in CLI Command Hierarchy.

To exit from the Privileged Exec mode and revert to the User Exec mode:

Step 1 At the ***SCE 1000#*** prompt, type **disable**, and press **Enter**.
The ***SCE 1000>*** prompt for the User Exec mode appears.

Exiting from any configuration mode and revert to the previous mode is done in the same manner, as in the following procedure.

To exit from the Global Configuration Mode:

Step 1 At the ***SCE 1000***`(config)#` prompt, type **`exit`**, and press **Enter**.
The appropriate prompt for the previous level appears.

EXAMPLE:

The following example shows the system response when you exit the Interface Configuration mode.

```
 SCE 1000(config if)#exit
 SCE 1000(config)#
```

Prompt Indications

The on-screen prompt indicates your authorization level, your command hierarchy level, and the assigned host name. The structure of the prompt is:
`<hostname(mode-indication)level-indication>`

Authorization levels are indicated as follows:

This prompt...	Indicates this...
>	indicates User level
#	indicates Admin level
#>	indicates Root level

Command hierarchy levels are indicated as follows:

This command hierarchy...	Is indicated as...
User Exec	***SCE 1000>***
Privileged Exec	***SCE 1000#***
Global Configuration	***SCE 1000***`(config)#`
Interface Configuration	***SCE 1000***`(config if)#`
Line Configuration	***SCE 1000***`(config-line)#`

EXAMPLE:

The prompt `My`***SCE 1000***`(config if)#` indicates:

- The name of the ***SCE 1000*** is `My`***SCE 1000***
- The user has Admin authorization level
- The current CLI mode is Interface configuration mode

CLI Help Features

CLI provides context sensitive help. Two types of context sensitive help are supported:

- Partial help
- Argument help

Partial Help

To obtain a list of commands that begin with a particular character string, enter the abbreviated command entry immediately followed by a question mark (?). This form of help is called partial help, because it lists only the keywords or arguments that begin with the abbreviation you entered.

EXAMPLE:

The following example illustrates how typing **`c?`** displays all available arguments that start with the letter c.

```
SCE 1000(config)#snmp-server c?
Community         contact
SCE 1000(config)#snmp-server c
```

Argument Help

To obtain a list of command’s associated keywords or parameters, type a question mark (?) in place of a keyword or parameter on the command line.

Note that if <**Enter**> is acceptable input, the symbol <cr> represents the **Enter** key.

EXAMPLE:

The following example illustrates how to get a list of all arguments or keywords expected after the command **snmp-server**.

```
SCE 1000(config)#snmp-server ?
Community   Define community string
Contact           Set system contact
Enable            Enable the SNMP agent
Host              Set traps destination
Location          Set system location
SCE 1000(config)#
```

When asking for help on particular parameter, the system informs you of the type of data that is an accepted legal value. The types of parameters supported are:

STRING When a String is expected, you can enter any set of characters or digits. If the string has a space as one of its characters, use double-quote (“) marks to enclose the string.

DECIMAL Any decimal number. Positive number is assumed, for negative numbers use the “–” symbol.

HEX A hexadecimal number; must start with either 0x or 0X.

EXAMPLE:

The following example illustrates the use of **?** to get help on commands syntax. In this example, you can enter either the word **running-config**, or any name of a file, after the word **copy**.

```
SCE 1000#copy ?
      running-config            Copy running configuration file
      STRING             Source file name
SCE 1000#
```

The [no] Prefix

Many CLI commands offer the option of adding the word **no** before the command to disable the feature controlled by the command or revert it to its default configuration. This notation is shown in the *CLI Command Reference* (on page A-1) as **[no]** to denote it is optional.

For example, **no service telnetd** disables the telnet server. Enabling the telnet server is done by typing **service telnetd**.

Navigational and Shortcut Features

Command History

CLI maintains a history buffer of the most recent commands you used in the current CLI session for quick retrieval. Using the keyboard, you can navigate through your last commands, one by one, or all commands that start with a given prefix. By default, the system saves the last 30 commands you typed. You can change the number of commands remembered using the **`history size`** command.

To use the history functions, use the keys shown in the following table.

Table 3-3 Keyboard Shortcuts for History Functions

Arrow	Shortcut	Description
Up arrow	Ctrl-P	Moves cursor to the previous command with the same prefix.
Down arrow	Ctrl-N	Moves cursor to the next command with the same prefix as original.
	Ctrl-L Ctrl-R	Re-display the current command line.

Keyboard Shortcuts

The ***SCE 1000*** has a number of keyboard shortcuts that make it easier to navigate and use the system. The following table shows the keyboard shortcuts available.

You can get a display the keyboard shortcuts at any time by typing **`help bindings`**.

Table 3-4 Keyboard Shortcuts

Shortcut Key	Description
Navigational shortcuts	
CTRL-F /->	Move cursor one character to the right.
CTRL-B /<-	Move cursor one character to the left.
ESC-F	Move cursor one word to the right (forward).
ESC-B	Move cursor one word to the left (backward.
CTRL-A	Move cursor to the start of the line.
CTRL-E	Move cursor to the end of the line.
Editing shortcuts	
CTRL-D	Delete the character where the cursor is located.
ESC-d	Delete from the cursor position to the end of the word.
Backspace	Delete the character before the current location of the cursor.
CTRL-H	Delete the character before the current location of the cursor.
CTRL-K	Deletes from the cursor position to the end of the line
CTRL-U	Deletes all characters from the cursor to the beginning of the line

Shortcut Key	Description
CTRL-X	Deletes all characters from the cursor to the beginning of the line. (Same functionality as CTRL-U.)
CTRL-W	Delete the word to the left of the cursor.
CTRL-Y	Recall the last item deleted.
<Tab>	Completes the word when there is only one possible completion.
CTRL-I	Completes the word when there is only one possible completion. (Same functionality as CTRL-I.)

Tab Completion

The CLI interface features tab completion. When you type in the first letters of a command and type **<Tab>**, the system automatically fills in the rest of the command or keyword. This feature works only when there is one possible command that could be possible using the starting letters.

EXAMPLE:

The letters **snm** followed by **<Tab>** will be completed to the command **snmp-server.**

```
SCE 1000(config)#snm<Tab>
SCE 1000(config)#snmp-server
```

If you type **<Enter>** instead of **<Tab>**, and there is no ambiguity, the system actually carries out the command which would be filled in by the rest of the word.

EXAMPLE:

The following example displays how the system completes a partial (unique) command for the **enable** command. Because **enable** does not require any parameters, the system simply carries out the **enable** command when the user presses **Enter**.

```
SCE 1000>en<Enter>
Password:
SCE 1000#
```

FTP User Name and Password

CLI enables saving ftp user name and password to be used in FTP operations—download and upload, per session.

These settings are effective during the current CLI session.

EXAMPLE:

The following example illustrates how to set FTP password and user name and the use in these settings for getting a file named *config.tmp* from a remote station using FTP protocol.

```
SCE 1000#ip ftp password vk
SCE 1000#ip ftp username vk
SCE 1000#copy ftp://@10.1.1.253/h:/config.tmp myconf.txt
connecting 10.1.1.253 (user name vk password vk) to retrieve config.tmp
SCE 1000#
```

CLI Scripts

The CLI scripts feature allows you to record several CLI commands together as a script and play it back. This is useful for saving repeatable sequence of commands , such as software upgrade. For example, if you are configuring a group of ***SCE 1000***s and you want to run the same configuration commands on each ***SCE 1000***, you could create a script on one ***SCE 1000*** and run it on all the other ***SCE 1000***s.

The available script commands are:

- `script capture`
- `script stop`
- `script print`
- `script run`

To create a script:

Step 1 At the ***SCE 1000#*** prompt, type **`script capture`** *`sample1.scr`* where *`sample1.scr`* is the name of the script.

Step 2 Perform the actions you want to be included in the script.

Step 3 Type **`script stop`**.
The system saves the script.

EXAMPLE:

The following is an example of recording a script for upgrading software.

```
SCE 1000#script capture upgrade.scr
SCE 1000#configure
SCE 1000(config)#boot system new.pkg
Verifying package file...
Package file verified OK.
SCE 1000(config)#exit
SCE 1000#copy running-config startup-config
Writing general configuration file to temporary location...
Extracting files from ‘/tffs0/images/new.pkg’...
Verifying package file...
Package file verified OK.
Device ‘/tffs0/’ has 81154048 bytes free, 21447973 bytes are needed for
extraction, all is well.
Extracting files to temp locations...
Renaming temp files...
Extracted OK.
Backing-up general configuration file...
Copy temporary file to final location...
SCE 1000#script stop
SCE 1000#
```

To run the script recorded above, type:

```
SCE 1000#script run upgrade.scr
```

Installation and Startup

This chapter guides you through the process of installing and starting the ***SCE 1000***. The installation process should be performed in the order described in this chapter.

For further information, see the following chapters:

- Overview of the ***SCE 1000*** platform installation in various topologies: *Topology* (on page 2-1)
- CLI commands: *CLI Command Reference* (on page A-1)
- For possible solutions if problems arise during the installation process: *Troubleshooting* (on page 10-1)

Step 4 This chapter contains the following sections:

- Pre-Installation Requirements 4-1
- Installation 4-6
- Connecting to the Power Supply 4-13
- Front Panel4-19
- Powering up 4-23
- Connecting the Local Console 4-24
- System Configuration 4-26
- Connecting the FE Management Port 4-46
- Connecting the line ports to the network 4-48
- Loading and Activating a Service Control Application 4-55
- Final Tests 4-55

Pre-Installation Requirements

You should perform the following steps prior to installing the system.

Step 1: Unpacking

Unpack the ***SCE 1000*** from its kit.

Step 2: Checking Shipping Contents

After opening the ***SCE 1000***, verify that all the parts on the packing list are included.

Packing List Parts

Check **(if present)**	**Item**
	SCE 1000 platform
	For AC systems: AC power supply cords
	Fast Ethernet cable for connecting to the Management port
	RS-232 serial cable (DB-9 to RJ-45) for connecting to a local terminal
	Rack-mount bracket kit comprising: • 2 mounting brackets for 19” rack • 6 screws (Philips), 8-32 x 3/8” (for attaching the brackets to the ***SCE 1000*** chassis) • supporting mounting brackets for 19” rack • 2 crossrail supports for 19” rack with front and back posts
	Grounding kit comprising: • Grounding cable • 2 Hex nuts (#¼”) • 2 spring washers (#¼”)
	4 Rubber Feet (for tabletop installation)

Step 3: Preparing to Install

Prior to installation make sure that you’re equipped with the required tools and parts, and that the site is ready/prepared. Consider the power and cabling requirements that must be in place at your installation site, and the environmental conditions your installation site must meet in order to maintain normal operation.

Tools and Parts Required

The ***SCE 1000*** chassis is fully assembled at the factory; including the application and software packages. No assembly is required. However, you need the following tools and equipment to install the ***SCE 1000*** chassis and the rack-mount and secure cable kit:

- Number 1 and 2 Phillips screwdriver
- #¼” Hex Wrench
- 19” Rack (for rack mounting), compatible with the dimensions of the ***SCE 1000***, as described in the table ***SCE 1000*** Dimensions.
- Screws compatible with your rack (for mounting the ***SCE 1000*** to the rack)
- Table top (free of dust, compatible with the ***SCE 1000*** dimensions, for table-top mounting)

SCE 1000 Dimensions

The dimensions of the ***SCE 1000*** are displayed in the following figure. The following table, ***SCE 1000*** Dimensions, contains the ***SCE 1000*** dimension measurements.

Figure 4-1: SCE 1000 Dimensions

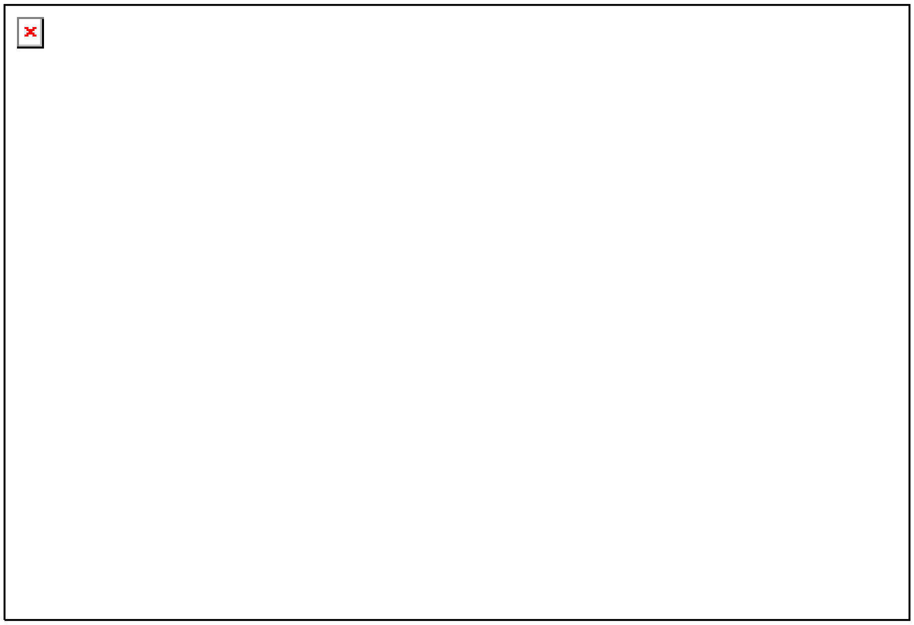


Table 4-1 *SCE 1000* Dimensions

Dimension	**Measurement**
Height	3.47 inches (9.5 cm)
Width	17.4 inches (4.43 cm)
Depth	18 inches (4.6 cm)
Mounting options	19” rack and desktop mounting options
Weight	33 lb (15 kg)

Site Requirement Guidelines

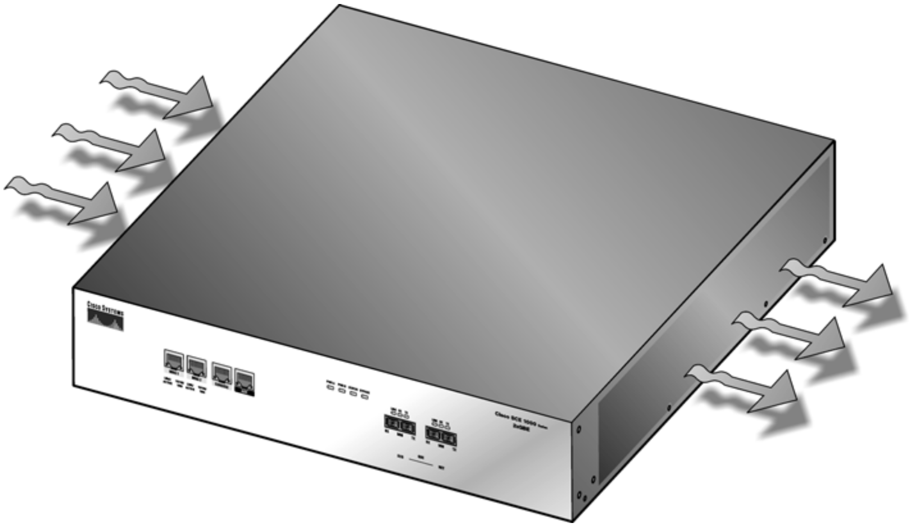
Warning It is recommended that you be fully familiar with all important safety information *before* working with the ***SCE 1000*** unit. See the chapter, *Regulatory Compliance and Safety Information* (on page xvii).

The environmental monitoring functionality in the ***SCE 1000*** protects the system and components from potential damage from over-voltage and over-temperature conditions. To ensure normal operation and to avoid unnecessary maintenance, plan your site configuration and prepare your site *before* installation. After installation, make sure the site maintains an ambient temperature of 23°F (–5°C) through 131°F (55°C), and keep the area around the ***SCE 1000*** chassis free from dust.

Planning a proper location for the ***SCE 1000*** and the layout of your equipment rack or wiring closet is essential for successful system operation. Equipment placed too close together or inadequately ventilated can cause system over-heating. In addition, chassis panels made inaccessible by poor equipment placement can make system maintenance difficult. The following precautions can help avoid problems during installation and ongoing operation.

Airflow

Figure 4-2: Airflow Through the SCE 1000

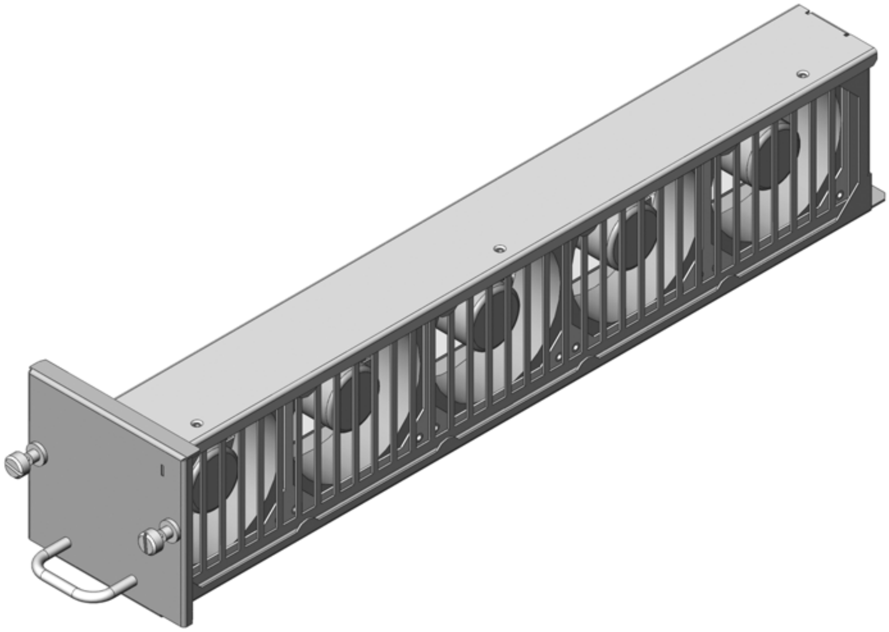


When you plan the location and layout of your equipment rack or wiring closet you need to consider how air flows though your system. The ***SCE 1000*** draws cooling air in through the intake vents on the left side of the chassis, moves the air across the internal components, and out through the right side and rear panel of the chassis. The above figure illustrates the airflow through the ***SCE 1000***.

Fans

The fan module provides cooling for the internal components. The fan drawer is a field-replaceable unit containing five fans, and is installed at the right rear of the ***SCE 1000***.

Figure 4-3: SE2000 Fan Module



When you install the ***SCE 1000***, ensure adequate airflow for the inlet and exhaust vents.

Note Remember to leave a two inch (5 cm) clearance on both sides of the ***SCE 1000*** and five inches (12.7 cm) at the rear for adequate airflow for the inlet and exhaust vents.

Site Requirements

The following tables contain the site requirement specifications for the ***SCE 1000***.

Table 4-2 SCE 1000 AC Power supply

Power	**Specification**
AC power input	100 to 240 VAC
AC power frequency	47 to 63 Hz
Power consumption	up to 200W

Table 4-3 *SCE 1000* DC Power Supply

Power	Specification
DC power input	-36 to -72 V DC
Power consumption	up to 200W
Circuit breaker	One Fast 10A for each power supplier

Table 4-4 *SCE 1000* Environmental Requirements

Environmental Factor	Requirement
Temperature -	23°F to 131°F (-5°C to +55°C)
Relative humidity	5% to 95% (non-condensing)

Table 4-5 *SCE 1000* Approvals Specifications

Approval	Specification
EMC	• USA - According to standard CFR 47. FCC rules and regulations PART 15 Subpart B. Methods and procedures ANSI 63/4/1992 • European Community - According to generic EMISSIONS standard EN 50081-2. Methods and procedures EN 55022, . • European Community - EN 50082-1 (ESD, RFI, EFT, etc.) (Commercial) • International - CISPR22
Safety	UL60950, Full CE mark, EN60950

Warning The ***SCE 1000*** DC should be installed in a Restricted Access Location only.

Installation

This section provides instructions for the physical installation of the ***SCE 1000*** platform, including how to install the ***SCE 1000*** in a rack, how to install the ***SCE 1000*** on a tabletop or workbench, how to attach cables, and how to connect the ground and electrical connections for powering on the ***SCE 1000***.

The ***SCE 1000*** operates as either a tabletop or a rack-mounted unit. A rack-mounted kit is included with the ***SCE 1000*** when it is shipped from the factory. The kit provides the hardware needed (see *Packing List* ("Packing List Parts" on page 4-2)) to mount the ***SCE 1000*** in either of two types of standard 19-inch equipment rack:

- 19-inch rack with only two posts in the front: Use the supporting brackets included in the kit
- 19-inch rack with only four posts, two in the front and two in the back: Use the crossrail supports included in the kit

If you are not rack-mounting your ***SCE 1000***, place it on a sturdy tabletop or workbench. A rubber feet kit is included for tabletop installations.

Installation Precautions

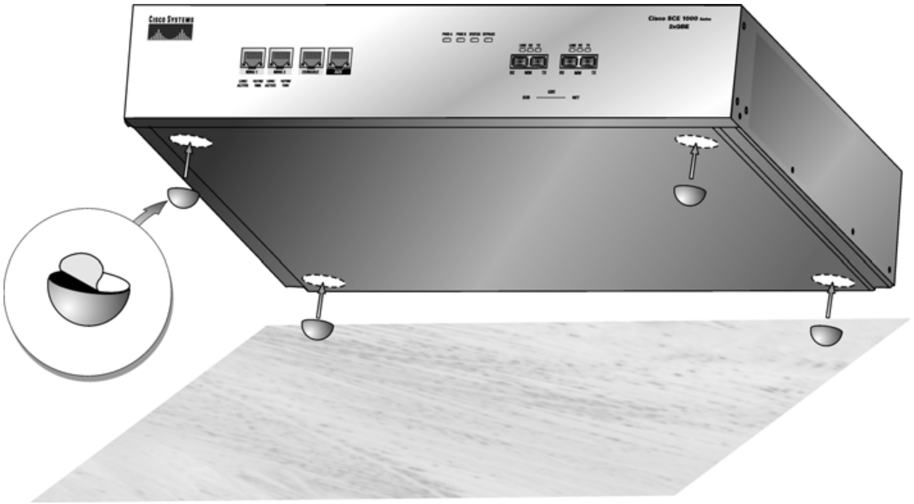
When installing the ***SCE 1000*** on a workbench or tabletop or in a rack, ensure that the surface is clean and in a safe location. Please observe the following conditions:

- Allow at least 2 inches (5 cm) of clearance at its left and right sides for airflow clearance from the inlet and exhaust vents, and that no exhaust air from other equipment is drawn into the ***SCE 1000***. See descriptions and illustrations regarding air flow, see *Airflow* (on page 4-4) and *Fans* (on page 4-5).
- Do not place the ***SCE 1000*** on the floor during installation. Dust that accumulates on the floor is drawn into the interior of the ***SCE 1000*** by the cooling fans. Excessive dust inside the ***SCE 1000*** can cause over-temperature conditions and component failures.
- Allow at least 5 inches (12.7 cm) of clearance at the front and rear of the ***SCE 1000*** for installing and rudimentary maintenance for accessing network cables or equipment.
- Ensure that the ***SCE 1000*** will receive adequate ventilation. Do not install the ***SCE 1000*** in an enclosed cabinet where ventilation is inadequate!
- Provide an adequate chassis Ground (earth) connection for the ***SCE 1000*** (see *Attaching a Chassis Ground Connection* (on page 4-15) for instructions).

Installing the SCE 1000 on a Workbench or Tabletop

You can install the ***SCE 1000*** on any flat surface as long as the surface is large enough for the ***SCE 1000*** (see the table in ***SCE 1000** Dimensions* (on page 4-3)), and allows for adequate air flow/ventilation around the sides of the ***SCE 1000***, as described in the *Installation Precautions* (on page 4-7)).

Figure 4-4: Installing the System on a Flat Surface



To install the ***SCE 1000*** on a workbench or tabletop:

Step 1 Follow the installation precautions in *Installation Precautions* (on page 4-7).

Step 2 View the bottom panel by lifting the ***SCE 1000***, placing your hands around the ***SCE 1000*** sides and lifting the ***SCE 1000*** from underneath. To prevent injury, avoid sudden twists or moves.
There are four marked locations, indicating where to affix the rubber feet (see figure above).

Step 3 Attach the rubber feet by removing the adhesive strips and affix the rubber feet onto the marked locations (on the bottom panel).
Remember to check for proper ventilation. Allow at least 2 inches (5 cm) on each side for proper ventilation and 5 inches (12.7 cm) at the back for ventilation.and power cord clearance.

This completes the general workbench or tabletop installation.

Proceed to section, Connecting to the Power Supply to continue the installation.

Mounting the SCE 1000 in a Rack

You can mount the ***SCE 1000*** to a 19” rack. There are two standard types of equipment racks, and the appropriate brackets for each are provided in the enclosed kit.

- 19” rack with front rack posts: the mounting kit includes two mounting brackets
- 19” rack with front and back rack posts: in addition to the mounting brackets, the mounting kit includes two crossrail supports that the unit slides onto

The ***SCE 1000*** mounts to the two front rack posts with brackets that attach to the front of the ***SCE 1000*** The inside width between the two posts or mounting strips (left and right) must be at least 17.3 inches (44 cm).

Note Remember to leave a two-inch (5 cm) clearance on both sides of the ***SCE 1000*** and at the rear for adequate airflow for the inlet and exhaust vents.

Because the inlet and exhaust ports (vents) for cooling air are located at both sides of the chassis, respectively, multiple ***SCE 1000***s can be stacked in a rack with no vertical clearance.

Step 1: Attaching the Brackets to the SCE 1000

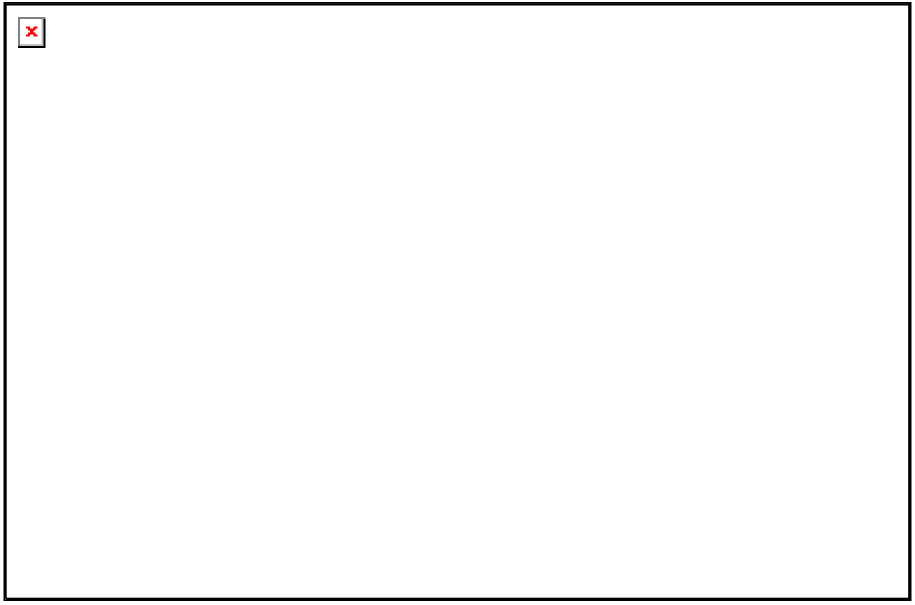
Before installing the ***SCE 1000*** in the rack, you must first install a rack-mount bracket on each side of the front of the ***SCE 1000***, as illustrated in the following figure. See *Tools and Parts Required* (on page 4-2) for a listing of the parts and tools required for installing the rack–mount.

To install the rack-mount brackets on the ***SCE 1000*** chassis:

Step 1 Align the rack-mount bracket to the side of the ***SCE 1000***.

Step 2 Insert and tighten three screws.

Figure 4-5: Attaching the Mounting Brackets



Step 3 Repeat steps 1 and 2 on the other side of the ***SCE 1000***.
This completes the steps for attaching the rack-mount brackets to the ***SCE 1000***.

If mounting the ***SCE 1000*** in a rack with only two posts, skip to *Step 3: Mounting the System to a Rack* (on page 4-11).

If mounting the ***SCE 1000*** in a rack with four posts, proceed to the next step to attach the crossrail supports to the rack.

Step 2: Attaching the Crossrail Supports to the Rack

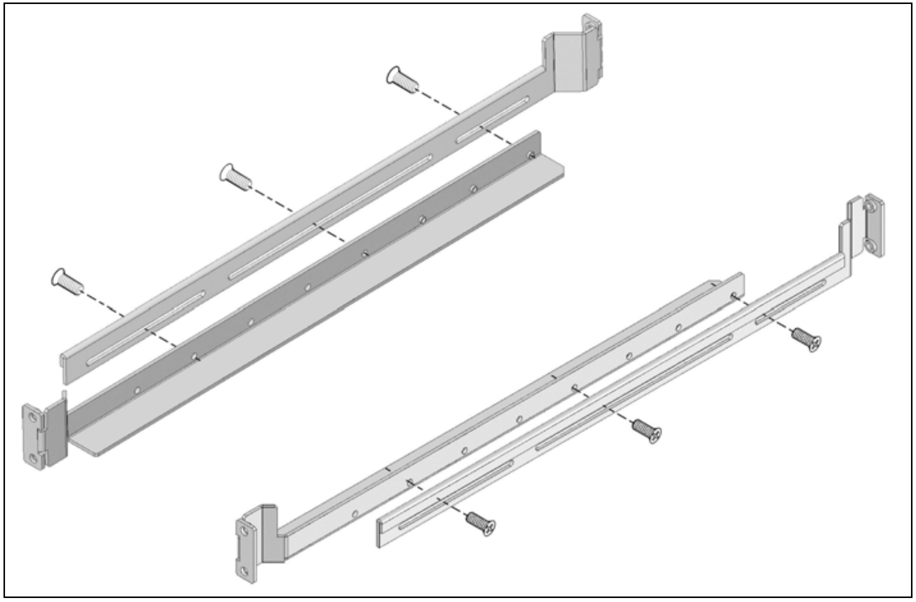
When mounting in a rack with four posts (front and back) the two crossrail supports are mounted one on each side of the rack. The ***SCE 1000*** then slides into these crossrails, which support the weight of the unit.

Note Cisco recommends that you allow at least 1 or 2 inches (2.54 or 5.08 cm) of vertical clearance between the ***SCE 1000*** and any equipment directly above and below it.

To install the crossrail supports on a rack with both front and back posts:

Step 1 Assemble the two crossrail supports as illustrated below. Use three screws for each crossrail assembly.
Make sure that they are oriented so that both crossrails will support the ***SCE 1000*** when they are attached to the rack.

Figure 4-6: Assembling the Slider Brackets

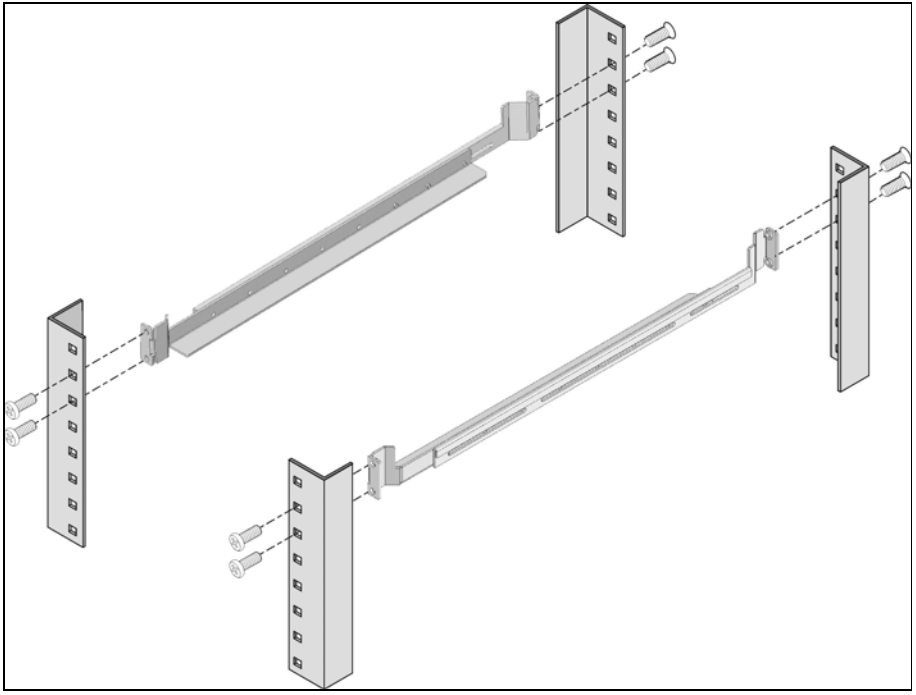


Step 2 Align the crossrail supports with the side of the rack, parallel to the floor.

Step 3 Insert and tighten two screws to the front posts or mounting strips of the rack

Step 4 Insert and tighten two screws to the Back posts of the rack.

Figure 4-7: Attaching the Crossrails to the Rack



Step 5 Repeat steps 2 through 4 on the other side of the rack, keeping the brackets flush against the posts and parallel to the supporting bracket on first side of the rack.

This completes the steps for attaching the rack-mount supporting brackets to the rack.

You are now ready to mount the ***SCE 1000*** to the rack.

Step 3: Mounting the System to a Rack

When the appropriate mounting brackets are securely installed, the ***SCE 1000*** can be installed into the rack.

To mount the ***SCE 1000*** to a rack:

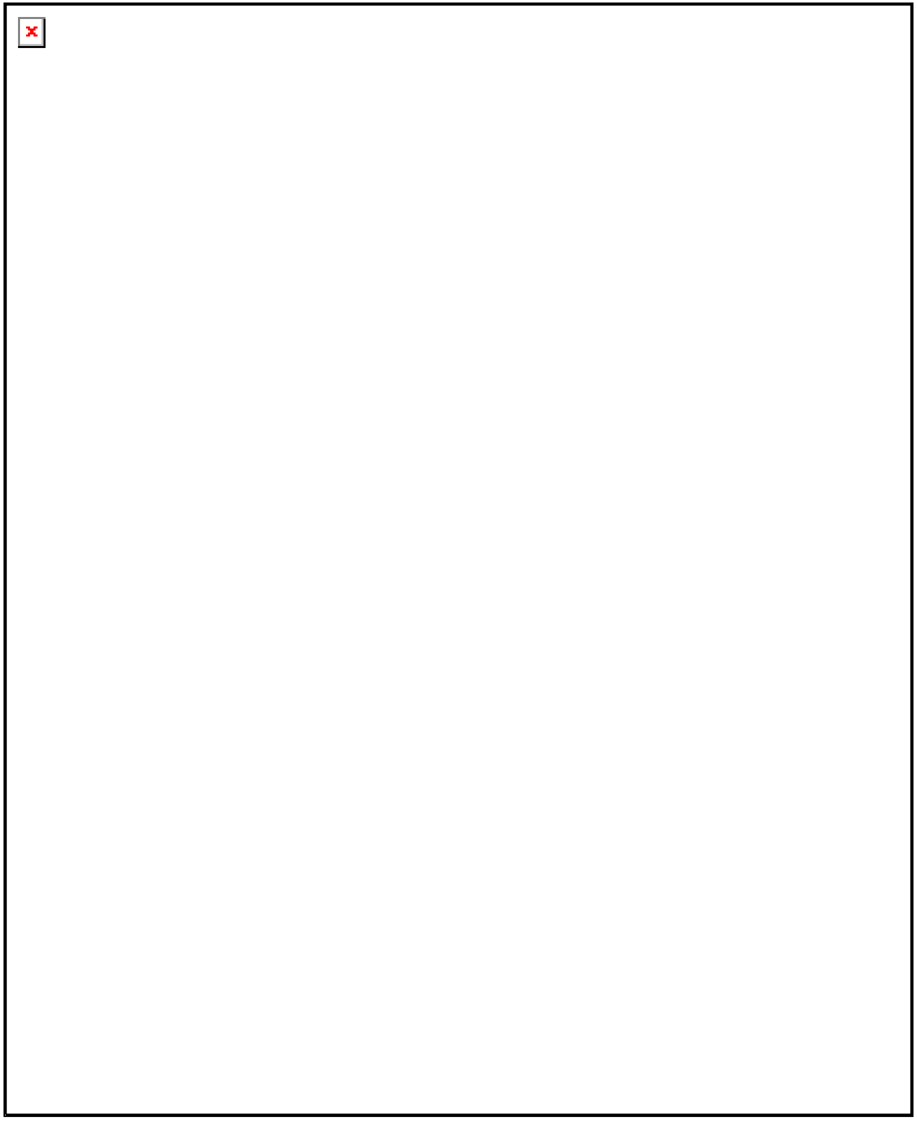
Step 1 Make sure that your path to the rack is unobstructed. If the rack is on wheels, ensure that the brakes are engaged or that the rack is otherwise stabilized.

Step 2 Position the ***SCE 1000*** so that the front end is closest to you, and lift it carefully to place it into the rack. To prevent injury, avoid sudden twists or moves.

Step 3 Slide the ***SCE 1000*** into the rack, pushing it back until the brackets (installed at the front of the ***SCE 1000***) meet the mounting strips or posts on both sides of the rack.

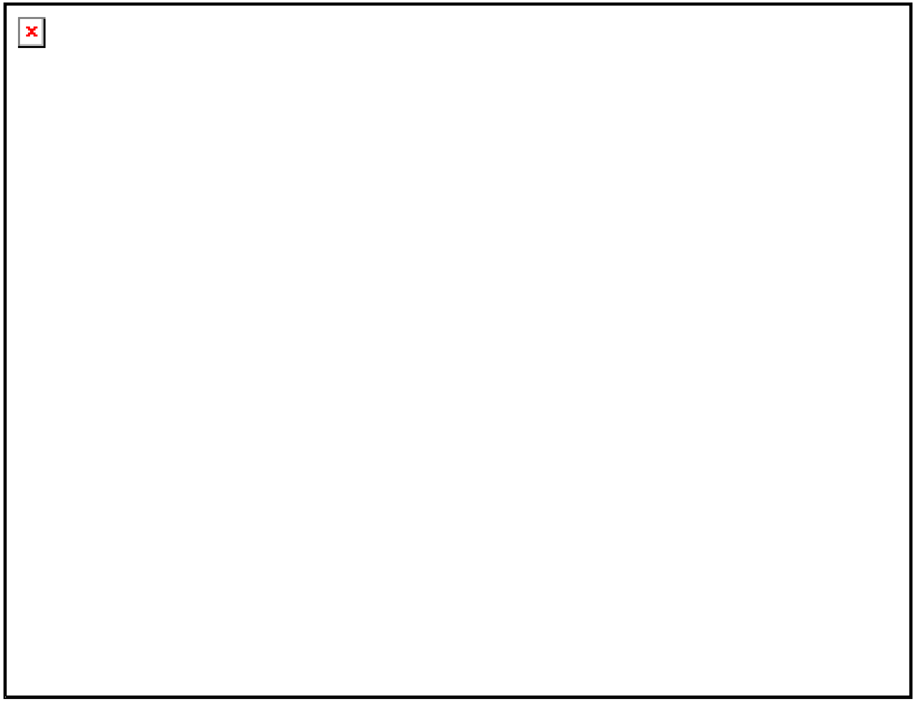
A rack with both front and back posts will have the crossrail supports installed. Slide the ***SCE 1000*** onto these crossrails and push it all the way back.

Figure 4-8: Sliding the SCE 1000 into the Rack



Step 4 While keeping the brackets flush against the posts or mounting strips, align the holes in the brackets with the holes on the rack or mounting strip.

Figure 4-9: Securing the SCE 1000 to a the Rack



Step 5 For each bracket, insert and tighten two appropriate screws to the rack.

Note Since the brackets support the weight of the entire ***SCE 1000*** chassis, be sure to use all four screws to fasten the two rack-mount brackets to the rack posts.

This completes the procedure for installing the ***SCE 1000*** in the rack. Proceed to the next section, Connecting to the Power Supply, to continue the installation.

Connecting to the Power Supply

The ***SCE 1000*** is available in two power options:

- Dual line feed AC power: Unit comes with two appropriate AC power supply cords
- Dual line feed DC power: requires appropriate cables (hex or loop connectors) (see Connecting the DC Power Supply).

Back Panel

The ***SCE 1000*** back-panel consists of the field-replaceable power supply units with ON/OFF switches, field-replaceable fan drawer, and ground connections, as shown in the following pair of figures.

Figure 4-10: SCE 1000 Back Panel: AC Power

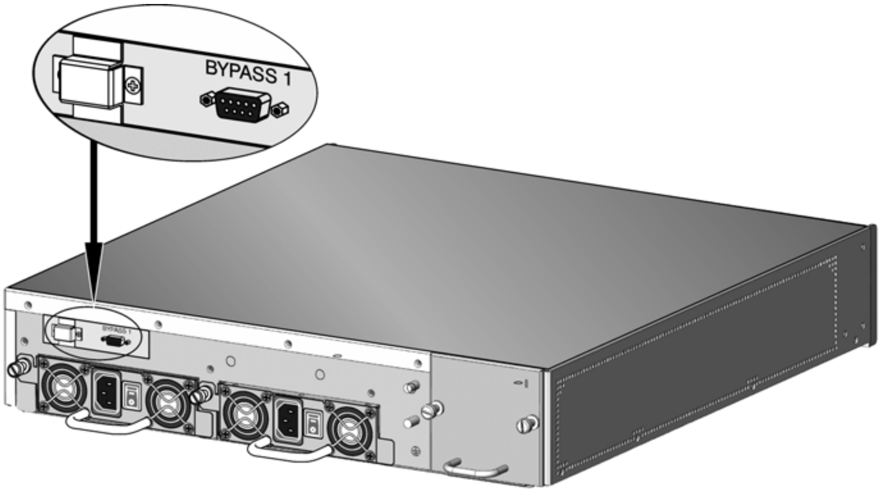
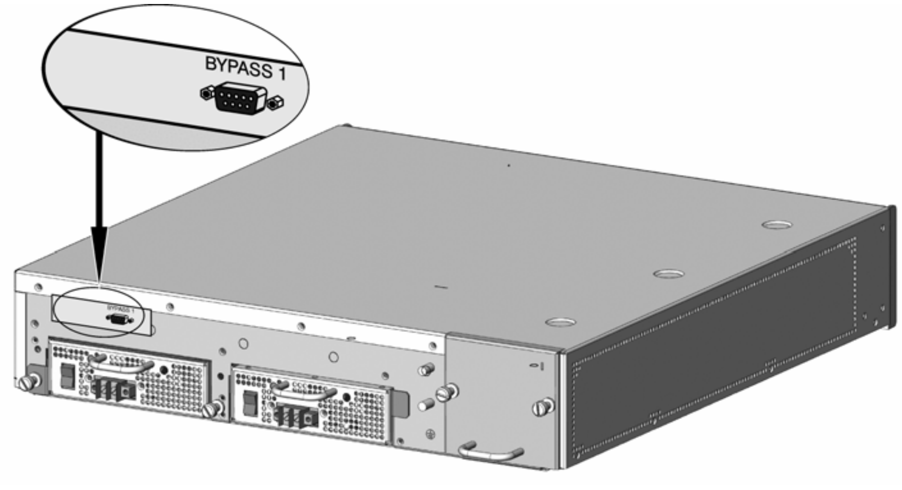


Figure 4-11: SCE 1000 Back Panel DC power



Attaching a Chassis Ground Connection

Before you connect the power or turn on the power to the ***SCE 1000***, Cisco strongly recommends that you provide an adequate chassis Ground (protective earth) connection for the ***SCE 1000*** chassis. A Chassis Grounding cable kit is provided with each ***SCE 1000***.

Use the Ground wire kit to properly ground the ***SCE 1000*** chassis (see *Packing List* ("Packing List Parts" on page 4-2) for details).

To connect the grounding cable to the chassis grounding connector on the ***SCE 1000***:

Step 1 From the enclosed Grounding kit, remove the necessary materials: the grounding cable (green and yellow colored cable) and pairs of hex nuts and spring washers.

Step 2 On the Rear panel of the ***SCE 1000***, locate the chassis grounding connector (refer to the appropriate figure below).

Step 3 Attach the grounding cable (green and yellow colored cable), firmly fastening the (enclosed) hex nuts and spring washers with a #¼” hex wrench (refer to the appropriate figure below).
The grounding cable must be connected on the other side to the site equivalent of the AC earth.

Figure 4-12: Grounding the Unit (AC)

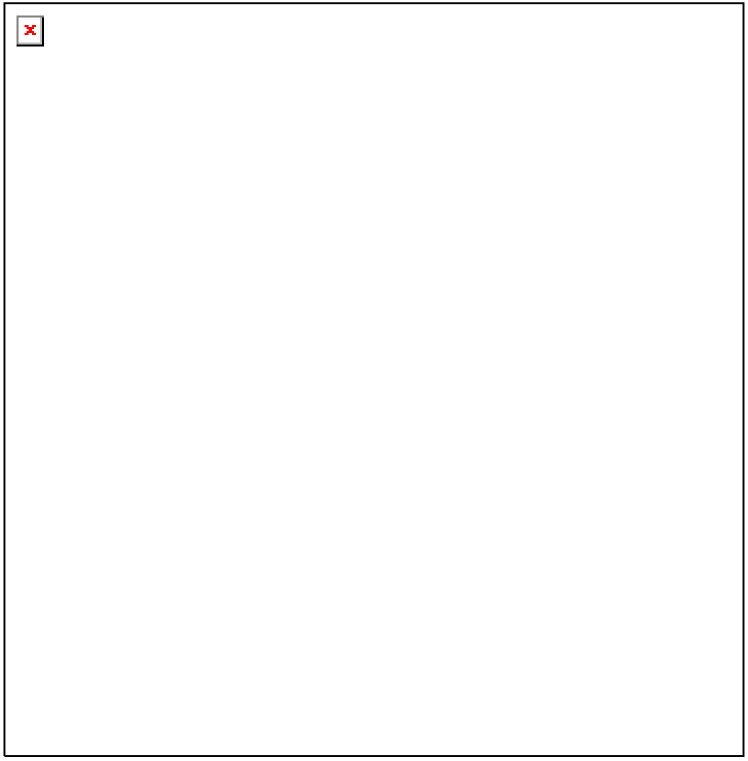
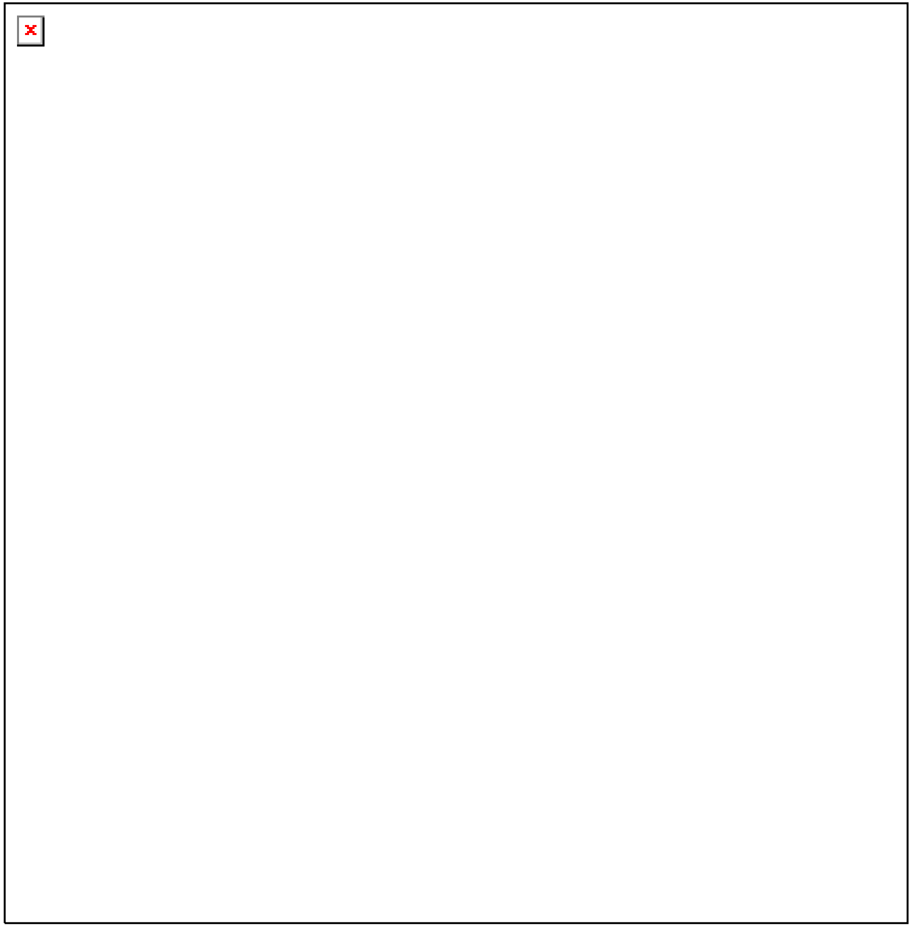


Figure 4-13: Grounding the Unit (DC)

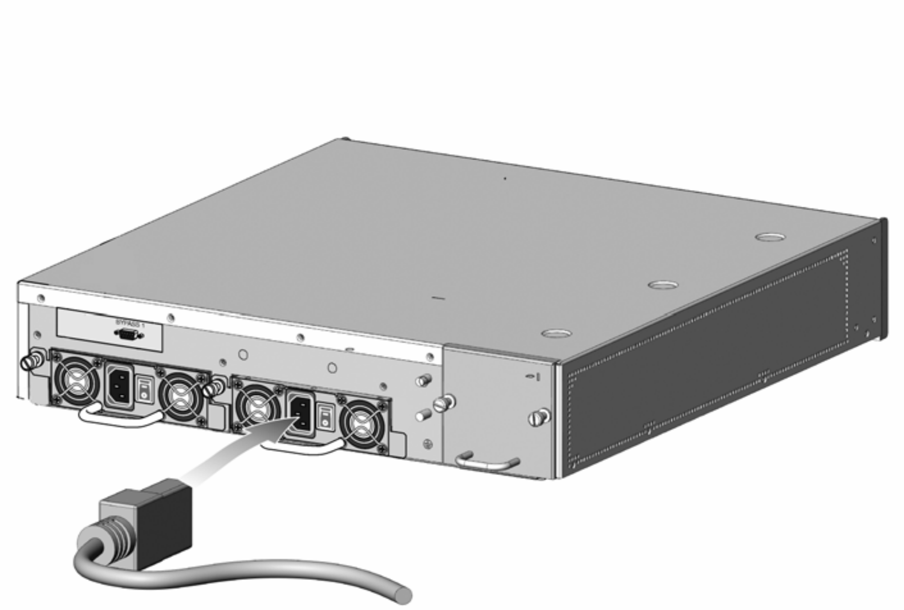


Connecting the AC Power Supply Cable

To connect the AC Power supply cable:

Step 1 Plug the AC power supply cable into the (AC) electrical inlet, located on the rear panel of the ***SCE 1000***.

Figure 4-14: Connecting the AC Power



Step 2 Plug the ***SCE 1000*** AC power supply cable (attached on the ***SCE 1000*** rear panel) into an (AC) electrical outlet.

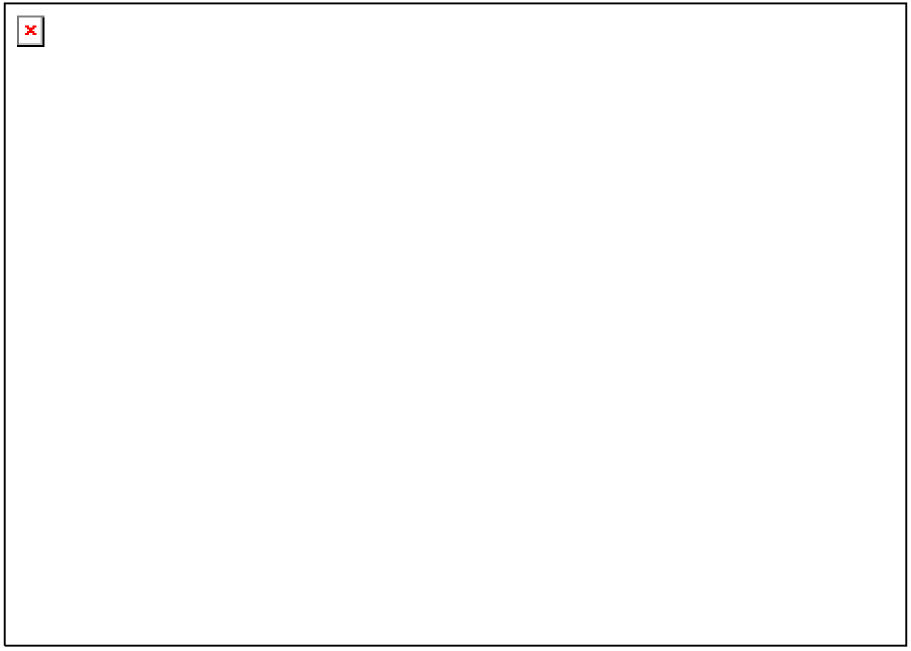
Step 3 Repeat the above steps for the second power cable.
You are now ready to turn the power on. For details, see Power Up ("Powering up" on page 4-23).

Connecting the DC Power Supply

To connect the DC power supply cables:

Step 1 Loosen the screws for the –48V and the –48V RTN connections, and attach the appropriate cables (hex or loop connectors).

Figure 4-15: Connecting the DC Power



For specific instructions regarding grounding the unit, see *Attaching a Chassis Ground Connection* (on page 4-15).

Step 2 Refasten the screws.

Step 3 Attach the DC cable to the DC power source through a fast 4A circuit breaker.

Step 4 Repeat the above steps for the second power cable.
The system powers on automatically.

Front Panel

The ***SCE 1000*** Front Panel consists of ports and LEDs as shown in the following figure and the following two tables ***SCE 1000*** Platform Posts and ***SCE 1000*** LED Groups.

Figure 4-16: SCE 1000 Front Panel

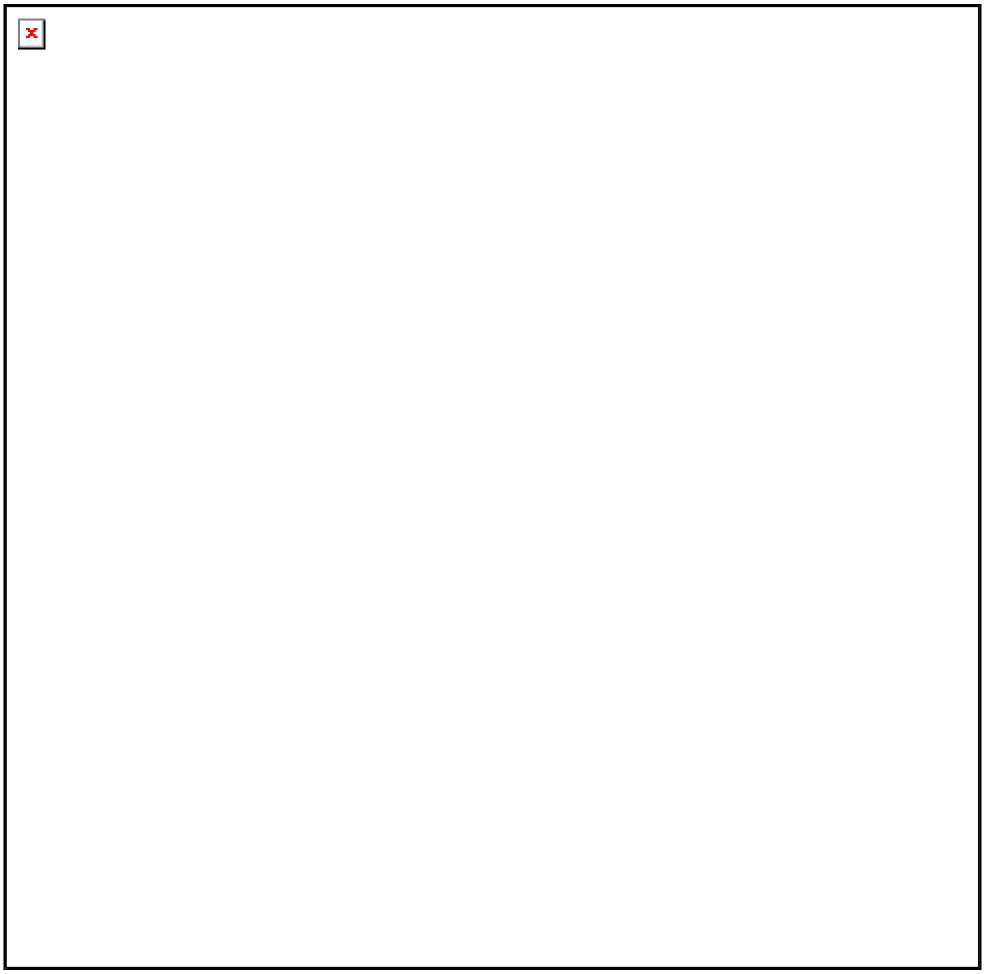


Table 4-6 *SCE 1000* Ports

Port	Quantity	Description	Connect This Port To…
Mng1/ Mng2	2	10/100/1000 Ethernet RJ-45 ports for management of the ***SCE 1000***. Mng 2 is currently not operational. CLI designation: 0/0.	A LAN using an FE cable with an RJ-45 connector
Console	1	RS-232 RJ-45 port for use by technicians	A local terminal (console) using an RS-232 cable with an RJ-45 connector, as provided in the ***SCE 1000*** kit.
AUX	1	RS-232 RJ-45 port used by technicians	
GBE ports 1 & 2	2	GigabitEthernet SC ports for connecting to the link. CLI designation: 0/1 and 0/2	Refer to Connecting the Line Ports for cabling diagrams for various topologies

Table 4-7 *SCE 1000* LED Groups

LED Groups	Description
Power A	• Continuous green: Power supply A is functioning normally • Red: Power supply A present, but malfunctioning • Unlit: Power supply A is either not present or has failed.
Power B	• Continuous green: Power supply B is functioning normally • Red: Power supply B present, but malfunctioning • Unlit: Power supply B is either not present or has failed.
Status	The Status LED indicates the operational status of the ***SCE 1000*** system, as follows: • Unlit: indicates no power from either power unit. • Orange: indicates that the system is booting up. • Flashing green: indicates that the system is fully operational. • Flashing orange: indicates that the system is operational, but is in a warning state. • Red: indicates that there is a problem or failure Note that Alarms are hierarchical: Failure takes precedence over Warning, which takes precedence over operational.

LED Groups	Description
Bypass	• Continuous green: indicates that the traffic bypasses the ***SCE 1000*** through an internal electrical bypass module. Single ***SCE 1000*** topology: The ***SCE 1000*** is either in bypass or sniffing mode Cascaded topology: Either the ***SCE 1000*** is forwarding traffic to the other ***SCE 1000***, where it is being processed, or is simply in bypass mode, so traffic through it is not being processed. • Unlit: traffic is not being bypassed Single ***SCE 1000*** topology: indicates normal operation of the ***SCE 1000*** Cascaded topology: indicates normal operation of the active ***SCE 1000***
GBE ports	The GBE LEDs indicate the operational status of the ***SCE 1000*** line ports, as follows: • Link Green: indicates that the port link is up Unlit: indicates that the port link is down • Rx Flashing Green: indicates that there are incoming packets • Tx Flashing Green: indicates that there are outgoing packets
Mng	The Mng port LEDs indicate the operational status of the ***SCE 1000*** out-of-band LAN-based management port, as follows: • Link/Active Green: indicates that the port link is up Unlit: indicates that the port link is down • 10/100/1000 Green: indicates that the port is set to 100 Mbps Unlit: indicates that the port is set to 10 Mbps Orange: iindicates that the port is set to 1000 Mbps

The following table presents the fiber specifications. The ***SCE 1000*** may be ordered with either Multimode or Single Mode transceivers. The transceiver type is indicated on the front panel under the ports. Note that both transceivers on any individual ***SCE 1000*** are the same, either 850nm Multimode OR 1310 Single Mode.

Table 4-8 Fiber Specifications

SCE Model	Transceiver	Transmit Power	Receive Power	Typical (Max.) Distance
SCE 1000 2xGBE MM	850nm (multimode)	–9.5 to –4 dBm	–17 to 0 dBm	• 750m for 50µm Core Diameter MMF • 400m for 62.5µm Core Diameter MMF
SCE 1000 2xGBE SM	1310nm FRP laser Single Mode	–9.5 to –3 dBm	–20 to 3 dBm	10 km for 9.0µm Core Diameter SMF

The following table lists the operational status states of the ***SCE 1000***. The Status LEDs on the ***SCE 1000*** Front Panel reflect the current ***SCE 1000*** operational state. The operational status state can be displayed using CLI command show system operation-status.

Table 4-9 *SCE 1000* Operational Status States

State	Description	Status LED
Booting	Initial state after reset	Orange
Operational	***SCE 1000*** becomes operational after completing the following process: • Boot is completed • Power self-tests are completed without failure • Platform configuration is applied	Flashing green
Warning	***SCE 1000*** is fully operational (as above) but one of the following occured: • Line ports (GBE ports) to the link are down • Management port link is down • Temperature raised above threshold • Voltage not in required range • FANs problem • Power supply problem • Insufficient space on the disk Note: If the condition that caused the ***SCE 1000*** to be in Warning state is resolved (for example, link is up) the ***SCE 1000*** reverts to Operational state.	Flashing orange

State	Description	Status LED
Failure	System is in Failure state after Boot due to one of the following conditions: • Power on test failure. • Three abnormal reboots in less than 20 minutes • Platform configured to enter Failure mode consequent to failure-induced reboot (this is configurable using CLI command). Note: Depending on the cause of failure, the management interface and the platform configuration may or may not be active/available.	Red

Powering up

To power up the ***SCE 1000***:

Step 1 Turn the power switches ON.
The power switches are located on the ***SCE 1000*** rear panel.

The ***SCE 1000*** operates AC or DC power input. In addition, it is recommended that the ***SCE 1000*** be powered through a backup power source, such as a UPS (Uninterruptible Power Supply.)

Step 2 Power LED(s) should be green if the power supplies are connected. Bypass LED should be green while the ***SCE 1000*** is on bypass and unlit when the bypass is turned off.

Step 3 Look at the Status LED to see that it is orange.

As explained in the table above, while booting, the Status LED is a constant orange. After a successful boot, the Status LED is flashing green.

Note It takes a several minutes for the ***SCE 1000*** to boot and for the status LED to change from orange to flashing orange or flashing green.

You are now ready to cable the ***SCE 1000***. If you are installing a redundant solution with two ***SCE 1000***s, refer to the installation procedure in Installing a Cascaded System before proceeding with the installation.

Warning When working with two ***SCE 1000***s with split-flow and redundancy, it is extremely important to follow the specified installation procedure.

Connecting the Local Console

Even if you will be managing the ***SCE 1000*** from a remote location, you must first connect the unit to a local console and configure the initial settings for the ***SCE 1000*** to support remote management. When the initial connection is established, the setup utility will run automatically, prompting you to perform the initial system configuration.

Setting Up the Local Console

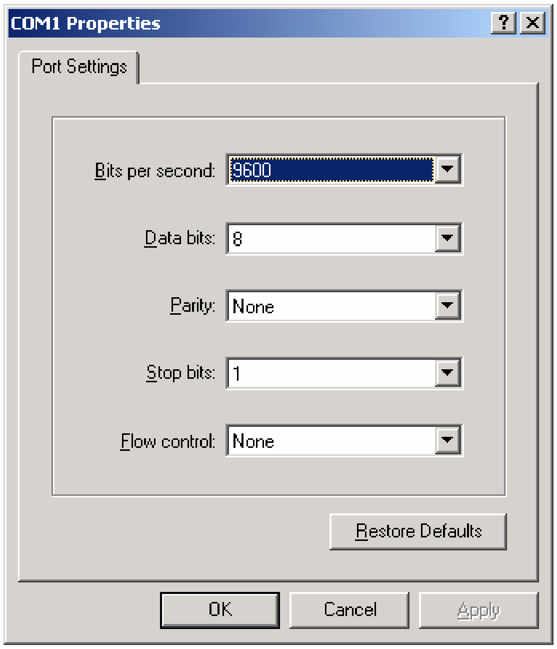
This section provides instructions for setting up your local terminal at your workstation, to enable you to perform the initial system configuration of the ***SCE 1000*** system using the setup utility.

Figure 4-17: Connecting to the Local Console

Make sure that the terminal configuration is as follows:

- 9600 baud
- 8 data bits
- No Parity
- 1 stop bits
- No flow control

The above ***SCE 1000*** port parameters are fixed and are not configurable.



Bits per second: 9600

Data bits: 8

Parity: None

Stop bits: 1

Flow control: None

To set up the local console:

Step 1 Plug the enclosed RS-232 serial cable into the CON port on the front panel of the ***SCE 1000***.
Make sure that you push on the RJ-45 connector (attached to the RS-232 serial cable) until you hear a “click”, which indicates that the connector is fully inserted and secured in the receptacle. Gently pull on the plug to confirm whether the plug is locked into the socket.

Step 2 Connect the other end of the serial cable (with an attached DB-9 connector) to the VT100 compatible local (serial) terminal.

Step 3 Make sure the local terminal is configured as a VT-100 terminal, according to the fixed ***SCE 1000*** CON port parameters.

Step 4 Press **Enter** several times until the setup configuration dialog is entered.

```
                    --- System Configuration Dialog ---

At any point you may enter a question mark ‘?’ followed by ‘Enter’ for help.
Use ctrl-C to abort configuration dialog at any prompt.
Use ctrl-Z to jump to the end of the configuration dialog at any prompt.
Default settings are in square brackets ‘[]’.

Would you like to continue with the System Configuration Dialog? [yes/no]: y
```

Step 5 Type **y** and press **Enter**.
The system configuration dialog begins.

System Configuration

Upon initial connection to the local terminal, as described above, the system configuration wizard automatically runs to guide the user through the entire setup process. The wizard prompts for all necessary parameters, displaying default values, where applicable. You may accept the default values or define other values.

With the exception of the time settings, which take effect immediately when entered, the new configuration is applied and saved only at the end of the dialog when approved by the user. Therefore, if the setup dialog is aborted, no change takes place in the configuration, other than time settings (if entered).

When the dialog is complete, you may review the new configuration before applying it. The system displays the configuration, including parameters that were not changed. The system also displays any errors that are detected in the configuration. When the configuration is satisfactory, you may apply and save the new configuration.

The following table lists all the parameter values that are necessary to complete the initial configuration. It is recommended that you obtain all these values before beginning the setup.

Setup Command Parameters

Table 4-10 Setup Command Parameters

Parameter	Definition
IP address	IP address of the ***SCE 1000***.
subnet mask	Subnet mask of the ***SCE 1000***.
default gateway	Default gateway.
hostname	Character string used to identify the ***SCE 1000***
admin password	Admin level password.
	Character string from 4-100 characters beginning with an alpha character.
root password	Root level password.
	Character string from 4-100 characters beginning with an alpha character.
password encryption status	Enable or disable password encryption?
Time Settings	
time zone name and offset	Standard time zone abbreviation and minutes offset from UTC.
local time and date	Current local time and date. Use the format:
	00:00:00 1 January 2002
SNTP Configuration	
broadcast client status	Set the status of the SNTP broadcast client.
	If enabled, the SCE will synchronize its local time with updates received from SNTP broadcast servers.

Parameter	Definition
unicast query interval	Interval in seconds between unicast requests for update (64 – 1024)
unicast server IP address	IP address of the SNTP unicast server.
DNS Configuration	
DNS lookup status	Enable or disable IP DNS-based hostname translation.
default domain name	Default domain name to be used for completing unqualified host names
IP address	IP address of domain name server. (maximum of 3 servers)
RDR Formatter Destination Configuration	
IP address	IP address of the RDR-formatter destination
TCP port number	TCP port number of the RDR-formatter destination
Access Control Lists	
Access Control List number	How many ACLs will be necessary? What IP addresses will be permitted/denied access for each management interface? You may want ACLs for the following : • Any IP access • Telnet access • SNMP GET access • SNMP SET access
list entries (maximum 20 per list)	IP address, and whether permitted or denied access.
IP access ACL	ID number of the ACL controlling IP access.
telnet ACL	ID number of the ACL controlling telnet access.
SNMP Configuration	
SNMP agent status	Enable or disable SNMP management.
GET community names	Community strings to allow GET access and associated ACLs (maximum 20).
SET community names	Community strings to allow SET access and associated ACLs (maximum 20).
trap managers	Trap manager IP address, community string, and SNMP version. (maximum 20)
Authentication Failure trap status	Set the status of the Authentication Failure trap. (See *Traps* (on page 6-34).)
enterprise traps status	Set the status of the enterprise traps. (See *Traps* (on page 6-34).)
system administrator	Name of the system administrator.
Topology Configuration	
connection mode	Is the ***SCE 1000*** installed in bump-in-the-wire topology (inline) or out of line using a switch with port mirroring (receive-only)?
link bypass mode on operational status	When the ***SCE 1000*** is operational, should it bypass traffic or not? Refer, in setup, to the table Setup Command Parameters.

Parameter	Definition
redundant ***SCE 1000*** platform?	Is there a redundant ***SCE 1000*** installed as a backup?
link bypass mode on non-operational status	When the ***SCE 1000*** is not operational, should it bypass traffic or cut it off? Refer, in setup, to the table Setup Command Parameters.
operational status of the SCE after abnormal boot	After a reboot due to a failure, should the ***SCE 1000*** remain in a Failure status or move to operational status provided no other problem was detected? Refer, in setup, to the table Setup Command Parameters.

Following are some general instructions regarding the setup dialog:

- All default values appear in square brackets [**default**].

  If no value appears in the brackets [], or more than one option appears [**yes/no**], then this parameter does not have a default value.

- To accept the default value, press **Enter.**
- If you need more information about any parameter, type **?** and press **Enter**.

  A help message will appear describing the expected format of the parameter and any other requirements.

- To jump to the end of the setup dialog at any point, accepting all remaining default values, press **ctrl-z.**
- In certain cases, there will be two or more logically related parameters within a menu. In these situations, it is not permitted to jump to the end of the setup dialog until all related parameters are configured. If you try to jump to the end of the setup dialog, the following message will appear: "`Sorry, Skipping is not allowed at this stage`."
- Certain groups of related parameters, such as time, date, and SNTP settings, form sub-dialogs or menus within the setup dialog. You may skip an entire menu, thereby accepting all default values for the parameters within the menu.

  Each group of related parameters is prefaced by a question, asking whether you want to enter the menu. To skip the menu, answer no ("n") to the question.

EXAMPLE:

```
Would you like to enter the SNMP configuration menu? n
```

- To abort the setup dialog at any point without making any configuration changes, press **ctrl-c.** All changes already entered will be lost, with the exception of time settings.

Step 1: Configuring Initial Settings

Verify the following initial settings for the ***SCE 1000***:

- IP address
- Subnet mask
- Default gateway

All values are Internet addresses of the form *'X.X.X.X'*, where each letter corresponds to a decimal number between 0 and 255.

To configure the initial settings:

Step 1 The current IP address is displayed.

- To accept the displayed value, press **Enter**.
- To change the value, type the desired value in the format "*x.x.x.x*" and press **Enter**.

Step 2 The current subnet mask is displayed.

- To accept the displayed value, press **Enter**.
- To change the value, type the desired value in the format "*x.x.x.x*" and press **Enter**.

Step 3 The current IP address of the default gateway is displayed.

- To accept the displayed value, press **Enter**.
- To change the value, type the desired value in the format "*x.x.x.x*" and press **Enter**.

EXAMPLE:

The following example displays a typical configuration of the IP address (10.1.5.109), subnet mask (255.255.0.0), and default gateway (10.1.1.3).

Since the IP address and the subnet mask are related, when the IP address is changed, there is no longer a default value of the subnet mask, and it must be entered explicitly.

```
Enter IP address [10.1.1.201]:10.1.5.109
Enter IP subnet mask:255.255.0.0
Enter IP address of default gateway [10.1.1.3]:
```

Step 2: Configuring the Hostname

The hostname is used to identify the ***SCE 1000***. It appears as part of the CLI prompt and is also returned as the value of the MIB-II object sysName.

The default hostname is ***SCE 1000***.

To configure the hostname:

Step 1 The current hostname is displayed.

- To accept the displayed value, press **Enter**.
- To change the value, type any desired character string and press **Enter**.

```
Enter hostname [SCE 1000]:
```

Step 3: Setting the Passwords

Configure the passwords as follows:

- Set the password for each authorization level (User, Admin, Root).
- Enable/disable password encryption. When password encryption is enabled, it encrypts the previously entered passwords.

Note Passwords are needed for all authorization levels in order to prevent unauthorized users from accessing the ***SCE 1000***. Admin level should be used by the network administrator. Root level is for use by Cisco technician.

Passwords must meet the following criteria:

- Minimum length: 4 characters
- Maximum length: 100 characters
- Begin with an alpha character
- May contain only printable characters

Note Passwords are case sensitive.

Note The default password for all levels is "**cisco**".

To change the passwords:

Step 1 The default User password is displayed.

- To accept the displayed value, press **Enter**.
- To change the value, type the desired string and press **Enter**.

Step 2 The default Admin password is displayed.

- To accept the displayed value, press **Enter**.
- To change the value, type the desired string and press **Enter**.

Step 3 The default Root password is displayed.

- To accept the displayed value, press **Enter**.
- To change the value, type the desired string and press **Enter**.

Step 4 Configure password encryption. By default, password encryption is not enabled.

- To disable password encryption, press **Enter**.

- To enable password encryption, type **y** and press **Enter**.

EXAMPLE:

Following is an example of changing all passwords. Password encryption is not enabled (default).

```
Enter a User password [cisco]: userin
Enter an Admin password [cisco]: mng123
Enter a Root password [cisco]: cistech
Enable passwords encryption? [no]:
```

Step 4: Configuring Time Settings

The time settings menu configures all time and date related parameters in the system. The time settings menu includes the following:

- Time zone
- Local time
- Date
- SNTP menu

You must enter the time setting menu in order to configure SNTP settings. You may choose to skip the time settings menu if you wish to accept all default values.

Note Unlike all other settings defined in the system configuration, setting the time is done immediately and not at the end of the setup process.

For more information on clocks and time zones, see *Time Clocks and Time Zone* (on page 6-11).

For more information on SNTP, see *SNTP* (on page 6-13).

To configure the time settings:

Step 1 Enter the time settings menu.

```
Would you like to enter the Time settings menu? [no]: y
```

Type **y** and press **Enter**.

The time settings dialog begins.

Step 2 Type the time zone abbreviation and press **Enter**.

```
Enter time zone name [UTC]: CET
```

Step 3 Type the minutes offset from UTC and press **Enter**.

```
Enter time zone minutes offset from UTC: 60
```

The local time and date are displayed, and you are asked whether you want to change them.

```
The local time and date is 15:00:01 CET FRI 01 July 2002
Would you like to set a new time and date? [no]:
```

Step 4 If the time and date are correct, go to step 5.

If the time and date are not correct, answer yes to the above question, and press **Enter**.

```
Would you like to set a new time and date? [no]: y
```

Confirm your response and type the new time and date.

```
This change will take effect immediately both on the system clock and the
calendar; it will also set the time zone you entered. Are you sure?
[yes/no]: y
Enter new local time and date: 14:00:01 1 July 2002
Time zone was successfully set.
The system clock and the calendar were successfully set.
```

Step 5 You are asked whether you wish to enter the SNTP configuration menu.
If you do not wish to configure the SNTP, skip the rest of this section and go to *Step 5: Configuring the DNS Settings* (on page 4-33).

To enter the SNTP configuration dialog, type **y**, and press **Enter**

```
Would you like to enter the SNTP configuration menu? [no]: y
```

Step 6 Configure the SNTP broadcast client. By default the SNTP broadcast client is not enabled.

- To disable the SNTP broadcast client, press **Enter**.
- To enable the SNTP broadcast client, type **y** and press **Enter**.

```
Enable SNTP broadcast client? [no]:
```

Step 7 Define the time interval between unicast updates.

- To accept the displayed default value, press **Enter**.
- To change the value, type the desired number of seconds (64 through 1024**)** and press **Enter**.

```
Enter time interval in seconds between unicast updates [1024]:
```

Step 8 You may enter an IP address for the SNTP unicast server. Type in the hostname or the IP address in the form *x.x.x.x*, and press **Enter**

```
Would you like to configure SNTP unicast servers? [no]: y
Enter IP address or hostname of SNTP unicast server: 10.1.1.1
```

EXAMPLE:

Following is a sample time setting dialog. In addition to setting the time zone, time and date are changed, and SNTP unicast updates are configured.

```
Would you like to enter the Time settings menu? [no]: y
Enter time zone name [UTC]: ISR
Enter time zone minutes offset from UTC: 120

The local time and date is 15:35:23 ISR FRI July 19 2002
Would you like to set a new time and date? [no]: y
This change will take effect immediately both on the system clock and the
calendar; it will also set the time zone you entered. Are you sure?
[yes/no]: y
Enter new local time and date: 14:35:23 19 July 2002
Time zone was successfully set.
The system clock and the calendar were successfully set.
Would you like to enter the SNTP configuration menu? [no]: y
Enable SNTP broadcast client? [no]: y
Enter time interval in seconds between unicast updates [900]:
Would you like to configure SNTP unicast servers? [no]: y
Enter IP address or hostname of SNTP unicast server: 10.1.1.1
```

Step 5: Configuring the DNS Settings

The DNS configuration menu defines the IP address(es) of the domain name server(s), which is used for DNS lookup, as well as the default domain name, which is used to complete unqualified host names.

You may choose to skip the DNS configuration menu if you wish to accept all default values.

To configure DNS settings:

Step 1 Enter the DNS settings menu.

```
Would you like to enter the DNS configuration menu? [no]: y
```

Type **y** and press **Enter**.

The DNS settings dialog begins.

Step 2 Enable or disable DNS lookup.

- To enable DNS lookup, press **Enter**.
- To disable DNS lookup, type **n** and press **Enter**.

```
Enable IP DNS-based hostname translation? [yes]:
```

If you choose to disable DNS lookup, skip the rest of this section and go to *Step 6: Configuring the RDR Formatter Destination* (on page 4-34). The rest of the dialog is not presented, as it is irrelevant when DNS lookup is disabled.

Step 3 Type the default domain name to be used, and press **Enter.** Note that there is no default domain name.

You may accept the default domain name or enter a new one.

```
Enter default domain name []:
```

Step 4 Type the IP address of the primary domain name server and press **Enter**.

```
Enter Primary DNS IP address:
```

Note that there is no default for this parameter.

Step 5 You may configure up to three domain servers.

```
Would you like to add another Name Server? [no]:
```

- To exit the DNS settings dialog, press **Enter**.
- To add another domain server, type **y** and press **Enter**.

  You are asked to enter the IP address of the next domain name server.

```
Enter Secondary DNS IP address:
```

Step 6 When IP addresses for all servers have been entered, exit the dialog by pressing **Enter**.

```
Would you like to add another Name Server? [no]:
```

EXAMPLE:

Following is a sample DNS configuration dialog. The default domain name is pcube.com, and the IP address of the Domain Name Server is 10.1.1.230.

```
Would you like to enter the DNS configuration menu? [no]: y
Enable IP DNS-based hostname translation? [yes]:
Enter default domain name []: pcube.com
Enter Primary DNS IP address: 10.1.1.230
Would you like to add another Name Server? [no]:
```

Step 6: Configuring the RDR Formatter Destination

The ***SCE 1000*** passes Raw Data Records (RDRs) to an external collection system via the RDR-Formatter. In order for the data to reach the correct location, the IP address of the external collection system and its port number must be configured. See also *RDR Formatter* (RDR Formatter "The RDR Formatter" on page 6-19).

To configure the RDR-formatter destination:

Step 1 Enter the RDR formatter configuration menu.

```
Would you like to enter the RDR-formatter configuration menu? [no]: y
```

Type **y** and press **Enter**.

The RDR-formatter destination dialog begins.

Step 2 Type the IP address of the RDR-formatter destination and press **Enter.**

```
Enter RDR-formatter destination’s IP address:
```

Note that there is no default for this parameter.

Step 3 Type the TCP port number of the RDR-formatter destination and press **Enter.** Note that there is no default for this parameter.

```
Enter RDR-formatter destination’s TCP port number:
```

EXAMPLE:

Following is a sample RDR-formatter configuration dialog, assigning the IP address and TCP port number.

```
Would you like to enter the RDR-formatter configuration menu? [no]: y
Enter RDR-formatter destination’s IP address: 10.1.1.230
Enter RDR-formatter destination’s TCP port number: 33000
```

Step 7: Configuring Access Control Lists (ACLs)

The ***SCE 1000*** can be configured with Access Control Lists (ACLs), which are used to permit or deny incoming connections on any of the management interfaces.

Note ACL #0 is a pre-defined list that permits access to all IP addresses.

Configuration of access control lists is done in two stages:

Step 1 Create the access control lists.
You may create 99 ACLs with a maximum of 20 entries per list. Each entry consists of an IP address, and an indication of whether access is permitted or denied to this IP address.

Step 2 Assign the ACLs to the appropriate management interface. (See *Step 9: Configuring the Topology-Dependent Parameters* (on page 4-41).)
The dialog permits you to skip the creation/editing of the ACLs and go directly to assigning ACLs to the management interfaces.

Entry Formats

Each ACL may permit/deny access to any IP address, one or more ranges of IP addresses, or one or more individual IP address. Three entry formats are available to support these options:

- Any IP address: Type the word “**any**”. Any IP address will be permitted or denied access.
- Range of IP addresses: Type the beginning IP address in the desired range, then enter the wildcard bits that define the range.

  This wildcard functions like a reverse mask, in that all “1” bits in the wildcard indicate the corresponding bit in the IP address should be ignored. All other bits must match the corresponding bit in the specified IP address. Refer to the table below for examples.

  Each range of IP addresses can be configured to be permitted or denied access.
- Individual IP address: Type the desired IP address, then enter the wildcard bits **0.0.0.0**.

  Each individual IP address can be configured to be permitted or denied access.

Table 4-11 IP address/Wildcard bit examples

Initial IP address	Wildcard bits	Range
10.1.1.0	0.0.0.255	10.1.1.0–10.1.1.255
10.1.1.0	0.0.0.63	10.1.1.0–10.1.1.63
10.1.1.0	0.0.0.0	10.1.1.0 (individual entry)

Order of Entries

The order of the entries in the list is important. The entries in the list are tested sequentially, and the action is determined by the first entry that matches the connecting IP address. Therefore, when the entry “any” appears in an Access Control List, all succeeding entries are irrelevant.

Consider two hypothetical ACLs containing the same entries in a different order.

The following list would permit access to all IP addresses, including 10.1.1.0:

permit any

deny 10.1.1.0

Note that the above list could not actually be created using the setup utility, since after the “any” entry, no other entries could be added to the list.

The following list will deny access to IP address 10.1.1.0, but permit access to all others:

deny 10.1.1.0

permit any

If no entry in the assigned Access Control List matches the connection, or if the Access Control List is empty, the default action is **deny**.

For a full explanation of how access control lists work, see *Configuring Access Control Lists (ACLs)* (on page 6-2).

To create the access control lists:

Step 1 Enter the Access Control Lists configuration menu.

```
Would you like to enter the Access lists configuration menu? [no]: y
```

Type **y** and press **Enter**.

The Access Control Lists configuration dialog begins.

Step 2 You have the option of creating or modifying Access Control Lists, or skipping this section and proceeding directly to assign the existing ACLs to the desired management interfaces.

```
Would you like create new Access lists or modify existing lists? [no]: y
```

If you choose not to create or edit Access Control Lists, skip to *Step 9: Configuring the Topology-Dependent Parameters* (on page 4-41).

Step 3 Type the number of the Access Control List to be configured (1 through 99) and press **Enter.**
Note that there is no default for this parameter.

Step 4 Begin adding entries to the selected list.
Indicate whether this entry is permitted access or denied access.

- To permit access press **Enter**.
- To deny access type **n** and press **Enter**.

```
Does this entry permit access? [yes]:
```

Step 5 Type the IP address to be added to this list, and press **Enter.**
Type "**any**" and press **Enter** to include any IP address in the ACL.

Note that there is no default for this parameter.

```
Enter IP address or the word 'any' to denote any IP address:
```

Step 6 If you entered a specific IP address, enter the wildcard bits to define a range of IP addresses and press **Enter**. (See *Entry Formats* (on page 4-35).)
To define an individual IP address, type **0.0.0.0** and press **Enter**.

There is no default for this parameter.

```
Enter wildcard bits:
```

Step 7 The maximum number of entries in an ACL is 20.
If the "any" option was used, no other IP addresses may be added to the list.

- To add more entries, type **y** and press **Enter**

```
Would you like to add another entry to this list? [no]:y
```

Enter up to 20 entries as described in step 5 and step 6.

- When all entries have been added, press **Enter**

```
Would you like to add another entry to this list? [no]:
```

Step 8 When all entries are added to one list, you are asked whether you would like to create another ACL. You may define up to 99 ACLs.

- To create another ACL, type **y** and press **Enter**

```
Would you like to configure another list? [no]: y
```

Enter up to 20 IP addresses in this new ACL, as described in step 5 and step 6.

- When all ACLs have been created, press **Enter.**

```
Would you like to configure another list? [no]:
```

You are now prompted to assign the desired ACLs to restrict IP and Telnet access.

Step 9 Restrict IP access to the ***SCE 1000*** by assigning the appropriate ACL.
Type the number of the ACL to be assigned to IP access and press **Enter.**

To accept the default ACL, press **Enter.**

```
Enter IP access-class [0]:
```

Step 10 Restrict Telnet access to the ***SCE 1000*** by assigning the appropriate ACL.
Type the number of the ACL to be assigned to the Telnet interface and press **Enter.**

To accept the default ACL, press **Enter.**

```
Enter Telnet access-class [0]: 2
```

EXAMPLE:

This example illustrates a common access control scenario. Let us assume the following:

- We want to permit every station to access the SCE on the management port (e.g. ping, SNMP polling etc.).
- We want to restrict Telnet access to only a few permitted stations.

We therefore need to create two access control lists:

- For general IP access: permit access to all IP addresses.
- For Telnet: permit access to the specified IP address, and deny to all others.

ACL #1 = permit any IP address. Assign to IP access.

ACL #2 = permit access to 10.1.1.0, 10.10.10.1, deny to all others. Assign to Telnet access.

```
Would you like to enter the Access lists configuration menu? [no]: y
Would you like create new Access lists or modify existing lists? [no]: y
Enter ACL number: 1
Does this entry permit access? [yes]:
Enter IP address or the word ‘any’ to denote any IP address: any
This entry matches every IP address, no use in adding more entries to this
list.
Would you like to configure another list? [no]: y
Enter ACL number: 2
Does this entry permit access? [yes]:
Enter IP address or the word ‘any’ to denote any IP address: 10.1.1.0
Enter wildcard bits: 0.0.0.0
Would you like to add another entry to this list? [no]:y
Does this entry permit access? [yes]:
Enter IP address or the word ‘any’ to denote any IP address: 10.10.10.1
Enter wildcard bits: 0.0.0.0
Would you like to add another entry to this list? [no]:y
Does this entry permit access? [yes]:n
Enter IP address or the word ‘any’ to denote any IP address: any
This entry matches every IP address, no use in adding more entries to this
list.
Would you like to configure another list? [no]:
Enter IP access-class [0]: 1
Enter Telnet access-class [0]: 2
```

EXAMPLE 2:

This example skips the first section of the dialog (creating/modifying), and proceeds directly to assign existing ACLs.

```
Would you like to enter the Access lists configuration menu? [no]: y
Would you like create new Access lists or modify existing lists? [no]:
Enter IP access-class [0]: 10
Enter Telnet access-class [0]: 22
```

Step 8: Configuring SNMP

Managing the ***SCE 1000*** is possible also via a Network Management System (NMS) that supports SNMP. By default, SNMP is disabled on the ***SCE 1000***. (See *SNMP Configuration and Management* (on page 6-31) for further information.)

To enable SNMP management you must configure the following basic SNMP parameters:

- SNMP traps status and managers.

- Community strings (where an SNMP community string is a text string that acts like a password to permit access to the SNMP agent on the ***SCE 1000***).

To configure SNMP parameters:

Step 1 Enter the SNMP configuration menu.

```
Would you like to enter the SNMP configuration menu? [no]: y
```

Type **y** and press **Enter**.

The SNMP configuration dialog begins.

Step 2 Enable SNMP management.

Type **y** and press **Enter**.

```
Enable SNMP management? [no]: y
```

If you choose to disable SNMP management, skip the rest of this section and go to *Step 9: Configuring the Topology-Dependent Parameters* (on page 4-41). The rest of the dialog is not presented, as it is irrelevant when SNMP management is disabled.

Step 3 Type the SNMP GET community name and press **Enter**.

The SNMP agent that resides inside the ***SCE 1000*** will respond only to GET requests that use this community string.

```
Enter SNMP GET community name:
```

Note that there is no default for this parameter.

Step 4 Assign an access list to restrict the SNMP management stations that may use this GET community.

Type a number (1 through 99) or type “0” to permit access to all IP addresses, and press **Enter**.

```
Enter Access list number allowing access with this community string, use ‘0’
to allow all:
```

Step 5 The maximum number of GET communities is 20.

- To add more entries, type **y** and press **Enter**
- Would you like to add another SNMP GET community? [no]:**y**

  Enter up to 20 SNMP GET communities as described in step 3 and step 4.

- When all entries have been added, press **Enter**

```
Would you like to add another SNMP GET community? [no]:
```

Step 6 Type the SNMP SET community name and press **Enter**.

The SNMP agent that resides inside the ***SCE 1000*** will respond only to SET requests that use this community string.

```
Enter SNMP SET community name:
```

Note that there is no default for this parameter.

Step 7 Assign an access list to restrict the SNMP management stations that may use this SET community.

Type a number (1 through 99) or type “0” to permit access to all IP addresses, and press **Enter**.

```
Enter Access list number allowing access with this community string, use ‘0’
to allow all:
```

Step 8 The maximum number of SET communities is 20.

- To add more entries, type **y** and press **Enter**

```
Would you like to add another SNMP SET community? [no]:y
```

Enter up to 20 SNMP SET communities as described in step 6 and step 7.

- When all entries have been added, press **Enter**

```
Would you like to add another SNMP SET community? [no]:
```

Step 9 Enter the SNMP trap managers menu.

```
Would you like to configure SNMP trap managers? [no]: y
```

Type **y** and press **Enter**.

The SNMP trap managers dialog begins.

If you choose not to configure SNMP trap managers, the dialog skips to the authentication failure trap status. (See step 14.)

Step 10 Type the trap manager IP address and press **Enter**.

```
Enter SNMP trap manager IP address:
```

Note that there is no default for this parameter.

Step 11 Type the trap manager community string and press **Enter**. Note that there is no default for this parameter.

```
Enter SNMP trap manager community string:
```

Step 12 Type the number of the trap manager SNMP version (1 or 2c) and press **Enter** Note that there is no default for this parameter.

```
Enter trap manager SNMP version:
```

Step 13 The maximum number of trap managers is 20.

- To add more entries, type **y** and press **Enter**

```
Would you like to add another SNMP trap manager? [no]:y
```

Enter up to 20 trap managers as described in step 10 through step 12.

- When all entries have been added, press **Enter**

```
Would you like to add another SNMP trap manager? [no]:
```

Step 14 Configure the Authentication Failure trap status.

- To disable the Authentication Failure trap, press **Enter**.
- To enable the Authentication Failure trap, type **y** and press **Enter**.

```
Enable the ‘Authentication Failure’ trap [no]:
```

Step 15 Configure the SCE enterprise trap status.

- To disable the SCE enterprise traps, type **n** press **Enter**.
- To enable the SCE enterprise traps, type **y** and press **Enter**.

```
Enable the SCE enterprise traps []:
```

Step 16 Type the name of the system administrator and press **Enter.** Note that there is no default for this parameter.

```
Enter system administrator contact name []:
```

EXAMPLE:

Following is a sample SNMP configuration, configuring one trap manager, one GET community, and one SET community, and enabling the authentication failure trap, as well as all enterprise traps.

```
Would you like to enter the SNMP configuration menu? [no]: y
Enable SNMP management? [no]: y
Enter SNMP GET community name[]: public
Enter Access list number allowing access with this community string, use ‘0’
to allow all: 0
Would you like to add another SNMP GET community? [no]:
Enter SNMP SET community name[]: private
Enter Access list number allowing access with this community string, use ‘0’
to allow all: 2
Would you like to add another SNMP SET community? [no]:
Would you like to configure SNMP trap managers? [no]: y
Enter SNMP trap manager IP address: 10.1.1.253
Enter SNMP trap manager community string: public
Enter trap manager SNMP version: 2c
Would you like to add another SNMP trap manager? [no]:
Enable the ‘Authentication Failure’ trap [no]: y
Enable SCE enterprise traps []: y
Enter system administrator contact name []: John Smith
```

Step 9: Configuring the Topology-Dependent Parameters

The topology configuration menu is a series of guided questions relating to the deployment of the ***SCE 1000*** in the network and its mode of operation. Values for the parameters are configured based on the user answers.

The correct value for each parameter must be ascertained before configuring the system to make sure that the system will function in the desired manner. (See *Topology* (on page 2-1) for a comprehensive discussion of topology and the related parameters.)

There are three topology-related parameters:

- **Connection mode**: Can be either Inline or Receive-only, depending on the physical installation of the ***SCE 1000***.
- **Bypass state when the *SCE 1000* is not operational (on-failure)**: This parameter determines whether the system cuts the traffic or bypasses it when the ***SCE 1000*** has failed.
- **Status after reboot caused by fatal error or abnormal shutdown**: This parameter determines whether the ***SCE 1000*** returns to normal operational state after a failure.

The procedure described below is a hypothetical presentation of all the questions in the topology configuration. In actual practice, it is impossible for all questions to be presented in any one configuration, as this part of the dialog is not linear like the other sections, but branches depending on the parameter values entered.

Study the examples that follow to understand the procedure for various topologies.

To configure topology dependent parameters:

Step 1 Enter the topology configuration menu.

```
Would you like to enter the Topology configuration menu? [no]: y
```

Type **y** and press **Enter**.

The topology configuration dialog begins.

Step 2 Specify the connection mode.

- To define **inline** connection mode, press **Enter**.
- To define **receive-only** connection mode, type **2** and press **Enter**.

```
Enter Connection mode:
1- inline
2- receive-only
Enter your choice [1]:
```

Step 3 Specify the On-failure link behavior.

- To specify **Bypass**, press **Enter**.
- To specify **Cutoff**, type **2** and press **Enter**.

```
Enter On-failure behavior:
1- bypass
2- cutoff
Enter your choice [1]:
```

Step 4 Specify the admin status of the ***SCE 1000*** after abnormal boot.

- To specify **Not-Operational** status after abnormal boot, press **Enter**.
- To specify **Operational** status after abnormal boot, type **1** and press **Enter**.

```
Enter admin status of the SCe after abnormal boot:
1- Operational
2- Not-Operational
Enter your choice [1]:
```

The following examples present the procedure for configuring the topology-related parameters for various topologies. Refer the *Topology Configuration Summary Table* (on page 2-10) for a summary of appropriate values for the parameters for each topology.

EXAMPLE #1:

Following is a sample topology configuration for a topology using an external switch.

All other parameter values are automatically assigned by the system as follows:

- Link bypass mode on-failure: Bypass
- Admin status of the SCE after abnormal boot: Operational

```
Would you like to enter the Topology configuration menu? [no]: y
Enter Connection mode:
1- inline
2- receive-only
Enter your choice [1]: 2
```

EXAMPLE #2:

Following is a sample topology configuration for a non-redundant bump-in-the-wire (inline) topology. All values are the system default values, so it is not necessary to type in the response. Simply press enter at each line.

- Connection mode: Inline
- For a non-redundant topology, link bypass on-failure should be Bypass, so that traffic continues to flow through the link.
- After operation of the system resumes, and the ***SCE 1000*** reboots, the ***SCE 1000*** will resume operation. (Admin status after abnormal reboot is Operational.)

```
Would you like to enter the Topology configuration menu? [no]: y
Enter Connection mode:
1- inline
2- receive-only
Enter your choice [1]:
Enter On-failure behavior:
1- Bypass
2- Cutoff
Enter your choice [1]:
Enter admin status of the SCe after abnormal boot:
1- Operational
2- Not-Operational
Enter your choice [1]:

Data collection for the system configuration is completed.
```

EXAMPLE #3:

Following is a sample topology configuration for a redundant inline topology.

- Connection mode: Inline
- For a redundant topology, link bypass on-failure should be Cutoff, so that operation switches to the backup link.
- After operation of the system resumes, and the ***SCE 1000*** reboots, the ***SCE 1000*** will resume operation. (Admin status after abnormal reboot is Operational.)

```
Would you like to enter the Topology configuration menu? [no]: y
Enter Connection mode:
1- inline
2- receive-only
Enter your choice [1]: 2
Enter On-failure behavior:
1- Bypass
2- Cutoff
Enter your choice [1]:2
Enter admin status of the SCE after abnormal boot:
1- Operational
2- Not-Operational
Enter your choice [1]:

Data collection for the system configuration is completed.
```

Step 10: Completing and Saving the Configuration

When you have completed the entire configuration, the system checks for errors. If errors are found, a warning message appears. When the configuration is error-free, you may apply and save it.

To complete and save the configuration:

Step 1 The system informs you that data collection is complete.
It is recommended that you view the entire new configuration before it is applied.

Type **y** and press **Enter**.

Note that there is no default.

If there are no errors, go to step 3.

Data collection for the system configuration is completed.

```
Would you like to view the new configuration before it is applied? [yes/no]:
y
```

Step 2 If any errors are detected, you may choose to view them.
Press **Enter**.

```
Found errors in the new configuration, would you like to view them? [yes]:
The following errors were found:
Warning - RDR formatter destination 10.1.1.1 is not allowed in the IP
access-class.
```

Step 3 You are asked whether to apply and save the configuration.

```
Apply and Save this configuration? [yes/no]:
```

- To apply and save the configuration, type **y** and press **Enter**.
- To abort the setup procedure without applying or saving the configuration (recommended if there are errors), type **n** and press **Enter**.

```
Setup procedure aborted, no configuration changes made.
```

If the setup is aborted, the dialog is ended.

Step 4 If there are no errors, the system requests confirmation of either a yes or no answer, in order to prevent mistakes.
Type the appropriate answer (**y** or **n**) and press **Enter**.

```
The running configuration would be overwritten by the changes you have just
entered, are you sure? [yes/no]:
```

The selected action is carried out by the system.

- If the apply and save action is not confirmed (**no**), the setup is aborted.

```
Setup procedure aborted, no configuration changes made.
```

- If the apply and save action is confirmed (**yes**), the configuration is applied and saved.

```
The new running configuration will be saved to the startup configuration.
```

Step 5 If the configuration was applied and saved, you may also save it to a file at a remote station.

```
Do you want to save a copy of the startup configuration file in a remote
station? [no]:
```

To save the configuration to a remote station, type **y** and press **Enter**.

The system will ask for FTP path:

```
Enter a full FTP path of the remote destination:
```

Step 6 The system informs you that the configuration is complete.

```
Committing configuration...

Configuration completed successfully.

Saving configuration...
Writing general configuration file to temporary location...
Backing-up general configuration file...
Copy temporary file to final location...

Done!
```

EXAMPLE #1:

Following is an example of a configuration that the user aborted due to errors detected in the configuration.

Note that no confirmation is requested for the decision to abort the setup. Had there been no errors, confirmation would have been requested before aborting.

```
Data collection for the system configuration is completed.
Would you like to view the new configuration before it is applied? [yes/no]:
n
Found errors in the new configuration, would you like to view them? [yes]: y
The following errors were found:
Warning - RDR formatter destination 10.1.1.1 is not allowed in the IP
access-class.
Warning - default Gateway 10.1.1.1 is not allowed in the IP access-class.
Warning - IP Access list (1) conflicts with Telnet Access list (2) as
follows:
Access list 2 permits all addresses while Access list 1 denies it.
Apply and Save this configuration? [yes/no]: n

Setup procedure aborted, no configuration changes made.
```

EXAMPLE #2:

Following is an example of a configuration that was applied and saved to the startup configuration as well as to an FTP site.

Although not demonstrated in this example, it is recommended that you always view the configuration before applying it.

```
Data collection for the system configuration is completed.
Would you like to view the new configuration before it is applied? [yes/no]:
Apply and Save this configuration? [yes/no]: y

(New configuration would be displayed here)

The running configuration would be overwritten by the changes you have just
entered, are you sure? [yes/no]:y

The new running configuration will be saved to the startup configuration.
Do you want to save a copy of the startup configuration file in a remote
station? [no]:y
Enter a full FTP path of the remote destination:
ftp://vk:vk@10.1.1.253/h:/copyofstartup.txt
Committing configuration...

Configuration completed successfully.

Saving configuration...
Writing general configuration file to temporary location...
Backing-up general configuration file...
Copy temporary file to final location...

Done!
```

EXAMPLE #3:

Following is an example of a configuration that was aborted, although no errors were detected.

```
Data collection for the system configuration is completed.
Would you like to view the new configuration before it is applied? [yes/no]:
Apply and Save this configuration? [yes/no]: n
The changes you have just entered would be discarded, are you sure?
[yes/no]:y

Setup procedure aborted, no configuration changes made.
```

Connecting the FE Management Port

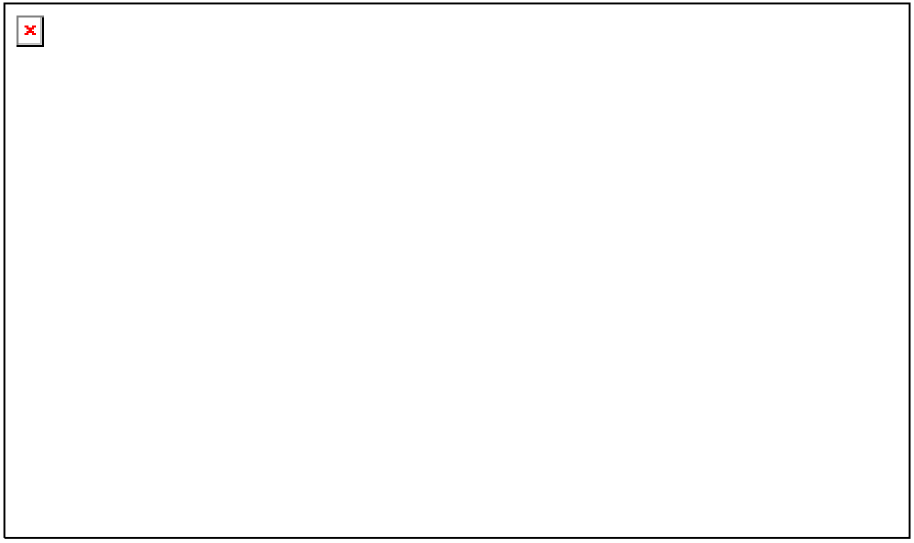
This section provides instructions for connecting the FE management port, and executing a check to verify that connectivity has been established between the ***SCE 1000*** and the remote management host.

Note By default, the FE management port is configured to auto-negotiation enabled. To change this default setting, refer to Configuring FastEthernet Management Interface Speed and Duplex Parameters

To cable the management port:

Step 1 Take the Ethernet LAN cable (with attached RJ-45 connector) and plug it into the Mng port on the front panel of the ***SCE 1000***, as shown in the figure below.

Figure 4-18: Cabling the Management Port



Step 2 Connect the other end of the Ethernet LAN cable into your management network. Make sure that you push on the RJ-45 connector (attached to the Ethernet cable) until you hear a click, which indicates that the connector is fully inserted and secured in the receptacle. Gently pull on the plug to confirm whether the plug is locked into the socket.

If the Link LED on the ***SCE 1000*** management port does not light, try removing the network cable plug and reinserting it firmly into the module socket. To disconnect the plug from the socket, press down on the raised portion on top of the plug, releasing the latch. You should hear an audible click indicating the latch has released. Carefully pull the plug out of the socket.

If the management port Link LED on the ***SCE 1000*** still does not light, verify that the cable is connected correctly to the appropriate network element on its second end.

Step 3 After you connect the FE cable to the Mng port and to your network, check the FE Mng port LEDS.
There are 3 FE LEDs: **Link**, **10/100**, and **Active** (see, in Front Panel, the figure ***SCE 1000*** Front Panel and the table ***SCE 1000*** LED Groups.

At this point, check that the **Link** LED is green. The **10/100** LED is green depending on the Ethernet network settings. Green indicates that the 10/100 Led is 100 Mbps., and ‘Off’ indicates 10 Mbps.

Step 4 Test connectivity. From the host that you intend to use for remote management, ping to the ***SCE 1000*** by typing `ping` and the ***SCE 1000*** IP address, and pressing **Enter** (see the example, below).

Note Please note that only step 4, above, is performed from the remote management host (Mng port connection).

This verifies that an “active” connection exists between the specified station and the management port.

This way you can see that the ping is received and can check that the Active LED is flashing green.

The ping program sends an echo request packet to an IP address and then awaits a reply. Ping output can help you evaluate path-to-host reliability, delays over the path, and whether the host can be reached or is functioning.

EXAMPLE:

The following example displays a typical ping response where the target IP address is 10.1.1.201.

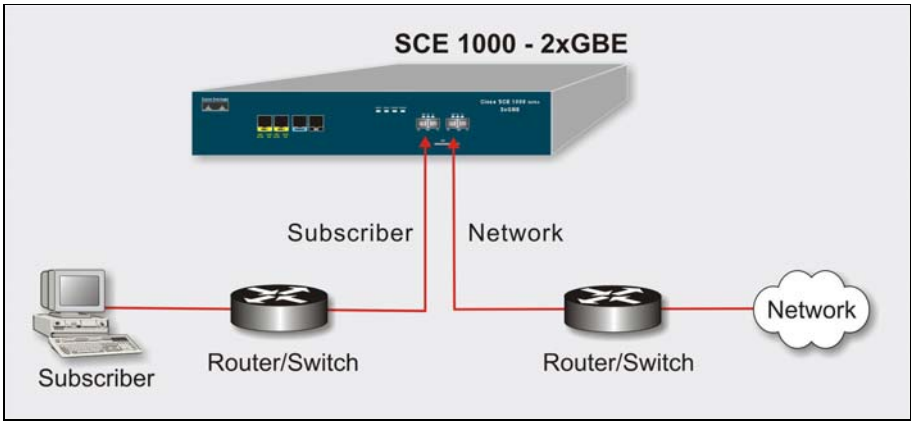
```
C:\>ping 10.1.1.201
pinging 10.1.1.201 ...
PING 10.1.1.201: 56 data bytes
64 bytes from host (10.1.1.201): icmp_seq=0. time=0. ms
64 bytes from host (10.1.1.201): icmp_seq=1. time=0. ms
64 bytes from host (10.1.1.201): icmp_seq=2. time=0. ms
64 bytes from host (10.1.1.201): icmp_seq=3. time=0. ms
----10.1.1.201 PING Statistics----
4 packets transmitted, 4 packets received, 0% packet loss
round-trip (ms) min/avg/max = 0/0/0
```

Connecting the line ports to the network

This section provides instructions for configuring Gigabit Ethernet interface parameters, and connecting subscriber and network ports, for both bump-in-the-wire and external switching topologies.

Bump-in-the-Wire (Inline) Topology

Figure 4-19: Bump-in-the-Wire Installation



In bump-in-the-wire topology (see the above figure), the ***SCE 1000*** resides physically on the data link between the subscriber side, usually either a BRAS (in DSL access), a PDSN (in wireless access), a CMTS (in the Cable access), or a switch or router aggregator (in other topologies), and the network side, usually a router or layer 3 switch network element. This is the inline topology, providing both traffic monitoring and control capabilities.

In bump-in-the-wire topology, all the traffic of the ***SCE 1000*** is deployed as a transparent layer2 overlay on the customer's existing network.

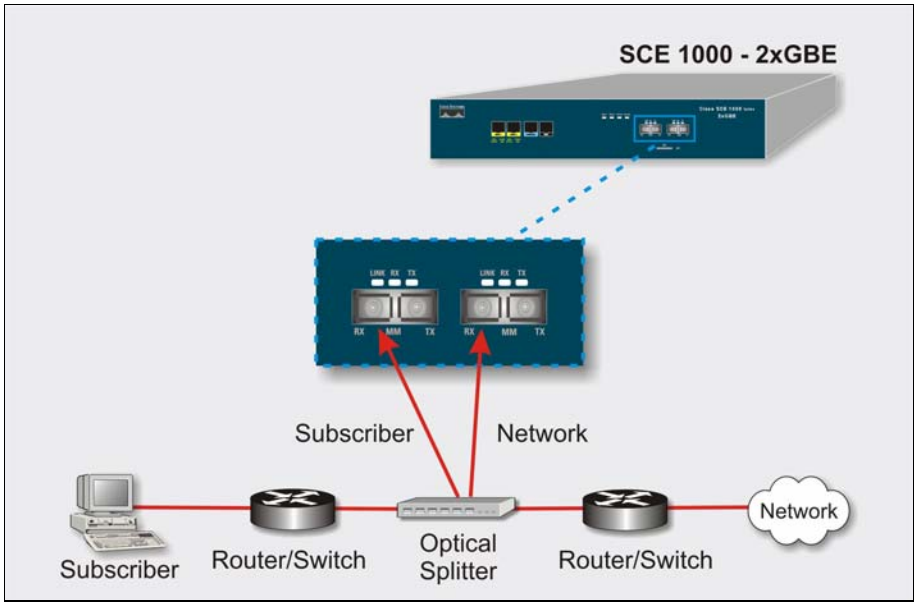
External Optical Splitter (Receive-only) Topology

In external splitting, an external optical splitter resides physically on the GBE link between the subscriber side and the network side. The external splitter is connected to the ***SCE 1000*** via Rx links only.

In this topology, the traffic passes through the external splitter, which splits traffic to the ***SCE 1000***. The ***SCE 1000***, therefore, is in receive-only topology, having only traffic monitoring capabilities.

Note Receive-only topologies can also be implemented using a switch. Such a switch must support SPAN functionality that includes separation between ingress and egress traffic and multiple SPAN-ports destinations.

Figure 4-20: External Splitting Topology



Configuring the GBE Interface Parameters

Configuring Auto-Negotiation

By default, the ***SCE 1000*** line interface ports are configured with auto-negotiation enabled. However, when using an external splitter, the auto-negotiation must be disabled.

Note In order to prevent errors when in bypass mode, the system must be configured so that the speed and duplex of both line interfaces is the same.

Note If you change any parameters, you must save the new configuration settings. Type copy running-config startup-config, and press **Enter.**

To configure GBE auto-negotiation for speed and duplex for the first GBE port (subscriber side) interface:

Step 1 To enter the Global Configuration Mode, at the ***SCE 1000***# prompt, type **configure**, and press **Enter**.
The ***SCE 1000***(config)# prompt appears.

Step 2 To enter the first GBE port interface, type **interface GigabitEthernet 0/1**, and press **Enter**.

The ***SCE 1000***(config if)# prompt appears.

Step 3 Type **auto-negotiate** and press **Enter**.
The ***SCE 1000***(config if)# prompt appears.

Step 4 To return to Global Configuration Mode, type **exit** and press **Enter**.
The ***SCE 1000***(config)# prompt appears.

Follow the next procedure to configure auto-negotiation for the second GBE port interface

To configure speed and duplex for the second GBE port (network side) interface:

Step 1 At the ***SCE 1000***(config)# prompt, to enter the second GBE port interface, type **interface GigabitEthernet 0/2**, and press **Enter**.
The ***SCE 1000***(config if)# prompt appears.

Step 2 Type **auto-negotiate** and press **Enter**.
The ***SCE 1000***(config if)# prompt appears.

Step 3 To return to Global Configuration Mode, type **exit** and press **Enter**.
The ***SCE 1000***(config)# prompt appears.

Step 4 To exit Global Configuration Mode, type exit and press **Enter**.
The ***SCE 1000***# prompt appears.

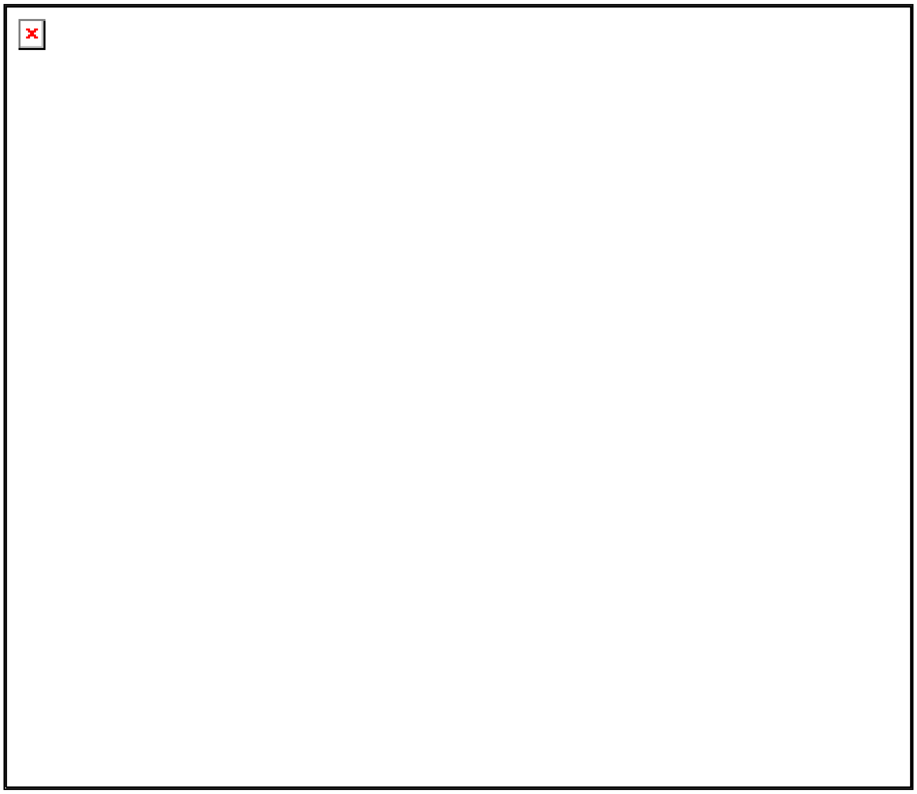
Note Auto-negotiation must be disabled when the ***SCE 1000*** is deployed via an external optical splitter (i.e. passive topology).

Connecting Subscriber Side and Network Side Ports

Note that the ***SCE 1000*** ports are not symmetric. The left-hand port is the Subscriber side port, and the right-hand port is the Network side port, as labeled on the front panel.

Connecting Subscriber Side Interface to the SCE 1000

Figure 4-21: Connecting the Subscriber Side Cable (via Port 1)



To connect the subscriber side cable to the ***SCE 1000***:

Step 1 Take the fiber optic cable that is connected toward the subscriber line, and plug it into Gigabit Ethernet Subscriber port on the front panel of the ***SCE 1000***.
Make sure to push on the connector until you hear a click, which indicates that the connector is fully inserted and secured in the receptacle. Always make sure that you insert the connector completely into the socket.

Rx and Tx are clearly marked on the front panel of the ***SCE 1000*** to assist in preventing incorrect connector insertion.

Step 2 Verify that the link LED is green.
If the link LED does not light, try removing the network cable plug and reinserting it firmly into the module socket.

Connecting the Network Side Interface to the SCE 1000

To connect the network side cable to the ***SCE 1000***:

Step 1 Take the fiber optic cable that is connected toward the network, and plug it into Gigabit Ethernet Network port on the front panel of the ***SCE 1000***.
Make sure to push on the connector until you hear a click, which indicates that the connector is fully inserted and secured in the receptacle. Always make sure that you insert the connector completely into the socket.

Rx and Tx are clearly marked on the front panel of the ***SCE 1000*** to assist in preventing incorrect connector insertion.

Step 2 Verify that the link LEDs are green.
If the link LED does not light, try removing the network cable plug and reinserting it firmly into the module socket.

Note In bump-in-the-wire topology, you connect both the Rx and Tx fibers. In receive-only topologies, using an external splitter, connect only the Rx fibers to the ***SCE 1000***.

Testing Connectivity: Examining Link LEDs and Counters

Examining the LEDs

The GBE Link LED must be green in order to verify that an active connection exists.

The GBE Rx and Tx LEDs (if flashing green) indicate that traffic is being received or transmitted by the ***SCE 1000***, respectively.

Note that in an inline topology, the Rx and Tx LEDs indicate that packets are being received/transmitted by the ***SCE 1000***.

In optical splitter topologies, the Rx LEDs are the sole indicators. The Tx LEDs do not “blink”, since the Tx is not connected to the port in this topology.

Viewing the Counters to See that the Network Traffic is Reaching the Device

In bump-in-the-wire topology, you can monitor traffic via the platform counters for both the Rx and Tx connections. The counters increase, together with the increased number of packets that flow through the ***SCE 1000*** for both Rx and Tx.

However, in receive-only topologies, the counters for the Tx do not increment, that is, Tx does not have a function in monitoring traffic, as it is disconnected.

To view the Gigabit Ethernet port status:

Step 1 Type **show interface Gigabit Ethernet 0/interface number**.
This displays the port link and auto-negotiation status.

EXAMPLE:

The following example displays a system response.

```
SCE 1000#show interface Gigabit Ethernet 0/1
Auto negotiation configured: Enabled
Actual Status:
Link is on, Auto negotiation: Enabled,
Bandwidth: 100000Kbps,
Burst-size: 50000bytes
```

Again, auto-negotiation for bump-in-the-wire topology may be enabled or disabled. For receive-only topologies, using an external splitter, auto-negotiation must be disabled.

To view the Gigabit Ethernet counters:

Step 1 Type **show interface Gigabit Ethernet 0/interface counters**.
This displays the Gigabit Ethernet counters. This command enables you to verify that traffic is taking place. You can see that the counters increase, together with the increased number of packets that flow through the ***SCE 1000***.

Again, in bump-in-the-wire topology, both the Rx and Tx counters are relevant as traffic monitors. For receive-only topologies, using an external switch, only the Rx counters are relevant.

EXAMPLE:

The following example shows the counters of the first Gigabit Ethernet interface:

```
SCE 1000#show interface Gigabit Ethernet 0/1 counters
In total octets: 100
In good unicast packets: 90
In good multicast packets: 0
In good broadcast packets: 10
In packets discarded: 0
In packets with CRC/Alignment error: 0
In undersized packets: 0
In oversized packets: 0
Out total octets: 93*2^32+1022342538
Out unicast packets: 858086051
Out non unicast packets: 0
Out packets discarded: 0
```

You are now ready to continue to the next stage, loading and activating an Service Control Application.

Loading and Activating a Service Control Application

The ***SCE 1000*** platform provides the basic functionalities of Service Control analysis and enforcement. A Service Control solution requires that a Service Control application be loaded into the platform, to take advantage of the unique SCE platform capabilities.

Loading and activating an application includes the following stages:

- Downloading the application provided as an SLI file to the ***SCE 1000*** disk.
- Activating the ***SCE 1000*** application.
- Configuring the ***SCE 1000*** application.

The detailed procedure of how to perform these operations is not specified and described in this manual. For further details, refer to the relevant Service Control application user guide or installation guide.

Final Tests

This section discusses the final tests that you need to perform to verify that the ***SCE 1000*** is functioning properly.

Verifying Operational Status

After all the ports are connected, verify that the ***SCE 1000*** is not in a Warning state.

To verify that the ***SCE 1000*** is not in a warning state:

Step 1 On the ***SCE 1000*** Front panel, examine that the Status LED is flashing green.

Step 2 To display the operation status of the system, at the ***SCE 1000#*** prompt, type **`show system operation-status`** and press **Enter**.

A message displaying the operation status of the system appears. If the system is operating in order, the following message appears:

```
System Operation status is Operational.
```

EXAMPLE:

The following example displays a sample output where the LEDs appear red/orange:

```
SCE 1000#show system operation-status
System Operation status is Operational
```

Viewing the User Log

View the user log for errors that occurred during the installation process.

To display the user log device counters:

Step 1 At the ***SCE 1000#*** prompt, type **`show logger device User-File-Log counters`** and press **Enter**.

EXAMPLE:

The following example shows the current User-File-Log device counters.

```
SCE 1000#show logger device user-file-log counters
Logger device User-File-Log counters:
Total info messages: 1
Total warning messages: 0
Total error messages: 0
Total fatal messages: 0
```

If there are “Total error messages” or “Total fatal messages”, refer to “The User Log,” page for details about the errors.

The installation process is now complete.

CHAPTER 5

Configuration and Management

This chapter describes available user interfaces and provides general guidelines for configuring and managing the ***SCE 1000*** by means of the Command Line Interface (CLI). It also describes general administrative tasks.

Step 2 This chapter contains the following sections:

- Setup Utility 5-1
- File-system Operations 5-3
- Viewing Configuration and Status 5-7
- Saving the Configuration Settings 5-12
- Recovering a Previous Configuration 5-14
- Entering and Exiting Global Configuration Mode 5-15
- The User Log 5-20
- Rebooting and Shutting Down the SCE Platform 5-25

Setup Utility

The setup utility is an interactive wizard that guides the user through the basic configuration process. This utility runs automatically upon initial connection to the local terminal. It may also be invoked explicitly via Telnet or via the local terminal to make changes to the system configuration. When explicitly invoked, the setup utility offers the option of multiple entries (lists) for certain parameters (see *Multiple entry parameters* (Multiple entry parameters "Multiple entry parameters (Lists)" on page 5-2)). Otherwise, the setup utility is the same regardless of whether it runs automatically or is invoked. The setup utility is explained in detail in *System Configuration* (on page 4-26).

Multiple entry parameters (Lists)

Several parameters, such as the Access Control Lists, are actually lists containing a number of entries. If these lists are empty (initial configuration) or contain only one entry, they act the same as any scalar parameter, except that you are giving the option of adding additional entries to the list.

If these lists already contain more than one entry, the entire list is displayed, and you are then presented with several options. Following is an excerpt from the SNMP trap manager menu, illustrating how to configure list entries.

To configure a list parameter when more than one entry already exists in the list:

Step 1 The entries in the list are displayed.

```
There are 2 SNMP trap managers in the current configuration as follows:
IP address: 10.10.10.10  Community: private  Version: 1
IP address: 10.11.10.1   Community: pcube    Version: 2c
```

Note If only one entry exists in the table, it is displayed as the default [ ] to be either accepted or changed The three list options are not displayed.

Step 2 Three options are presented.

```
Please choose one of the following options:
1. Leave the running configuration unchanged.
2. Clear the existing lists and configure new ones.
3. Add new entries.

Enter your choice:
```

Step 3 You are prompted to continue the setup, depending on the choice you entered:

- 1. Leave the running configuration unchanged:

  The dialog proceeds to the next question. The list remains unchanged.

- 2. Clear the existing entries and configure new ones:

  The dialog prompts you for a new entry in the list.

  After completing the first entry, you are asked whether you would like to add another new entry.

```
Would you like to add another SNMP trap manager? [no]:y
```

  Since the list was empty, you may enter the maximum number of entries.

- 3. Add new entries:

  The dialog prompts you for a new entry in the list.

  After the completing one entry, you are asked whether you would like add another new entry.

```
Would you like to add another SNMP trap manager? [no]:y
```

  You may enter only enough additional entries to reach the maximum number.

File-system Operations

The CLI commands include a complete range of file management commands. These commands allow you to create, delete, copy, and display both files and directories.

Note Regarding disk capacity: While performing disk operations, the user should take care that the addition of new files that are stored on the SCE disk do not cause the disk to exceed 70% utilization.

Working with Directories

The following file-system operations commands are relevant to directories:

- `cd`
- `delete`
- `dir`
- `mkdir`
- `pwd`
- `rmdir`

Creating a Directory

To create a directory:

Step 1 From the ***SCE 1000#*** prompt, type **`mkdir`** *`directory-name`* and press **Enter**.
The specified directory is created and the ***SCE 1000#*** prompt appears.

Deleting a Directory

There are two different commands for deleting a directory, depending on whether the directory is empty or not.

Use this command to delete a directory along with all of its contents.

To delete a directory and all its files and sub-directories:

Step 1 From the ***SCE 1000#*** prompt, type **`delete`** *`directory-name`* **`/recursive`** **and** press Enter.
The specified directory, including all files and sub-directories, is deleted, and the ***SCE 1000#*** prompt appears.

Use this command to remove an empty directory.

To delete an empty directory:

Step 1 From the ***SCE 1000#*** prompt, type **`rmdir`** *`directory-name`* and press **Enter**.
The specified directory is deleted and the ***SCE 1000#*** prompt appears.

Changing Directories

To change the path of the current working directory:

Step 1 From the ***SCE 1000#*** prompt, type **`cd`** *`new path`* and press **Enter**.
The specified directory becomes the working directory and the ***SCE 1000#*** prompt appears.

Displaying Working Directory

To display the current working directory:

Step 1 From the ***SCE 1000#*** prompt, type **`pwd`** and press **Enter**.
The name of the working directory is displayed and the ***SCE 1000#*** prompt appears.

Listing Files in Current Directory

You can display a listing of all files in the current working directory. This list may be filtered to include only application files. The listing may also be expanded to include all files in any subdirectories.

To list all the files in the current directory:

Step 1 From the ***SCE 1000#*** prompt, type **`dir`** and press **Enter**.
A listing of all files in the working directory is displayed and the ***SCE 1000#*** prompt appears.

To list all the applications in the current directory:

Step 1 From the ***SCE 1000#*** prompt, type **`dir applications`** and press **Enter**.
A listing of all application files in the working directory is displayed and the ***SCE 1000#*** prompt appears.

To include files in all sub-directories in the listing of the current directory:

Step 1 From the ***SCE 1000#*** prompt, type **`dir -r`** and press **Enter**.
A listing of all files in the working directory, including all files in all sub-directories, is displayed and the ***SCE 1000#*** prompt appears.

Working with Files

The following file-system operations commands are relevant to files:

- `copy`
- `copy-passive`
- `delete`
- `more`
- `rename`
- `unzip`

Renaming a File

To rename a file:

Step 1 From the ***SCE 1000#*** prompt, type **`rename`** *`current-file-name new-file-name`* and press **Enter**.
The specified file is renamed and the ***SCE 1000#*** prompt appears.

Deleting a File

To delete a file:

Step 1 From the ***SCE 1000#*** prompt, type **`delete`** *`file-name`* and press **Enter**.

The specified file is deleted and the ***SCE 1000#*** prompt appears.

Copying a File

You can copy a file from the current directory to a different directory.

You can also copy a file (upload/download) to or from an FTP site. In this case, either the source or destination filename must begin with *ftp://*. To copy a file using passive FTP, use the **`copy-passive command.`**

To copy a file:

Step 1 From the ***SCE 1000#*** prompt, type **`copy`** *`source-file-name destination-file-name`* and press **Enter**.
The file is copied to the specified directory and the ***SCE 1000#*** prompt appears.

EXAMPLE:

The following example copies the local *`analysis.sli`* file located in the root directory to the *`applications`* directory.

```
SCE 1000#copy analysis.sli applications/analysis.sli
SCE 1000#
```

To download a file from an FTP site:

Step 1 From the ***SCE 1000#*** prompt, type **`copy`** *`ftp://source destination-file-name`* and press **Enter**.
The file is downloaded from the FTP site to the specified directory and the ***SCE 1000#*** prompt appears.

To upload a file to an FTP site using Passive FTP:

Step 1 From the ***SCE 1000#*** prompt, type **`copy-passive`** *`source-file-name ftp://destination`* and press **Enter**.
The file is uploaded to the specified FTP site and the ***SCE 1000#*** prompt appears.

EXAMPLE:

The following example uploads the `analysis.sli` file located on the local flash file system to the host 10.1.1.105, specifying Passive FTP.

```
SCE 1000#copy-passive /appli/analysis.sli
ftp://myname:mypw@10.1.1.105/p:/appli/analysis.sli
SCE 1000#
```

Displaying File Contents

To display the contents of a file:

Step 1 From the ***SCE 1000#*** prompt, type **`more`** *`file-name`* and press **Enter**.
The contents of the specified file are displayed and the ***SCE 1000#*** prompt appears.

Unzipping a File

Use this command to unzip a file. The specified file must be a zip file.

Files are extracted to the current directory.

To unzip a file:

Step 1 From the ***SCE 1000#*** prompt, type **`unzip`** *`file-name`* and press **Enter**.
The specified file is extracted to the current directory and the ***SCE 1000#*** prompt appears.

Viewing Configuration and Status

When you enter configuration commands, it immediately effects the ***SCE 1000*** operation and configuration. This configuration, referred to as the *`running-config`*, is saved in the ***SCE 1000*** volatile memory and is effective while the ***SCE 1000*** is up. After reboot, the ***SCE 1000*** loads the *`startup-config`*, which includes the non-default configuration as saved by the user, into the *`running-config`*.

The ***SCE 1000*** provides commands for:

- Viewing the running configuration
- Viewing the startup configuration
- Viewing the settings of a partial group or individual parameters from the global or the interfaces configuration.
- Viewing dynamic data, such as counters or SCE status.

The following commands are provided for viewing configuration information:

- `show running-config`
- `more running-config`
- `show startup-config`
- `more startup-config`
- `show access-lists`
- `show blink slot`
- `show calendar`
- `show clock`
- `show failure-recovery operation-mode`
- `show hostname`
- `show hosts`
- `show interface FastEthernet`
- `show interface LineCard`
- `show ip route`
- `show ip rpc-management`
- `show ip rpc-management notifications`
- `show line vty access-class in`
- `show line vty timeout`
- `show logger device`
- `show RDR-formatter`
- `show rpc-management`
- `show snmp`
- `show snmp community`
- `show snmp contact`
- `show snmp enabled`
- `show snmp host`
- `show snmp location`
- `show system operation-status`
- `show system uptime`
- `show telnet sessions`
- `show telnet status`
- `show timezone`
- `show version`

EXAMPLE:

The following example illustrates how typing a '?' after the word show while you are in the Privileged Exec mode will display all the show commands supported.

```
SCE 1000#show ?
  access-lists      Show all access-lists
  blink             Display blink status
  calendar          Display the system calendar
  clock             Display the system clock
  failure-recovery  Display failure recovery related configuration
  hostname          Display the configured hostname
  hosts             Display the host table
  interface         Interfaces show menu
  ip                Display IP related information
  line              Line show menu
  logger            Display logger configuration
  RDR-formatter     Display RDR Formatter configuration
  Rpc-management    Display Rpc-management parameters
  running-config    Show current configuration
  snmp              Display SNMP information
  startup-config    Show start-up configuration
  system            Display system information
  telnet            Display telnet information
  timezone          Display the current timezone
  version           Display system version information
SCE 1000#show
```

After configuring the ***SCE 1000***, you may query for the running configuration using the command **`show running-config`.** This command displays the non-default running configuration. To view all ***SCE 1000*** running configuration, whether it is the default or not, you may use the option **`all-data`** in the **`show running-config`** command.

To view the running configuration:

Step 1 At the ***SCE 1000#*** prompt, type **`show running-config`**.
The system shows the running configuration.

```
SCE 1000#show running-config
#This is a general configuration file (running-config).
#Created on 15:50:56  CET  MON  February  11  2002
#cli-type 1
#version 1

clock timezone CET 1
snmp-server community “public” ro
snmp-server host 10.1.1.253 traps version 1 “public”
interface LineCard 0
connection-mode active
no silent
no shutdown
flow-aging default-timeout UDP 60
interface FastEthernet 0/0
ip address 10.1.5.109 255.255.0.0
interface FastEthernet 0/1
interface FastEthernet 0/2
exit
line vty 0 4
no timeout
exit
SCE 1000#
```

One of the useful show commands is the **`show version`** command. This command displays global static information on the ***SCE 1000*** as software and hardware version, image build time, system uptime, last open packages names and information on the SLI application assigned.

To show the version information for the ***SCE 1000*** software and hardware:

Step 1 At the ***SCE 1000#*** prompt, type **`show version`**.
The system shows the version information.

```
SCE 1000#show version
System version: Version 2.5.2 Build 240
Build time: Jan 11 2005, 07:34:47
Software version is: Version 2.5.2 Build 240
Hardware information is:
rx            : 0x0075
dp            : 0x1808
tx            : 0x1708
ff            : 0x0077
cls           : 0x1721
cpld          : 0x0025
Lic           : 0x0176
rev           : G001
Bootrom       : 2.1.0
L2 cache      : Samsung 0.5
lic type      : MFE
optic mode    :
Part number: 53AA-BXC1-AAAA
Revision: A02A
Software revision: G001
Serial number: 043P6982
Power Supply type: AC

SML Application information is:
Application file: /tffs0/temp.sli
Application name:
Application help:
Original source file:
H:\work\Emb\jrt\V2.5\sml\actions\drop\drop_basic_anyflow.san
Compilation date: Wed, September 22, 2004 at 21:25:21
Compiler version: SANc v2.50 Build 32 gcc_codelets=true built on: Tue
September 22 2004 09:51:57 AM.;SME plugin v1.1
Default capacity option used.


Logger status: Enabled


Platform: SCE 2000 - 4xFE
Management agent interface version: SCE Agent 2.5.1 Build 18
Software package file:
ftp://vk:vk@10.1.8.22/P:/EMB/LatestVersion/2.5.2/se1000.pkg

SCE 2000 uptime is 21 minutes, 37 seconds
SCE 1000#
```

Another useful show commands is the **`show system-uptime`** command. This command displays information similar to the last line above, which indicates how long the system has been running since the last reboot.

To show the **`s`**ystem uptime for the ***SCE 1000*** software and hardware:

Step 1 At the ***SCE 1000#*** prompt, type **`show system-uptime.`**

The system shows how long the system has been running since the last reboot.

```
SCE 1000#show system-uptime
SCE 1000 uptime is 21 minutes, 37 seconds
SCE 1000#
```

Saving the Configuration Settings

When you make changes to the current running-config and you want those changes to continue to be valid when the system restarts, you must save the changes before leaving the management session, that is, you must save the running configuration to the startup configuration file.

As mentioned before, ***SCE 1000*** provides multiple interfaces for the purpose of configuration and management. All interfaces supply an API to the same database of the ***SCE 1000*** and any configuration made through one interface is reflected through all interfaces. Furthermore, when saving the running-config to the startup-config from any management interface, all configuration settings are saved regardless of the management interface used to set the configuration.

To save configuration changes:

Step 1 At the ***SCE 1000#*** prompt, type **`show running-config`** to view the running configuration.
The running configuration is displayed.

Step 2 Check the displayed configuration to make sure that it is set the way you want. If not, make the changes you want before saving.

Step 3 Type **`copy running-config startup-config`**.
The system saves all running configuration information to the configuration file, which is used when the system reboots.

The configuration file holds all information that is different from the system default in a file called config.txt located in the directory: tffs0:system.

EXAMPLE:

The following example shows the running configuration file.

```
SCE 1000#show running-config
#This is a general configuration file (running-config).
#Created on 15:50:56  CET  MON  February  11  2002
#cli-type 1
#version 1

clock timezone CET 1
snmp-server community “public” ro
snmp-server host 10.1.1.253 traps version 1 “public”
interface LineCard 0
connection-mode active
no silent
no shutdown
flow-aging default-timeout UDP 60
interface FastEthernet 0/0
ip address 10.1.5.109 255.255.0.0
interface FastEthernet 0/1

interface FastEthernet 0/2

exit
line vty 0 4
no timeout
exit
SCE 1000#
SCE 1000#copy running-config startup-config
Writing general configuration file to temporary location...
Backing-up general configuration file...
Copy temporary file to final location...
SCE 1000#
```

For backup purposes, the old startup-config file is saved under the directory: `tffs0:system/prevconf`. Refer to *Recovering a Previous Configuration* (on page 5-14) for an explanation on how to recover previous configuration.

To remove a configuration command from the running-config, use the no form of the command.

EXAMPLE:

The following example illustrates how to remove all DNS settings from the running configuration.

```
SCE 1000(config)#no ip name-server
SCE 1000(config)#
```

Recovering a Previous Configuration

When you save a new configuration, the system automatically backs up the old configuration in the directory *`tffs0:system/prevconf/`*. Up to nine versions of the startup configuration file are saved, namely *`config.tx1-config.tx9`*, where *`config.tx1`* is the most recently saved file.

You can view the old startup configuration files using the CLI command **`more`**.

Restoring a previous startup configuration means renaming the file so it overwrites the startup configuration (*`config.txt`*) file.

To restore a previous startup configuration:

Step 1 At the ***SCE 1000#*** prompt, type **`more tffs0:system/prevconf/config.txt`** to view the configuration file.
The system displays the configuration information stored in the file.

Step 2 Read the configuration information to make sure it is the configuration you want to restore.
Note that you cannot undo the configuration restore command.

Step 3 Type
`copy tffs0:system/prevconf/config.tx1`
`tffs0:system/config.txt`.
The system sets the startup configuration to the configuration from config.tx1.

EXAMPLE:

The following example displays a saved configuration file and then restores the file to overwrite the current configuration.

```
SCE 1000#more tffs0:system/prevconf/config.tx1
#This is a general configuration file (running-config).
#Created on 19:36:07 UTC THU February 14 2002

#cli-type 1
#version 1

interface LineCard 0
no silent
no shutdown

interface FastEthernet 0/0
ip address 10.1.5.109 255.255.0.0

interface FastEthernet 0/1

interface FastEthernet 0/2

exit

line vty 0 4
exit
SCE 1000#copy tffs0:system/prevconf/config.tx1 tffs0:system/config.txt
SCE 1000#
```

Entering and Exiting Global Configuration Mode

To enter the Global Configuration Mode:

Step 1 At the ***SCE 1000#*** prompt, type configure, and press **Enter**.
The ***SCE 1000***(config)# prompt appears.

To exit the Global Configuration Mode:

Step 1 At the ***SCE 1000***(config)# prompt, type exit and press **Enter**.
The ***SCE 1000#*** prompt appears.

Passwords

Cisco CLI passwords are an access-level authorization setting, not individual user passwords. All Admin users, for example, log in with the same password. This means that the system does not identify you as an individual, but as a user with certain privileges.

Passwords are needed for all authorization levels in order to prevent unauthorized users from accessing the ***SCE 1000***. It is highly recommended that you change the default password upon initial installation, and that you change the passwords periodically to secure the system.

Note The default password for all levels is "**cisco**".

When a telnet user logs on, he sees only a Password: prompt, no logo is displayed. This provides extra security by not revealing the system identity to users that do not know the password.

Password guidelines:

- Password length must be between 4 and 100 characters long.
- Passwords can contain any visible keyboard character.
- Passwords must begin with a letter.
- Passwords cannot contain spaces.
- Passwords are case-sensitive.

Users with Admin or higher authorization level can view the configured passwords using the show running-config or the show startup-config commands. Therefore, if you want passwords to remain completely confidential, you must activate the encryption feature, described in *Encryption* (on page 5-18)

Requiring Passwords

The default password is either of the following:

- **`pcube`**
- **cisco**

Use the **`enable password`** command to configure your installation to require a password for user level access, and to change the default password for the admin and root levels. Use the [no] form of the command to restore the password of a specific level to the default state.

To require a password at the User level:

Step 1 At the ***SCE 1000***> prompt, to access the Admin authorization level, type enable and press **Enter**.
The `Password:` prompt appears

Step 2 Type **`pcube`** (the default password for the Admin level) and press **Enter**.
The ***SCE 1000#*** prompt appears.

Step 3 To enter the Global Configuration Mode, type **`configure`** and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

Step 4 Type **`enable password level 0 <password>`**, and press **Enter**.

A password is now required for all telnet access. The Network Administrator should record passwords in a secure location.

To disable the password requirement at the User level:

Step 1 At the ***SCE 1000***`(config)#` prompt, type **`no enable password level 0`**, and press **Enter**.
A password is not required for telnet access to the User authorization level.

Changing Passwords

Use the **`enable password`** command to change the password. Note that if the password has been changed, the default password will no longer be accepted.

To change the password for a specified level:

Step 1 At the ***SCE 1000***> prompt, to access the Admin authorization level, type **`enable`** and press **Enter**.
The `Password:` prompt appears.

Step 2 Type **`cisco`** (the default password for the Admin level) and press **Enter**.
The ***SCE 1000***# prompt appears.

Step 3 To enter the Global Configuration Mode, type **`configure`** and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

Step 4 Type **`enable password level <level> <password>`**, and press **Enter**.
Use the appropriate value for the *`level`* parameter as follows:

- 0: user
- 10: admin
- 15: root

Your new password for the specified level is entered into the system.

The ***SCE 1000***`(config)#` prompt appears.

Step 5 Type **`exit`** to exit the Global Configuration Mode and press **Enter**.
The ***SCE 1000***# prompt appears.

Step 6 At this point, the Network Administrator should record passwords in a secure location.

To verify that you configured your passwords correctly:

Step 1 Initiate a new telnet connection, while maintaining the one you used to set the password. This is needed so that if the verification fails, you would still have admin level authorization in order to re-enter the password.

Step 2 At the ***SCE 1000#*** prompt, do one of the following, according to the password level you are checking:

- Type **`enable`**.

  OR

- Type **`enable 15`**. (Root level)

Step 3 Press **Enter**.

Step 4 Type your new password and press **Enter**.
If your new password has been entered successfully, then the ***SCE 1000*** Admin or Root prompt appears.

If you enter an incorrect password , the following error message appears: “`Error—The supplied password is simply not right.`”

Step 5 Repeat steps 1 to 3 to check additional passwords.

The encryption feature will encrypt the passwords in the platform configuration files.

Encryption

Once the encryption feature is activated, passwords entered into the system are encrypted to the startup configuration file the next time the configuration is saved. When encryption feature is turned off, passwords previously encrypted to the startup configuration file are not deciphered.

By default, the password encryption feature is turned off.

To enable password encryption:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`service password encryption`**.
Password encryption is enabled.

To disable password encryption:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`no service password encryption`**.
This does not remove the encryption from the configuration file. You must save to the startup configuration file if you want the password to be stored un-encrypted on the startup configuration file.

Note Once the system is secured, you cannot recover a lost or forgotten password. Contact your Cisco customer support center if the password is lost.

Upgrading SCE Platform Firmware

Cisco distributes upgrades to the software and firmware on the ***SCE 1000***. Cisco distributes upgrade software as a file with the extension .pkg that is installed directly from the ftp site without being copied to the disk. This procedure walks you through installation and rebooting of the ***SCE 1000*** with the new firmware.

To upgrade your ***SCE 1000*** software:

Step 1 Type **`configure`** to enter Global Configuration mode.
The SCE prompt changes to ***SCE 1000***`(config)#`.

Step 2 Type **`boot system ftp://<user:password@host/drive:dir/seNum.pkg>`**, where <seNum.pkg> is the file name on the ftp site.
The boot command verifies that the package is a legal, appropriate update for the ***SCE 1000*** and that the file was not corrupted. It does not perform an upgrade, but does keep in the system memory that a pkg file is available.

Step 3 Type **`exit`** to leave the Global Configuration mode.
The SCE prompt changes to ***SCE 1000***#.

Step 4 Type **`copy running-config startup-config`**.
This command re-verifies that the package is valid, and extracts the upgrade to the Flash file system.

The system notifies you that it is performing the extraction as follows:

```
Backing–up configuration file…
Writing configuration file…
Extracting new system image…
Extracted OK.
SCE 1000#
```

Step 5 Type reload to reboot the system.
The ***SCE 1000*** prompts you for confirmation by asking `Are you sure?`

Step 6 Type **Y** and press **Enter**.
The system sends the following message and reboots.

```
the system is about to reboot, this will end your CLI session
```

EXAMPLE:

The following example shows the full procedure for performing a software update.

```
SCE 1000#configure
SCE 1000(config)# boot system ftp://vk:vk@10.1.1.230/downloads/SENum.pkg
SCE 1000(config)#exit
SCE 1000#copy running-config startup-config
Backing–up configuration file…
Writing configuration file…
Extracting new system image…
Extracted OK.
SCE 1000#>reload
Are you sure? y
the system is about to reboot, this will end your CLI session
```

The User Log

The user log is an ASCII file that can be viewed in any editor. It contains a record of system events, including startup, shutdown and errors. You can use the Logger to view the user log to determine whether or not the system is functioning properly, as well as for technical support purposes.

The Logging System

Events are logged to one of two log files. After a file reaches maximum capacity, the events logged in that file are then temporarily archived. New events are then automatically logged to the alternate log file. When the second log file reaches maximum capacity, the system then reverts to logging events to the first log file, thus overwriting the temporarily archived information stored in that file.

Basic operations include:

- Enabling/disabling the User Log
- Copying the User Log to an external source
- Viewing/clearing the User Log counter
- Clearing the User Log

The commands relevant to the user log are:

- `clear logger device User-File-Log`
- `clear logger device` *`device-name`* `nv-counters`
- `clear logger nv-counters`
- `clear logger device User-File-Log counters`
- `logger add-user-message`
- `logger device User-File-Log disabled`
- `logger device User-File-Log enabled`
- `logger device User-File-Log max-file-size`
- `logger get user-log file-name`
- `show logger nv-counters`
- `show logger device` *`device-name`* `nv-counters`
- `show logger device User-File-Log`
- `show logger device User-File-Log counters`
- `show logger device User-File-Log max-file-size`

Enabling and Disabling the User Log

By default, the user log is enabled. You can disable the user log by configuring the status of the logger.

To disable the user log:

Step 1 From the ***SCE 1000#*** prompt, type **`configure`** and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears indicating that you are in Global Configuration mode.

Step 2 Type **`logger device User-File-Log disabled`** and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

To enable the user file log:

Step 1 From the ***SCE 1000#*** prompt, type **`configure`** and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

Step 2 Type **`logger device User-File-Log enabled`** and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

Copying the User Log

You can view the log file by copying it to an external source or to disk. This command copies both log files to the local ***SCE 1000*** disk or any external host running a FTP server.

To copy the user log to an external source:

Step 1 From the ***SCE 1000#*** prompt, type **`logger get user-log file-name`** *`ftp://username:password@ipaddress/path`* and press **Enter**.
The ***SCE 1000#*** prompt appears.

To copy the user log to an internal location:

Step 1 From the ***SCE 1000#*** prompt, type **`logger get user-log file-name`** *`target-filename`* and press **Enter**.
The ***SCE 1000#*** prompt appears.

Viewing/Clearing the User Log Counters

There are two types of log counters:

- User log counters: count the number of system events logged from the ***SCE 1000*** last reboot.
- Non-volatile counters: are not cleared during boot time

The non-volatile counters are cleared only by explicitly executing the clear command for the desired log, they are not cleared when the device or the regular counters are cleared. Conversely, clearing the non-volatile counters does not affect the regular log counters.

To view the user log counter for the current session:

Step 1 From the ***SCE 1000#*** prompt, type **`show logger device user-file-log counters`** and pr**ess E**nter.
The logger lines information appears, followed by the ***SCE 1000#*** prompt.

To view the non-volatile logger counter:

Step 1 From the ***SCE 1000#*** prompt, type **`show logger nv-counters`** and press **Enter**.
The non-volatile log counter information appears, followed by the ***SCE 1000#*** prompt.

To view the non-volatile counter for the user-file-log:

Step 1 From the ***SCE 1000#*** prompt, type **`show logger device user-file-log nv-counters`** and press **Enter**.
The user-file-log non-volatile log counter information appears, followed by the ***SCE 1000#*** prompt.

To view the non-volatile counter for the debug-file-log:

Step 1 From the ***SCE 1000#*** prompt, type **`show logger device debug-file-log nv-counters`** and press **Enter**.
The debug-file-log non-volatile log counter information appears, followed by the ***SCE 1000#*** prompt.

To clear the system counter:

Step 1 From the ***SCE 1000#*** prompt, type **`clear logger device user-file-log counters`** and press **Enter**.
The system asks “`Are you sure?”`

Step 2 Type **Y** and press **Enter**.
The ***SCE 1000#*** prompt appears.

To clear the non-volatile logger counter:

Step 1 From the ***SCE 1000#*** prompt, type **`clear logger nv-counters`** and press **Enter**.
The system asks “`Are you sure?”`

Step 2 Type **Y** and press **Enter**.
The ***SCE 1000#*** prompt appears.

To clear the non-volatile counter for the user-file-log:

Step 1 From the ***SCE 1000#*** prompt, type **`clear logger device user-file-log nv-counters`** and press **Enter**.
The system asks “`Are you sure?`”

Step 2 Type **Y** and press **Enter**.
The ***SCE 1000#*** prompt appears.

To clear the non-volatile counter for the debug-file-log:

Step 1 From the ***SCE 1000#*** prompt, type **`clear logger device debug-file-log nv-counters`** and press **Enter**.
The system asks “`Are you sure?`”

Step 2 Type **Y** and press **Enter**.
The ***SCE 1000#*** prompt appears.

Viewing the User Log

Note This command is not recommended when the user log is large. Copy a large log to a file to view it (see *Copying the User Log* (on page 5-22))

To view the user log:

Step 1 From the ***SCE 1000#*** prompt, type **`more user log`** and press **Enter**.
The user log appears, followed by the ***SCE 1000#*** prompt.

Clearing the User Log

You can clear the contents of the user log at any time. The user log contains important information regarding the functioning of the system. It is recommended that a copy be made before the log is cleared.

To clear the user log:

Step 1 From `the` ***SCE 1000#*** prompt, type **clear logger device user-file-log** and press **Enter**.

Step 2 The system asks `Are you sure?`

Step 3 Type **Y** and press **Enter**.
The ***SCE 1000#*** prompt appears.

Generating a File for Technical Support

In order for technical support to be most effective, the user should provide them with the information contained in the system logs. Use the **`logger get support-file`** command to generate a support file for the use of Cisco technical support staff.

To generate a log file for technical support:

Step 1 From the ***SCE 1000#*** prompt, type **`logger get support-file`** *`filename`* and press **Enter**.
The support information file is created using the specified filename, and the ***SCE 1000#*** prompt appears. This operation may take some time.

Rebooting and Shutting Down the SCE Platform

Rebooting the SCE Platform

Rebooting the ***SCE 1000*** is required after installing a new firmware, in order for that firmware to take effect. There might be other occasions where rebooting the ***SCE 1000*** is necessary.

Note When the SCE restarts, it loads the startup configuration, so all changes made in the running configuration will be lost. You are advised to save the running configuration before performing reload, as described in *Saving the Configuration Settings* (on page 5-12).

To reboot your ***SCE 1000***:

Step 1 At the ***SCE 1000#*** prompt, type **`reload`** and press **Enter**.
A confirmation message appears.

Step 2 Type **Y** to confirm the reboot request and press **Enter**.

EXAMPLE:

The following example shows the commands for system reboot.

```
SCE 1000#reload
Are you sure? y
the system is about to reboot, this will end your CLI session
```

Shutting Down the SCE Platform

Shutting down the ***SCE 1000*** is required before turning the power off. This helps to ensure that non-volatile memory devices in the ***SCE 1000*** are properly flushed in an orderly manner.

Note When the SCE restarts, it loads the startup configuration, so all changes made in the running configuration will be lost. You are advised to save the running configuration before performing reload, as described in *Saving the Configuration Settings* (on page 5-12).

To shut down your ***SCE 1000***:

Step 1 Connect to the serial console port (The CON connector on the ***SCE 1000*** front panel, 9600 baud).
The ***SCE 1000#*** prompt appears.

Step 2 Type **`reload shutdown`**.
A confirmation message appears.

Step 3 Type **Y** to confirm the shutdown request and press **Enter**.

EXAMPLE:

The following example shows the commands for system shutdown.

```
SCE 1000#reload shutdown
You are about to shut down the system.
The only way to resume system operation after this
is to cycle the power off, and then back on.
Continue?
y

IT IS NOW SAFE TO TURN THE POWER OFF.
```

Note Since the ***SCE 1000 SCE 1000*** can recover from the power-down state only by being physically turned off (Or cycling the power), this command can only be executed from the serial CLI console. This limitation helps prevent situations in which a user issues this command from a Telnet sessions, and then realizes he/she has no physical access to the ***SCE 1000***.

CHAPTER 6

Control Configuration

This chapter discusses the configuration of the ***SCE 1000*** management ports and interfaces.

Step 4 This chapter contains the following sections:

- Entering and Exiting Global Configuration Mode 6-1
- SCE Platform Management Interfaces 6-2
- Configuring the Available Interfaces 6-2
- IP Configuration 6-7
- Time Clocks and Time Zone 6-11
- SNTP 6-13
- Domain Name (DNS) Settings 6-16
- The RDR Formatter 6-19
- SNMP Configuration and Management 6-31
- Failure Recovery Mode 6-41
- Entering FastEthernet (Management) Interface Configuration Mode
- Management Interface Configuration Mode 6-43
- Entering LineCard Interface Configuration Mode 6-44

Entering and Exiting Global Configuration Mode

To enter the Global Configuration Mode:

Step 1 At the ***SCE 1000#*** prompt, type configure, and press **Enter**.
The ***SCE 1000***(config)# prompt appears.

To exit the Global Configuration Mode:

Step 1 At the ***SCE 1000***(config)# prompt, type exit and press **Enter**.
The ***SCE 1000***# prompt appears.

SCE Platform Management Interfaces

You can manage the ***SCE 1000*** through either of its management interfaces, CLI or SNMP. Both these interfaces supply API to the same database of the ***SCE 1000***; any configuration changes made through one interface are also reflected through the other interface.

- **CLI** (Command Line Interface). The CLI is accessible through the Console port or through a Telnet connection. The CLI is the interface described throughout this manual. *Command Line Interface* (on page 3-1) further discusses the CLI.
- **SNMP** (Simple Network Management Protocol). You can use SNMP as an interface for controlling the variables as defined in the MIB-II and Cisco's propriety MIB specifications. For information on enabling SNMP, see *SNMP Interface* (on page 6-6)

Configuring the Available Interfaces

The system allows you to configure the Telnet and SNMP interfaces according to how you are planning to manage the ***SCE 1000*** and the external components of the system.

Configuring Access Control Lists (ACLs)

The ***SCE 1000*** can be configured with Access Control Lists (ACLs), which are used to permit or deny incoming connections on any of the management interfaces. An access list is an ordered list of entries, each consisting of an IP address and an optional wildcard "mask" defining an IP address range, and a permit/deny field.

The order of the entries in the list is important. The default action of the first entry that matches the connection is used. If no entry in the Access List matches the connection, or if the Access List is empty, the default action is **deny**.

Configuration of system access is done in two stages:

Step 1 Creating an access list. (See *Adding Entries to an Access List* (on page 6-3)).

Step 2 Associating the access list with a management interface. (See *Defining the Global Access List* (on page 6-4) and *Associating an Access List to Telnet Interface.* ("Associating an Access List to Telnet Interface" on page 6-5))

Creating an access list is done entry by entry, from the first to the last.

When the system checks for an IP address on an access list, the system checks each line in the access list for the IP address, starting at the first entry and moving towards the last entry. The first match that is detected (that is, the IP address being checked is found within the IP address range defined by the entry) determines the result, according to the permit/deny flag in the matched entry. If no matching entry is found in the access list, access is denied.

You can create up to 99 access lists. Access lists can be associated with system access on the following levels:

- Global (IP) level. If a global list is defined using the **ip access-class** command, when a request comes in, the ***SCE 1000*** first checks if there is permission for access from that IP address. If not, the SCE does not respond to the request. Configuring the ***SCE 1000*** to deny a certain IP address would preclude the option of communicating with that address using any IP-based protocol including Telnet, FTP, ICMP and SNMP. The basic IP interface is low-level, blocking the IP packets before they reach the interfaces.
- Interface level. Access to each management interface (Telnet, SNMP, etc.) can be restricted to an access list. Interface-level lists are, by definition, a subset of the Global list defined. If access is denied at the global level, the IP will not be allowed to access using one of the interfaces. Once an access list is associated with a specific management interface, that interface checks the access list to find out if there is permission for a specific external IP address trying to access the management interface.

It is possible to configure several management interfaces to the same access list, if this is the desired behavior of the ***SCE 1000***.

If no ACL is associated to a management interface or to the global IP level, access is permitted from all IP addresses.

Note The SCE Platform will respond to **ping** commands only from IP addresses that are allowed access. Ping from a non-authorized address will not receive a response from the SCE unit, as ping uses ICMP protocol

The following commands are relevant to access lists:

- `access-list`
- `access-class number in`
- `ip access-class`
- `no access-list`
- `no ip access-class`
- `show ip access-class`

Adding Entries to an Access List

To add an address to an access list allowing access to a particular address:

Step 1 To enter the Global Configuration Mode, type **`configure`** and press **Enter**.

Step 2 The ***SCE 1000***`(config)#` prompt appears.

Step 3 To configure one IP address type:
`access-list` `number` **`permit`** `x.x.x.x` and press **Enter** where `x.x.x.x` is the IP address.

Step 4 To configure more than one IP address type:
`access-list` `number` **`permit`** `x.x.x.x y.y.y.y` and press **Enter**.

This command configures a range of addresses in the format `x.x.x.x y.y.y.y` where `x.x.x.x` specifies the prefix bits common to all IP addresses in the range, and `y.y.y.y` is a wildcard-bits mask specifying the bits that are ignored. In this notation, ‘1’ means bits to ignore.

EXAMPLE:

The following example adds an entry to the access list number 1, that permits access only to IP addresses in the range of 10.1.1.0–10.1.1.255.

```
 SCE 1000(config)#access-list 1 permit 10.1.1.0 0.0.0.255
```

You can also add addresses from which you deny service, by using the **`deny`** rather than the **`permit`** switch. You can create up to 99 different address lists, which can be associated with access to the interfaces.

When you add a new entry to an ACL, it is always added to the end of the Access-List.

Removing an Access List

To remove an Access List (with all its entries):

Step 1 From the ***SCE 1000***`(config)`# prompt, type **`no access-list`** *number permit/deny*, and press **Enter**.
The Access List and all of its entries are removed.

Defining the Global Access List

To define an Access List as the global list for permitting or denying all traffic to the ***SCE 1000***:

Step 1 From the ***SCE 1000***`(config)`# prompt, type `ip access-class` *number*, and press **Enter**.

Telnet Interface

This section discusses the Telnet interface of the ***SCE 1000***. A Telnet session is the most common way to connect to the ***SCE 1000*** CLI interface.

You can set the following parameters for the Telnet interface:

- Enable/disable the interface
- Associate an access list to permit or deny incoming connections. (Access lists)
- Timeout for Telnet sessions, that is, if there is no activity on the session, how long the ***SCE 1000*** waits before automatically cutting off the Telnet connection.

The following commands are relevant to Telnet interface:

- `access-class number in`
- `line vty`
- `[no] access list`
- `[no] service telnetd`
- `[no] timeout`
- `show line vty access-class in`
- `show line vty timeout`

Preventing Telnet Access

You can disable access by Telnet altogether.

To disable Telnet access:

Step 1 From the ***SCE 1000***`(config)`# prompt, type **`no service telnetd`**.
Telnet service is no longer allowed on the ***SCE 1000***. Current Telnet sessions are not disconnected, but no new Telnet sessions are allowed.

Associating an Access List to Telnet Interface

To restrict the ***SCE 1000*** management via Telnet to a specific access list:

Step 1 From the ***SCE 1000***`(config)#` prompt, enter the Line Configuration mode by typing line vty 0.

Step 2 Type **`access-class`** *access-list-number* **`in`** (where `access-list-number` is an index of an existing access list).
The following example associates the access list number 1 to the Telnet interface.

```
SCE 1000#configure
SCE 1000 (config)#line vty 0
SCE 1000(config-line)#access-class 1 in
```

Step 3 Type **`exit`** and press **Enter**.
This returns you to Global Configuration Mode.

Telnet Timeout

The ***SCE 1000*** supports timeout of inactive Telnet sessions. The default timeout is 30 minutes.

To configure the timeout for a telnet session when the line is idle:

Step 1 From the ***SCE 1000***`(config-line)`# prompt, type **`timeout`** time, where time is the time in minutes.

SNMP Interface

To enable the SNMP interface, use the **`snmp-server`** command. You can also configure any of the SNMP parameters: hosts, communities, contact, location, and trap destination host. When you enable the SNMP agent, these four parameters are filled in with their most recent values before the agent was disabled. To disable the SNMP interface, use the **`no snmp-server`** command.

This section guides you through enabling and disabling the SNMP interface. Complete information on SNMP is found in *SNMP Configuration and Management* (on page 6-31).

The following commands are relevant to enabling and disabling the SNMP interface:

- `[no] snmp-server`
- `[no] snmp-server community`
- `[no] snmp-server contact`
- `[no] snmp-server host`
- `[no] snmp-server location`

Enabling SNMP

To enable SNMP by setting a community string:

Step 1 To enter the Global Configuration Mode, at the ***SCE 1000***# prompt, type `configure` and press **Enter**.
The ***SCE 1000***`(config)`# prompt appears.

Step 2 Type **`snmp-server community`** `community-string`, where the `community string` is a security string that identifies a community of managers that are able to access the SNMP server.
You must define at least one community string in order to allow SNMP access. For complete information on community strings see *Configuring SNMP Community Strings* (on page 6-33).

Disabling SNMP

To disable SNMP access:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`no snmp-server`**.

IP Configuration

IP Routing Table

For handling IP packets on the out of band FE port, the ***SCE 1000*** maintains a static routing table. When a packet is sent, the system checks the routing table for proper routing, and forwards the packet accordingly. In cases where the ***SCE 1000*** cannot determine where to route a packet, it sends the packet to the default gateway.

SCE 1000 supports the configuration of the default gateway as the default next hop router, as well as the configuration of the routing table to provide different next hop routers for different subnets (for maximum configuration of 10 subnets).

The following sections illustrate how to use CLI commands to configure various parameters.

The following commands are relevant to IP Routing tables:

- `ip route prefix mask next-hop`
- `no ip route all`
- `no ip route prefix mask`
- `show ip route`
- `show ip route prefix`
- `show ip route prefix mask`

Default Gateway

To configure the default gateway:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`ip default-gateway <address>`**, and press **Enter**.
The default gateway for the ***SCE 1000*** is set.

EXAMPLE:

The following example shows how to set the default gateway IP of the ***SCE 1000*** to 10.1.1.1.

```
 SCE 1000(config)#ip default-gateway 10.1.1.1
```

Adding IP Routing Entry to Routing Table

To add an IP routing entry to the routing table:

Step 1 From the ***SCE 1000***`(config)#` prompt, use the **`ip route <prefix> <mask> <next-hop>`** command, and press **Enter**.
The IP routing entry is added to the routing table. (All addresses must be in dotted notation. The next-hop must be within the Fast-Ethernet interface subnet.)

EXAMPLE:

The following example shows how to set the router 10.1.1.250 as the next hop to subnet 10.2.0.0.

```
 SCE 1000(config)#ip route 10.2.0.0 255.255.0.0 10.1.1.250
```

Show IP Route

To use show ip route command to display the entire routing table:

Step 1 From the ***SCE 1000#*** prompt, type **`show ip route`** and press **Enter**.
The entire routing table and the destination of last resort (default-gateway) appear.

EXAMPLE:

```
SCE 1000#show ip route
gateway of last resort is        10.1.1.1

|    prefix       |     mask         |    next hop     |
|-----------------|------------------|-----------------|
|        10.2.0.0 |     255.255.0.0  |      10.1.1.250 |
|        10.3.0.0 |     255.255.0.0  |      10.1.1.253 |
|        198.0.0.0 |       255.0.0.0 |      10.1.1.251 |
|        10.1.60.0 |   255.255.255.0 |      10.1.1.5   |
```

To use show ip route prefix command to display routing entries from the subnet specified by the prefix and mask pair:

Step 1 From the ***SCE 1000#*** prompt, type show **`ip route prefix mask`** and press **Enter**. Routing entries with this prefix and mask pair appear.

EXAMPLE:

```
SCE 1000#show ip route 10.1.60.0 255.255.255.0
|    prefix       |     mask        |    next hop     |
|-----------------|-----------------|-----------------|
|       10.1.60.0 |   255.255.255.0 |        10.1.1.5 |
SCE 1000#
```

IP Advertising

IP advertising is the act of periodically sending Ping requests to a configured address at configured intervals. This maintains the ***SCE 1000*** IP/MAC addresses in the memory of adaptive network elements, such as switches, even during a long period of inactivity.

The following commands are relevant to IP advertising:

- `[no] ip advertising`
- `ip advertising destination`
- `ip advertising interval`
- `default ip advertising destination`
- `default ip advertising interval`
- `show ip advertising`
- `show ip advertising destination`
- `show ip advertising interval`

Configuring IP Advertising

In order to configure IP advertising, you must first enable IP advertising. You may then specify a destination address to which the ping request is to be sent and/or the frequency of the ping requests (interval). If no destination or interval is explicitly configured, the default values are assumed.

To enable IP advertising:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`ip advertising`**, and press **Enter**.
IP advertising is enabled.

To configure the IP advertising destination:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`ip advertising destination <destination>`**, and press **Enter**.
The specified IP address is the destination for the ping requests.

To configure the IP advertising interval in seconds:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`ip advertising interval <interval>`**, and press **Enter**.
The ping requests are sent at the specified intervals.

EXAMPLE:

The following example shows how to configure IP advertising, specifying 10.1.1.1 as the destination and an interval of 240 seconds.

```
SCE 1000(config)#ip advertising destination 10.1.1.1 interval 240
```

Show IP Advertising

To display the current IP advertising configuration:

Step 1 From the ***SCE 1000#*** prompt, type **`show ip advertising`** and press **Enter**.
The status of IP advertising (enabled or disabled), the configured destination, and the configured interval are displayed.

Time Clocks and Time Zone

The ***SCE 1000*** has three types of time settings, which can be configured: the clock, the calendar, and the time zone. It is important to synchronize the clock and calendar to the local time, and to set the time zone properly. The ***SCE 1000*** does not track Daylight Saving Time automatically, so you must update the time zone when the time changes bi-annually.

The ***SCE 1000*** has the following two time sources:

- A real-time clock, called the calendar, that continuously keeps track of the time, even when the ***SCE 1000*** is not powered up. When the ***SCE 1000*** reboots, the calendar time is used to set the system clock. The calendar is not used for time tracking during system operation.
- A system clock, which creates all the time stamps during normal operation. This clock clears if the system shuts down. During a system boot, the clock is initialized to show the time indicated by the calendar.

It does not matter which clock you set first, as long as you use the clock and calendar read commands to ensure they are synchronized.

The time zone settings are important because they allow the system to communicate properly with other systems in other time zones. The system is configured based on Greenwich Mean Time (GMT), which is standard in the industry for coordination with other manufacturers' hardware and software. For example, Pacific Standard Time would be written as PST-10, meaning that the name of the time zone is PST, which is 10 hours behind Greenwich Mean Time.

When setting and showing the time, the time is always typed or displayed according to the local time zone configured.

Showing System Time

To display the current time of the system clock:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`show clock`** and press **Enter**.
The time maintained by the system clock appears.

EXAMPLE:

The following example shows the current system clock.

```
SCE 1000#show clock
12:50:03  UTC  MON  November 13 2001
```

Showing Calendar Time

To display the current time and date of the system calendar:

Step 1 From the ***SCE 1000#*** prompt, type **`show calendar`** and press **Enter**.
The current system calendar appears.

EXAMPLE:

The following example shows the current system calendar.

```
SCE 1000#show calendar
12:50:03  UTC  MON  November 13 2001
```

Setting the Clock

To set the clock:

Step 1 From the *SCE 1000#* prompt, type **`clock set <hh:mm:ss day month year>`**, where *<hh:mm:ss day month year>* is the time and date you want to set, and press **Enter**.
The time is set.

EXAMPLE:

The following example shows how to set the clock to 20 minutes past 10 AM, October 13, 2001, updates the calendar and then displays the time.

```
SCE 1000#clock set 10:20:00 13 oct 2001
SCE 1000#clock update-calendar
SCE 1000#show clock
10:21:10  UTC  THU  October  13  2001
```

Setting the Calendar

To set the calendar:

Step 1 From the *SCE 1000#* prompt, type calendar **`set <hh:mm:ss day month year>`**, where <hh:mm:ss day month year> is the time and date you want to set.
This sets the system calendar, displaying the time and date.

Step 2 Synchronize the clock with the calendar time you just set by typing **`clock read-calendar`**.
The time specified in this command is relative to the configured time zone.

EXAMPLE:

The following example shows that the calendar is set to 20 minutes past 10 AM, October 13, 2001.

```
SCE 1000#calendar set 10:20:00 13 oct 2001
SCE 1000#clock read-calendar
SCE 1000#show calendar
10:20:00  UTC  THU  October  13  2001
```

Setting the Time Zone

To set the current time zone:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`clock timezone <zone> <hours>`**, where <zone> is the name of the time zone and <hours> is the offset from GMT.

EXAMPLE:

The following example shows how to set the time zone to Pacific Standard Time with an offset of 10 hours behind GMT.

```
SCE 1000(config)#clock timezone PST –10
SCE 1000(config)#
```

Note You can configure time zones that do not differ from GMT by a multiple of one hour. Consult the *CLI Command Reference* (on page A-1) regarding the clock timezone global configuration command.

Removing Current Time Zone Setting

To remove the current time zone setting:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`no clock timezone`** and press **Enter**.
The default time zone is UTC (GMT).

EXAMPLE:

The following example shows how to remove the time zone setting.

```
SCE 1000(config)#no clock timezone
```

SNTP

The Simple Network Timing Protocol (SNTP) is a simple solution to the problem of synchronizing the clocks in the various elements of the network. SNTP provides access to a time source via the network. The system clock and calendar are then set in accordance with this external source.

There are two options for the SNTP client. These functions are independent, and the system employ either one or both.

- Multicast SNTP client: Listens to SNTP broadcasts and updates the system clock accordingly.

- Unicast SNTP client: Sends a periodic request to a configured SNTP server, and updates the system clock according to the server response.

Note It is recommended that an IP access control list be configured in order to prevent access from unauthorized SNTP or NTP multicast servers.

The following commands are relevant to SNTP configuration:

- `[no] sntp broadcast client`
- `[no] sntp server address`
- `no sntp server all`
- `sntp update-interval interval in seconds`
- `show sntp`

Enabling SNTP multicast client

To enable the SNTP multicast client:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`sntp broadcast client`**, and press **Enter**.
The SNTP multicast is enabled, and will accept time updates from any broadcast server.

Disabling SNTP multicast client

To disable the SNTP multicast client:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`no sntp broadcast client`**, and press **Enter**.
The SNTP multicast client is disabled, and will not accept any broadcast time updates.

Enabling SNTP unicast client

To define the SNTP unicast server to be queried:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`sntp server <address>`**, and press **Enter**, where <address> is the IP address of the SNTP server.
The SNTP unicast server is defined, and SNTP client is enabled to query that server.

EXAMPLE:

The following example shows how to enable an SNTP server at IP address 128.182.58.100.

```
SCE 1000(config)# sntp server 128.182.58.100
```

Disabling SNTP unicast client

To disable the SNTP unicast client and remove all servers from the client list:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`no sntp server all`**, and press Enter.
All SNTP unicast servers are removed, preventing unicast SNTP query.

To remove one SNTP servers from the client list:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`no sntp server <address>`**, and press **Enter**, where <address> is the IP address of the SNTP server.
The specified SNTP unicast server is removed.

Defining the SNTP unicast update interval

To define the interval for SNTP update queries:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`sntp update-interval <interval>`**, where <interval> is the time in seconds between updates (64 through 1024), and press **Enter**.
The SNTP unicast client will query the server at the defined intervals.

EXAMPLE:

The following example shows how to set the SNTP update interval for 100 seconds.

```
SCE 1000(config)# sntp update-interval 100
```

Display SNTP information

To get information about SNTP servers and updates:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`show sntp`**, and press **Enter**.
The configuration of both the SNTP unicast client and the SNTP multicast client is displayed.

EXAMPLE:

```
SNTP broadcast client: disabled
last update time: not available

SNTP unicast client: enabled
SNTP unicast server: 128.182.58.100
last update time: Feb 10 2002, 14:06:41
update interval: 100 seconds
```

Domain Name (DNS) Settings

When a name of a host is given as a parameter to a CLI command that expects a host name or an IP address, the system translates the name to an IP address according to the following:

Step 1 If the name is in a dotted decimal notation (that is, in the format x.x.x.x), it is directly translated to an IP address it represents.

Step 2 If the name does not contain the dot character (.), the system looks it up in the IP Host table. If the name is found on the table, it is mapped to the corresponding IP address. The IP host table can be configured using the command `ip host`.

Step 3 If the name does not contain the dot (.) character, and the domain name function is enabled (See the ip domain-lookup command), and a default domain name is specified (See the ip domain-name command), the default domain name is appended to the given name to form a fully qualified host name. This, in turn, is used to perform a DNS query translating the name to an IP address.

Step 4 Otherwise, if the domain name function is enabled, the name is considered to be fully qualified, and is used to perform a DNS query translating the name to an IP address.

The following commands are relevant to DNS settings:

- `ip name-server`
- `ip domain-name`
- `no ip domain-name`
- `ip domain-lookup`
- `show hosts`

To enable DNS lookup:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`ip domain-lookup`**.

To disable DNS lookup:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`no ip domain-lookup`**.

Name Servers

To specify the address of one or more name servers to use for name and address resolution:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`ip name-server <server-address1> [<server-address2> [<server-address3>]]`**, and press **Enter**.
The addresses of the name servers are set.

EXAMPLE:

The following example shows how to configure the two name server (DNS) IP addresses.

```
SCE 1000(config)#ip name-server 10.1.1.60 10.1.1.61
```

To remove the name server address:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`no ip name-server <server-address1> [<server-address2> [<server-address3>]]`**, and press **Enter**.
The addresses of the name servers are removed.

EXAMPLE:

The following example shows how to remove the name server (DNS) IP address.

```
SCE 1000(config)#no ip name-server 10.1.1.60 10.1.1.61
```

To clear the name server table all addresses :

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`no ip name-server`**, and press **Enter**.

Domain Name

To define a default domain name:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`ip domain-name domain-name`**, and press **Enter**.
The default domain name is defined. The default domain name is used to complete unqualified host names. Do not include the initial period that separates an unqualified name from the domain name.

EXAMPLE:

The following example shows how to configure the domain name.

Now, if the hostname “Cisco” is entered, the default domain name “com” is appended, to produce “Cisco.com”.

```
SCE 1000(config)#ip domain-name com
```

EXAMPLE:

The following example shows how to remove the configured domain name.

```
SCE 1000(config)#no ip domain-name
```

Host Table

To add a hostname and address to the host table:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`ip host hostname ip-address`**, and press **Enter**.

EXAMPLE:

The following example shows how to add a host to the host table.

```
SCE 1000(config)#ip host PC85 10.1.1.61
```

EXAMPLE:

The following example shows how to remove a hostname together with all of its IP mappings.

```
SCE 1000(config)#no ip host PC85
```

show hosts

To display current DNS settings:

Step 1 From the ***SCE 1000#*** prompt, type **`show hosts`**.

EXAMPLE:

The following example shows how to display current DNS information.

```
SCE 1000#show hosts
Default domain is Cisco.com
Name/address lookup uses domain service
Name servers are 10.1.1.60, 10.1.1.61
Host                 Address
----                 -------
PC85                 10.1.1.61
SCE 1000#
```

The RDR Formatter

The RDR formatter is used to gather the streams of events passed from the application, format the data into Raw Data Records (RDRs), and send these RDRs to the appropriate destination(s).

There can be a maximum of four destinations for the RDRs. The system decides which destination to send the RDRs to on the basis of three factors:

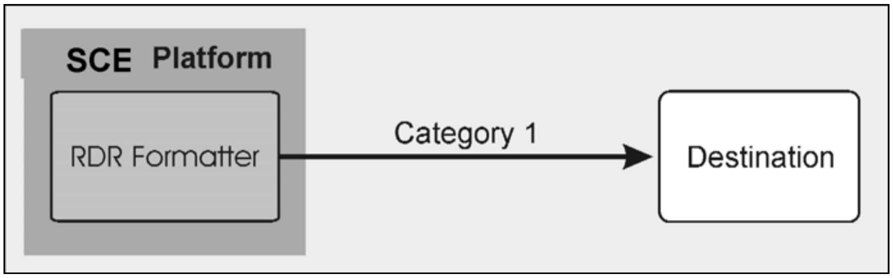
- Categories: RDRs may be divided into two categories, with each category being assigned to a maximum of three of the defined destinations. A destination may be assigned to both categories.
- Priority: The priority value assigned to the destination for a specific category
- Forwarding mode: the pattern in which the RDR traffic is divided between the various destinations

RDR Formatter Destinations

The ***SCE 1000*** can be configured with a maximum of four RDR destinations, three destinations per category. Each destination is defined by its IP address and TCP port number, and is assigned a priority for each category to which it is assigned.

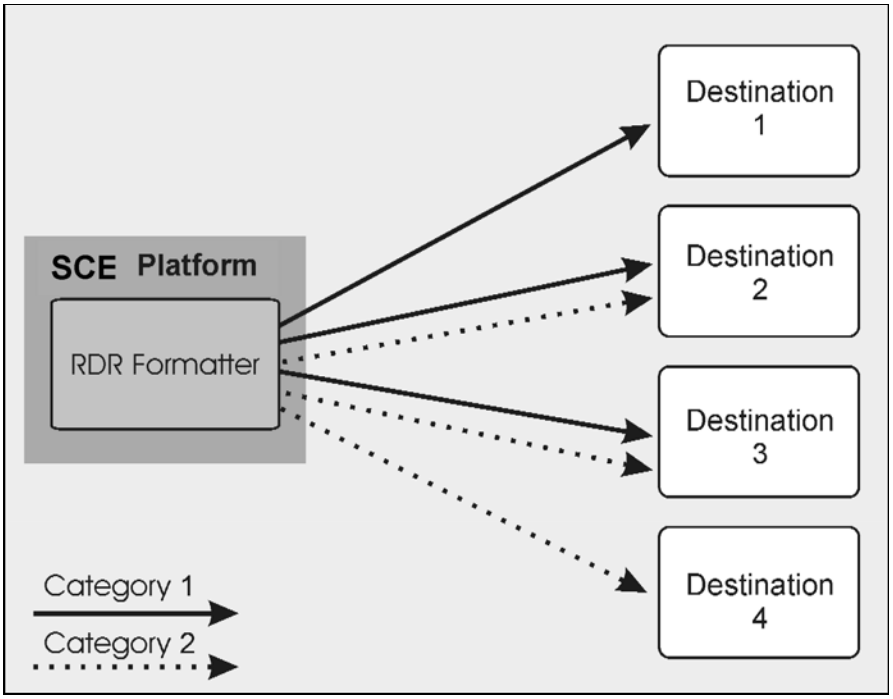
The following figure illustrates the simplest RDR formatter topology, with only one category and one destination.

Figure 6-1: Simple RDR Formatter Topology



The following figure illustrates a complex topology using both categories and the maximum number of destinations (four). Each category can send RDRs to three of the four destinations.

Figure 6-2: RDR Formatter Topology with Multiple Destinations



Categories

In certain installations, RDRs must be sent to different collector servers according to their type. For instance, in the pre-paid environment, some RDRs must be sent to the pre-paid collector to get a new quota, while others should be sent to the mediation system. In this case, the RDRs are divided into two groups, and each group, or category, is assigned to a particular destination or destinations. (Assigning the RDRs to categories is defined by the application running on the ***SCE 1000***.)

The system supports two categories. Therefore, the RDR formatter destinations must be configured regarding each category. Each destination may be assigned to both categories and may be assigned the same or different priorities for each category. If more than one destination is defined for a category, a load-balancing or multicast forwarding mode could be selected. (Obviously, these modes have no meaning of there is only one destination per category.)

It is also possible to remove a category from a destination, leaving only the desired category. If both categories are removed, the destination itself is deleted.

By default, the categories are referred to as Category 1 and Category 2. However, the user may define meaningful names for the categories. This generally reduces confusion and prevents errors.

Priority

The priority value is used to indicate whether the destination should be a destination for a given category. A high priority indicates that RDRs from a category should be sent a particular destination. No priority indicates that RDRs from a category should not be sent to a particular destination.

Priority also is related to the redundant forwarding mode, in that it indicates which is the primary active connection. Priority values have no affect in simple-load-balancing or multicast forwarding modes.

Each destination is assigned two priority values, one for each category. The first destination that is configured is automatically assigned a priority of 100 (highest priority) for both categories, unless explicitly defined otherwise.

Following are some important points to keep in mind regarding priority values:

- Two destinations may not have the same priority for one category. The priority values for destinations within a category must be unique in order to have any meaning.
- If only one category is defined by the application, the second priority value is ignored.
- If only one priority value is assigned to the destination, that priority is automatically assigned to both categories for that destination.
- If only one category is assigned a priority value for a destination, no RDRs from the other category will be sent to the specified destination.
- Assign a high priority if RDRs from the specified category should be sent to this destination. Assign a low priority if RDRs from the specified category should less likely to be sent to this destination.
- Redundant forwarding mode: Assign a high priority to the primary destination for the system/category. Assign a lower priority to the secondary destination for the system/category.

Protocol Version

The RDR protocol is used to export the application reports from the ***SCE 1000*** to an external destination. Currently, Cisco supports two versions o the RDR protocol: RDR protocol version 1 (RDRv1) protocol and RDR protocol version 2 (RDRv2). The ***SCE 1000*** can support the formatting of RDRs based on either of these protocols. The selection of the configured protocol should be based on the destination capabilities. Please note that RDRv2 is superior to RDRv1 with respect to redundancy, robustness, and reliability.

The RDR formatter can be configured to work with exclusively RDRv1 protocol or RDRv2 protocol for the selected RDR formatter destination.

Note The RDR formatter must be disabled when configuring the protocol version.

The RDRv1 does not support RDR aggregation (the ability to combine and store separate RDR streams in case of failure), so the following restrictions should be noted:

- The simple-load-balancing forwarding mode is not to be used with RDRv1.

  Note that no error message will appear if the simple-load-balancing forwarding mode is defined with the RDRv1 protocol, even though it is not recommended with this protocol.
- The size of the history buffer must be zero bytes (the default value). Other values may cause duplication of RDRs.
- The connection timeout parameter is not supported by the RDRv1 protocol.

Forwarding Modes

When more than one RDR destination is defined for a category, the system must decide which of these destinations is to receive the RDRs. This is determined by the forwarding mode. There are three forwarding modes:

- Redundancy: All RDRs are sent only to the primary (active) connection. If the primary connection fails, the RDRs will be sent to the connected destination with the next highest priority.

  When the formatter switches to the secondary connection, it resends the messages collected in the history buffer to that destination.
- Simple load balancing: Each successive RDR is sent to a different destination, one destination after the other, in a round robin manner. It is the responsibility of the collectors to aggregate the RDRs.

  If one connection fails, the contents of the history buffer are sent to all connected destinations.

Note Do not use the load-balancing feature with the RDRv1 protocol, as this protocol does not support RDR aggregation.

- Multicast: All RDRs are sent to all destinations. This feature may negatively affect performance in an installation with a high rate of RDRs.

If all connections should fail, the contents of the history buffer will be sent when the first connection is re-established.

The history buffer contains the last RDRs passed to the TCP stack. If a connection fails, these RDRs are resent to another destination, depending on the forwarding mode in effect. The history buffer is intended to overcome the loss of RDRs in an event of an abnormally TCP disconnection.

The size of the history buffer (in bytes) is configurable by the user.

Configuring the RDR Formatter

There are several configurable parameters for the RDR formatter:

- Forwarding mode: the pattern in which the RDR traffic is divided between the various destinations
- History buffer: the size of the history buffer
- Protocol: the version of the RDR protocol used with the destinations
- Connection timeout (RDRv2 only): the length of time after which an inactive connection will be timed out.

The following commands are relevant to the RDR-formatter:

- `RDR-formatter category-number`
- `no RDR-formatter category-number`
- `RDR-formatter history-size`
- `RDR-formatter forwarding-mode`
- `RDR-formatter protocol`
- `RDR-formatter protocol connection-timeout`
- `RDR-formatter destination`
- `no RDR-formatter destination`
- `no RDR-formatter destination all`
- `service RDR-formatter`
- `no service RDR-formatter`

To configure the RDR Formatter forwarding mode:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`RDR-Formatter forwarding-mode <redundancy>|<simple-load-balancing>|<multicast>`**, and press **Enter**.
The specified RDR Formatter forwarding mode is defined.

To specify the size of the RDR Formatter history buffer (bytes):

Step 1 From the ***SCE 1000***(config)# prompt, type **RDR-Formatter history-size <size>** (0-65536), and press **Enter**.
The history buffer is set to the specified size.

To configure the RDR Formatter protocol:

Step 1 Disable the RDR Formatter:
From the ***SCE 1000***(config)# prompt, type **no service RDR-Formatter**, and press **Enter**.

Step 2 From the ***SCE 1000***(config)# prompt, type **RDR-Formatter protocol RDRv1|RDRv2**, and press **Enter**.
The RDR Formatter protocol is defined.

Step 3 Enable the RDR Formatter:
From the ***SCE 1000***(config)# prompt, **type service RDR-Formatter**, and press **Enter**.

To specify the RDR Formatter connection timeout value (seconds) (RDRv2 only):

Step 1 From the ***SCE 1000***(config)# prompt, type **RDR-Formatter protocol RDRv2 connection-timeout <timeout value (2-300)>**, and press **Enter**.
The RDR Formatter connection timeout value is defined.

EXAMPLE:

The following example shows how to configure the RDR Formatter as follows:

- forwarding-mode: multicast
- History buffer size: 0
- Protocol: RDRv1 (therefore the history buffer must be zero)

```
SCE 1000(config)# RDR-Formatter forwarding-mode multicast
SCE 1000(config)# RDR-Formatter history-size 0
SCE 1000(config)# no service RDR-Formatter
SCE 1000(config)# RDR-Formatter protocol RDRv1
SCE 1000(config)# service RDR-Formatter
```

Configuring the RDR Formatter Destinations

In order for the RDRs from the ***SCE 1000*** to arrive at the correct location, the IP address of the destination and its TCP port number must be configured.

A priority value must be assigned. Priority is important in the redundancy forwarding mode, but not crucial in simple-load-balancing mode or multicast mode. Remember that in load-balancing and multicast modes, the existence of any priority value causes the destination to receive RDRs.

The relationship between priorities and categories is addressed in the next section.

To configure an RDR Formatter destination (all categories):

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`RDR-Formatter destination <IP address> port <port-number> [priority <priority(1-100)>]`**, and press **Enter**.
The RDR Formatter destination is defined. When no category is specified, as in the above example, the specified priority is assigned to both categories.

EXAMPLE:

The following example shows how to configure two RDR Formatter destinations in a system without using the categories.

The first destination will automatically be assigned a priority of 100, and therefore the priority does not need to be explicitly defined. For the second destination, the priority must be explicitly defined.

The same priority will automatically be assigned to both categories for each destination, but since the categories will be ignored, this is irrelevant.

```
SCE 1000(config)# RDR-Formatter destination 10.1.1.205 port 33000
SCE 1000(config)# RDR-Formatter destination 10.1.1.206 port 33000 priority
80
```

Configuring the RDR Formatter Categories

There are two steps in defining the RDR formatter destination categories:

Step 1 Define the category names (optional).

Step 2 Assign the destinations to both categories.

Configuring the destinations with the proper priorities for each category, as well as configuring all the other RDR formatter parameters, may be approached in several different ways, and may take some planning. Refer to the examples below for illustrations of some of the issues involved in configuring categories.

To configure an RDR Formatter category name:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`RDR-Formatter category-number 1|2 name <category-name>`**, and press **Enter**.
The name for the specified category number is defined. This category name can then be used in any **RDR-formatter** command instead of the category number.

To configure a RDR Formatter destination and assign it to a category:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`RDR-Formatter destination <IP address> port <port-number> category [name <category-name> |number [1|2]] [priority <priority(1-100)>] [category [name <category-name> |number [1|2]] [priority <priority(1-100)>]]`**, and press **Enter**.
The RDR Formatter destination is defined. A different priority may be assigned to each category. (This can be done in one command.) If RDRs from the specified category should be sent to this destination, the priority for the category should be high. If the RDRs from the specified category should not be sent to this destination, the priority should be low.

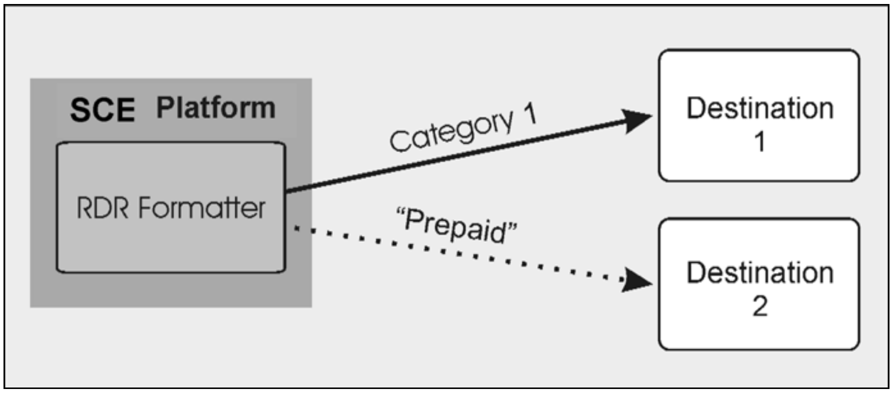
Note that within each category the priorities must be unique for each destination.

EXAMPLE 1:

The following example defines a name for one category, and then configures two RDR Formatter destinations, assigning each to a different category (see diagram).

The RDRs of category 1 are to go to the first destination, so a high priority was assigned to that category in the first destination, and no priority in the second.

Since all RDRs in category 2 (prepaid) are to go to the second destination, the priority assigned to category 2 is assigned only to the second destination and not to the first.

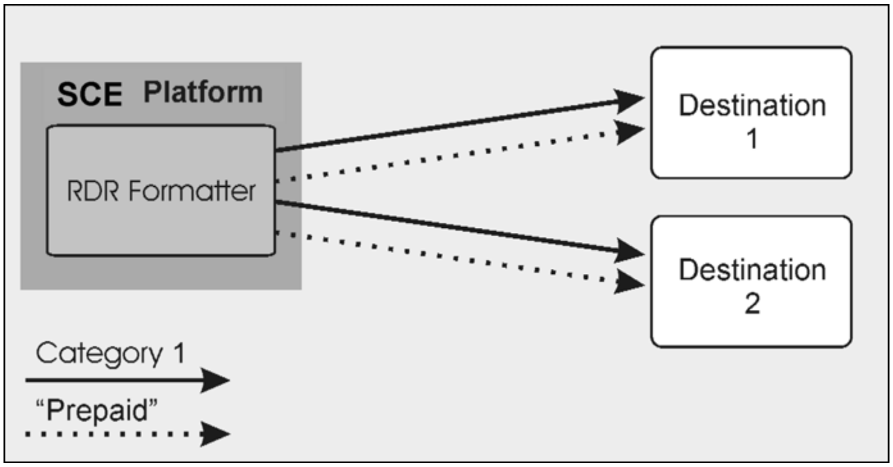


Note that if there is a loss of connection to either destination, transmission of RDRs of the relevant category is interrupted until the connection is re-established. There is no redundant connection defined for either category.

```
SCE 1000(config)# RDR-Formatter category-number 2 name prepaid
SCE 1000(config)# RDR-Formatter destination 10.1.1.205 port 33000 category
number 1 priority 90
SCE 1000(config)# RDR-Formatter destination 10.1.1.206 port 33000 category
name prepaid priority 80
```

EXAMPLE 2:

This example is similar to the above, but a low priority is assigned to the second category for each destination, rather than no priority. This allows each destination to function as a backup for the other in case of a problem with one of the connections (redundancy forwarding mode).



```
SCE 1000(config)# RDR-Formatter category-number 2 name prepaid
SCE 1000(config)# RDR-Formatter destination 10.1.1.205 port 33000 category
name prepaid priority 90 category number 1 priority 25
SCE 1000(config)# RDR-Formatter destination 10.1.1.206 port 33000 category
number 1 priority 80 category name prepaid priority 20
```

EXAMPLE 3:

This example demonstrates two methods for assigning one category to the first destination only, while the other category uses the second destination as the primary destination, and the first destination as a secondary destination.

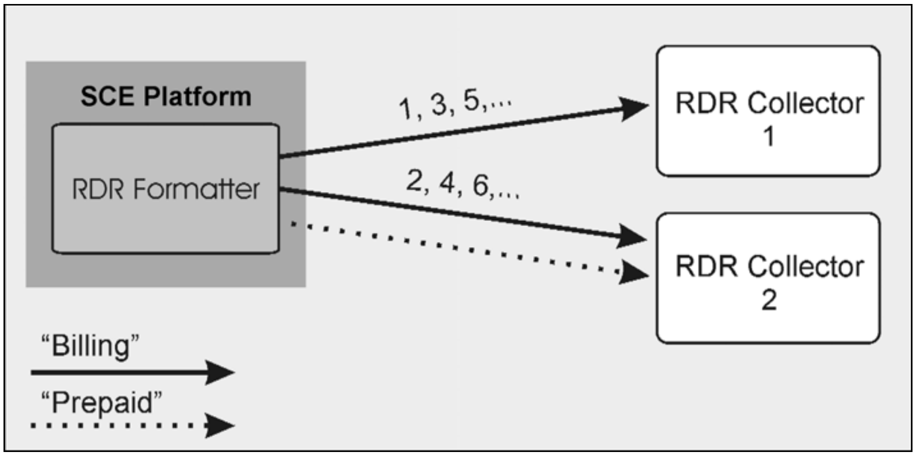
```
SCE 1000(config)# RDR-Formatter category-number 2 name prepaid
SCE 1000(config)# RDR-Formatter destination 10.1.1.205 port 33000 category
name prepaid priority 90 category number 1 priority 10
SCE 1000(config)# RDR-Formatter destination 10.1.1.206 port 33000 category
number 1 priority 95
```

In the following example, all priority values seem quite high. However, it is the relative values of priorities for a category that determine which destination is the primary destination.

```
SCE 1000(config)# RDR-Formatter category-number 2 name prepaid
SCE 1000(config)# RDR-Formatter destination 10.1.1.205 port 33000 priority
90
SCE 1000(config)# RDR-Formatter destination 10.1.1.206 port 33000 priority
95
SCE 1000(config)# no RDR-Formatter destination 10.1.1.206 port 33000
category name prepaid
```

EXAMPLE 4:

Finally, the following illustrates a more complex configuration with one category (prepaid) assigned to one destination and the other (billing) being sent to either of the two destinations, in simple-load-balancing mode.



The forwarding mode is defined for the entire RDR formatter, not just one category. However, the load balancing takes place within each category. Since the category “prepaid” goes to only one destination, the forwarding mode is irrelevant. It is relevant, however to the “billing” category, since it goes to two different destinations.

```
SCE 1000(config)# RDR-Formatter forwarding-mode simple-load-balancing
SCE 1000(config)# RDR-Formatter category-number 1 name billing
SCE 1000(config)# RDR-Formatter category-number 2 name prepaid
SCE 1000(config)# RDR-Formatter destination 10.1.1.205 port 33000 priority
40
SCE 1000(config)# no RDR-Formatter destination 10.1.1.205 port 33000
category name billing
SCE 1000(config)# RDR-Formatter destination 10.10.10.96 port 33000 category
name billing priority 90
SCE 1000(config)# RDR-Formatter destination 10.1.96.0 port 33000 category
name billing priority 80
```

Displaying RDR Formatter Configuration and Statistics

The system can display the complete RDR formatter configuration, or just specific parameters.

The following commands can be used to display the RDR formatter configuration and statistics:

- `show RDR-formatter`
- `show RDR-formatter connection-status`
- `show RDR-formatter counters`
- `show RDR-formatter destination`
- `show RDR-formatter enabled`
- `show RDR-formatter forwarding-mode`
- `show RDR-formatter history-size`
- `show RDR-formatter protocol`
- `show RDR-formatter statistics`

To display the current RDR formatter configuration:

Step 1 From the ***SCE 1000#*** prompt, type **`show RDR formatter`**.

EXAMPLE:

The following example shows how to display the current RDR formatter configuration.

```
SCE 1000#show RDR-formatter
Status: enabled
Connection is: up
Forwarding mode: redundancy
Connection table:
----------------------------------------------------------
Collector     | Port | Status   | Priority per Category:   |
IP Addres /   |      |          |--------------------------|
Host-Name     |      |          | Category1    | Category2  |
----------------------------------------------------------
10.1.1.205    |33000 | Up       | 100 primary | 100 primary|
10.1.1.206    |33000 | Down     | 60          | 60         |
10.12.12.12   |33000 | Up       | 40          | 40         |
----------------------------------------------------------

RDR:    queued:         0 ,sent:         0, thrown:         0
UM:     queued:         0 ,sent:         0, thrown:         0
Logger: queued:         0 ,sent:         0, thrown:         0
Errors: thrown:         0
Last time these counters were cleared: 14:05:57 UTC SUN February 23 2003
SCE 1000#
```

Refer to *CLI Command Reference* (on page A-1) for a complete description of the other **show RDR-formatter** commands.

Disabling the LineCard from Sending RDRs

The **`silent`** command disables the LineCard from issuing Raw Data Records (RDR). Use the **[no]** form of this command if you want the LineCard to send reports.

To disable the LineCard from sending Raw Data Records (RDRs):

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`interface Linecard 0`**, and press **Enter**.
The ***SCE 1000***`(config if)#` prompt appears.

Step 2 Type **`silent`**, and press **Enter**.
The LineCard stops producing RDRs and the ***SCE 1000***`(config if)#` prompt appears.

To enable the Line Card to produce RDRs:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`no silent`**, and press **Enter** .
The ***SCE 1000***`(config if)#` prompt appears.

SNMP Configuration and Management

The ***SCE 1000*** operating system includes a Simple Network Management Protocol (SNMP) agent that supports the RFC 1213 standard (MIB-II) and Cisco’s enterprise MIBs. This section explains how to configure the SNMP agent parameters. It also describes the SNMP traps and the Cisco proprietary MIB, and explains the order in which the MIB must be loaded.

Note Throughout this manual, the terms SNMP server and SNMP agent are used interchangeably, as equivalents.

SNMP Protocol

SNMP (Simple Network Management Protocol) is a set of protocols for managing complex networks. SNMP works by sending messages, called protocol data units (PDUs), to different parts of a network. SNMP-compliant devices, called agents, store data about themselves in Management Information Bases (MIBs) and return this data to the SNMP requesters.

SCE 1000 supports the original SNMP protocol (also known as SNMPv1), and a newer version called Community-based SNMPv2 (also known as SNMPv2C).

- **SNMPv1:** is the first version of the Simple Network Management Protocol, as defined in RFCs 1155 and 1157, and is a full Internet standard. SNMPv1 uses a community-based form of security.
- **SNMPv2c:** is the revised protocol, which includes improvements to SNMPv1 in the areas of protocol packet types, transport mappings, and MIB structure elements but using the existing SNMPv1 administration structure. It is defined in RFC 1901, RFC 1905, and RFC 1906.

SCE 1000 implementation of SNMP supports all MIB II variables, as described in RFC 1213, and defines the SNMP traps using the guidelines described in RFC 1215.

The SNMPv1 and SNMPv2C specifications define the following basic operations that are supported by ***SCE 1000***:

Table 6-1 Request Types

Request Type	Description	Remarks
Set Request	Writes new data to one or more of the objects managed by an agent.	Set operations immediately affect the ***SCE 1000*** running-config but do not affect the startup config.
Get Request	Requests the value of one or more of the objects managed by an agent.	
Get Next Request	Requests the Object Identifier(s) and value(s) of the next object(s) managed by an agent.	
Get Response	Contains the data returned by an agent.	
Trap	Sends an unsolicited notification from an agent to a manager, indicating that an event or error has occurred on the agent system	***SCE 1000*** may be configured to send either SNMPv1 or SNMPv2 style traps.
Get Bulk Request	Retrieves large amounts of object information in a single Request / response transaction. GetBulk behaves as if many iterations of GetNext request/responses were issued, except that they are all performed in a single request/response.	This is newly defined SNMPv2c message.

Configuration via SNMP

SCE 1000 supports a limited set of variables that may be configured via SNMP (read-write variables). Setting a variable via SNMP (as via the CLI) takes effect immediately and affects only the running-configuration. To make this configuration stored for next reboots (startup-configuration) the user must specify it explicitly via CLI or via SNMP using the Cisco enterprise MIB objects (see the figure in *Cisco Enterprise MIB* (on page 6-40)).

It should be noted also that the ***SCE 1000*** takes the approach of a single configuration database with multiple interfaces that may change this database. Therefore, activating the `copy running-config startup-config` command via CLI or SNMP makes permanent all the changes made by either SNMP or CLI.

Security Considerations

By default, the SNMP agent is disabled for both read and write operations. When enabled, SNMP is supported over the management port only (in-band management is not supported).

In addition, ***SCE 1000*** supports the option to configure community of managers for read-write accessibility or for read-only accessibility. Furthermore, an ACL (Access List) may be associated with a community to allow SNMP management to a restricted set of managers IP addresses.

SNMP Community Strings

An SNMP community string is a text string that acts like a password to permit access to the agent on the ***SCE 1000***. The community string is used to authenticate messages that are sent between the management station (the SNMP manager) and the device (the SNMP agent). The community string is included in every message transmitted between the SNMP manager and the SNMP agent.

Configuring SNMP Community Strings

In order to enable SNMP management, you must configure SNMP community strings to define the relationship between the SNMP manager and the agent.

After receiving an SNMP request, the SNMP agent compares the community string in the request to the community strings that are configured for the agent. The requests are valid under the following circumstances:

- SNMP *`Get`* and *`Get-next`*, *`Get-bulk`* requests are valid if the community string in the request matches the read-only community.
- SNMP *`Get`*, *`Get-next`*, *`Get-bulk`* and *`Set`* requests are valid if the community string in the request matches the agent's read-write community.

You may specify the following characteristics associated with the community string:

- An access list of IP addresses of the SNMP managers permitted to use the community string to gain access to the agent
- Read-write or read-only accessibility for the community.

Note If no access list is configured, all IP addresses can access the agent using the defined community string. For more information about Access Lists, see *Configuring Access Control Lists (ACLs)* (on page 6-2)

Note When defining a community if it is not specified explicitly, the default accessibility is read-only.

The following describes how to configure a community string, as well as how to remove a community string.

To configure a community string:

Step 1 At the ***SCE 1000***`(config)#` prompt, type **`snmp-server community`** *`community-string`* **`[ro|rw]`** `[acl-number]`, and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

Step 2 If needed, repeat steps 1 to configure additional community strings.

EXAMPLE:

The following example shows how to configure a community string called “mycommunity” with read-only rights and access list number “1”.

```
SCE 1000(config)#snmp-server community mycommunity 1
```

Note ACL-number is an index to an access list. For further information about access lists, see *Configuring Access Control Lists (ACLs)* (on page 6-2)

To remove a community string:

Step 1 At the ***SCE 1000***`(config)#` prompt, type **`no snmp-server community`** *`community-string`*, and press **Enter**.
The community string is removed.

EXAMPLE:

The following example displays how to remove a community string called “mycommunity”.

```
SCE 1000(config)#no snmp-server community mycommunity
```

To display the configured communities:

Step 1 At the ***SCE 1000#*** prompt, type **`show snmp community`** and press **Enter**.
The configured SNMP communities appear.

EXAMPLE:

The following example shows the SNMP communities.

```
SCE 1000#show snmp community
Community: public, Access Authorization: RO, Access List Index: 1
```

Traps

Traps are unsolicited messages that are generated by the SNMP agent that resides inside the ***SCE 1000*** when an event occurs. When the Network Management System receives the trap message, it can take suitable actions, such as logging the occurrence or ignoring the signal.

Configuring Traps

By default, the ***SCE 1000*** is not configured to send any SNMP traps. You must define the Network Management System to which the ***SCE 1000*** should send traps. (See the table below, Configurable Traps, for a list of configurable traps). Whenever one of the events that trigger traps occurs in the ***SCE 1000***, an SNMP trap is sent from the ***SCE 1000*** to the list of IP addresses that you define.

SCE 1000 supports two general categories of traps:

- Standard SNMP traps: As defined in RFC1157 and using the conventions defined in RFC1215.
- Proprietary SCE enterprise traps: As defined in the SCE proprietary MIB.

After a host is configured to receive traps, by default, the ***SCE 1000*** sends to this host all the traps supported by the ***SCE 1000*** except for the AuthenticationFailure trap. The ***SCE 1000*** provides the option to enable or disable the sending of this trap, as well as some of the SCE enterprise traps, explicitly.

SCE 1000 can be configured to generate either SNMPv1 style or SNMPv2c style traps. By default, the ***SCE 1000***s sends SNMPv1 traps.

Following the table are sample procedures displaying how to configure a host (NMS) to which the SNMP agent should send traps; how to enable the SNMP agent to send authentication-failure traps; how to reset all traps to the default setting, and how to remove/disable a host (NMS) from receiving traps.

Table 6-2 Configurable Traps

Traps	Description	Trap Names	Default
Standard Traps			
Authentication Failure	An authenticationFailure trap is sent when the ***SCE 1000*** is the addressee of a protocol message that is not properly authenticated.	authenticationFailure	Disabled
Enterprise Traps			
attack filter	An attack filter trap is sent when an attack filter has been activated or deactivated. The type of attack-filter that was activated is returned in pcubeSeEventGenericString1	moduleAttackFilterActivatedTrap moduleAttackFilter DeactivatedTrap	Disabled
chassis	A chassis trap is sent when an environmental alarm condition occurs in the ***SCE 1000*** or is resolved.	chassisTempAlarmOnTrap chassisTempAlarmOffTrap chassisVoltageAlarmOnTrap chassisFansAlarmOnTrap chassisPowerSupplyAlarmOn Trap	Enabled

Traps	Description	Trap Names	Default
link-bypass	A link-bypass trap is sent when the ***SCE 1000*** recognizes that the link-bypass mode has changed (bypass, no bypass, cutoff).	linkModeBypassTrap linkModeNoBypassTrap linkModeCutoffTrap	Enabled
logger	A logger trap is sent when the ***SCE 1000*** recognizes that the User log is full. The ***SCE 1000*** rolls over to the next log file.	loggerUserLogIsFullTrap	Enabled
operational-status	An operational-status trap is sent when the ***SCE 1000*** recognizes that the operational status has changed (the ***SCE 1000*** fails, resumes operation, or detects a warning).	OperationalStatusOperational Trap operationalStatusWarningTrap operationalStatusFailureTrap	Enabled
rdr-formatter	An rdr-formatter trap is sent when the ***SCE 1000*** recognizes a change in the status of the connection of the rdr-formatter to the Collection Manager (up, down, active, not active).	rdrActiveConnectionTrap rdrNoActiveConnectionTrap rdrConnectionUpTrap rdrConnectionDownTrap	Enabled
sntp	An sntp trap is sent when the ***SCE 1000*** recognizes that the SNTP agent has not updated the time in a long enough interval that time drift may occur in the system.	sntpClockDriftWarnTrap	Enabled
system-reset	A system-reset trap is sent before the ***SCE 1000*** performs a system reset, due either to user request or fatal event.	systemResetTrap	Enabled
telnet	A telnet trap is sent when the ***SCE 1000*** recognizes that a telnet session has started or ended. A telnet trap is also sent when an attempt is made to logon from an unauthorized source, or with the wrong password.	telnetSessionStartedTrap telnetSessionEndedTrap telnetSessionDeniedAccess Trap telnetSessionBadLoginTrap	Enabled

To configure the ***SCE 1000*** to send traps to a host (NMS):

Step 1 At the ***SCE 1000***`config)#` prompt, type **`snmp-server host`** *`IP-address community-string`*, and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

EXAMPLE:

The following example shows how to configure the ***SCE 1000*** to send SNMPv1 traps to a host with the IP Address: `192.168.0.83` and community string named `mycommunity`.

```
SCE 1000(config)#snmp-server host 192.168.0.83 mycommunity
```

To enable the SNMP server to send AuthenticationFailure traps:

Step 1 At the ***SCE 1000***`(config)#` prompt, type **`snmp-server enable traps snmp authentication`**, and press **Enter**.
The SNMP server is enabled to send **`authentication failure`** traps.

EXAMPLE:

The following example shows how to configure the SNMP server to send the Authentication failure trap.

```
SCE 1000(config)#snmp-server enable traps snmp authentication
```

You may enable or disable a specific enterprise trap or all enterprise traps.

To enable the SNMP server to send all Enterprise traps:

Step 1 At the ***SCE 1000***`(config)#` prompt, type **`snmp-server enable traps enterprise`**, and press **Enter**.

The SNMP server is enabled to send all **`enterprise`** traps.

EXAMPLE:

The following example shows how to configure the SNMP server to send all enterprise traps.

```
SCE 1000(config)#snmp-server enable traps enterprise
```

To enable the SNMP server to send a specific Enterprise trap:

Step 1 At the ***SCE 1000***`(config)#` prompt, type **`snmp-server enable traps enterprise [`***`chassis`***`|`***`link-bypass`***`|`***`logger`***`|`***`operational-status`***`|`***`RDR-formatter`***`|`***`sntp`***`|`***`system-reset`***`|`***`telnet`***`]`** and press **Enter**.
The SNMP server is enabled to send the specified enterprise trap(s).

EXAMPLE:

The following example shows how to configure the SNMP server to send the logger enterprise trap only.

```
SCE 1000(config)#snmp-server enable traps enterprise logger
```

To restore all traps to the default status:

Step 1 At the ***SCE 1000***`(config)#` prompt, type **`default snmp-server enable traps`**, and press **Enter**.
All traps supported by the ***SCE 1000*** are reset to their default status.

EXAMPLE:

The following example shows how to restore all SNMP traps to their default status.

```
SCE 1000(config)# default snmp-server enable traps
```

To configure the SCE to stop sending traps to an NMS:

Step 1 At the ***SCE 1000***`(config)#` prompt, type **`no snmp-server host`** *`IP-address`*, and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

EXAMPLE:

The following example shows how to remove the host with the IP Address: “192.168.0.83”.

```
SCE 1000(config)#no snmp-server host 192.168.0.83
```

CLI

The ***SCE 1000*** supports the CLI commands that control the operation of the SNMP agent. All the SNMP commands are available in Admin authorization level. The SNMP agent is disabled by default and any SNMP configuration command enables the SNMP agent (except where there is an explicit disable command).

Privileged Exec Mode Commands

The following SNMP commands are available in Exec mode when the SNMP agent is enabled:

- `show snmp (also available when SNMP agent is disabled)`
- `show snmp community`
- `show snmp contact`
- `show snmp enabled`
- `show snmp host`
- `show snmp location`
- `show snmp mib`
- `show snmp traps`

Global Configuration Mode Commands

The following SNMP commands are available in Global Configuration Mode:

- `snmp-server enable`
- `no snmp-server`
- `snmp-server community`
- `no snmp-server community all`
- `[no | default] snmp-server enable traps`
- `[no] snmp-server host`
- `no snmp-server host all`
- `[no] snmp-server contact`
- `[no] snmp-server location`

MIBs

MIBs (Management Information Bases) are databases of objects that can be monitored by a network management system (NMS). SNMP uses standardized MIB formats that allow any SNMP tools to monitor any device defined by a MIB.

The ***SCE 1000*** supports the following MIBs:

- MIB-II as defined in RFC 1213, Management Information Base for Network Management of TCP/IP-based Internets.
- Cisco enterprise MIB, which is described by a number of MIB files. *Proprietary MIB Reference* (on page B-1).)

MIB-II

SCE 1000 fully supports MIB-II (RFC1213), including the following groups:

- System
- Interface (for both the management and line ports)
- AT (management port)
- IP (management port)
- ICMP (management port)
- TCP (management port)
- UDP (management port)
- SNMP (management port)

Cisco Enterprise MIB

The SCE proprietary MIB enables external management systems to retrieve general information regarding the ***SCE 1000*** operating status and resources utilization, extract real time measurements of bandwidth utilization and network statistics, and receive notifications of critical events and alarms.

Note The following object identifier represents the Cisco Enterprise MIB: *1.3.6.1.4.1.5655*, or *iso.org.dod.internet.private.enterprise.pcube*

The Cisco Enterprise MIB splits into four main groups: Products, Modules, Management, and Workgroup. The Cisco enterprise tree structure is defined in a MIB file named *pcube.mib*.

Refer to the *Proprietary MIB Reference* (on page B-1) for a complete description of the *pcube* enterprise MIB.

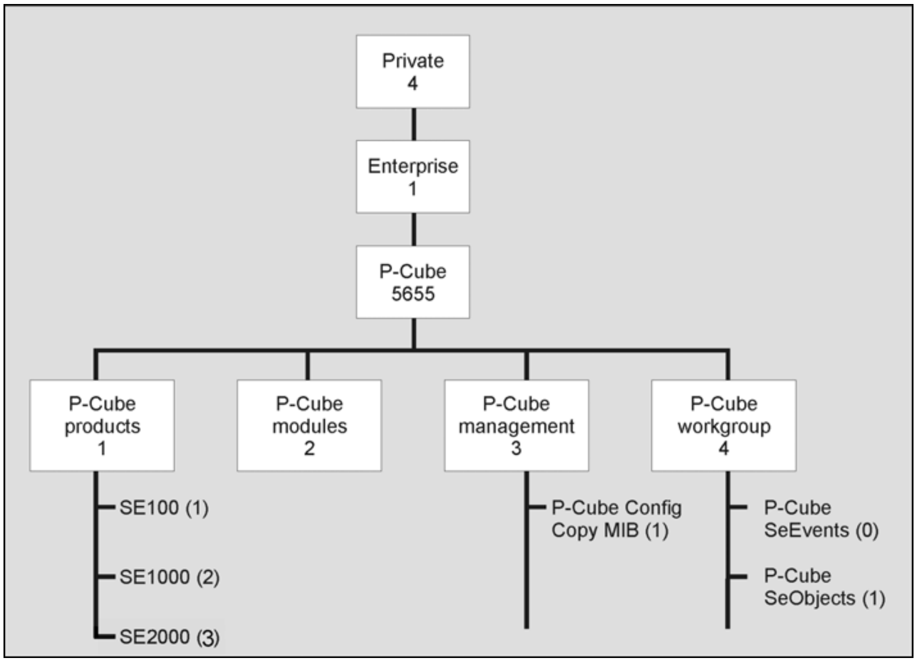
- The *pcubeProducts* sub-tree contains the sysObjectIDs of Cisco products.

  Cisco product sysObjectIDs are defined in a MIB file named *Pcube-Products-MIB*
- The *pcubeModules* sub-tree provides a root object identifier from which MIB modules can be defined.
- The *pcubeMgmt* sub-tree contains the configuration copy MIB.
- The *pcubeWorkgroup* sub-tree contains the SCE MIB, which is the main SNMP MIB for the Cisco OS products.

  The SCE MIB is divided into two main groups:
  - **pcubeSeEvents**
  - **pcubeSEObjs**

The figure below, illustrates the Cisco Enterprise MIB structure.

Figure 6-3: Service Control MIB Structure



Loading the MIB Files

The SCE proprietary MIB uses definitions that are defined in other MIBs, such as Pcube MIB (pcube.mib), and the SNMPv2-SMI. Therefore, the order in which the MIBs are loaded is important. To avoid errors, the MIBs must be loaded in the proper order.

To load the MIBs:

Step 1 Load the SNMPv2-SMI.

Step 2 Load the SNMPv2-TC.

Step 3 Load pcube.mib.

Step 4 Load pcubeSEMib.mib.

Failure Recovery Mode

The **`failure-recovery operation-mode`** command defines the behavior of the system after boot resulting from failure. The system may return to operational mode, or remain not operational.

The default value is **operational**.

- [no|default] failure-recovery operation-mode

To edit the failure recovery operational mode:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`failure-recovery operation-mode operational|non-operational`** and press **Enter**.
Enter either the value **`operational`** or **`non-operational`**.

EXAMPLE 1:

The following example sets the system to boot as operational after a failure

```
SCE 1000(config)#failure-recovery operation-mode operational
SCE 1000(config)#
```

EXAMPLE 2:

The following example sets the system to the default failure recovery mode.

```
SCE 1000(config)# default failure-recovery operation-mode
SCE 1000(config)#
```

Entering FastEthernet (Management) Interface Configuration Mode

Before you can configure the FastEthernet parameters for the management interface, you must be in the FastEthernet Management Interface Configuration Mode.

To enter FastEthernet Management Interface Configuration Mode:

Step 1 To enter Global Configuration Mode, type **`configure`** and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

Step 2 Type **`interface FastEthernet 0/0`** and press **Enter**.
The ***SCE 1000***`(config if)#` prompt appears.

The system prompt changes to reflect the higher level mode.

To return to the Global Configuration mode:

Step 1 Type **`exit`**.

Management Interface Configuration Mode

This interface has a transmission rate of 100 Mbps and is used for management operations and for transmitting RDRs, which are the output of traffic analysis and management operations. The parameters that can be configured for this interface include:

- IP address of the interface, see Setting the IP Address and Subnet Mask of the FastEthernet Management Interface.
- Speed and duplex, see *Configuring the Speed of the FastEthernet Interface* (on page 6-43) and *Configuring the Duplex Operation of the FastEthernet Interface* (on page 6-43).

Configuring the Management Interface Speed and Duplex Parameters

This section presents sample procedures that describe how to configure the speed and the duplex of the Management Interface.

Configuring the Duplex Operation of the FastEthernet Interface

To configure the duplex operation of the FastEthernet Management Interface:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`duplex [auto | full |half]`** **and** press Enter.
Configures the duplex operation of the FastEthernet Management Interface to either half duplex, or full duplex. **auto** means auto-negotiation (do not force duplex on the link).

The default of this command is set to **auto**. Changing this configuration takes effect only if the **speed** is not configured to **auto**.

EXAMPLE:

The following example shows how to use this command to configure the FastEthernet Management port to half duplex mode.

```
SCE 1000(config if)#duplex half
```

Configuring the Speed of the FastEthernet Interface

To configure the speed of the FastEthernet Management Interface:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`speed`** *`speed`*, where *`speed`* can be **`10`**, **`100`** (Mbps) or **`auto`** and press **Enter**.
Configures the speed of the FastEthernet Management Interface to either 10 Mbps or 100 Mbps. **`auto`** means auto-negotiation (do not force speed on the link).

The default of this command is set to **`auto`**. Changing this configuration takes effect only if the **`duplex`** mode is not configured to **`auto`**.

EXAMPLE:

The following example shows how to use this command to configure the FastEthernet Management port to 100 Mbps speed.

```
SCE 1000(config if)#speed 100
```

Table 6-3 Interface State Relationship to Speed and Duplex

Speed	**Duplex**	**Actual FEI state**
Auto	Auto	Auto negotiation
Auto	Full	Auto negotiation
Auto	Half	Auto negotiation
10	Auto	Auto-negotiation (duplex only)
10	Full	10 Mbps and Full duplex
10	Half	10 Mbps and half duplex
100	Auto	Auto-negotiation (speed only)
100	Full	100 Mbps and full duplex
100	Half	100 Mbps and half duplex

Entering LineCard Interface Configuration Mode

The following procedure is for entering Line Card Interface Configuration mode. The procedures for entering the other interfaces are the same except for the interface command as described above and in *CLI Command Reference* (on page A-1).

To enter LineCard Interface Configuration mode:

Step 1 To enter Global Configuration Mode, at the ***SCE 1000#*** prompt, type **`configure`**, and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

Step 2 Type **`interface LineCard`** 0, and press **Enter**.
The ***SCE 1000***`(config if)#` prompt appears.

Step 3 To return to Global Configuration Mode, type **`exit`** and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

Step 4 To exit Global Configuration Mode, type **`exit`** and press **Enter**.
The ***SCE 1000#*** prompt appears.

Configuring Applications

The ***SCE 1000*** platform can be configured to run with different Service Control applications by installing the appropriate file. All ***SCE 1000*** application files are **pqi** files, that is, the filename must end with the *pqi* extension.

Once a specific Service Control application is installed it can be configured by applying a configuration file. The configuration file is application-specific, and is produced by application-specific means, not covered in this documentation. Configuration files have no specific extension.

Note These configuration changes are automatically saved to the start-up configuration after execution, and therefore do not appear when the running configuration is displayed (**`more running-config`** command).
These configurations cannot be manipulated by changing the *system/config.txt* file

Installing an Application

Use the following commands to install, uninstall, and upgrade an application. You can use the **`show pqi file`** command before installing or upgrading an application to display the options that are available when installing the pqi file. These options can then be specified in the **install** or **upgrade** command as needed.

The documentation of the application will tell the user whether the application is stand-alone (in which case **`install`** should be used), or an upgrade to an existing application that is assumed to be installed already (in this case **`upgrade`** should be used). Currently all Cisco Service Control applications are stand-alone.

You should always run the pqi unistall command before installing a new pqi file. This prevents old files from accumulating on the disk.

The following commands are relevant for installing and uninstalling an application:

- `pqi install file`
- `pqi uninstall file`
- `pqi upgrade file`
- `pqi rollback file`
- `show pqi file`
- `show pqi last-installed`

To display information about an application file:

Step 1 From the ***SCE 1000#*** prompt, type **`show pqi file`** *`filename`* **`info`** and press **Enter**.
Information regarding the pqi file, such as installation options, is displayed and the ***SCE 1000#*** prompt appears.

To install an application:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`pqi install file`** *`filename [options]`* and press **Enter**.
The specified pqi file is installed using the installation options specified (if any) and the ***SCE 1000***`(config if)#` prompt appears.

Note that this may take up to 5 minutes.

Note Always run the pqi uninstall command before installing a new pqi file.

To uninstall an application:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`pqi uninstall file`** *`filename`* and press **Enter**.
The specified *pqi* file is uninstalled and the ***SCE 1000***`(config if)#` prompt appears.

You must specify the same *pqi* file that was installed.

Note that this may take up to 5 minutes.

To upgrade an application:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`pqi upgrade file`** *`filename [options]`* and press **Enter**.
The specified pqi file is upgraded using the options specified (if any) and the ***SCE 1000***`(config if)#` prompt appears.

You must specify the *pqi* file that was last used for upgrade.

Note that this may take up to 5 minutes.

To undo an upgrade of an application:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`pqi rollback file`** *`filename`* and press **Enter**.
The upgrade of the specified pqi file is undone and the ***SCE 1000***`(config if)#` prompt appears.

Note that this may take up to 5 minutes.

To display the last pqi file that was installed:

Step 1 From the ***SCE 1000#*** prompt, type **`show pqi last-installed`** and press **Enter**.
The name of the last pqi file that was installed is displayed and the ***SCE 1000#*** prompt appears.

Configuring the Currently Installed Application

Use the following commands to:

- Validate the configuration file
- Configure the currently installed application by applying the configuration file
- Display the name of the last configuration file that was applied

The following commands are relevant for configuring the currently installed application:

- `scm apply file`
- `scm validate file`
- `show scm last-applied`

To validate a configuration file:

Step 1 From the ***SCE 1000#*** prompt, type **`scm validate file`** *`filename`* and **press** Enter.
The specified configuration file is checked and the ***SCE 1000#*** prompt appears.

To apply a configuration file:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`scm apply file`** *`filename`* and press **Enter**.

The specified configuration file is applied and the ***SCE 1000***`(config if)#` prompt appears.

To display the last configuration file that was applied:

Step 1 From the ***SCE 1000#*** prompt, type **`show scm last-applied`** and press **Enter**. The name of the last configuration file that was applied is displayed and the ***SCE 1000#*** prompt appears.

Line Configuration

This chapter discusses the interface configuration of the ***SCE 1000***.

The relevant configuration modes are:

- LineCard: **`Interface LineCard 0`**

  The LineCard interface configures the main functionality of viewing and handling traffic on the line.

- GigabitEthernet: **`Interface GigabitEthernet 0/1`** or **`0/2`**)

  The GigabitEthernet Interface mode configures the settings for the GigabitEthernet interface to the Internet traffic on the wire. Each of the two ports can be set individually.

- Line Configuration Mode: **`Line vty 0`**

  Line Configuration Mode enables you to configure Telnet parameters

Step 2 This chapter contains the following sections:

- Entering LineCard Interface Configuration Mode 7-2
- Configuring Tunneling Protocols 7-2
- Configuring Traffic Rules and Counters 7-5
- Configuring TOS Marking 7-12
- Editing the Connection Mode 7-13
- Enforcing the Link Mode 7-14
- Enabling and Disabling Link Failure Reflection 7-15
- Line Gigabit Ethernet Interfaces 7-15

Entering LineCard Interface Configuration Mode

The following procedure is for entering Line Card Interface Configuration mode. The procedures for entering the other interfaces are the same except for the interface command as described above and in *CLI Command Reference* (on page A-1).

To enter LineCard Interface Configuration mode:

Step 1 To enter Global Configuration Mode, at the ***SCE 1000#*** prompt, type **`configure`**, and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

Step 2 Type **`interface LineCard`** 0, and press **Enter**.
The ***SCE 1000***`(config if)#` prompt appears.

Step 3 To return to Global Configuration Mode, type **`exit`** and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

Step 4 To exit Global Configuration Mode, type **`exit`** and press **Enter**.
The ***SCE 1000#*** prompt appears.

Configuring Tunneling Protocols

Tunneling technology is used across various telecommunications segments in order to solve a wide variety of networking problems. The ***SCE 1000*** Platform is designed to recognize various tunneling protocols. When the ***SCE 1000*** is installed in an L2TP, MPLS or VLAN environment, it is able to ignore the tunnel headers and skip into the higher L3 layer for protocol classification

A tunneling protocol adds headers to the basic protocol stack in order to route the packet across the telecommunications segments. Therefore, the system must be aware that the packets contain additional tunnel headers. Based on the selected protocol, the system skips the tunnel (outer IP headers and tunnel headers) and processes only to the internal IP header and the data.

Since VLAN and MPLS constitute headers at layers just above L2 and below any L3 layer, they are automatically recognized as tunnels regardless of the system configuration, with the exception that MPLS label stacks have a maximum depth of 15 labels.

In addition to skipping the tunnel VLAN and MPLS tunnel headers, the ***SCE 1000*** is also able to differentiate flows and differentiate subscribers (i.e. use the VLAN information for classification purposes) according to the VLAN tag when configured in the correct mode. VLAN classification is possible only for symmetric tunnels, that is, when the VLAN tags of every tunnel are identical for both the upstream and downstream direction (of that tunnel).

The default system mode is the following:

- Skip VLAN headers, do-not use them for classification.

  The VLAN environment is assumed to be symmetric.

- Skip MPLS headers.

  The MPLS environment is assumed to be Traffic-Engineering.

- No IP-tunnel support – L2TP tunnels will not be skipped and therefore all flows within a single L2TP tunnel will be classified as the same flow.

Selecting the Tunneling Mode

Use these commands to configure tunneling:

- `ip tunnel`
- `vlan`
- `mpls`
- `L2PT identify-by`

Configuring IP Tunnels

By default, IP tunnel recognition is disabled. Use this command to configure recognition of L2TP tunnels and skipping into the internal IP packet.

An IP tunnel is mutually exclusive with using VLAN for classification.

To configure IP tunnels:

Step 1 From the ***SCE 1000***(config if)# prompt, type:
`ip tunnel L2TP skip` and press **Enter**.

To disable identification of IP tunnels:

Step 1 From the ***SCE 1000***(config if)# prompt, type:
`no ip tunnel` and press **Enter**.

Configuring the VLAN Environment

Use this command to configure the VLAN environment. There are three options:

- symmetric classify
- symmetric skip (default)
- a-symmetric skip

Setting the mode to classify means that subscriber and flow classification will use the VLAN tag. Using VLAN classification is mutually exclusive with any IP tunnels.

Note that using The *a-symmetric skip* value incurs a performance penalty.

To configure the VLAN environment

Step 1 From the ***SCE 1000***(config if)# prompt, type:
`vlan [symmetric {classify|skip}] [a-symmetric skip]`and press **Enter.**

EXAMPLE:

The following example selects *symmetric skip* VLAN tunnel environment.

```
SCE 1000(config if)#vlan symmetric skip
```

Configuring the MPLS Environment

Use this command to set the MPLS environment. Use the *VPN* keyword when the labels are mandatory in the traffic, otherwise use *Traffic-Engineering* (default).

Note that using the *VPN* value incurs a performance penalty.

To configure the MPLS environment

Step 1 From the ***SCE 1000***(config if)# prompt, type:
`mpls [vpn|Traffic-Engineering] skip` and press **Enter**.

EXAMPLE:

The following example selects the VPN MPLS tunnel environment.

```
SCE 1000(config if)#mpls vpn skip
```

Configuring the L2TP Environment

Use this command to set the port number that the LNS and LAC use for L2TP tunnels. The default port number is 1701.

To configure the L2TP port number

Step 1 From the ***SCE 1000***(config if)# prompt, type:
`L2TP identify-by port-number` *`<number>`* and press **Enter.**

Displaying Tunneling Configuration

You can display the tunnel configuration.

To display the tunneling configuration:

Step 1 From the ***SCE 1000#*** prompt, type: **`show interface lineCard 0 [MPLS|VLAN|L2TP|IP-tunnel]`** and press **Enter**.

Configuring Traffic Rules and Counters

Traffic rules and counters may be configured by the user. This functionality enables the user to define specific operations on the traffic flowing through the SCE Platform, such as blocking or ignoring certain flows or counting certain packets. The configuration of traffic rules and counters is independent of the application loaded by the ***SCE 1000***, and thus is preserved when the application being run by the ***SCE 1000*** is changed.

Possible uses for traffic rules and counters include:

- Enabling the user to count packets according to various criteria. Since the traffic counters are readable via the SCE SNMP MIB, these might be used to monitor up to 32 types of packets, according to the requirements of the installation.
- Ignoring certain types of flows. When a traffic rules specifies an “ignore” action, packets matching the rule criteria will not open a new flow, but will pass through the ***SCE 1000*** without being processed. This is useful when a particular type of traffic should be ignored by the ***SCE 1000***.

  Possible examples include ignoring traffic from a certain IP range known to require no service, or traffic from a certain protocol.
- Blocking certain types of flows. When a traffic rules specifies a “block” action, packets matching the rule criteria (and not belonging to an existing flow) will be dropped and not passed to the other interface. This is useful when a particular type of traffic should be blocked by the ***SCE 1000***.

  Possible examples include performing ingress source address filtering (dropping packets originating from a subscriber port whose IP address does not belong to any defined subscriber-side subnet), or blocking specific ports.

It should be noted that using traffic rules and counters does not affect performance. It is possible to define the maximum number of both traffic rules and counters without causing any degradation in the ***SCE 1000*** performance.

Traffic Rules

A traffic rule specifies that a defined action should be taken on packets processed by the SCE Platform that meet certain criteria. The maximum number of rules is 128. Each rule is given a name when it is defined, which is then used when referring to the rule.

Packets are selected according to user-defined criteria, which may be any combination of the following:

- **IP address**: A single address or a subnet range can be specified for each of the line ports (Subscriber / Network).
- **Protocol:** TCP/UCP/ICMP/IGRP/EIGRP/IS-IS/OSPF/Other
- **TCP/UDP Ports**: A single port or a port range can be specified for each of the line ports (Subscriber / Network). Valid for the TCP/UDP protocols only.
- **TCP flags** (TCP only).
- **Direction** (Upstream/Downstream).

The possible actions are:

- **Count** the packet by a specific traffic counter
- **Block** the packet (do not pass it to the other side)
- **Ignore** the packet (do not provide service for this packet: No bandwidth metering, transaction reporting etc. is done)

Block and **Ignore** actions affect only packets that are not part of an existing flow.

Note that **Block** and **Ignore** are mutually exclusive. However, blocked or ignored packets can also be counted.

It is possible for a single packet to match more that one rule (The simplest way to cause this is to configure two identical rules with different names). When this happens, the system operates as follows:

- Any counter counts a specific packet only once. This means that:
  - If two rules specify that the packet should be counted by the same counter, it is counted only once.
  - If two rules specify that the packet should be counted by different counters, it is counted twice, once by each counter.
- **Block** takes precedence over **Ignore**: If one rule specifies **Block**, and another rule specifies **Ignore**, the packet is blocked.

Traffic counters

Traffic counters count the traffic as specified by the traffic rules. The maximum number of counters is 32. Each counter is given a name when it is defined, which is then used when referring to the counter.

A traffic counter can be configured in one of two ways:

- **Count packets**: the counter is incremented by 1 for each packet it counts.

- **Count bytes**: the counter is incremented by the number of bytes in the packet for each packet it counts.

Configuring Traffic Counters

A traffic counter must be created before it can be referenced in a traffic rule. Use the following commands to create and delete traffic counters.

To create a traffic counter:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`traffic-counter name`** *`<name> (count-bytes|count-packets)`*

To delete a traffic counter:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`no traffic-counter name`** *`<name>`*
Note that a traffic counter cannot be deleted if it is used by any existing traffic rule.

To delete all existing traffic counters:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`no traffic-counter all`**

Configuring Traffic Rules

Use the following commands to create and delete traffic rules.

To create a traffic rule:

Step 1 From the ***SCE 1000*****(config if)#** prompt, type **`traffic-rule name`** *`<name>`* **`IP-addresses`** *`(all|(subscriber-side <IP specification> network-side <IP specification>))`* **`protocol`** *`<protocol>`* **`ports`** *`(all|(subscriber-side <port specification> network-side <port specification>))`* **`flags`** *`<flags specification>`* **`direction`** *`<direction>`* **`traffic-counter`** *`<traffic-counter>`* [**`action`** *`<action>`*]
Where the command options are defined as follows:

IP specification:

all|([all-but] (<ip-address>|<ip-range>))

- *<ip-address>* is a single IP address in dotted-decimal notation, such as 10.1.2.3
- *<ip-range>* is an IP subnet range, in the dotted-decimal notation followed by the number of significant bits, such as 10.1.2.0/24.
- Use the **all-but** keyword to exclude the specified IP address or range of IP addresses

protocol:

Any one of the following protocols:

TCP/UCP/ICMP/IGRP/EIGRP/IS-IS/OSPF/Other

port specification (TCP/UDP only):

all|([all-but] (<port>|<port-range>))

- *<port>* is a single port number (0-65535)
- *<port-range>* is a port range in the following notation: <min-port>:<max-port>, such as 80:82.
- Use the **all-but** keyword to exclude the specified port or range of ports

<**flags specification**> **(TCP only):**

Defines criteria for matching packets based on the TCP flag values.

all | (SYN (0|1|all) [FIN (0|1|all) [RST (0|1|all) [ACK (0|1|all) [URG (0|1|all) [PSH (0|1|all)]]]]])

For each flag, a value of 0, 1, or 'all' can be selected. Default is "all".

Note that flags are always processed in order, so that it is not possible to define a specific value for one flag without defining criteria for the preceding flags. So, for example, to specify ACK = 0 as one of the criteria, the preceding flags, SYN, FIN, and RST, must be set to **all**. The URG and PSH flags can be ignored, as they come after the ACk flag.

direction:

Any of the following:

upstream/downstream/all

traffic-counter:

Either of the following:

- *name <name of an existing traffic counter>:* Packets meeting the criteria of the rule are to be counted in the specified counter. If a counter name is defined, the "count" action is also defined implicitly. The keyword **name** must appear as well as the actual name of the counter.
- *none:* If **none** is specified, then an action must be explicitly defined via the **action** option.

action: (not required if the action is count only)

Either of the following:

ignore/block

EXAMPLE 1

This example creates the following traffic rule:

Name = rule1

IP addresses: subscriber side = all IP addresses, network side = 10.10.10.10 only

Protocol = other

Direction = all

Traffic counter = counter1

Since it is not TCP/UDP, port and flags are not applicable.

The only action performed will be counting

```
SCE 1000 (config if)# traffic-rule rule1 IP-addresses subscriber-side all
network-side 10.10.10.10 protocol other direction all traffic-counter name
counter1
```

EXAMPLE 2

This example creates the following traffic rule:

Name = rule2

IP addresses: subscriber side = all IP addresses, network side = all IP addresses EXCEPT the subnet 10.10.10.0/24

Protocol = TCP

Ports: subscriber side = 100, network side = 100-150

Flags = FIN flag when value = 1 (preceding flag (SYN) must be set to all)

Direction = downstream

Traffic counter = counter2

Action = Block

The actions performed will be counting and blocking

```
SCE 1000 (config if)# traffic-rule rule2 IP-addresses subscriber-side all
network-side all-but 10.10.10.0/24 protocol TCP ports subscriber-side 100
network-side 100:150 flags SYN all FIN 1 direction downstream traffic-
counter name counter2 action block
```

EXAMPLE 3

This example creates the following traffic rule:

Name = rule3

IP addresses: all

Protocol = IS-IS

Direction = upstream

Traffic counter = none

Action = ignore (required since traffic-counter = none)

Since it is not TCP/UDP, port and flags are not applicable.

The only action performed will be **Ignore**.

```
SCE 1000 (config if)# traffic-rule rule3 IP-addresses all protocol IS-IS
direction upstream traffic-counter none action ignore
```

To delete a traffic rule:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`no traffic-rule name`** *`<name>`*
Note that a traffic counter cannot be deleted if it is used by any existing traffic rule.

To delete all existing traffic rules:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`no traffic-rule all`**

Managing Traffic Rules and Counters

Use these commands to display existing traffic rule configuration, as well as traffic counter configuration (packets/bytes and the name of the rule using the counter) and traffic counter value. You can also reset a specific counter or all counters.

To view a specified traffic rule:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 traffic-rule name`** *`<rule-name>`*

To view all existing traffic rules:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 traffic-rule all`**

To view a specified traffic counter:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 traffic-counter name`** *`<counter-name>`*

EXAMPLE

The following example displays information for the traffic counter “cnt”.

```
SCE 1000# show interface linecard 0 traffic-counter name cnt
Counter 'cnt' value: 0 packets. Rules using it: None.
```

To view all existing traffic counters:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 traffic-counter all`**

EXAMPLE

The following example displays information for all existing traffic counters.

```
SCE 1000#show interface linecard 0 traffic-counter all
Counter 'cnt' value: 0 packets. Rules using it: None.
1 counters listed out of 32 available.
```

To reset a specified traffic counter:

Step 1 From the ***SCE 1000#*** prompt, type **clear interface linecard 0 traffic-counter name <counter-name>**

To reset all existing traffic counters:

Step 1 From the ***SCE 1000#*** prompt, type **clear interface linecard 0 traffic-counter all**

Configuring TOS Marking

The ***SCE 1000*** TOS marking feature enables marking the TOS field in the IP header of each packet according to two applicative attributes of the packet: its Class (class of service) and its Color (reflects the packet's level of compliance to its relevant bandwidth limitations, where applicable). The actual TOS value set in the IP header is determined according to the configurable TOS table, based on the Class and Color. The default values in the TOS table are based on the Diffserv standard.

Note The first few TCP packets (connection establishment) are associated and marked with a default AF4 class that is mapped to the IQ2 queue and *are marked accordingly*. This occurs because the ***SCE 1000*** transmits the first few packets before classifying the flow and identifying the application or service.

The following commands are relevant to TOS marking:

- `no tos-marking diffserv`
- `tos-marking mode`
- `tos-marking set-table-entry class`
- `tos-marking reset-table`
- `show interface LineCard tos-marking mode`
- `show interface LineCard tos-marking table`

Enabling and Disabling TOS Marking

To enable TOS marking:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`tos-marking mode diffserv`** and press **Enter**.

To disable TOS marking:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`no tos-marking diffserv`** and press **Enter**.

Modifying the TOS Table

To modify the TOS table:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`tos-marking set-table-entry`** *`class`* class **`color`** *`color`* **`value`** *`value`* and press Enter.
`class` is the applicative class of the packet (BE, AF1, AF2, AF3, AF4, EF),, *`color`* is the applicative color (green, red or any) and *`value`* is the value to be assigned to the packet (value set to the IP TOS field). The *`value`* parameter must be in hexadecimal format in the range **`0x0`** to **`0x3f`**.

EXAMPLE:

The following example sets a TOS marking table entry.

```
SCE 1000 (config if)#tos-marking set-table-entry class AF3 color green value
0x24
```

Editing the Connection Mode

The connection mode command allows you to configure the topology of the system in one command. The connection mode is determined by the physical installation of the ***SCE 1000***.

There are two topology-related parameters included in the connection mode command:

- **Connection mode**: Can be either of the following, depending on the physical installation of the ***SCE 1000***:
  - **Inline** connection mode: Bump-in-the-wire installation.
  - **Receive-only** connection mode: Out-of-line installation utilizing an external switch or splitter.

  The default value is **inline**.
- **On-failure**: This parameter determines how the behavior of the bypass mechanism of the ***SCE 1000*** when it either has failed or is booting.
  - **Bypass**: The bypass mechanism preserves the network link, but traffic is not processed for monitoring or for control
  - **Cutoff**: There is no forwarding of traffic, and the physical link is forced down (cutoff functionality at layer 1).

  Default: **bypass**

Note Do not change the connection mode unless the physical installation has been changed.

To edit the connection mode:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`connection-mode`** *`inline|receive-only`* **`on-failure [`***`bypass|cutoff`***`]`** and press **Enter**.

EXAMPLE:

The following example sets the connection mode to inline and the on-failure mode to cutoff.

```
 SCE 1000 (config if)# connection-mode inline on-failure cutoff
```

Enforcing the Link Mode

The ***SCE 1000*** has an internal bypass mechanism used to maintain the link even when the ***SCE 1000*** fails. This bypass mechanism has four possible modes of operation:

- bypass
- forwarding
- sniffing
- cutoff

Normally, the link mode is selected by the ***SCE 1000*** software according to the configured connection-mode. However, the **`link-mode`** command can be used to enforce a specific desired mode. This may be useful when debugging the network, or in cases where we would like the ***SCE 1000*** just to forward the traffic. (Note that this is only relevant to inline topologies even though the configuration is available also when in receive-only mode.)

The following link mode options are available:

- **Forwarding:** forwards traffic on the specified link to the ***SCE 1000*** for processing.
- **Bypass:** stops all forwarding of traffic on the specified link to the ***SCE 1000***. Traffic still flows on the link, but is not processed in any way by the ***SCE 1000***.

  This does not affect the redundancy states.
- **Sniffing:** allows the***SCE 1000*** to forward traffic on the specified link through the bypass mechanism while still analyzing the traffic passively.
- **Cutoff:** completely cuts off flow of traffic through the specified link.

Note the following recommendations and restrictions:

- Link mode is relevant only to inline topologies.
- The default link mode is forwarding. When other link modes are selected, active service control is not available and any service control configuration will not be applicable.

To set the link mode:

Step 1 From the ***SCE 1000*** `(config if)#` prompt, type **`link-mode [`***`forwarding|bypass|sniffing|cutoff`***`]`** and press **Enter**.

To view the current link mode:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 link mode`** and press **Enter**.

Enabling and Disabling Link Failure Reflection

In some topologies, link failure on one port must be reflected to the other port in order to allow the higher layer redundancy protocol in the network to detect the failure and function correctly. The **`link failure-reflection`** command determines the behavior of the system when there is a link problem.

The **`link failure-reflection`** command enables reflection of a link failure. Use the **[no]** form of this command to disable failure reflection on the link.

- `[no] link failure-reflection`

The default value is **disabled.**

To enable reflection of link failure:

Step 1 From the ***SCE 1000***`(config)#` prompt, type **`interface Linecard 0`**, and press **Enter**.
The ***SCE 1000***`(config if)#` prompt appears.

Step 2 Type **`link failure-reflection`** and press **Enter**.

Failure reflection on the link is enabled, and the ***SCE 1000***`(config if)#` prompt appears.

Line Gigabit Ethernet Interfaces

The two Gigabit Ethernet interfaces connect the ***SCE 1000*** platform to the network. See the description of network topologies in *Topology* (on page 2-1).

To configure the GigabitEthernet parameters, you must be in the GigabitEthernet Configure Interface Mode

Entering GigabitEthernet Line Interface Configuration Mode

To enter GigabitEthernet Interface Configuration Mode:

Step 1 To enter Global Configuration Mode, type **`configure`** and press **Enter**.
The ***SCE 1000***`(config)#` prompt appears.

Step 2 Type **`interface GigaBitEthernet`** *`[0/1|0/2]`* and press **Enter**.
`interface GigaBitEthernet 0/1` enables configuration of interface 1

`interface GigaBitEthernet 0/2` enables configuration of interface 2

The ***SCE 1000***`(config if)#` prompt appears.

EXAMPLE:

The following example shows how to enter Configuration Mode for the GigabitEthernet Interface number 2.

```
SCE 1000(config)#interface GigabitEthernet 0/2
SCE 1000(config if)#
```

Configuring GigabitEthernet Auto-Negotiation

Auto-negotiation

By default, the ***SCE 1000*** GigabitEthernet ports are configured with auto-negotiation disabled. In bump-in-the-wire topologies, auto-negotiation may be enabled, as described below.

The following commands are relevant to auto negotiation:

- `[no | default ]` **`autonegotiate`**

Configuring the GigabitEthernet Auto-negotiation Mode

To configure GigabitEthernet auto-negotiation mode:

Step 1 From the ***SCE 1000*****(config if)#** prompt, type **`auto-negotiate`**, and press **Enter.**
This configures the GigaBitEthernet to auto-negotiation mode.

Note Auto-negotiation must be disabled when the ***SCE 1000***is connected to traffic links via an external optical splitter in external splitting topology.

EXAMPLE:

The following example shows how to configure the GigabitEthernet Interface to disable auto-negotiation process. That is, it forces the link up with 1000 Mbps no matter what the partner port setting is.

```
SCE 1000(config if)# no auto-negotiate
```

CHAPTER 8

Managing Subscribers

The ***SCE 1000*** Platform is subscriber aware, that is, it can relate traffic and usage to specific customers. This ability to map between IP flows and a specific subscriber allows the system to do the following:

- Maintain the state of each subscriber transmitting traffic through the platform
- Provide usage information for specific subscribers
- Enforce the appropriate policy on subscriber traffic (each subscriber can have a different policy)

Step 2 This chapter contains the following sections:

- Subscriber Overview 8-1
- Importing/Exporting Subscriber Information 8-6
- Removing Subscribers and Templates 8-8
- Monitoring Subscribers 8-10
- Subscriber Aging 8-18

Subscriber Overview

In the Service Control solution, a subscriber is defined as a managed entity on the subscriber side of the SCE Platform to which accounting and policy are applied individually.

The following table lists several examples of subscribers in Service Control solutions.

Table 8-1 Subscriber Examples

The Subscriber	Subscriber Characteristics	
	Managed Entity	**Subscriber (Entity) Identified By**
DSL residential subscriber	DSL residential user	IP address The list of IP addresses is allocated by a Radius server
Cable residential subscriber	Cable residential user	IP address The list of IP addresses of the CPEs is allocated dynamically by a DHCP server
Owner of a 3G-phone that is subscribed to data services	3G-phone owner	The MS-ISDN, which is dynamically allocated by a Radius server.
A corporate/enterprise customer of the service provider	The corporate/enterprise and the traffic it produces	The set of NAT-ed IP addresses, which are allocated statically
A CMTS	The CMTS and the broadband traffic of the Cable Modem users that connect to the Internet through the CMTS	• A range of IP addresses • A group of VLAN tags

Mapping IP traffic flows to subscribers enables the SCE Platform to enforce policies on these flows based on the subscriber who produced them.

The SCE Platform can also insert the information that identifies the subscriber into the RDR records that it produces for analyzed traffic, facilitating OSS systems that use these data records for billing and analysis purposes.

The SCE Platform includes dedicated infrastructure for per-subscriber BW shaping, IP traffic quota management, or any other per-subscriber long-term state management. This is implemented using a set of dedicated data structures that are dynamically managed in the SCE Platform per subscriber.

The SCE Platform examines each IP flow and maps it to the subscriber that produced the flow using one or more networking parameters of this flow. Examples of these could be:

- Source IP address
- Group of source IP addresses
- Range of source IP addresses
- VLAN tag

These parameters are sometimes referred to as *Network-ID*. In order to perform the mapping between the Network-ID and Subscriber-ID, the SCE Platform must be configured with this mapping information.

In some cases the subscriber’s Network-ID is static and changes only rarely and at long intervals. In such cases, obtaining the mapping information is quite simple, and can be implemented by importing the content of a text file, or even by typing the information via the user interface. In other cases, the Network-ID has a dynamic nature, and tends to change every time the subscriber logs into the network. In this case the SCE Platform must obtain the mapping information from some element that stores this information.

The most common Network-IDs are IP addresses. Typically, obtaining the mappings between subscriber-IDs and IP addresses is done through integration with an AAA element or a subscriber repository.

Many times, the SCE Platform runs a Service Control Application that is policy-driven, so it should also be provisioned with the parameters of the policy that should be applied to each of the subscribers. In simple cases, there is only a small set of standard policy packages (Gold, Silver, Bronze…) so the per subscriber information includes only an index into the policies list. In other cases, a whole set of policy parameters should be configured per subscriber. Often the policy that should be applied per subscriber is managed using the same AAA infrastructure that is used for managing the Subscriber-ID to Network-ID mappings.

There are two methods of managing subscribers:

- smartSUB Manager (SM) component: usually necessary in topologies where full dynamic subscriber integration is required (see the *smartSUB Manager User Guide* for details).
- CLI commands: can be used to import and export subscriber information, as well as to monitor subscribers.

As is described in the following sections, subscriber-related information can be imported from external files. This provides an easy method for transferring large quantities of subscriber information to and from the SCE Platform.

Subscriber Modes in Service Control Solutions

Service Control solutions support several modes of handling subscribers:

- Subscriber-less mode
- Anonymous subscriber mode
- Static subscriber aware mode
- Dynamic subscriber aware mode

Note that not all the solutions support all modes.

The most basic mode is **Subscriber-less mode**. In this mode, there is no notion of subscriber in the system, and the entire link where the SCE Platform is deployed is treated as a single subscriber. Global Application level analysis (such as total p2p, browsing) can be conducted, as well as global control (such as limiting total p2p to a specified percentage). From a configuration stand point, this is a turnkey system and there is no need to integrate or configure the system from a subscriber perspective.

In **Anonymous subscriber mode**, analysis is performed on an incoming subscriber-IP address, as the SCE Platform creates an 'anonymous/on-the-fly' record for each subscriber. This permits analyzing traffic at an individual IP address level (for example, to identify/monitor what a particular 'subscriber' IP is currently doing) as well as control at this level (for example, to limit each subscriber's bandwidth to a specified amount, or block, or redirect). Anonymous-subscriber allows quick visibility into application and protocol usage without OSS integration, and permits the application of a uniform control scheme using predefined templates.

There are two possible **Subscriber Aware modes**. In these modes, subscriber IDs and currently used IP addresses are provisioned into the SCE Platform. The SCE Platform can then bind usage to a particular subscriber, and enforce per-subscriber policies on the traffic. Named reports are supported (such as top subscribers with the OSS IDs), quota-tracking (such as tracking a subscriber-quota over time even when IP addresses change) as well as dynamic binding of packages to subscribers. The two Subscriber Aware modes are:

- **Static subscriber aware:** The IP addresses are static. The system supports the definition of static-subscribers directly to the SCE Platform. This is achieved by using the SCE Platform CLI, and defining the list of subscribers, their IP addresses and policy information using interactive configuration or import/export operations.
- **Dynamic subscriber aware:** The IP addresses change dynamically for each subscriber login into the Service Provider’s network. In this case, subscriber awareness is achieved by integrating with AAA and provisioning systems for dynamically obtaining network-ID to subscriber ID mappings, and distributing them to the SCE Platforms.

Aging Subscribers

Subscribers can be aged automatically by the ***SCE 1000***. ‘Aging’ is the automatic removal of a subscriber, performed when no traffic sessions assigned to it have been detected for a certain amount of time. The most common usage for aging is for anonymous subscribers, since this is the easiest way to ensure that anonymous subscribers that have logged-out of the network are removed from the ***SCE 1000*** and are no longer occupying resources. Aging time can be configured individually for introduced subscribers and for anonymous subscribers.

Anonymous Groups and Subscriber Templates

An anonymous group is a specified IP range, possibly assigned a subscriber template. When an anonymous group is configured, the SCE Platform generates anonymous subscribers for that group when it detects traffic with an IP address that is in the specified IP range. If a subscriber template has been assigned to the group, the anonymous subscribers generated have properties as defined by that template. If no subscriber template has been assigned, the default template is used.

Subscriber templates are identified by a number from 0-199. Subscriber templates 1-199 are defined in *csv* formatted subscriber template files. However, template #0 cannot change; it always contains the default values.

If an anonymous group is not explicitly assigned a template, the group uses template #0.

Subscriber Files

Individual subscribers, anonymous groups, and subscriber templates may all be defined in **csv** files. A **csv** file is a text file in a comma-separated-values format. Microsoft Excel™ can be used to view and create such files. The subscriber data is imported into the system using the appropriate CLI command. The ***SCE 1000*** can also export the currently configured subscribers, subscriber templates and anonymous groups to csv-formatted files

Subscriber **csv** files and subscriber template **csv** files are application-specific. Refer to the relevant application documentation for the definition of the file format.

Each line in a **csv** file should contain either a comment (beginning with the character ‘#’), or a list of comma-separated fields.

Subscriber **csv** files are application-specific, but a default format is defined by the SCE, which is used when the application does not choose to over-ride it. The application might over-ride the format when additional data is desired for each subscriber or subscriber template. Refer to the relevant Service Control Application documentation to see if the application defines a different format.

Subscriber template **csv** files are application-specific. Refer to the relevant Service Control Application documentation of the file format.

Anonymous groups **csv** files are not application specific. Their format is described below.

Subscriber default csv file format

Each line has the following structure:

```
name, mappings
```

- **Name:** is the subscriber name
- **Mappings:** contains one of more mappings, specifying the Tunnel IDs or IP addresses mapped to this subscriber. Multiple mappings are separated by semi-colon. Tunnel IDs and IP address/range cannot be specified for the same subscriber. The following mapping formats are supported:
  - Tunnel ID: A number in the range 0-1023. Example: 4

Note Currently only VLAN IDs are supported.

- Tunnel ID range: A range of tunnel Ids. Example: 4-8
- IP address: in dotted decimal notation. Example: 10.3.4.5
- IP address range: dotted decimal, followed by the amount of significant bits. Note that the non-significant bits (As determined by the mask) must be set to zero. Example: 10.3.0.0/16. Example for a bad range: 10.1.1.1/24 (Should have been 10.1.1.0/24).

Here is an example for a subscriber **csv** file in the default format:

```
# A comment line
sub7, 10.1.7.0/24
sub8, 10.1.12.32
sub9, 5
sub10, 13-17
sub11, 39;41
sub12, 10.1.11.90; 10.3.0.0/16
```

Subscriber anonymous groups csv file format

Each line has the following structure:

`name, IP-range, template-index`

- **Name:** is the anonymous group name
- **IP-range:** dotted decimal, followed by the amount of significant bits. Example: 10.3.0.0/16
- **Template-index:** is the index of the subscriber template to be used by subscribers belonging to this anonymous group.

Here is an example for an anonymous groups **csv** file:

```
# Yet another comment line
anon1, 10.1.1.0/24, 1
anon2, 10.1.2.0/24, 2
anon3, 10.1.3.0/32, 3
anon4, 10.1.4.0/24, 3
anon5, 10.1.5.0/31, 2
anon6, 10.1.6.0/30, 1
anon7, 0.0.0.0/0, 1
```

Importing/Exporting Subscriber Information

Use the following commands to import subscriber data from *csv* files and to export subscriber data to these files:

- `subscriber import csv-file`
- `subscriber export csv-file`
- `subscriber anonymous-group import csv-file`
- `subscriber anonymous-group export csv-file`

- `subscriber template import csv-file`
- `subscriber template export csv-file`

These subscriber management commands are LineCard interface commands. Make sure that you are in LineCard Interface command mode, (see *Entering LineCard Interface Configuration Mode* "Entering LineCard Interface Configuration Mode" on page 3-8)).

Importing/Exporting Subscribers

To import subscribers from the csv subscriber file:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`subscriber import csv-file`** *`file`*`name` and pr**ess E**nter.
The subscriber information is imported from the specified file and the ***SCE 1000***`(config if)#` prompt appears.

Imported subscriber information is added to the existing subscriber information. It does not overwrite the existing data.

If the information in the imported file is not valid, the command will fail during the verification process before it is actually applied.

To export subscribers to a csv subscriber file:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`subscriber export csv-file`** *`filename`* and press **Enter**.
Subscriber information is exported to the specified file and the ***SCE 1000***`(config if)#` prompt appears.

Importing/Exporting Anonymous Groups

To create anonymous groups by importing anonymous subscribers from the csv file:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`subscriber anonymous-group import`** *`csv-file`* filename **and p**ress Enter.
The anonymous subscriber information is imported from the specified file, creating anonymous groups and the ***SCE 1000***`(config if)#` prompt appears.

Imported anonymous subscriber information is added to the existing anonymous subscriber information. It does not overwrite the existing data.

To export anonymous groups to a csv file:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`subscriber anonymous-group export csv-file`** *`filename`* and press **Enter**.
The anonymous groups are exported to the specified file and the ***SCE 1000***`(config if)#` prompt appears.

Importing/Exporting Subscriber Templates

To import a subscriber template from the csv file:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`subscriber template import`** *`csv-file`* filename a**nd pr**ess Enter.
The subscriber template is imported from the specified file and the ***SCE 1000***`(config if)#` prompt appears.

To export a subscriber template to a csv file:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`subscriber template export csv-file`** *`filename`* and press **Enter**.
The subscriber template is exported to the specified file and the ***SCE 1000***`(config if)#` prompt appears.

Removing Subscribers and Templates

Use the following commands to remove all subscribers, anonymous groups, or subscriber templates from the system.

- `no subscriber all`
- `no subscriber anonymous-group all`
- `clear subscriber anonymous`
- `default subscriber template all`

Use the following commands to remove a specific subscriber or anonymous group from the system.

- `no subscriber name`

- `no subscriber anonymous-group name`

These subscriber management commands are LineCard interface commands. Make sure that you are in LineCard Interface command mode, (see “Entering LineCard Interface Mode,” page and that the ***SCE 1000***`(config if)#` prompt appears in the command line.

To remove a specific subscriber:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **no** **`subscriber name`** *`subscriber-name`* and press **Enter**.
The specified subscriber is removed from the system, and the ***SCE 1000***`(config)#` prompt appears.

To remove all introduced subscribers:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **no** **`subscriber all`** and press **Enter**.
All introduced subscribers are removed from the system, and the ***SCE 1000***`(config)#` prompt appears.

To remove a specific anonymous subscriber group:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **no** **`subscriber anonymous-group name`** *`group-name`* and press **Enter**.
The specified anonymous group is removed from the system, and the ***SCE 1000***`(config)#` prompt appears.

To remove all anonymous subscriber groups:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **no** **`subscriber anonymous-group all`** and press **Enter**.
All anonymous groups are removed from the system, and the ***SCE 1000***`(config)#` prompt appears.

To remove all anonymous subscribers:

Step 1 From the ***SCE 1000#*** prompt, type **`clear interface linecard 0 subscriber anonymous all`** and press **Enter**.
All anonymous subscribers are removed from the system, and the ***SCE 1000***`(config)#` prompt appears.

Note The **`clear subscriber anonymous`** command is a Privileged Exec command.

To remove all subscriber templates:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`default subscriber template all`** and press **Enter**.
All subscriber templates are removed from the system, and the ***SCE 1000***`(config)#` prompt appears. All anonymous subscribers will be assigned to the default subscriber template.

Monitoring Subscribers

The CLI provides a number of commands that allow you to monitor subscribers. These commands can be used to display information regarding the following:

- Subscriber Database
- All subscriber meeting various criteria
- Individual subscriber information, such as properties and mappings
- Anonymous subscribers

Subscribers may be introduced to the SCE Platform via the SCE Platform CLI or via the smartSUB Manager. The monitoring commands may be used to monitor all subscribers and subscriber information, regardless of how the subscribers were introduced to the system.

Note that these commands are all in Privileged Exec mode. Make sure that you are in the proper mode and that the ***SCE 1000#*** prompt appears in the command line. Note also that you must specify '**linecard 0**' in these commands.

Monitoring the Subscriber Database

Use the following commands to display statistics about the subscriber database, and to clear the "**total**" and "**maximum**" counters.

- `show interface linecard 0 subscriber db counters`
- `clear interface linecard 0 subscriber db counters`

To display statistics about the subscriber database:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber db counters`** and press **Enter**.
The following counters are displayed:

- Current number of subscribers
- Current number of introduced subscribers
- Current number of anonymous subscribers
- Current number of active subscribers (with active traffic sessions)
- Current number of subscribers with mappings
- Current number of IP mappings
- Current number of vlan mappings
- Max number of subscribers that can be introduced
- Max number of subscribers with mappings
- Max number of subscribers with mappings date / time
- Total aggregated number introduced
- Total number of aged subscribers
- Total number of pull events
- Number of traffic sessions currently assigned to the default subscriber

To clear subscriber database counters:

Step 1 From the ***SCE 1000#*** prompt, type **`clear interface linecard 0 subscriber db counters`** and press **Enter**.
The "**total**" and "**maximum**" counters are cleared (see list above).

Displaying Subscribers

You can display specific subscriber name(s) that meet various criteria:

- A subscriber property is equal to, larger than, or smaller than a specified value
- Subscriber name matches a specific prefix or suffix
- Mapped to a specified IP address range
- Mapped to a specified VLAN ID

Use the following commands to display subscribers:

- `show interface linecard 0 subscriber [amount]`
- `[prefix ‘prefix’] [property ‘propertyname’ equals|greater-than|less-than ‘property-val’]`
- `show interface linecard 0 subscriber [amount] prefix ‘prefix’`
- `show interface linecard 0 subscriber [amount] suffix ‘suffix’`
- `show interface linecard 0 subscriber mapping IP ‘iprange’`
- `show interface linecard 0 subscriber [amount] mapping intersecting IP ‘iprange’`
- `show interface linecard 0 subscriber mapping VLANid ‘vlanid’`

Displaying Subscribers: By Subscriber Property or Prefix

You can search for all subscribers that match a specified value of one of the subscriber properties, or are greater than or less than the specified value. You can also search for all subscribers that match a specified prefix. You can also find out how many subscribers match any one of these criteria, rather than displaying all the actual subscriber names.

To display subscribers that match a specified value of a subscriber property:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber property ‘propertyname’ equals ‘property-val’`** and press Enter.

To display subscribers that are greater than or less than a specified value of a subscriber property:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber property ‘propertyname’ greater-than|less-than ‘property val’`** and press **Enter**.

To display subscribers that match a specified prefix:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber prefix ‘prefix’`** and press **Enter**.

To display subscribers that match a specified suffix:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber suffix ‘suffix’`** and press **Enter**.

To display the number of subscribers that match a specified value of a subscriber property:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber amount property ‘propertyname’ equals ‘property val’`** and press **Enter**.

To display the number of subscribers that are greater than or less than a specified value of a subscriber property:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber amount property ‘propertyname’ greater-than|less-than ‘property val’`** and press **Enter**.

To display the number of subscribers that match a specified prefix:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber amount prefix ‘prefix’`** and press **Enter**.

To display the number of subscribers that match a specified prefix:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber amount suffix ‘suffix’`** and press **Enter**.

Displaying Subscribers: By IP Address or VLAN ID

You can display the subscribers who are mapped to any of the following:

- A specified IP address, or range of IP addresses
- IP addresses intersecting a given IP address or IP range
- A specified VLAN ID
- no mapping

You can also display just the number of subscribers are mapped to IP addresses that intersect a given IP address or IP range.

To display subscribers that are mapped to a specified IP address, or range of IP addresses:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber mapping IP ‘iprange’`** **and** press Enter.

To display subscribers that are mapped to IP addresses that intersect a given IP address or IP range:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber mapping intersecting IP ‘iprange’`** and press **Enter**.

To display subscribers that are mapped to a specified IP address, or range of IP addresses:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber mapping IP ‘iprange’`** and press **Enter**.

To display subscribers with no mapping:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber mapping none`** and press **Enter**.

To display the number of subscribers that are mapped to IP addresses that intersect a given IP address or IP range:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber amount mapping intersecting IP ‘iprange’`** and press **Enter**.

To display the number of subscribers with no mapping:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber amount mapping none`** and press **Enter**.

Displaying Subscriber Information

You can display the following information about a specified subscriber:

- values of the various subscriber properties
- mappings
- OS counters:
  - current number of flows
  - bandwidth

Use the following commands to display subscriber information:

- `show interface linecard 0 subscriber properties`
- `show interface linecard 0 subscriber name ‘name’`
- `show interface linecard 0 subscriber name ‘name’ mappings`
- `show interface linecard 0 subscriber name ‘name’ counters`
- `show interface linecard 0 subscriber name ‘name’ properties`

To display a listing of subscriber properties:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber properties`** **and** press Enter.

To display complete information for a specified subscriber - all values of subscriber properties and mappings:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber name ‘name’`** and press **Enter**.

To display values of subscriber properties for a specified subscriber:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber name ‘name’ properties`** and press **Enter**.

To display mappings for a specified subscriber:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber name ‘name’ mappings`** and press **Enter**.

To display the OS counters for a specified subscriber:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber name ‘name’ counters`** and press **Enter**.

Displaying Anonymous Subscriber Information

You can display the following information regarding the anonymous subscriber groups:

- aging (see *Subscriber Aging* (on page 8-18))
- currently configured anonymous groups
- currently configured subscriber templates
- configuration of a specified anonymous group
- number of subscribers in a specified anonymous group, or in all anonymous groups

Use the following commands to display anonymous subscriber information:

- `show interface linecard 0 subscriber templates [index]`
- `show interface linecard 0 subscriber anonymous-group [all] [name ‘groupname’]`

- `show interface linecard 0 subscriber amount anonymous [name ‘groupname’]`
- `show interface linecard 0 subscriber anonymous [name ‘groupname’]`

To display the currently configured anonymous groups:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber anonymous-group all`** **and** press Enter.

To display the currently configured templates for anonymous groups:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber templates`** and press **Enter**.

To display the current configuration for a specified anonymous group:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber anonymous-group name ‘groupname’`** and press **Enter**.

To display the subscribers in a specified anonymous group:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber anonymous name ‘groupname’`** and press Enter.

To display all subscribers in anonymous groups:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber anonymous`** and press **Enter**.

To display the number of subscribers in a specified anonymous group:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber amount anonymous name ‘groupname’`** and press **Enter**.

To display the total number of subscribers in anonymous groups:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber amount anonymous`** and press **Enter**.

Subscriber Aging

As explained previously, aging is the automatic removal of a subscriber when no traffic sessions assigned to it have been detected for a certain amount of time. Aging may be enabled or disabled, and the aging timeout period (in minutes) can be specified.

Aging can be configured separately for introduced subscribers and for anonymous subscribers.

Use the following commands to configure and monitor aging.

- `[no] subscriber aging`
- `subscriber aging timeout`
- `show interface linecard 0 subscriber aging`

To enable aging for anonymous group subscribers:

Step 1 From the ***SCE 1000***`(config if)#` prompt, **`subscriber aging anonymous`** and press **Enter**.

To enable aging for introduced subscribers:

Step 1 From the ***SCE 1000***`(config if)#` prompt, **`subscriber aging introduced`** and press **Enter**.

To disable aging for anonymous group subscribers:

Step 1 From the ***SCE 1000***`(config if)#` prompt, **`no subscriber aging anonymous`** and press **Enter**.

To disable aging for introduced subscribers:

Step 1 From the ***SCE 1000***`(config if)#` prompt, **`no subscriber aging introduced`** and press **Enter**.

To set the aging timeout period (in minutes) for anonymous group subscribers:

Step 1 From the ***SCE 1000***`(config if)#` prompt, **`subscriber aging anonymous timeout ‘aging-time’`** and press **Enter**.

To set the aging timeout period (in minutes) for introduced subscribers:

Step 1 From the ***SCE 1000***`(config if)#` prompt, **`subscriber aging introduced timeout ‘aging-time’`** and press **Enter**.

To display aging for anonymous groups:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber aging anonymous`** and press **Enter**.

To display aging for anonymous groups:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 subscriber aging introduced`** and press **Enter**.

CHAPTER 9

Identifying And Preventing Distributed-Denial-Of-Service Attacks

This chapter describes the ability of the ***SCE 1000*** to identify and prevent DoS and DDoS attacks, and the various procedures for configuring and monitoring the Attack Filter Module.

Step 2 This chapter contains the following sections:

- Attack Filtering 9-1
- Attack Detection 9-2
- Attack Detection Thresholds 9-3
- Attack Handling 9-3
- Configuring Attack Detectors 9-5
- Configuring Subscriber Notifications 9-11
- Managing Attack Filtering 9-12
- Monitoring Attack Filtering 9-14

Attack Filtering

The ***SCE 1000*** includes enhanced capabilities of identifying DoS and DDoS attacks, and protecting against them. Previous versions of the SEos provided a means to monitor the entire link and identify a global increase in flow-open rate, indicative of a DoS attack.

The new SEos that runs on the ***SCE 1000*** extends this concept by improving the detection mechanism, adding individual IP address granularity, and providing a set of actions to report (to the operator), block, and notify (the subscriber) of the attack.

The system tracks the following two metrics in an attempt to identify abnormal flow/ connection increase:

- **open-flows**: Total number of flows (TCP, UDP, ICMP, other) that are concurrently open
- **ddos-suspected-flows**: Total number of flows that are possible suspects of being part of a denial- of- service attack because they are un- established (in TCP the 3-way handshake is incomplete, in UDP/ ICMP/ OTHER, less than 3 packets have been transmitted on a flow).

The above two metrics are maintained for each IP address, and the system tracks the values against pre- defined (and user- configurable) thresholds (an attack is defined when the threshold is breached for a certain IP address).

Note that the system makes a distinction between an Attack- Source & Attack-Destination. As each attack is associated with an IP address, the IP- address is classified as either the attack source (i. e. it is generating the attack traffic) or its destination (i.e. it is being attacked). This parameter is later reported, and can also be used in creating filtering and action rules for the DoS mechanism.

Once an attack is identified, the system can be instructed to perform any of the following actions:

- **Report**: The system will generate an SNMP trap each time an attack ‘starts’ and ‘stops’. The SNMP trap contains the following information fields:
  - A specific IP address
  - **Protocol** (TCP, UDP, ICMP or Other)
  - **Interface** (User/Network) behind which the detected IP address is found. This is referred to below as the attack ‘side’
  - **Attack direction** (whether the IP address is the attack source or the attack destination).
  - **Type of threshold breached** (open- flows / ddos- suspected- flows) [‘ attack- start’ traps only]
  - **Threshold value breached** [‘ attack- start’ traps only]
  - **Action taken** (report, block) indicating what was the action taken by the ***SCE 1000*** in response to the detection
  - **Amount of attack flows blocked/ reported** providing the total number of flows blocked by the protection mechanism during the attack [‘ attack- stop’ traps only]
- **Block**: The system will block all suspected traffic from / to the attack IP address (depending on whether the IP address is an Attack- Source or Attack-Destination)
- **Subscriber notification**: When the IP address identified is mapped to a particular subscriber context, the system can be configured to notify the subscriber of the fact that he is under an attack (or a machine in his network is generating such an attack), using HTTP Redirect.

Attack Detection

The attack interface, protocol and specific IP address are detected. When one specific IP address is attacking a different specific IP address, two separate attack detections should be identified, one for the attacking host and one for the attacked host. The system can identify a maximum of 1000 independent, simultaneous attacks.

Attack detections are identified using the following parameters:

- A specific IP address
- Protocol (TCP, UDP, ICMP or Other)
- Interface (User / Network) behind which the detected IP address is found.
- This is referred to below as the attack side.
- Attack direction (whether the IP address is the attack source or the attack destination address).

Attack detection and handling are user-configurable. The remainder of this chapter explains how to configure and monitor attack detection.

Attack Detection Thresholds

There are two counters that are used for attack detection. These counters are maintained by the SCE Platform for each IP address, protocol, interface and attack-direction.

- **Concurrently open flows**: The number of flows that have been opened and have not yet been closed by TCP FIN or by aging.
- **DDoS-suspected open flows**: The definition of a DDoS-suspected open flow varies according to the protocol:
  - TCP flows: A flow for which the first payload packet has not been detected. (Also called un-established.)
  - All other flows: A flow for which less than three packets have been detected.

Note that every flow begins life in the ***SCE 1000***as a DDoS-suspected flow, and stops being DDoS-suspected when the system determines that it is carrying a real TCP connection due or that its length identifies it as a normal flow. When observing traffic related to a specific IP address, it is expected that under normal conditions there will be not many DDoS-suspected flows, even though there might be a lot of concurrently open flows.

The system has a separate default threshold for the number of concurrently open flows and DDoS-suspected open flows. If either threshold is crossed for a particular IP address/interface combination, an attack is declared for that IP address. When the number of flows decreases and the threshold is crossed in the opposite direction for more than three seconds, the system declares that the attack has ended.

The user may define values for these thresholds that override the preset defaults. It is also possible to configure specific thresholds for certain conditions (per IP range, protocol, interface and attack direction). This enables the user to set different detection criteria for different types of network entities, such as a server farm, DNS server, or large enterprise customer.

Attack Handling

Attack handling can be configured as follows:

- **Configuring the action**:
  - Report: Attack packets are processed as usual, and the occurrence of the attack is reported.
  - Block: Attack packets are dropped by the SE200, and therefore do not reach their destination.

  Regardless of which action is configured, two reports are generated for every attack: one when the start of an attack is detected, and one when the end of an attack is detected.

  Attack start and end are defined as follows:

  - Attack start: Reported as soon as the threshold value for concurrent open-flows or DDoS-suspected flows is exceeded.

  - Attack end: Reported when both the number of concurrent open-flows and the number of DDoS-suspected flows are below the threshold value for at least 3 seconds
- **Configuring subscriber-notification**:
  - Enabled: If the subscriber IP address is detected to be attacked or attacking, the subscriber is notified about the attack.
  - Disabled: The subscriber is not notified about the attack.

Subscriber Notification

When an attack is identified, if the IP address is detected on the subscriber side and is mapped to a subscriber, the system notifies the application about the attack. This enables the application to notify the subscriber about the attack on-line by redirecting HTTP requests of this subscriber to a server that will notify it of the attack.

In addition, when blocking TCP traffic, the system can be configured to not block certain ports in order to make this redirection possible. A list of up to three port numbers can be configured to be *un-blockable*.

Note that subscriber-notification can only function if supported by the Service Control Application currently loaded to the SCE Platform, and the application is configured to activate this capability. To verify whether the application you are using supports attack subscriber notification, and for details about enabling attack subscriber notification in the application, please refer to the documentation of the relevant Service Control Application**.**

Configuring Attack Detectors

The Cisco attack detection mechanism is controlled by defining and configuring special entities called Attack Detectors.

There is one attack detector called ‘default’, which is always enabled, and 99 attack detectors (numbered 1-99), which are disabled by default. Each detector (both the default and detectors 1-99) can be configured with a separate action and threshold values for all possible combinations of protocol, direction and side.

When detectors 1-99 are disabled, the default attack detector configuration determines the thresholds used for detecting an attack, and the action taken by the SCE Platform when an attack is taken. For each combination of protocol (TCP/UDP/ICMP/Other), attack-direction (source/destination) and side (Network/Subscriber), a different set of thresholds and action can be set. In addition, subscriber-notification can be enabled or disabled in the same granularity.

The default attack detector should be configured with values that reflect the desired SCE Platform behavior for the majority of the traffic flows flowing through it. However, it is not feasible to use the same set of values for all the traffic that traverses through the ***SCE 1000***, since there might be some network entities for which the characteristics of their normal traffic should be considered as an attack when coming from most other network elements. Here are two common examples:

- A DNS server is expected to be the target of many short DNS queries. These queries are typically UDP flows, each flow consisting of two packets: The request and the response. Normally, the SCE considers all UDP flows that are opened to the DNS server as DDoS-suspected flows, since these flows include less than 3 packets. A DNS server might serve hundreds of DNS requests at peak times, and so the system should be configured with a suitable threshold for DDos-suspected flows for *protocol = UDP* and *direction = attack-destination*. A threshold value of 1000 would probably be suitable for the DNS server. However, this threshold would be unsuitable for almost all other network elements, since, for them, being the destination of such large number of UDP flows would be considered an attack. Therefore setting a threshold of 1000 for all traffic is not a good solution.
- The subscriber side of the ***SCE 1000*** might contain many residential subscribers, each having several computers connected through an Internet connection, and each computer having a different IP address. In addition, there might be a few business subscribers, each using a NAT that hides hundreds of computers behind a single IP address. Clearly, the traffic seen for an IP address of a business subscriber contains significantly more flows than the traffic of an IP address belonging to a residential subscriber. The same threshold cannot be adequate in both cases.

To let the SCE Platform treat such special cases differently, the user can configure non-default attack detectors in the range of 1-99. Like the default attack detector, non-default attack detectors can be configured with different sets of values of action and thresholds for every combination of Protocol, attack direction and side. However, in order to be effective, a non-default attack detector must be enabled and must be assigned an ACL (access control list). The action and thresholds configured for such attack detector are effective only for IP addresses permitted by the ACL. Non-default attack-detectors can be assigned a label for describing their purpose, such as 'DNS servers' or 'Server farm'.

Non-default attack detectors are effective only for combinations of protocol, attack direction and sides that have been specifically configured. This eliminates the need to duplicate the default attack detector configuration into the configuration non-default attack detectors, and is best illustrated with an example: Suppose an HTTP server on the subscriber side of the ***SCE 1000*** is getting many requests, which requires the use of a non-default attack detector for configuring high threshold values for incoming TCP flows. Assume attack detector number 4 is used for this purpose; hence it is enabled, and assigned an ACL which permits the IP address of the HTTP server. Also suppose that it is desirable to protect subscribers from UDP attacks, hence the default attack detector is configured to block UDP attacks coming from the network (The default configuration is only to report attacks, not block them). If the HTTP server is attacked by a UDP attack from the network , the configuration of the default attack detector will hold for this HTTP server as well, since attack detector number 4 was not configured for UDP attacks.

For each possible combination of protocol, attack direction, and side, the set of enabled attack detectors, together with the default attack detector, forms a database used to determine the threshold and action to take when an attack is detected. When the platform detects a possible attack, it uses the following algorithm to determine the thresholds for attack detection.

- Enabled attack detectors are scanned from low to high numbers.
- If the IP address is permitted by the ACL specified by the attack detector, and a threshold is configured for this combination of protocol, direction and side, then the threshold value specified by this attack detector are used. If not, the scan continues to the next attack detector.
- If no attack detector matches the IP address/protocol combination, then the values of the default attack detector are used.

The same logic is applied when deciding what action the platform should take in handling the attack. The action that is used, is the one specified by the lowest-numbered enabled attack detector that has a specific action setting for the attack protocol, direction and side is used. If none exists, the configuration of the default attack detector is used.

Use the following commands to configure and enable attack detection:

- `[no] attack-filter`
- `attack-detector (default|<number>) protocol <protocol> attack-direction <direction> side <side> action <action> [open-flows <number> ddos-suspected-flows <number>]`
- `attack-detector (default|<number>) protocol <protocol> attack-direction <direction> side <side> (notify-subscriber|dont-notify-subscriber)`
- `default attack-detector (default|<number>) protocol <protocol> attack-direction <direction> side <side>`
- `attack-detector <number> access-list comment`

- `[no] attack-filter subscriber-notification ports`
- `no attack-detector <number>`

Note All the above CLI commands are line interface configuration commands. You must enter line interface configuration mode and see the ***SCE 1000***`(config if)#` prompt displayed.

Enabling Specific-IP Detection

By default, specific-IP detection is disabled, however the user may enable it.

To disable Specific-IP Detection:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`no attack-filter`** and press **Enter**.

To enable Specific-IP Detection:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`attack-filter`** and press **Enter**.

Default Attack Detector

Use these commands to define default thresholds and attack handling action. If a specific attack detector is defined for a particular situation (protocol/attack direction/side), it will override these defaults. The default values configured for the default attack detector are:

- Default action: Report
- Default TCP thresholds:
  - Concurrently open flows: 10000
  - DDoS-suspected flows: 2000
- Default UDP thresholds:
  - Concurrently open flows: 10000
  - DDoS-suspected flows: 5000
- Default ICMP/Other flows:
  - Concurrently open flows: 1000
  - DDoS-suspected flows: 500
- Subscriber notification: Disabled

To define action and optionally the default thresholds:

Step 1 From the ***SCE 1000***(config if)# prompt, type **attack-detector default protocol (***TCP*|*UDP*|*ICMP*|*other***) attack-direction (***attack-source*|*attack-destination*|*both***) side (***subscriber*|*network*|*both***) action (***report*|*block***) [open-flows <***number***> ddos-suspected-flows <***number***>]** and press **Enter**.

Use the following command to set the default values for the subscriber notification mechanism.

Step 2 From the ***SCE 1000***(config if)# prompt, type **attack-detector default protocol** (*TCP*|*UDP*|*ICMP*|*other*) a**ttack-direction** (*attack-source*|*attack-destination*|*both)* **side** *(subscriber*|*network*|*both) (notify-subscriber*|*dont-notify-subscriber)* and press **Enter**.

Use the following command delete user-defined default values for action, thresholds and subscriber notification for a given combination of protocol, direction and side, and reinstate the system defaults.

To delete user-defined defaults for a specific situation:

Step 1 From the ***SCE 1000***(config if)# prompt, type **no attack-detector default protocol (***TCP*|*UDP*|*ICMP*|*other***) attack-direction (***attack-source*|*attack-destination*|*both***) side (***subscriber*|*network*|*both***)** and press **Enter**.

Specific Attack Detectors

A specific attack detector may be configured for each possible combination of protocol direction, and side. The ***SCE 1000*** supports a maximum of 100 attack detectors. Each attack detector is identified by a number (1-99). Each detector can be either disabled (default) or enabled. An enabled attack detector must be configured with the following parameters:

- Access-Control List (ACL) number: Identifies the IP addresses selected by this detector. (See *Access Control Lists* ("Configuring Access Control Lists (ACLs)" on page 6-2).)
- Comment: For documentation purposes

In addition, an enabled attack detector may contain the following settings:

- Threshold values for number of concurrently open flows and for number of DDoS-suspected flows
- Action to take when an attack is detected (Report or Block)
- Subscriber notification setting (Enabled or Disabled)

Use these commands to define thresholds, actions, and subscriber notification setting for a specific attack detector for a particular situation (protocol/attack direction/side).

To enable a specific attack detector and assign and it an ACL:

Step 1 From the ***SCE 1000***(config if)# prompt, type **`attack-detector`** *`<number>`* **`access-list`** *`<number>`* **`comment`** *`<comment>`* and press **Enter**.

To disable a specific attack detector:

Step 1 From the ***SCE 1000***(config if)# prompt, type **`no attack-detector`** *`<number>`* and press **Enter**.

To disable all non-default attack detectors:

Step 1 From the ***SCE 1000***(config if)# prompt, type **`no attack-detector`** *`all-numbered`* and press **Enter**.

To define action and optionally thresholds for a specific attack detector:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`attack-detector`** *`<number>`* **`protocol (`***`TCP|UDP|ICMP|other`***`) attack-direction (`***`attack-source|attack-destination|both`***`) side (`***`subscriber|network|both`***`) action (`***`report|block`***`) [open-flows`** *`<number>`* **`ddos-suspected-flows`** *`<number>`***`]`** and press **Enter**.

Use the following command to set the subscriber notification setting for a given attack detector and a given combination of protocol, direction and side.

To define the subscriber notification setting for a specific attack detector:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`attack-detector`** *`<number>`* **`protocol (`** *`TCP|UDP|ICMP|other`* **`) attack-direction (`** *`attack-source|attack-destination|both`* **`) side (`** *`subscriber|network|both`* **`) (`** *`notify-subscriber|dont-notify-subscriber`* **`)`** and press **Enter**.

Use the following command to remove settings of action, thresholds and subscriber notification for a specific attack detector and combination of protocol, direction and side.

Use the following command to remove the specific user-defined default values for this attack detector and reinstate the default values.

To delete user-defined values for a specific situation:

Step 1 From the ***SCE 1000***`(config if)#` prompt, type **`default attack-detector`** *`<number>`* **`protocol (`** *`TCP|UDP|ICMP|other`* **`) attack-direction (`** *`attack-source|attack-destination|both`* **`) side (`** *`subscriber|network|both`* **`) (`** *`notify-subscriber|dont-notify-subscriber`* **`)`** and press **Enter**.

Sample Attack Detector Configuration

The following configuration changes the default user threshold values used for detecting ICMP attacks, and configures an attack-detector with high thresholds for UDP attacks, preventing false detections of two DNS servers (10.1.1.10 and 10.1.1.13) as being attacked.

(First enter the linecard interface configuration mode)

```
SCE 1000(config)# interface linecard 0
```

(Configure the default ICMP threshold and action.)

```
SCE 1000(config if)# attack-detector default protocol ICMP attack-direction
attack-source action report open-flows 100 ddos-suspected-flows 100
```

(Enable attack detector #1 and assign ACL #3 to it.)

```
SCE 1000(config if)# attack-detector 1 access-list 3 comment "DNS servers"
```

(Define the thresholds and action for attack detector #1)

```
SCE 1000(config if)# attack-detector 1 protocol UDP attack-direction attack-
destination action report open-flows 1000000 ddos-suspected-flows 1000000
```

(Enable subscriber notification for attack detector #1)

```
SCE 1000(config if)# attack-detector 1 protocol UDP attack-direction attack-
destination side subscriber notify-subscriber
```

(Exit the linecard interface configuration mode)

```
SCE 1000(config if)# exit
```

(Define the ACL)

```
SCE 1000(config)# access-list 3 permit 10.1.1.10
SCE 1000(config)# access-list 3 permit 10.1.1.13
```

Configuring Subscriber Notifications

Subscriber notification is a capability used- for notifying a subscriber in real-time about current attacks involving IP addresses mapped to that subscriber. Subscriber notification is configured on a per-attack-detector level, as explained above, and must also be enabled and configured by the application loaded to the ***SCE 1000***, as explained in the appropriate Service Control Application user guide**.**

In the current solutions, the SCE Platform notifies the subscriber about the attack by redirecting HTTP flows originating from the subscriber to the service provider's server, that should notify the subscriber that he is under attack. This raises a question regarding TCP attacks originating from the subscriber that are configured with *block* action. Such attacks cannot normally be notified to the subscriber using HTTP redirection, since all HTTP flows originating from the subscriber are TCP flows, and they are therefore blocked along with all other attack flows. In order to enable effective use of HTTP redirect, there is a CLI command that prevents blocking of TCP flows originating from the subscriber to specified TCP ports, even when the above scenario occurs.

Subscriber Notification Ports

Up to three ports can be specified as subscriber notification ports. The attack filter will, never block TCP Traffic from the subscriber side of the ***SCE 1000*** to these ports, leaving them always available for subscriber notification.

To add ports to the list of subscriber notification ports:

Step 1 From the ***SCE 1000*****(config if)#** prompt, type **`attack-filter subscriber-notification ports`** *`<port1> [<port2> [<port3>]]`* and press **Enter**.

To remove all ports from the list of subscriber notification ports:

Step 1 From the ***SCE 1000*****(config if)#** prompt, type **`no attack-filter subscriber-notification ports`** and press **Enter**.

Managing Attack Filtering

After configuring the attack detectors, the SCE Platform automatically detects attacks and handles them according to the configuration. However, there are scenarios in which a manual intervention is desired, either for debug purposes, or because it is not trivial to reconfigure the SCE attack-detectors properly. For example:

- The SCE Platform has detected an attack, but the user knows this to be a false alarm. The proper action that should be taken by the user is to configure the system with higher thresholds (for the whole IP range, or maybe for specific IP addresses). However, this might take time, and, if attack handling is specified as ‘Block’, the user may wish to stop the block action for this specific attack quickly, leaving the configuration changes for a future time when there is time to plan the needed changes properly.

  Use the **dont-filter** command described below for this type of case.

- An ISP is informed that one of his subscribers is being attacked by a UDP attack from the network side. The ISP wants to protect the subscriber from this attack by blocking all UDP traffic to the subscriber, but unfortunately the SCE Platform did not recognize the attack. (Alternatively, it could be that the attack was recognized, but the configured action was ‘report’ and not ‘block’).

  Use the **force-filter** command described below for this type of case.

The user can use the CLI attack filtering commands to do the following:

- Prevent/stop filtering of an attack related to a specified IP address
- Force filtering of an attack related to a specified IP address

Use the following commands to either force or prevent attack filtering:

- `attack-filter slot 0 dont-filter`
- `attack-filter slot 0 force-filter`
- `no attack-filter slot 0 dont-filter all`
- `no attack-filter slot 0 force-filter all`

Note All the above CLI commands are privileged exec commands. If in line interface configuration mode, you must exit to the privileged exec mode and see the ***SCE 1000#*** prompt displayed

Preventing Attack Filtering

Attack filtering can be prevented for a specified IP address/protocol by executing a **`dont-filter`** CLI command. If filtering is already in process, it will be stopped. When attack filtering has been stopped, it remains stopped until explicitly restored by another CLI command (either **`force-filter`** or **`no dont-filter`**).

To prevent attack filtering for the specified situation:

Step 1 From the ***SCE 1000#*** prompt, type **`attack-filter slot 0 dont-filter ip <`***`IP-address`***`> protocol (`***`TCP|UDP|ICMP|other`***`) attack-direction (`***`attack-source|attack-destination|both`***`) side (`***`subscriber|network|both`***`)`**and press **Enter**.

To restore automatic attack filtering for the specified situation:

Step 1 From the ***SCE 1000#*** prompt, type **`no attack-filter slot 0 dont-filter ip <`***`IP-address`***`> protocol (`***`TCP|UDP|ICMP|other`***`) attack-direction (`***`attack-source|attack-destination|both`***`) side (`***`subscriber|network|both`***`)`**and press **Enter**.

To restore all stopped attack filtering:

Step 1 From the ***SCE 1000#*** prompt, type **`no attack-filter slot 0 dont-filter all`** and press **Enter**.

Forcing Attack Filtering

Attack filtering can be forced for a specified IP address/protocol. If filtering is already in process, it will be stopped. Forced attack filtering will continue until undone by an explicit CLI command (either **`no force-filter`** or **`dont-filter`**).

To force attack filtering for the specified situation:

Step 1 From the ***SCE 1000#*** prompt, type **`attack-filter slot 0 force-filter action (report|block`**) **`ip <`IP-address`> protocol (`TCP|UDP|ICMP|other`) attack-direction (`attack-source|attack-destination|both`) side (`subscriber|network|both`)`[notify-subscriber]** and press **Enter**.

To undo forced attack filtering for the specified situation:

Step 1 From the ***SCE 1000#*** prompt, type **`no attack-filter slot 0 force-filter ip <IP-address> protocol (`TCP|UDP|ICMP|other`) attack-direction (`attack-source|attack-destination|both`) side (`subscriber|network|both`)`** and press **Enter**.

To undo all forced attack filtering:

Step 1 From the ***SCE 1000#*** prompt, type **`no attack-filter slot 0 force-filter all`** and press **Enter**.

Monitoring Attack Filtering

Use these commands to monitor attack detection and filtering:

- `show interface linecard 0 attack-detector`
- `show interface linecard 0 attack-filter`
- `show interface linecard 0 attack-filter query`
- `show interface linecard 0 attack-filter current-attacks`
- `show interface linecard 0 attack-filter dont-filter`
- `show interface linecard 0 attack-filter force-filter`
- `show interface linecard 0 attack-filter subscriber-notification ports`

Note All the above CLI commands are privikeged exec commands. If in line interface configuration mode, you must exit to the privileged exec mode and see the ***SCE 1000#*** prompt displayed

To display a specified attack detector configuration:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 attack-detector <number>`** and press **Enter**.

To display the default attack detector configuration:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 attack-detector default`** and press **Enter**.

To display all attack detector configurations:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 attack-detector all`** and press **Enter**.

To display the configured threshold values and action for the attack detector for a specified IP address:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 attack-filter query IP-address <IP-address> configured`** and press **Enter**.

To display the current counters for the attack detector for all protocols, attack directions, and sides for a specified IP address:

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 attack-filter query IP-address <IP-address> counters`** and press **Enter**.

To display all currently handled attacks

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 attack-filter current-attacks`** and press **Enter.**

To display all existing forced attack filters

Step 1 From the ***SCE 1000#*** prompt, type **`show interface linecard 0 attack-filter force-filter`** and press **Enter.**

To display all existing stopped attack filters

Step 1 From the *SCE 1000#* prompt, type **`show interface linecard 0 attack-filter dont-filter`** and press **Enter.**

To display the list of ports selected for subscriber notification

Step 1 From the *SCE 1000#* prompt, type **`show interface linecard 0 attack-filter subscriber-notification ports`** and press **Enter**.

Troubleshooting

This chapter discusses common problems and solutions when configuring the ***SCE 1000*** or one of its components.

Whenever there is a problem or a suspected problem, search the user log for warnings and/or errors that might indicate the reason for the problem.

The following instructions will help you troubleshoot the ***SCE 1000*** platform. However, it is advisable to first review the chapter that discusses the related features before trying to resolve the problem.

Note Before contacting customer support, always generate the appropriate file from the user log. See *Generating a File for Technical Support* (on page 5-25).

Step 2 This chapter contains the following sections:

- Document Conventions 10-1
- Front Panel LEDs 10-2
- Management Link 10-5
- RDR Reports 10-6
- GBE Interfaces Connectivity 10-10
- Software Package Installation 10-12
- User Log 10-14

Document Conventions

The usage of the troubleshooting tables is as follows:

- Row shaded in gray: The main symptom that could indicate a variety of problems; following rows include detailed symptoms for further diagnosis.
- “How to …” column: Gives instructions to help pinpoint the cause of the problem.

- Resolution column: Assists in resolving the problem, and refers to the relevant chapter for further instructions. In most cases, you will need to refer to these chapters for detailed information.

Front Panel LEDs

The front panel LEDS are the most immediate problem-detection mechanism of the platform. This section explains the different problems that might be indicated by the LED and their immediate resolution.

In CLI commands for the Gigabit Ethernet interfaces, # stands for the number of the interface. This could be 1 or 2.

Table 10-1 Front Panel LEDs

Symptom	**How to look for the specific cause**	**Possible Cause**	**Resolution**
Status LED is flashing orange	CLI commands: **show system operation-status** System operation status is Warning.	Platform is in Warning status.	
One or more of the GBE port LEDs are unlit	CLI commands: **show interface `GigabitEthernet 0/#` counters**		
	Output counters are incrementing.	GBE interface link LED problem.	If GBE counters are incrementing, this indicates LED problem. Contact customer support.
	Output counters are not incrementing.	Line ports GBE links are down. See For possible causes, see below.	
		Cable is broken Connector is not connected to the platform or to the network	Reconnect / replace the cable to the GBE port.

Symptom	How to look for the specific cause	Possible Cause	Resolution
Management port link LED is unlit	CLI commands: **show interface** **`GigabitEthernet 0/#`** If the management link is down, you might need to use the Console port.	Management port link is down. For possible causes, see below.	Check the management interface port by performing a **ping** command to the ***SCE 1000*** platform. If connection is functional contact customer support
		GBE connector is not connected to the platform or to the network	Reconnect the cable to the GBE port
		GBE cable is broken	Replace the cable to the GBE port Check / Replace the cable.
Other problems indicated by the status LED:	View the user log. (See *Viewing the User Log* (on page 4-56).		
	Warning message in the user log file: “voltage problem:”	Voltage problem.	Call technical support immediately
	Warning message in the user log file: “fans problem:”	Fans problem.	Call technical support immediately
	Warning message in the user log file: “abnormal raise in interior temperature:”	Temperature raised above threshold.	Switch the ***SCE 1000*** platform Off. Call technical support immediately.
	Warning message in the user log file: “insufficient disk space:”	Disk capacity exceeded.	Delete uneeded files from the disk.
Power supply LED is unlit	Warning message in the user log file: **power supply problem**	Both power supply LEDs are unlit indicates that there is no power. One power supply LED unlit indicates that there is no power supply redundancy.	If both LEDs are flashing, but the box is still functional, this indicates a LED problem. For any problem of this sort, contact customer support.

Symptom	How to look for the specific cause	Possible Cause	Resolution
Status LED is red	CLI commands: **show system operation-status** System Operation status is Failure	Platform is in Failure status.	
Platform reload fails	Warning message in the user log file	Power-on self tests failed	Reload the SCE Platform. (use CLI **reload** command) If problem is not solved, reopen the software package. See *Software Package Installation* (on page 10-12). If reopening the software package does not solve the problem, contact customer support.
		Abnormal boot (watchdog timeout or power failure) Failure recovery is set to “non-operational”	Reload the ***SCE 1000*** platform
		Five consecutive abnormal boots	System stability problem. Check user log file, and contact customer support for further assistance.
Bypass LED is continuous green	CLI Commands: **show interface LineCard 0 link-bypass**	***SCE 1000*** Platform is in **Failure** status and configured to be in bypass when in **Failure**	If platform is in **Failure** status, reload the ***SCE 1000*** platform

Management Link

There are several cases that might cause a management link problem. When a Telnet connection cannot be established, you need to use the ***SCE 1000*** serial Console port in order to open the CLI session. This enables you to solve the problem and reconnect through the management port.

Table 10-2 Management Link

Symptom	How to look for the specific cause	Possible Cause	Resolution
Management link does not answer **ping**	CLI Commands: **show interface FastEthernet 0/0**		
	Management link is down.	RJ45 connector is not connected in the platform or to the network	Reconnect the cable to the Mng 1 port.
		Cable is connected to Mng 2 port.	Reconnect the cable to the Mng 1 port.
		Cable is damaged.	Check / Replace the cable.
	Management link is up.	One of the following configurations may be wrong: IP address / subnet mask IP default gateway	Static route tables Refer to *IP Configuration* (on page 6-7).
		An ACL may be assigned that denies entry.	CLI Commands **show access-lists**
Telnet connection cannot be established due to link problems	First access the ***SCE 1000*** via a direct connection to the console. CLI Commands: **show interface FastEthernet 0/0**	Management interface IP address or subnet mask is incorrect	Check / reconfigure management port IP address and subnet mask
		Management interface duplex / speed is incorrectly configured	See Entering FastEthernet Line Interface Configuration Mode.
Telnet connection cannot be established when link is up (link LED is green)	First access the ***SCE 1000*** via a direct connection to the console. CLI Commands: **show telnet status**	Telnet server is disabled	Enable Telnet server **service telnetd**

Symptom	How to look for the specific cause	Possible Cause	Resolution
	CLI Commands: **show telnet sessions**	Too many Telnet connections (up to 5 concurrent sessions are supported)	Close one or more of the open Telnet sessions
	CLI Commands: **show ip default-gateway**	Default gateway is incorrect (when the host used as client is not in the same network as the SCE Platform)	Check / reconfigure default gateway. Refer to *Default Gateway*. ("Default Gateway" on page 6-8)
	CLI commands: **show ip route <host-ip-address>**	Routing tables are incorrectly configured (when the host used as client is not in the same network as the SCE Platform, and there is more than one gateway on the SCE Platform network)	Check / reconfigure routing tables. Refer to *IP Routing Table* (on page 6-7).
	CLI commands: **show access-lists** **show line vty access-class** **show ip access-class**	Host is not a member of a valid access-list	Check / reconfigure access-list. Refer to *Configuring Access Control Lists (ACLs)* (on page 6-2).
Telnet connection terminates automatically	CLI commands: **show line vty timeout**	There is a timeout configured on Telnet sessions	Check / reconfigure line timeout (use **no timeout** to disable timeout). Refer to Telnet Timeout.

RDR Reports

The main cause for missing RDR reports can be a management link problem. For the troubleshooting of management link problems, see section *Management Link* (on page 10-5) in this chapter.

The following table describes the different cases that might lead to a RDR reporting problem, assuming that the management link is functional (answers **`ping`**).

Table 10-3 RDR Reports

Symptom	How to look for the specific cause	Possible Cause	Resolution
No RDR reports		• Configuration problems	
No RDR reports are sent from the SCE Platform	CLI commands: • **`show RDR-formatter connection-status`** (Connection is down) • **`show RDR-formatter counters`**	• RDR connection is not configured or configured to a host which is non-functional	• Check / configure RDR destination. • Refer to *The RDR Formatter* (on page 6-19).
RDR formatter fails to connect to the Collection Manager	CLI commands: **`show ip access-class`**	• The Collection Manager is denied by IP access list.	• Check IP ACL configuration • Refer to *Defining the Global Access List* (on page 6-4).
		• Management Link problems.	• Refer to *Management Link* (on page 10-5).
RDR connection is setup correctly but reports are not generated	CLI commands: **`show RDR-formatter counters`** Counters show that RDR did not read any events.	• No application is configured to Linecard CLI command **`show interface LineCard 0`**	• Refer to the to the relevant application user guide.
	CLI commands: **`show interface linecard #`**	• Linecard is in shutdown mode	• Change Linecard mode to no shutdown. Refer to LineCard Interface Configuration Mode.
		• Linecard is in silent mode	• Change Linecard mode to **`no silent`**. Refer to LineCard Interface Configuration Mode.

Symptom	How to look for the specific cause	Possible Cause	Resolution
No RDR reports		• System operation-status problem	
	System status is not **Operational** Front panel LEDs indications. CLI commands: **show system operation-status**	• Boot time failure • Run time failure • Link problems	Check the system status, front panel LEDs and user log file for problem indications. Handle the problem according to the warning / error in the user log. Refer to *Verifying Operational Status* (on page 4-55).
RDR reports are not generated due to traffic problems	If all previous options were correctly functioning / configured, check if traffic reaches the SCE Platform. CLI commands: **show interface GigabitEthernet 0/# counters** Check printout of this command for: “In good unicast packet”. This counter should be constantly incrementing in both ports.	Traffic connection may be cutoff at the SCE Platform or its peers	Check GBE interface link LEDs. Check auto-negotiation configuration in the SCE Platform and its peers.
	show interface GigabitEthernet 0/#	GigabitEthernet interfaces auto-negotiation may be incorrectly configured.	• Check / reconnect the cable to the GBE port • Check / replace the cable

Symptom	How to look for the specific cause	Possible Cause	Resolution
No RDR reports		- Traffic configuration or connection problems	
RDR reports are not generated due to traffic problems	If all previous options were correctly functioning / configured , check if traffic reaches the ***SCE 1000***. CLI commands: - **`show interface GigabitEthernet 0/# counters`** Check printout of this command for: “In good unicast packet”. This counter should be constantly incrementing in both ports. - **`show interface GigabitEthernet 0/#`**	Traffic connection may be cutoff at the SCE Platform or at its peers GigabitEthernet interfaces auto-negotiation may be incorrectly configured.	- Check GBE interface link LEDs. - Check auto-negotiation configuration in the SCE Platform and its peers. - Check / reconnect the cable to the GBE port - Check / replace the cable
RDR reports are not generated due to traffic problems	GBE interface link LED is continuous green (OK). GBE interfaces Rx LEDS are not flashing (no traffic).	No traffic is being transmitted to the SCE Platform from its peer	Check traffic flow going out of the peer (network element connected directly to the SCE Platform)
Missing RDR reports or reports are not generated as expected		Subscriber side and Network side ports on the SCE Platform are oppositely connected.	- Check the GBE interfaces connection. Refer to *Connecting the Line Ports to the Network* (on page 4-48)

GBE Interfaces Connectivity

In general, the case where no traffic is coming out of the ***SCE 1000*** is often caused by link problems or GBE interface configuration. Note that in some cases, the problem which seems as a transmit problem could be in the Rx (no traffic is being received by the ***SCE 1000*** or there is actually no traffic on the line, which could be a normal situation).

In CLI commands of GigabitEthernet interfaces, # stands for the number of the interface. This can be 1 or 2.

Table 10-4 Network Interfaces Connectivity

Symptom	How to look for the specific cause	Possible Cause	Resolution
Interface connectivity problem			
GE interface link LED is off	CLI commands: • **`show interface GigaBitEthernet 0/# counters`** Check printout of this command for: “In good unicast packet” and “Out unicast packet”. These counters should be constantly incrementing. • **`show interface GigaBitEthernet 0/#`**	• GigabitEthernet interfaces auto-negotiation may be incorrectly configured	• Check auto-negotiation configuration in the SCE Platform and in its and peers.
		• Physical connection broken	• Check / reconnect the optical cable to the GBE port • Check / replace the optical cable • Check / replace the cable

Symptom	How to look for the specific cause	Possible Cause	Resolution
Peer does not receive traffic from SCE Platform GBE link is up and Tx LED is flashing correctly	• GBE interface link LED is continuous green • GBE interface Tx LED is flashing CLI commands: • **`show interface GigaBitEthernet 0/# counters`** Check printout of this command for: “Out unicast packet”. This counter should be constantly incrementing. • **`show interface GigaBitEthernet 0/#`**	• GBE interfaces auto-negotiation is disabled at the SCE Platform but enabled at peer	• Check auto-negotiation in SCE Platform and in peer
GBE link is up but Rx LED is not flashing	• GBE interface link LED is continuous green • GBE interface Rx LED is not flashing	• No traffic is being transmitted to the SCE Platform from its peers	• Check traffic connection at peer
		• GE interfaces auto-negotiation is disabled at the SCE Platform but enabled at peer	• Check auto-negotiation in SCE Platform and in peer
Link LEDs are continuously green and Rx LEDs are flashing	CLI commands: • **`show system operation-status`** • **`show interface LineCard 0 link-bypass`** Verify that in the printout of this command: “current bypass state” is not Cutoff.	• System operation-status is **`Failure`** and link-bypass is configured to be in **`Cutoff`** for **`Failure`** state	• This is a result of system failure. Failure causes are indicated in the user log. Refer to Front Panel for more information about the handling of **Failure** status. To recover from this state you must reload the SCE Platform.

Software Package Installation

When encountering problems during the installation of a new software package on the ***SCE 1000***, check the following options.

Table 10-5 Software Package Installation

Symptom	How to look for the specific cause	Possible Cause	Resolution
Package file not found	CLI commands: • **`Boot system <filename>`** Returned error is: • `Error—File <file name> does not exist`	• The package file does not exist in the specified location	• Verify package file location and try again
Package file open error	CLI commands: • **`Boot system <filename>`**		• Refer to secondary symptoms
	Check the printout of this command for the package file type.	Package file **type** mismatch • The package file type is **`management-image`** instead of **`system-image`**	• Verify that you are trying to open the correct package file
		Package file **platform** mismatch • The package file platform is not the ***SCE 1000*** installation file	• Verify that you have the package file appropriate to your platform type
	Returned error is: • `Package file <file name> does not contain magic header`	• The file is not a software installation package file	• Verify that you are trying to open the correct file

Symptom	How to look for the specific cause	Possible Cause	Resolution
Package installation failure	CLI commands: - **`Boot system filename`** Returned error is: - `Error—There are only X free bytes on device <device name>, but Y bytes are needed for the extraction (where X and Y are stated in bytes)`	- **`/tffs0/ device is full`**	- Delete old and unnecessary files and try the package extraction again

User Log

The following table describes the possible causes of user log problems.

Table 10-6 User Log

Symptom	How to look for the specific cause	Possible Cause	Resolution
User log files are empty	CLI commands: • **more user-log** The presented log is empty.	Check logger device User-File-Log configuration. CLI command • **Show logger device User-File-Log status** • The device might be disabled	• Verify that the device is enabled
User log files contain very little, or only very recent information.	CLI commands: • **more user-log** There are less messages in the user log than expected. • **Show logger device User-File-Log**	The device User-File-Log size of the device might be too small causing it to recycle and to delete older messages	• Set the max-file-size to a reasonable size (default and recommended size is 1MB) CLI command • **logger device User-File-Log max-file-size 100000**
User log files are empty (or no new messages are added) while device configuration is correct	CLI commands: • **more user-log** The presented log is empty or there are very few messages. • **Show logger device User-File-Log**	Logger service might be disabled. To check logger service configuration use CLI **show version**. Look for the Logger status in the printout.	• If logger status is disabled, contact customer support
New user log messages are not added to the log when expected to	CLI commands: **more user-log**	• /tffs0/ device is full. New messages cannot be added to the log files. • Use dir command to check device free space	• Delete old or unnecessary files from the ***SCE 1000***

Symptom	How to look for the specific cause	Possible Cause	Resolution
Message time stamps in the log file are not as expected		• **`Clock`** or **`timezone`** configuration is incorrect (wrong time or time zone)	• Configure clock time and time zone Refer to *Time Clocks and Time Zone* (on page 6-11).

CHAPTER 11

Maintenance

The ***SCE 1000*** has redundant, field replaceable power supplies and fan module. This chapter explains how to replace the power supplies and fan module.

This chapter contains the following sections:

- Replacing the Battery 11-1
- Replacing the Fan Module 11-2
- Replacing the Power Module 11-3

Replacing the Battery

The ***SCE 1000*** has a lithium battery on its main circuit board. When the battery loses its charge, call Cisco Technical Support to replace the battery.

Warning Do not attempt to replace this battery yourself

Warning There is danger of explosion if the lithium battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer’s instructions.

Replacing the Fan Module

The*SCE 1000* has a removable fan unit with five fans. This unit is accessed from the rear of the device.

When a fan malfunctions, the fan module should be replaced as promptly as possible. Although it is possible for the unit to function for some time with one non-functioning fan, this is not optimal or recommended.

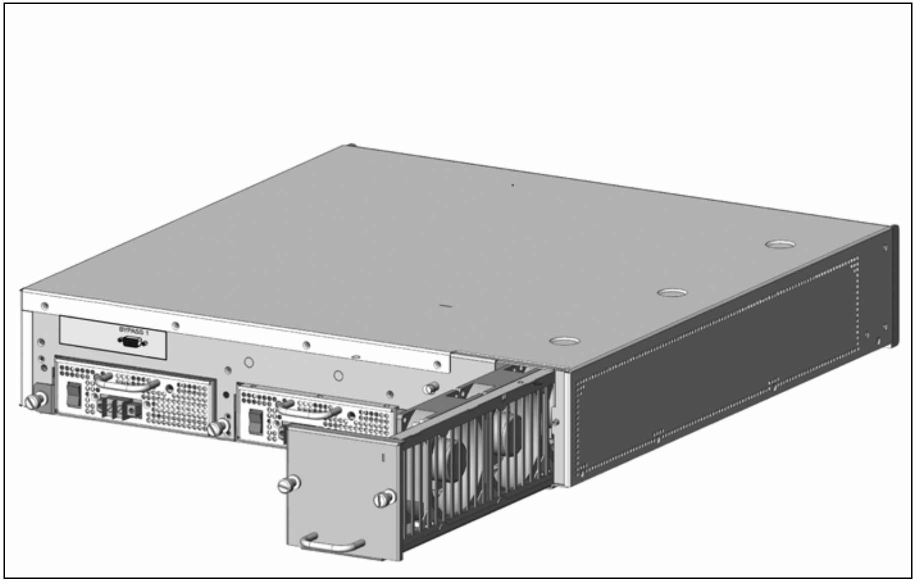
Warning When removing the fan drawer, keep hands and fingers away from the spinning fan blades. Let the fan blades stop completely before removing the fan drawer.

To replace the fan module:

Step 1 Unscrew the malfunctioning unit and gently pull it out of the chassis.

Step 2 Fit the top and bottom edges of the fan module into the guides in the chassis and gently, but firmly, slide the module into place.

Figure 11-1: Inserting the Fan Module



The handle of the unit should be at the bottom.

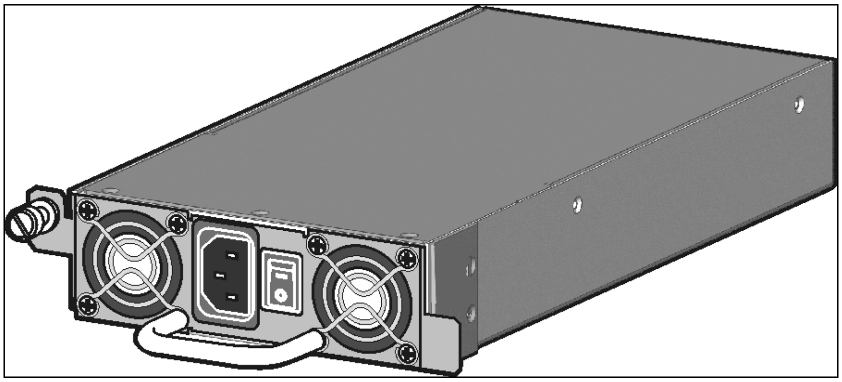
Step 3 Fasten the module into place using the two screws.

Replacing the Power Module

Both AC and DC power modules are field replaceable; if one of the power supplies fails, you can simply replace it using the following procedure. The AC power supply and DC power supplies are different and cannot be interchanged. The power supply units are asymmetrical, with screws in only two diagonal corners of the unit. and can only be inserted in one direction, to prevent the accidental installation of one DC unit and one AC unit.

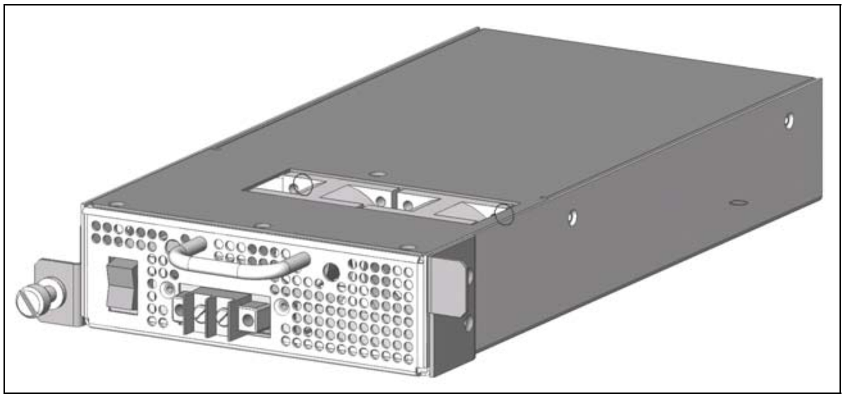
The handle of the AC unit is at the bottom of the unit.

Figure 11-2: AC Power Module



The handle of the DC unit goes at the top.

Figure 11-3: DC Power Module



Warning Make sure that the power supply unit is switched off, and that appropriate fuses or circuit breakers in the power distribution panel are turned off before replacing a power supply unit (NO hot-swap.)

Warning This unit may have more than one power supply cord. Disconnect the cord of the defective power supply before servicing to avoid electric shock.

To replace a power module:

Step 1 Turn the module OFF.

Step 2 Make sure that the module power distribution is turned off

Step 3 Disconnect all power cables from the module.

Step 4 Unscrew the module and slide it out of the chassis.

Step 5 Fit the groove in the side of the new power supply module into the guide in the chassis and gently, but firmly, slide the module into place.
Refer to the two following illustrations.

Figure 11-4: Inserting an AC Power Module

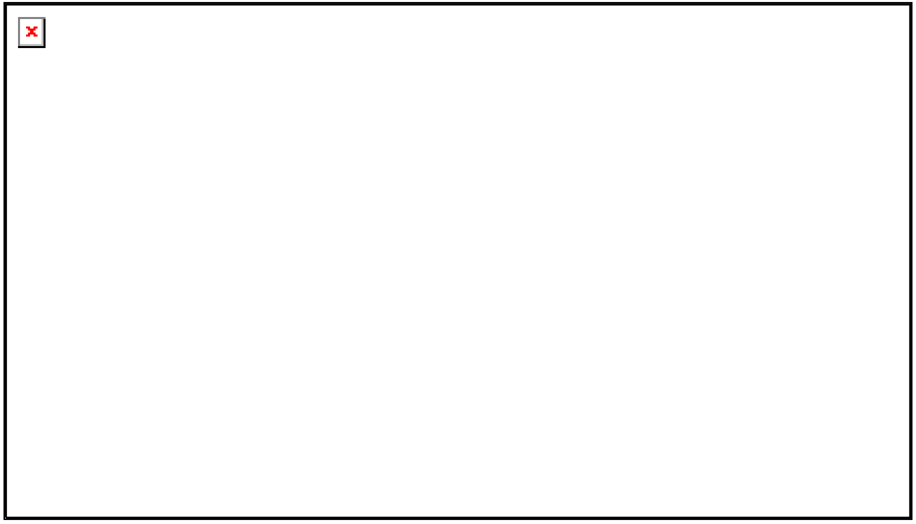
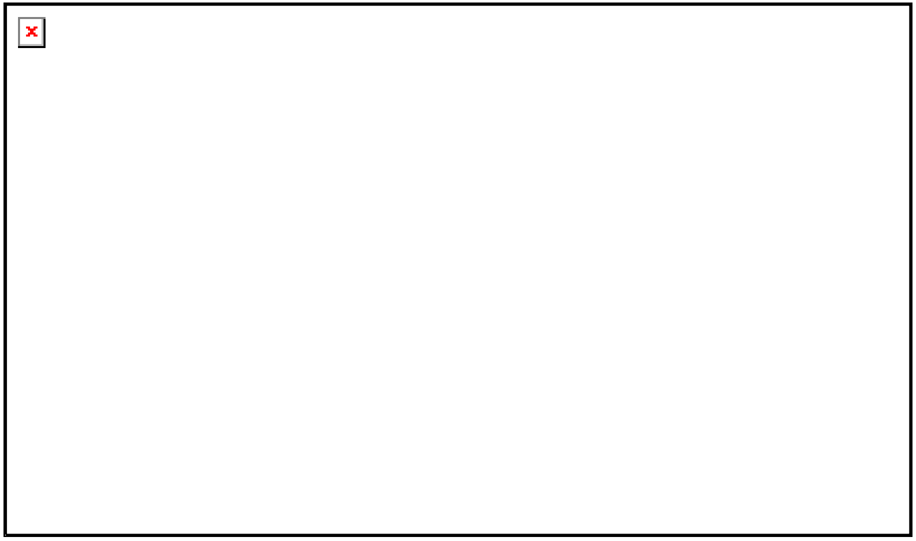


Figure 11-5: Inserting a DC Power Module



Step 6 Fasten the module into place using the module screw.

Step 7 Rewire the new module with the power cables the same way as the old power supply had been wired.

Step 8 Turn on the module power distribution .

Step 9 Turn the module ON.

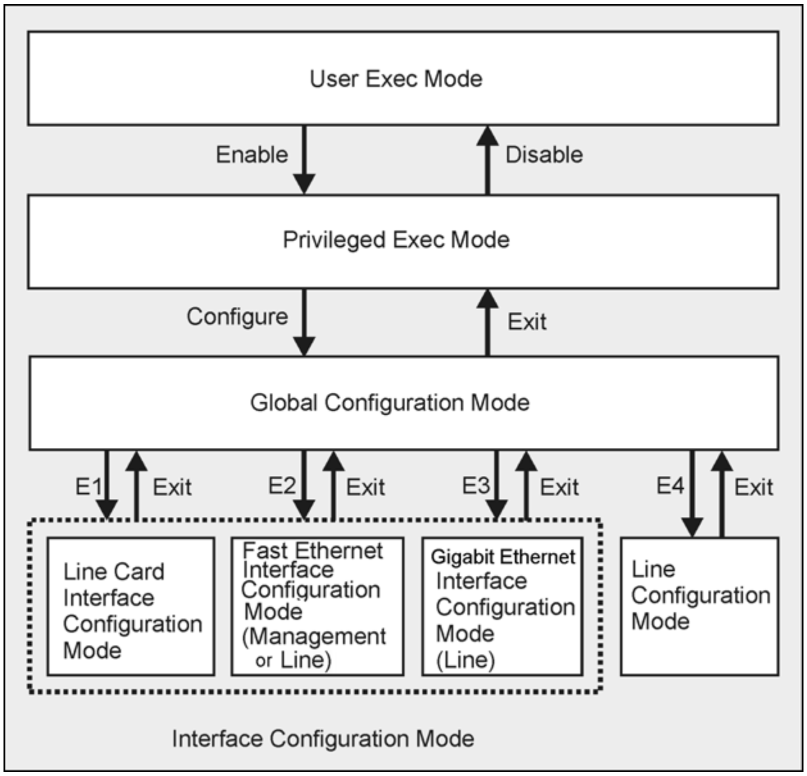
APPENDIX A

CLI Command Reference

This appendix contains all the CLI commands available on the ***SCE 1000*** platform.

This reference is divided into sections according to the mode in which the commands can be invoked, as shown in the following diagram and described in *Command Line Interface* (on page 3-1).

Figure A-1: CLI Command Hierarchy


User Exec Mode
Enable
Disable
Privileged Exec Mode
Configure
Exit
Global Configuration Mode
E1
Exit
E2
Exit
E3
Exit
E4
Exit
Line Card Interface Configuration Mode
Fast Ethernet Interface Configuration Mode (Management or Line)
Gigabit Ethernet Interface Configuration Mode (Line)
Line Configuration Mode
Interface Configuration Mode

The following commands are used to enter the different configure interface modes and the Line Configuration Mode:

E1	interface LineCard 0
E2	interface FastEthernet 0/0
E3	interface GigabitEthernet 0/1 or 0/2
E4	line vty 0 or 1 or 2 or 3 or 4

Each command is broken down into the following sub-sections:

Command syntax The general format of the command.

Description Description of what the command does.

Default If relevant, the default setting for the command.

Authorization The level of user authorization required for using the command.

Mode The mode (command line) from which the command can be invoked.

Parameters Description of parameters and switches for the command.

Usage guidelines Information about when to invoke the command and additional details.

Example An illustration of how the command looks when invoked. Because the interface is straightforward, some of the examples are obvious, but they are included for clarity.

Functional Information

Several of the CLI functions require further background in order to set the parameters. This section features important additional information on the interaction between various commands in the system, as well as system functional information to help you set the parameters.

Login and User Levels

To log in to the ***SCE 1000***, start a Telnet session from your computer to connect to the Command Line Interface (CLI). When you initially connect to the ***SCE 1000***, you are automatically in the User authorization level, which is the most basic mode with minimum functionality.

In order to perform administrative functions on the ***SCE 1000***, you must enter the password-protected Admin or Root authorization levels. The password is not a personal password, but rather it is a password that gives you and others access to these levels.

During the course of a Telnet session, you can change your current access level by enabling or disabling the access level and giving the correct system password. There are three authorization levels, as described in the following table.

Table A-1 Authorization Levels

Level	**Value**	**Description**
User	0	By default, no password required. This level provides minimum functionality.
Admin	10	By default, password required. For use by general administrators, the Admin authorization level enables configuration of the ***SCE 1000***.
Root	15	By default, password required. For use by technical field engineers, the Root authorization level enables configuration of all advanced settings, such as debug and disaster recovery.

When setting the authorization level in the CLI commands, you must use the value number rather than the level name.

Syntax and Conventions

The CLI commands are written in the following format:

command *required-parameter* [*optional-parameter*]

[no] is an optional parameter that may appear before the command name.

- When typing commands, you may enclose parameters in double-quote marks, and you *must* do so when there is a space within a parameter name.
- Examples are shown in courier style. **Bold courier** is used to show the commands as you type them and regular courier is used for system prompts and responses.

All Modes

exit

Exits the current mode and reverts to the mode used prior to the current mode.

Default 0

Authorization admin

Mode all

USAGE GUIDELINES

- Use this command each time you want to exit a mode. The system prompt changes to reflect the lower-level mode.

EXAMPLE:

The following example exits from the Configure Interface Mode to Global Configuration Mode and then to Privileged Exec Mode.

```
SCE 1000(config if)#exit
SCE 1000(config)#exit
SCE 1000#
```

?

Lists all commands available for the current command mode. You can also use the ? command to get specific information on a keyword or parameter.

To obtain a list of commands that begin with a particular character string, enter the abbreviated command entry immediately followed by a question mark (?). This form of help is called partial help, because it lists only the keywords or arguments that begin with the abbreviation you entered

Authorization	user
Mode	all

USAGE GUIDELINES

- To list all commands available for a particular command mode, enter a question mark (?) at the system prompt.
- To list a command's associated keywords or arguments, enter a question mark (?) in place of a keyword or parameter on the command line. This form of help is called argument help because it lists the keywords or arguments that apply based on the command, keywords, and arguments you have already entered.

EXAMPLE:

The following example shows ways of requesting help using the ? wildcard.

```
SCE 1000(config)#ip ?
default-gateway  Sets the default gateway
domain-lookup    Enables the IP DNS-based host name-to-address translation
domain-name      Define a default domain name
host             Add a host to the host table
name-server      Specify the address of one or more name servers to use for
name and address resolution
route            Add IP routing entry
SCE 1000(config)#ip d?
default-gateway  domain-lookup  domain-name
SCE 1000(config)#ip de?
default-gateway
SCE 1000(config)#
```

Exec Mode Commands

disable [level]

Moves the user from a higher level of authorization to a lower user level.

Authorization user

Mode Exec

PARAMETERS

level User authorization level (0, 10, 15) as specified in *Login and User Levels* (on page A-3), in table Authorization Levels.

USAGE GUIDELINES

- Use this command with the level option to lower the user privilege level. If a level is not specified, it defaults to User mode.

EXAMPLE:

The following example shows exits from root to admin mode:

```
SCE 1000#>disable 10
SCE 1000#
```

enable [level]

Enables the user to access a higher authorization level.

Default admin

Authorization user

Mode Exec

PARAMETERS

level User authorization level (0, 10, 15) as specified in in *Login and User Levels* (on page A-3), in table Authorization Levels.

USAGE GUIDELINES

- After entering this command, the user is prompted to enter the password before obtaining access to Privileged Exec mode. The password is case-sensitive.
- If a level is not specified, the level defaults to the Privileged Exec mode, level 10.

EXAMPLE:

The following example accesses the administrator authorization level. Note that the prompt changes from ***SCE 1000>*** to ***SCE 1000#***, indicating that the privilege is the administrator privilege level.

```
SCE 1000>enable
Password:[pwd]
SCE 1000#
```

help

Prints a list of keyboard bindings (shortcut commands).

Authorization user

Mode Exec

EXAMPLE:

The following example shows the partial output of the help bindings command.

```
SCE 1000>help bindings

Line Cursor Movements
---------------------
Ctrl-F /->  Moves cursor one character to the right.
Ctrl-B /<-  Moves cursor one character to the left.
Esc-F       Moves cursor one word to the right.
Esc-B       Moves cursor one word to the left.
Ctrl-A            Moves cursor to the start of the line.
Ctrl-E            Moves cursor to the end of the line.
Esc F             Moves cursor forward one word.
Esc B       Moves cursor backward one word.

Editing
-------
Ctrl-D            Deletes the character where the cursor is located.
Esc-D       Deletes from the cursor position to the end of the word.
Backspace   Deletes the character before the current location of the cursor.
Ctrl-H            "           " "            "            "      "
      "           "      "      "
Ctrl-K            Deletes from the cursor position to the end of the line.
Ctrl-U      Deletes all characters from the cursor to the beginning of the
line.
Ctrl-X            "           " "            "            "      "
      "           "      "      "
Ctrl-W            Deletes the word to the left of the cursor.
Ctrl-Y            Recall the last item deleted.

Help and Operation Features
---------------------------
?                        Argument help.
<Tab>       Toggles between possible endings for the typed prefix.
<Esc><Tab>  Displays all the possible arguments backwards.
Ctrl-I            <TAB>
SCE 1000>
```

logout

Authorization user

Mode Exec

EXAMPLE:

The following example shows how the user logs out (and confirms the logout).

```
SCE 1000>logout
Are you sure? Y
```

Global Configuration Mode Commands

access-list number permission address

Adds an entry to the bottom of the specified access list.

Authorization admin

Mode Global Configuration

PARAMETERS

number An access-list number (1–99).

permission Indicates whether the IP address should be allowed or denied access permission according to the list.

deny Deny access to list member.

permit Permit access to list member.

address Addresses to be matched by this entry.

any All IP addresses are matched by this entry. This is equivalent to specifying the address 0.0.0.0 255.255.255.255.

ip-address The IP address or range of IP addresses, matched by this entry. This can be one address in the x.x.x.x format or a range of addresses in the format x.x.x.x y.y.y.y where x.x.x.x specifies the prefix bits common to all IP addresses in the range, and y.y.y.y is a mask specifying the bits that are ignored. In this notation, ‘1’ means bits to ignore. For example, the address 0.0.0.0 255.255.255.255 means any IP address. The address 10.0.0.0 0.1.255.255 means IP addresses from 10.0.0.0 to 10.1.255.255. The address 1.2.3.4 0.0.0.255 means IP addresses from 1.2.3.0 to 1.2.3.255 (A more natural way of expressing the same range is 1.2.3.0 0.0.0.255).

EXAMPLE:

The following example adds entries to the bottom of access-list 1. The first entry permits access to 10.1.1.0 through 10.1.1.255. The second entry denies access to any address. Together this list allows access only to addresses 10.1.1.*.

```
SCE 1000(config)#access-list 1 permit 10.1.1.0 0.0.0.255
SCE 1000(config)#access-list 1 deny any
SCE 1000(config)#
```

The following example defines access list 2, a list that denies access to all IP addresses in the range: 10.1.2.0 to 10.1.2.255, permits access to all other addresses in the range 10.1.0.0 to 10.1.15.255, and denies access to all other IP addresses. Note that since the first range is contained within the second range, the order of entries is important. If they had been entered in the opposite order, the **deny** entry would not have any effect.

```
SCE 1000 (config)#access-list 2 deny 10.1.2.0 0.0.0.255
SCE 1000 (config)#access-list 2 permit 10.1.0.0 0.0.15.255
SCE 1000(config)#
```

no access-list number

Removes an entire access list (together with all its entries).

Authorization admin

Mode Global Configuration

PARAMETERS

number An access-list number (1–99).

EXAMPLE:

The following example removes access list 1.

```
SCE 1000(config)#no access-list 1
SCE 1000(config)#
```

[no] boot system ftp://username[:password]@server-address[:port]/path/source-file destination-file

Specifies a new package file to install. The ***SCE 1000*** extracts the actual image file(s) from the specified package file only during the **copy running-config startup-config** command.

When using the [**no**] version of this command, you do not have to specify the package-file-name.

Authorization admin

Mode Global Configuration

PARAMETERS

ftp://…*destination-file* The ftp site and path of a package file that contains the new firmware. The filename should end w*ith* the .pkg extension.

USAGE GUIDELINES

- Use this command to upgrade the ***SCE 1000*** embedded firmware. The package file is verified for the system and checked that it is not corrupted. The actual upgrade takes place only after executing the **copy running-config startup-config** command and rebooting the ***SCE 1000***.

EXAMPLE:

The following example upgrades the system.

```
SCE 1000(config)#boot system ftp://vk:vk@10.1.1.230/downloads/SENum.pkg.pkg
Verifying package file…
Package file verified OK.
SCE 1000(config)#exit
SCE 1000#copy running-config startup-config
Backing –up configuration file…
Writing configuration file…
Extracting new system image…
…

Extracted OK.
```

[no] clock timezone zone hours [minutes]

Sets the time zone. Use the [**no**] version of this command to remove current time zone setting. The purpose of setting the time zone is that the system can correctly interpret time stamps data coming from systems located in other time zones.

Default GMT (hours=0)

Authorization admin

Mode Global Configuration

PARAMETERS

zone The name of the time zone to be displayed.

hours The hours offset from GMT (UTC). This must be an integer in the range –23 to 23.

minutes The minutes offset from GMT (UTC). This must be an integer in the range of 0 to 59. Use this parameter to specify an additional offset in minutes when the offset is not measured in whole hours.

EXAMPLE:

The following example sets the time zone to Pacific Standard Time with an offset of 10 hours behind GMT.

```
SCE 1000(config)#clock timezone PST –10
SCE 1000(config)#
```

enable password [level level] [encryption-type] password

Configures a password for the specified authorization level, thus preventing unauthorized users from accessing the ***SCE 1000***.

Authorization	admin
Mode	Global Configuration
Default	pcube

PARAMETERS

level User authorization level (0, 10, 15) as specified in *Login and User Levels* (on page A-3), in table Authorization Levels. If no level is specified, the default is Admin (10).

encryption-type If you want to enter the encrypted version of the password, set the *encryption type* to **5**, to specify the algorithm used to encrypt the password.

password A regular or encrypted password set for the access level. If you specify *encryption-type*, you must supply an encrypted password.

USAGE GUIDELINES

- After the command is entered, any user executing the **enable** command must supply the specified password.
- Passwords must be at least 4 and no more than 100 characters long.
- Passwords can contain any printable characters.
- Passwords must begin with a letter.
- Passwords cannot contain spaces.
- Passwords are case-sensitive.

EXAMPLE:

The following example sets a level 10 password as **a123*man**.

```
SCE 1000(config)#enable password level 10 a123*man
SCE 1000(config)#
```

no enable password [level level]

Resets the password for the specified authorization level to the default value. For the user level, this means that no password is required. For the admin and root levels, the password is restored to the default value ‘pcube’.

Authorization admin

Mode Global Configuration

Default pcube

PARAMETERS

level User authorization level (0, 10, 15) as specified in in *Login and User Levels* (on page A-3), in table Authorization Levels. If no level is specified, the default is Admin (10).

EXAMPLE:

The following example removes the requirement for user level password.

```
SCE 1000(config)#no enable password level 0
SCE 1000(config)#
```

[no | default] failure-recovery operation-mode mode

Specifies the operation mode to be applied after boot resulting from failure. When using the [**`no`**] or [**`default`**] switch, you do not have to specify the mode.

Default operational

Authorization admin

Mode Global Configuration

PARAMETERS

mode **`operational`** or **`non-operational`**. Indicates whether the system will boot as operational or not following a failure.

EXAMPLE:

The following example sets the system to boot as operational after a failure

```
SCE 1000(config)#failure-recovery operation-mode operational
SCE 1000(config)#
```

hostname host-name

Modifies the name of the ***SCE 1000***. The host name is part of the displayed prompt.

Default	***SCE 1000***
Authorization	admin
Mode	Global Configuration

PARAMETERS

host-name	The new host name.

EXAMPLE:

The following example changes the host name to MyHost.

```
SCE 1000(config)#>hostname MyHost
MyHost(config)#>psnn
```

interface FastEthernet slot-number/interface-number

Enters FastEthernet Interface Configuration mode.

Authorization	admin
Mode	Global Configuration

PARAMETERS

slot-number	The number of the identified slot. Enter a value of **0**.
interface-number	The FastEthernet interface number. Enter a value of 0 to configure the management port, or a value of 1 or 2 to configure one of the line ports.

USAGE GUIDELINES

- The system prompt changes to reflect the Fast Ethernet Interface Configuration mode. To return to Global Configuration Mode, type **exit**.

EXAMPLE:

The following example enters into FastEthernet Configure Interface Mode.

```
SCE 1000(config)#interface FastEthernet 0/0
SCE 1000(config if)#
```

interface LineCard slot-number

Enters LineCard Interface Configuration Mode.

Authorization admin

Mode Global Configuration

PARAMETERS

slot-number	The number of the identified slot. Enter a value of 0.

USAGE GUIDELINES

- The system prompt changes to reflect the Line Card Configuration mode. To return to Global Configuration Mode, type **exit**.

EXAMPLE:

The following example enters LineCard Interface Configuration Mode.

```
SCE 1000(config)#interface LineCard 0
SCE 1000(config if)#
```

ip access-class number

Set the global IP access class. The access list defined here contains the definitions for all IP addresses with permission to access the ***SCE 1000*** system. IP addresses not permitted in this access list cannot access or detect the ***SCE 1000***, that is, even a ping command will receive no response if it is not from a permitted IP address.

Authorization admin

Mode Global Configuration

Default none (all IP addresses can access the system)

EXAMPLE:

The following example sets access list 1 as the global access list.

```
SCE 1000(config)#ip access-class 1
SCE 1000(config)#
```

no ip access-class

Resets global access to the ***SCE 1000*** from any IP address.

Authorization admin

Mode Global Configuration

EXAMPLE:

The following example resets global access.

```
SCE 1000(config)#no ip access-class
SCE 1000(config)#
```

[no] ip advertising [destination destination] [interval interval]

Enables IP advertising. If the destination and/or interval is not configured, the default values are assumed.

Use the [no] version of the command to disable IP advertising.

Default	disabled
Authorization	admin
Mode	Global Configuration

PARAMETERS

destination The IP address of the destination for the ping requests

Default: 127.0.0.1

interval The frequency of the ping requests in seconds

Default: 300

EXAMPLE:

The following example enables IP advertising, specifying 10.1.1.1 as the destination and an interval of 240 seconds..

```
SCE 1000(config)# ip advertising destination 10.1.1.1 interval 240
SCE 1000(config)#
```

default ip advertising destination|interval

Restores the IP advertising destination or interval to the default values.

Authorization	admin
Mode	Global Configuration

PARAMETERS

destination Restores the IP advertising destination to the default value of 127.0.0.1

interval Restores the IP advertising interval to the default value of 300

EXAMPLE:

The following example restores the IP advertising destination to the default value.

```
SCE 1000(config)# default ip advertising destination
SCE 1000(config)#
```

[no] ip default-gateway x.x.x.x

Configures the default gateway for the ***SCE 1000***. Use the [**no**] form of this command to unset the ***SCE 1000*** default gateway.

Authorization admin

Mode Global Configuration

PARAMETERS

x.x.x.x The IP address of the default gateway for the ***SCE 1000***.

EXAMPLE:

The following example sets the default gateway IP of the ***SCE 1000*** to 10.1.1.1.

```
SCE 1000(config)#ip default-gateway 10.1.1.1
SCE 1000(config)#
```

[no] ip domain-lookup

Enables [disables] the domain name lookups.

Default enabled

Authorization admin

Mode Global Configuration

EXAMPLES:

The following example enables the domain lookup.

```
SCE 1000(config)#ip domain-lookup
SCE 1000(config)#
```

The following example disables the domain lookup.

```
SCE 1000(config)#no ip domain-lookup
SCE 1000(config)#
```

[no] ip domain-name domain-name

Defines a default domain name. Use the [**no**] version of this command to remove the current default domain name. When using the [**no**] version, you do not have to specify the domain name.

Authorization admin

Mode Global Configuration

PARAMETERS

domain-name The default domain name used to complete host names that do not specify a domain. Do not include the initial period that separates an unqualified name from the domain name.

EXAMPLES:

The following example configures the domain name.

```
SCE 1000(config)#ip domain-name Cisco.com
SCE 1000(config)#
```

The following example removes the configured domain name.

```
SCE 1000(config)#no ip domain-name
SCE 1000(config)#
```

ip host hostname ip-address

Adds a host name and address to the host table.

Authorization admin

Mode Global Configuration

PARAMETERS

hostname	The host name to be added.
ip-address	The host IP address in x.x.x.x format.

EXAMPLE:

The following example adds a host to the host table.

```
SCE 1000(config)#ip host PC85 10.1.1.61
SCE 1000(config)#
```

no ip host hostname [ip-address]

Removes a host name and address from the host table.

Authorization admin

Mode Global Configuration

PARAMETERS

hostname	The host name to be removed. If you do not include an IP address, all mappings for the hostname are removed from the list.
ip-address	The host IP address. If the pair {hostname, IP-address} does not exist in the host table, the system returns no indication.

EXAMPLE:

The following example removes a host name together with all of its IP mappings.

```
SCE 1000(config)#no ip host PC85
SCE 1000(config)#
```

[no] ip name-server server-address1 [server-address2] [server-address3]

Specifies the address of 1–3 servers to use for name and address resolution. The system maintains a list of up to 3 name servers. If the current list is not empty, this command adds the specified servers to the list. The [**no**] form of this command removes specified servers from the current list.

Authorization admin

Mode Global Configuration

PARAMETERS

server-address1	The IP address of the name server.
server-address2	The IP address of an additional name server.
server-address3	The IP address of an additional name server.

EXAMPLE:

The following example adds the DNS 10.1.1.60 and 10.1.1.61 to the configured servers list.

```
SCE 1000(config)#ip name-server 10.1.1.60 10.1.1.61
SCE 1000(config)#
```

[no] ip rmi-adapter

Enables the RMI adapter. Use the “no” form of this command to disable the RMI adapter.

Authorization admin

Mode Global Configuration

EXAMPLE:

The following example enables the RMI adapter.

```
SCE 1000(config)# ip rmi-adapter
```

ip rmi-adapter port port-number

Defines the RMI adapter port.

Authorization admin

Mode Global Configuration

PARAMETERS

`port-number`	The number of the port assigned to the RMI adapter.

EXAMPLE:

The following example shows how to configure the RMI interface, specifying 1299 as the RMI adapter port.

```
SCE 1000(config)#ip rmi-adapter
SCE 1000(config)#ip rmi-adapter port 1299
```

default ip rmi-adapter port

Resets the RMI adapter port assignment to the default port (1099).

Authorization admin

Mode Global Configuration

EXAMPLE:

The following example shows how reset the RMI adapter port.

```
SCE 1000(config)# default ip rmi-adapter port
```

ip route prefix mask next-hop

Adds an IP routing entry to the routing table.

Authorization admin

Mode Global Configuration

PARAMETERS

prefix	The new entry's prefix.
mask	The new entry's subnet mask.
next-hop	The new entry's next hop in the route.

USAGE GUIDELINES

- All addresses must be in dotted notation.
- The *next-hop* must be within the Management FastEthernet Interface subnet.

EXAMPLE:

The following example sets the next-hop to 10.1.1.2 for IP addresses in the range 244.50.4.0 to 244.50.4.255.

```
SCE 1000(config)#ip route 244.50.4.0 255.255.255.0 10.1.1.2
SCE 1000(config)#
```

no ip route prefix mask

Removes an IP routing entry from the routing table.

Authorization admin

Mode Global Configuration

PARAMETERS

prefix	The new entry’s prefix.
mask	The new entry’s subnet mask.

USAGE GUIDELINES

- All addresses must be in dotted notation.

EXAMPLE:

The following example removes the entry added in the previous example

```
SCE 1000(config)#no ip route 244.50.4.0 255.255.255.0
SCE 1000(config)#
```

no ip route all

Removes all IP routing entries from the routing table.

Authorization admin

Mode Global Configuration

EXAMPLE:

The following example removes all IP routing entries from the routing table

```
SCE 1000(config)#no ip route all
SCE 1000(config)#
```

[no] ip rpc-adapter

Enables the RPC adapter. Use the “no” form of this command to disable the RPC adapter.

Authorization admin

Mode Global Configuration

EXAMPLE:

The following example enables the RPC adapter.

```
SCE 1000(config)# ip rpc-adapter
```

ip rpc-adapter port port-number

Defines the RPC adapter port.

Authorization admin

Mode Global Configuration

PARAMETERS

`port-number`	The number of the port assigned to the RPC adapter.

EXAMPLE:

The following example shows how to configure the RPC interface, specifying 1444 as the RPC adapter port.

```
SCE 1000(config)#ip rpc-adapter
SCE 1000(config)#ip rpc-adapter port 1444
```

default ip rpc-adapter port

Resets the RPC adapter port assignment to the default port: 14374.

Authorization admin

Mode Global Configuration

EXAMPLE:

The following example shows how reset the RPC adapter port.

```
SCE 1000(config)# default ip rpc-adapter port
```

line vty start-number [end-number]

Enters Line Configuration Mode for Telnet lines, configuring all Telnet lines.

Authorization admin

Mode Global Configuration

PARAMETERS

start-number	A number in the range 0-4. The actual number supplied does not matter. All telnet lines will be configured by this command.
end-number	A number in the range 0-4. The actual number supplied does not matter. All telnet lines will be configured by this command.

USAGE GUIDELINES

- The system prompt changes to reflect the Line Configuration mode. To return to Global Configuration Mode, type **`exit`**.

EXAMPLE:

The following example enters the Line Configuration Mode for all lines.

```
SCE 1000(config)#line vty 0
SCE 1000(config-line)#
```

logger device User-File-Log status

Disables or enables the logger device.

Authorization	admin
Mode	Global Configuration
Default	enabled

PARAMETERS

status	**`enabled`** or **`disabled`**, indicating whether to turn on or off logging.

EXAMPLE:

The following example disables the User-File-Log device.

```
SCE 1000(config)#logger device User-File-Log disabled
SCE 1000(config)#
```

logger device User-File-Log max-file-size size

Sets the maximum log file size.

Authorization	admin
Mode	Global Configuration
Default	1000000 bytes

PARAMETERS

size	The maximum size for the user log (in bytes).

EXAMPLE:

The following example configures the maximum size of the User-File-Log device to 65000 bytes.

```
SCE 1000(config)#logger device User-File-Log max-file-size 65000
SCE 1000(config)#
```

[no] management-agent system package-file-name

Specifies a new package file to install for the management agent. The ***SCE 1000*** extracts the actual image file(s) from the specified package file only during the **`copy running-config startup-config`** command.

When using the [**`no`**] version of this command, you do not have to specify the package-file-name.

Authorization	admin
Mode	Global Configuration

PARAMETERS

Package file name	The name of a package file that contains the new management agent software. The filename should end wi**t**h the *`.pkg`* extension..

USAGE GUIDELINES

Use this command to upgrade the ***SCE 1000*** management agent. The package file is verified for the system and checked that it is not corrupted. The actual upgrade takes place only after executing the **`copy running-config startup-config`** command and rebooting the ***SCE 1000***.

EXAMPLE:

The following example upgrades the system with the *`mng45.pkg`* package.

```
SCE 1000(config)#management-agent system mng45.pkg
Verifying package file…
Package file verified OK.
SCE 1000(config)#exit
SCE 1000#copy running-config startup-config
Backing –up configuration file…
Writing configuration file…
Extracting new management agent…

…

Extracted OK.
```

[no] RDR-formatter category-number[1-4] name category name

Assigns a meaningful name to a category. This category name can then be used in any **rdr-formatter** command instead of the category number.

Use the “no” form of this command to disassociate the name from the category. The name will then not be recognized by any CLI commands.

Authorization	admin
Mode	Global Configuration

PARAMETERS

category name	The user-defined name to be assigned to the category.

EXAMPLE:

The following example assigns the name “prepaid” to Category 1.

```
SCE 1000(config)#RDR-formatter category-number 1 name prepaid
SCE 1000(config)#
```

RDR-formatter history-size

Configures the size of the history buffer

Note The size of the history buffer in RDRv1 must be zero bytes, even though the system will accept a command specifying a larger size.

Authorization	admin
Mode	Global Configuration
Default	0

PARAMETERS

size	Size of the history buffer in bytes. Range: 0-64,000 bytes

EXAMPLE:

The following example configures the size of the history buffer to 16000 bytes.

```
SCE 1000(config)#RDR-formatter history-size 16000
SCE 1000(config)#
```

RDR-formatter forwarding-mode mode

Defines the mode in which the RDR formatter will send the RDRs to the destinations.

Authorization	admin
Mode	Global Configuration
Default	redundancy

PARAMETERS

mode Settings: **redundancy, simple-load-balancing, multicast**.

redundancy All RDRs are sent only to the primary (active) connection.

simple-load-balancing Each successive RDR is sent to a different destination, one destination after the other, in a round robin manner.

multicast All RDRs are sent to all destinations.

EXAMPLE:

The following example sets the RDR formatter mode to “**redundancy**”.

```
SCE 1000(config)#RDR-formatter forwarding-mode redundancy
SCE 1000(config)#
```

RDR-formatter protocol protocol [force-reset]

Defines the protocol (RDR formatter version) of the RDR formatter. The protocol can be changed only if the RDR formatter is disabled. Therefore, you must do one of the following:

- Explicitly disable the RDR formatter before using the command, and then enable it again afterwards (see the first example).
- Use the **force-reset** form of this command to automatically disable and then enable the RDR formatter (see the second example).

Authorization admin

Mode Global Configuration

Default RDRv1

- Parameters

protocol Settings: **`RDRv1, RDRv2`**.

EXAMPLES:

The following example selects the RDRv1 RDR formatter protocol. It demonstrates that the RDR formatter is first explicitly disabled, and then enabled after the protocol has been defined.

```
SCE 1000(config)#no service rdr-formatter
SCE 1000(config)#RDR-formatter protocol RDRv1
SCE 1000(config)#service rdr-formatter
SCE 1000(config)#
```

The following example demonstrates the use of the **force-reset** argument.

```
SCE 1000(config)#RDR-formatter protocol RDRv1 force-reset
SCE 1000(config)#
```

RDR-formatter protocol RDRv2 connection-timeout time

Configures the amount of time (in seconds) after which an inactive connection will timeout.

(RDRv2 protocol only.)

Authorization admin

Mode Global Configuration

Default 10

PARAMETERS

time Timeout value in seconds. Range: 2-300 seconds

EXAMPLE:

The following example specifies a timeout value of 100 seconds.

```
SCE 1000(config)#RDR-formatter protocol RDRv2 connection-timeout 100
SCE 1000(config)#
```

RDR-formatter destination ip-address port port-number [category {name category name }| {number [1-4]}] [priority priority-value]

Configures an RDR destination entry. Up to four entries can be configured. Each entry must have a different priority. The entry with the highest priority is used by the RDR formatter, provided that a connection with this destination can be established. This is where the RDR–formatter sends the events produced by the LineCard Interface.

Authorization admin

Mode Global Configuration

PARAMETERS

ip-address The destination IP address.

port-number The destination port number.

category Use this parameter to assign a priority to a particular category for this destination. The category may be identified by either a user-defined name or number (1 to 4).
Assign a high priority to send RDRs from the specified category to this destination. Assign a low priority if RDRs from the specified category should not be sent to this destination.

priority-value The priority of the destination. The priority value may be any number between 1 (lowest) to 100 (highest).
For the first entry, if no priority is set, the highest priority is automatically assigned.
For all subsequent entries, the priority must be explicitly defined.
It is also possible to assign a different priority to each category for each destination. If no category is specified, the same priority is assigned to both categories for that destination.

EXAMPLES:

The following example configures an RDR-formatter destination with the default priority (highest) both categories.

```
SCE 1000(config)#RDR-formatter destination 10.1.1.205 port 33000
SCE 1000(config)#
```

The following example configures an RDR-formatter destination with a different priority for each category. This configuration will send RDRs from category 2 to this destination, but not RDRs from category 1.

```
SCE 1000(config)#RDR-formatter destination 10.1.1.206 port 34000 category
number 1 priority 10 category number 2 priority 90
SCE 1000(config)#
```

no RDR-formatter destination all

Removes all of the configured RDR-formatter peer connection for the list of possible destinations.

Authorization admin

Mode Global Configuration

EXAMPLE:

The following example removes all RDR formatter destinations.

```
SCE 1000(config)#no RDR-formatter destination all
SCE 1000(config)#
```

no RDR-formatter destination ip-address port port-number [category {name category name }|{number [1-4]}]

Removes the mappings of an RDR formatter destination to categories. When all categories for a destination are removed, the entire destination is removed.

Authorization admin

Mode Global Configuration

PARAMETERS

ip-address	IP address of the destination.
port-number	The port number of the destination.
category	Use this parameter to remove a particular category from this destination. The category may be identified by either a user-defined name or number (1 to 4). If the category is specified, only the specified category is removed. If no category is specified, the entire destination is removed.

EXAMPLES:

The following example removes an entire RDR formatter destination.

```
SCE 1000(config)#no RDR-formatter destination 10.1.1.206 port 34000
SCE 1000(config)#
```

The following example removes only one category from the specified RDR formatter destination.

```
SCE 1000(config)#no RDR-formatter destination 10.1.1.206 port 34000 category
name prepaid
SCE 1000(config)#
```

[no] service RDR-formatter

Enables/disables the RDR-formatter. The RDR-formatter is the element that formats the reports of events produced by the LineCard and sends them to an external data collector.

Use the [**no**] form of this command to disable the RDR-formatter.

Default Enabled

Authorization admin

Mode Global Configuration

EXAMPLE:

The following example enables the RDR-formatter.

```
SCE 1000(config)#service rdr-formatter
SCE 1000(config)#
```

[no] service password encryption

Enables password encryption, so that the password remains secret when the configuration file is displayed. Use the [**no**] form of this command to disable password encryption.

Default Disabled (no encryption)

Authorization admin

Mode Global Configuration

USAGE GUIDELINES

- Passwords that were configured in an encrypted format are not deciphered when password encryption is disabled.

EXAMPLE:

The following example shows the effect of enabling password encryption.

```
SCE 1000#configure
SCE 1000(config)#enable password abcd
SCE 1000(config)#exit
SCE 1000#more running-config
#This is a general configuration file (running-config).
#Created on 10:20:57  ISR  TUE  July  3  2001
…
enable password level 10 0 “abcd”
…
SCE 1000#configure
SCE 1000(config)#service password-encryption
SCE 1000(config)#exit
SCE 1000#more running-config
#This is a general configuration file (running-config).
#Created on 10:21:12  ISR  TUE  July  3  2001
…
service password-encryption
enable password level 10 5 “e2fc714c4727ee9395f324cd2e7f331f”
…
SCE 1000#
```

[no] service telnetd

Enables/disables Telnet daemon. Use the [**no**] form of this command to disable the daemon preventing new users from accessing the ***SCE 1000*** via Telnet.

Default enabled

Authorization admin

Mode Global Configuration

EXAMPLE:

The following example enables the Telnet daemon.

```
SCE 1000(config)#service telnetd
SCE 1000(config)#
```

no snmp-server

Disables the SNMP agent from responding to SNMP managers. All SNMP settings are saved and are restored when the SNMP agent is re-enabled. To enable the SNMP agent use the command **`snmp-server enable`** or use any of the other SNMP-server commands.

Default disabled

Authorization admin

Mode Global Configuration

EXAMPLE:

The following example disables the SNMP server.

```
SCE 1000(config)#no snmp-server
SCE 1000(config)#
```

[no] snmp-server community community-string [read-option] [acl-number]

Sets a community string.

The optional acl-number parameter states the access list number to restrict the managers that can use this community.

Default	no SNMP access
Authorization	admin
Mode	Global Configuration

Parameters

community-string	The SNMPv1 and SNMPv2c security string that identifies a community of managers that can access the SNMP server.
read-option	Legal values are **`ro`** and **`rw`**. The default **`ro`** (read-only) option allows managers to view MIB variables. **`rw`** sets the variable to read-write.
acl-number	Access-list of managers that may access the ***SCE 1000*** via SNMP.

Example:

The following example configures an SNMP managers community that has read-only permissions for the ***SCE 1000*** MIB. Only SNMP managers in access list 1 can access the ***SCE 1000***.

```
SCE 1000(config)#snmp-server community public ro 1
SCE 1000(config)#
```

no snmp-server community all

Removes all configured communities.

Authorization	admin
Mode	Global Configuration

[no] snmp-server contact contact

Sets the MIB-2 variable system contact. Use the [**no**] form of this command to remove the contact setting.

Authorization	admin
Mode	Global Configuration

Parameters

contact	A string that identifies the system contact.

Example:

The following example configures the system contact.

```
SCE 1000(config)#snmp-server contact Brenda@MyCompany.com
SCE 1000(config)#
```

[no | default] snmp-server enable traps [snmp [snmp trap name]] [enterprise [enterprise trap name]]

Enables/disables SNMP traps (only authentication-failure traps and enterprise traps can be controlled using this command). Use the [**default**] form of this command to reset SNMP traps to the default status.

There are two classes of SNMP traps that are controlled by this command:

- snmp traps
- enterprise traps

The parameters `snmp` and `enterprise` are parameters specifying the class of traps that are to be enabled/disabled by this command. Each class, or type, is composed of specific traps. Use these parameters as follows:

- To enable/disable all traps of one type: Specify only `snmp` or `enterprise`.
- To enable/disable only one specific trap: Specify `snmp` or `enterprise` with the additional *trap name* parameter naming the desired trap.
- To enable/disable all traps: Do not specify either `snmp` or `enterprise`.

Since, at this time, the only snmp type trap is the authentication trap, the `snmp` and `authentication` parameters are currently redundant.

Default snmp traps: Disabled

enterprise traps: Enabled

Authorization admin

Mode Global Configuration

PARAMETERS

snmp Optional parameter, which, if given, must be `snmp` to support controlling snmp traps.

snmp trap name Optional parameter used with the `snmp` parameter to control a specific snmp trap.

Settings: **`Authentication`**

enterprise Optional parameter, which, if given, must be `enterprise` to support controlling enterprise traps.

enterprise trap name Optional parameter used with the `enterprise` parameter to control a specific enterprise trap.

Settings: **`chassis, link-bypass, logger, operational-status, RDR-formatter, sntp, system-reset, telnet`**

EXAMPLE:

The following example configures the SNMP server to send traps.

```
SCE 1000(config)#snmp-server enable traps
SCE 1000(config)#
```

[no] snmp-server host address [traps] [version version] community-string

Sets destination hosts for SNMP traps.

Default No hosts

Authorization admin

Mode Global Configuration

PARAMETERS

address The IP address of the SNMP server host.

traps Optional switch, does not influence command functionality.

version Version of the ***SCE 1000*** software running in the system. Can be set to **`1`** or **`2c`**.

community-string The SNMPv1 and SNMPv2c security string that identifies a community of managers that are able to access the SNMP server.

USAGE GUIDELINES

- If no communities are specified by the **`snmp-server community`** command, the community string specified by this command is used by the ***SCE 1000***, as if an **`snmp-server community community-string ro`** was given.

EXAMPLE:

The following example adds a host destination for SNMP traps.

```
SCE 1000(config)#snmp-server host 10.1.1.205 version 2c public
SCE 1000(config)#
```

no snmp-server host all

Removes all configured hosts.

Authorization admin

Mode Global Configuration

[no] snmp-server location location

Gives a name to the ***SCE 1000*** location, setting the MIB-2 variable sysLocation. Use the [**no**] form of this command to remove the location setting.

Default no location

Authorization admin

Mode Global Configuration

PARAMETERS

location A string that specifies the system location.

EXAMPLE:

The following example configures the system location.

```
SCE 1000(config)#snmp-server location London_Office
SCE 1000(config)#
```

[no] sntp broadcast client

Enables the SNTP multicast client to accept SNTP broadcasts from any SNTP server. Use the [**no**] form of this command to disable the SNTP multicast client.

Default disabled

Authorization admin

Mode Global Configuration

EXAMPLE:

The following example enables the SNTP multicast client.

```
SCE 1000(config)#sntp broadcast client
SCE 1000(config)#
```

[no] sntp server address/hostname

Enables the SNTP uni-cast client to query the specified SNTP server. Use the [**no**] form of this command to disable the SNTP uni-cast server.

Default disabled

Authorization admin

Mode Global Configuration

PARAMETERS

address The IP address of the SNTP server.

hostname The hostname of the SNTP server.

EXAMPLE:

The following example enables an SNTP server at a specified IP address.

```
SCE 1000(config)# sntp server 128.182.58.100
SCE 1000(config)#
```

no sntp server all

Disables all SNTP uni-cast servers.

Authorization admin

Mode Global Configuration

sntp update-interval interval

Defines the interval (in seconds) between SNTP uni-cast update queries.

Default 900

Authorization admin

Mode Global Configuration

PARAMETERS

interval The interval between queries in seconds.

EXAMPLE:

The following example sets the SNTP update interval for 100 seconds.

```
SCE 1000(config)# sntp update-interval 100
SCE 1000(config)#
```

LineCard Interface Configuration Mode Commands

[no] attack-detector default

Defines default thresholds and attack handling action. If a specific attack detector is defined for a particular situation (protocol/attack direction/side), it will override these defaults.

Use the [no] version of this command to delete the user-defined defaults. The system defaults will then be used.

Authorization admin

Mode LineCard Interface Configuration

PARAMETERS

protocol	**TCP**
	UDP
	IMCP
	other
attack-direction	**attack-source**
	attack-destination
	both
side	**subscriber**
	network
	both
action	**report**
	block
open-flows	Threshold for concurrently open flows
ddos-suspected-flows	Threshold for DDoS-suspected flows

USAGE GUIDELINES

- Use the *notify-subscriber* keyword to enable subscriber notification.
- Use the *dont-notify-subscriber* keyword to disable subscriber notification.

EXAMPLE 1:

The following example configures a default attack detector for TCP flows from the attack source.

```
SCE 1000(config if)#attack-detector default protocol TCP attack-direction
attack-source side both action report open-flows 500 ddos-suspected-flows 75
```

EXAMPLE 2:

The following example enables subscriber notification for the specified situation (protocol/attack direction/side).

```
SCE 1000(config if)#attack-detector default protocol TCP attack-direction
attack-source side both notify-subscriber
```

[no] attack-detector <number>

Configures a specific attack detector for a particular situation (protocol/attack direction/side) with the assigned number.

Use the [no] version of this command to delete the specified attack detector.

Authorization admin

Mode LineCard Interface Configuration

PARAMETERS

protocol	**TCP**
	UDP
	IMCP
	other
attack-direction	**attack-source**
	attack-destination
	both
side	**subscriber**
	network
	both
action	**report**
	block
open-flows	Threshold for concurrently open flows
ddos-suspected-flows	Threshold for DDoS-suspected flows

USAGE GUIDELINES

- Use the *notify-subscriber* keyword to enable subscriber notification.
- Use the *dont-notify-subscriber* keyword to disable subscriber notification.

EXAMPLE 1:

The following example configures the attack detector number "2".

```
SCE 1000(config if)#attack-detector 2 protocol TCP attack-direction attack-
source side both action report open-flows 500 ddos-suspected-flows 75
```

EXAMPLE 2:

The following example deletes attack detector number "2".

```
SCE 1000(config if)# no attack-detector 2
```

EXAMPLE 3:

The following example disables subscriber notification for attack detector number "2".

```
SCE 1000(config if)#attack-detector 2 dont-notify-subscriber
```

attack-detector <number> access-list

Enables the specified attack detector and assigns an access control list (ACL) to it.

Authorization admin

Mode LineCard Interface Configuration

PARAMETERS

access-list	The number of the ACL containing the IP addresses selected by this detector
comment	For documentation purposes

EXAMPLE:

The following example enables attack detector number "2", and assigns ACL "8".

```
SCE 1000(config if)# attack-detector 2 access-list 8
```

[no] attack-filter

Enables/disables attack detection.

Default enabled

Authorization admin

Mode LineCard Interface Configuration

EXAMPLE:

The following example disables attack detection.

```
SCE 1000(config if)#no attack-filter
```

[no] attack-filter subscriber-notification ports

Specifies up to three ports as subscriber notification ports. TCP Traffic from the subscriber side to these ports will never be blocked by the attack filter, leaving them always available for subscriber notification.

Use the [no] form of this command to remove all ports from the subscriber notification port list.

Authorization admin

Mode LineCard Interface Configuration

EXAMPLE:

The following example defines adds ports to the subscriber notification port list.

```
SCE 1000(config if)# attack-filter subscriber-notification ports 100,101,102
```

L2TP identify-by

Configures the port number that the LNS and LAC use for L2TP tunnels. The default port number is 1701.

default	1701
Authorization	admin
Mode	LineCard Interface Configuration

EXAMPLE:

The following example identifies the L2TP port as being port# 1000.

```
 SCE 1000(config if)#L2TP identify-by port-number <1000>
```

connection-mode

Sets the connection mode to either inline (on the wire) or receive-only (using beam splitter or switch).

Default	inline
Authorization	admin
Mode	LineCard Interface Configuration

PARAMETERS

connection-mode **`inline`** or **`receive-only`** setting.

`inline` ***SCE 1000*** is connected in a bump-in-the-wire topology.

`receive-only` ***SCE 1000*** is connected in a out of the line topology using a beam splitter or switch.

On-failure: determines system behavior on failure of the ***SCE 1000***. (inline topologies only)

`Bypass`

`cutoff`

EXAMPLE:

The following example sets the connection-mode to inline and the on-failure mode to cutoff.

```
 SCE 1000(config if)# connection-mode inline on-failure cutoff
```

[no] link failure-reflection [on-all-ports]

Enables/disables the link failure reflection.

Default Disabled

Authorization admin

Mode LineCard Interface Configuration

USAGE GUIDELINES

- Use the **`on-all-ports`** keyword to enable reflection of a link failure to all ports
- Use the **[no]** form of this command to disable failure reflection (the **`on-all-ports`** keyword is not used in the [no] form of the command).

EXAMPLE:

```
SCE 1000(config if)#link failure-reflection on-all-ports
SCE 1000(config if)#
```

link mode

Configures the link mode. The link mode allows the user to enforce the specified behavior on the link. This may be useful during installation and for debugging the network.

Authorization admin

Mode LineCard Interface Configuration

PARAMETERS

Mode **`Forwarding`**

`Bypass`

`Cutoff`

`Sniffing`

EXAMPLE:

The following example configures "sniffing" as the link mode.

```
SCE 1000(config if)# link mode sniffing
```

MPLS

Configures the MPLS environment.

default Traffic-Engineering

Authorization admin

Mode LineCard Interface Configuration

USAGE GUIDELINES

- Use the **`VPN`** keyword when the labels are mandatory in the traffic, otherwise use the **`Traffic-Engineering`** keyword.

EXAMPLE:

The following example selects the VPN MPLS tunnel environment.

```
SCE 1000(config if)#mpls vpn skip
```

pqi install file filename [options options]

Installs the specified *pqi* file using the installation options specified (if any). This may take up to 5 minutes

Authorization admin

Mode LineCard Interface Configuration

PARAMETERS

filename The filename of the *pqi* application file to be installed.

options The desired installation options. Use the **`show pqi file`** command to display the available installation options.

EXAMPLE:

The following example installs the Subscriber Manager *anr10015.pqi* file. No options are specified.

```
SCE 1000 (config if)# pqi install file anr10015.pqi
```

pqi uninstall file filename

Uninstalls the specified *pqi* file. This may take up to 5 minutes

Authorization admin

Mode LineCard Interface Configuration

PARAMETERS

filename The filename of the *pqi* application file to be uninstalled. It must be the *pqi* file that was installed last.

USAGE GUIDELINES

- Always specify the last *pqi* file that was installed.
- Always run the pqi uninstall command before installing a new pqi file to prevent accumulation of old files on the disk.

EXAMPLE:

The following example uninstalls the Subscriber Manager *anr10015.pqi* file.

```
SCE 1000 (config if)# pqi uninstall file anr10015.pqi
```

pqi rollback file filename

Undoes an upgrade of the specified *pqi* file. This may take up to 5 minutes

Authorization admin

Mode LineCard Interface Configuration

PARAMETERS

filename The filename of the *pqi* application file to be rolled-back. It must be the *pqi* file that was last upgraded.

USAGE GUIDELINES

- Always specify the last *pqi* file that was upgraded.

EXAMPLE:

The following example undoes the upgrade for the Subscriber Manager using the *anr100155.pqi* file.

```
SCE 1000 (config if)# pqi rollback file anr100155.pqi
```

[no] silent

Disables the LineCard from reporting events. Use the [**no**] form of this command if you want the LineCard to send reports.

Default No silent

Authorization admin

Mode LineCard Interface Configuration

EXAMPLE:

The following example changes the LineCard state to silent.

```
SCE 1000(config if)#silent
SCE 1000(config if)#
```

pqi upgrade file filename [options options]

Upgrades the application using the specified *pqi* file and the upgrade options specified (if any). This may take up to 5 minutes

Authorization admin

Mode LineCard Interface Configuration

PARAMETERS

filename The filename of the *pqi* application file to be used for the upgrade.

options The desired upgrade options. Use the **show pqi file** command to display the available options.

USAGE GUIDELINES

- A given *pqi* upgrade file is suitable for upgrading only from specific previously installed *pqi* files. The upgrade procedure checks that an upgrade is possible from the currently installed *pqi* file. The upgrade procedure will be stopped with an error message if the upgrade is not possible.

EXAMPLE:

The following example upgrades the Subscriber Manager using the *anr100155.pqi* file. No options are specified.

```
SCE 1000 (config if)# pqi upgrade file anr100155.pqi
```

scm apply file file-name

Applies an *scm* configuration file.

Authorization admin

Mode LineCard Interface Configuration

USAGE GUIDELINES

- *scm* configuration files are specific to the current application installed. Refer to the relevant application documentation for the definition of file format and content.

EXAMPLE:

The following example applies a *scm* configuration file that disables TOS marking.

```
SCE 1000 (config if)#scm apply file /tffs0/xmlFile.xml
applying configuration ...
state ...
SCE 1000 (config if)#
```

[no] subscriber aging anonymous|introduced [timeout aging-time]

Enables/disables subscriber aging for the specified type of subscribers (anonymous or introduced).

The aging period may also be defined when aging is enabled.

Authorization admin

Mode LineCard Interface Configuration

EXAMPLE:

The following example enables subscriber aging for anonymous subscribers with a timeout period of 10 minutes.

```
SCE 1000(config if)# subscriber aging anonymous timeout 10
SCE 1000(config if)#
```

subscriber import csv-file filename

Imports subscribers from the specified *csv* file. Subscriber *csv* files are application-specific. Refer to the relevant application documentation for the definition of the file format.

Authorization admin

Mode LineCard Interface Configuration

PARAMETERS

filename Name of the *csv* file containing the subscriber information.

EXAMPLE:

The following example imports subscriber from the file *gold_subscribers.csv*.

```
SCE 1000(config if)# subscriber import csv-file gold_subscribers.csv
SCE 1000(config if)#
```

subscriber export csv-file filename

Exports subscribers to the specified *csv* file. Subscriber *csv* files are application-specific. Refer to the relevant application documentation for the definition of the file format.

Authorization admin

Mode LineCard Interface Configuration

PARAMETERS

filename Name of the *csv* file to which the subscriber information is to be exported.

EXAMPLE:

The following example exports subscribers to the specified file.

```
SCE 1000(config if)# subscriber export csv-file
gold_subscribers_04072003.csv
SCE 1000(config if)#
```

subscriber anonymous-group import csv-file filename

Creates anonymous groups by importing anonymous subscribers from the specified *csv* file.

Anonymous Group *csv* files have a fixed format. All lines have the same structure, as described below:

- Anonymous-group-name, IP-range [, subscriber-template-number].

If no subscriber-template-number is specified, then the anonymous subscribers of that group will use the default template (#0), which cannot be changed by template import operations.

Following is an example of an anonymous group *csv* file:

```
group1, 10.1.0.0/16, 2
group2, 176.23.34.0/24, 3
group3, 10.2.0.0/16
```

Authorization admin

Mode LineCard Interface Configuration

PARAMETERS

filename Name of the *csv* file containing the anonymous groups information.

EXAMPLE:

The following example imports subscriber from the file *subscribers_groups.csv*.

```
SCE 1000(config if)# subscriber anonymous-group import csv-file
subscribers_groups.csv
SCE 1000(config if)#
```

subscriber anonymous-group export csv-file filename

Exports anonymous groups to the specified *csv* file.

Authorization admin

Mode LineCard Interface Configuration

PARAMETERS

filename Name of the *csv* file to which the anonymous groups information is to be exported.

EXAMPLE:

The following example exports anonymous groups information to the specified file

```
SCE 1000(config if)# subscriber anonymous-group export csv-file s_g_0507.csv
SCE 1000(config if)#
```

subscriber template import csv-file filename

Imports a subscriber template from the specified *csv* file, creating a party template.

Authorization admin

Mode LineCard Interface Configuration

PARAMETERS

filename Name of the *csv* file containing the subscriber template.

EXAMPLE:

The following example imports the subscriber template from the file *gold0507.csv*.

```
SCE 1000(config if)# subscriber template import csv-file gold0507.csv
SCE 1000(config if)#
```

subscriber template export csv-file filename

Exports a subscriber template to the specified *csv* file, according to the party template.

Authorization admin

Mode LineCard Interface Configuration

PARAMETERS

filename Name of the *csv* file to which the subscriber template is to be exported.

EXAMPLE:

The following example exports the subscriber template to the specified file.

```
SCE 1000(config if)# subscriber template export csv-file gold0507.csv
SCE 1000(config if)#
```

no subscriber [name subscriber-name] [all]

Removes a specified subscriber from the system. Use the ‘all’ form to remove all introduced subscribers.

Authorization admin

Mode LineCard Interface Configuration

EXAMPLE:

The following example removes all subscriber.

```
SCE 1000(config if)# no subscriber all
SCE 1000(config if)#
```

no subscriber anonymous-group [name group-name] [all]

Removes a specified anonymous subscriber group from the system. Use the ‘all’ form to remove all anonymous subscriber groups.

Authorization admin

Mode LineCard Interface Configuration

EXAMPLE:

The following example removes all anonymous subscriber groups.

```
SCE 1000(config if)# no subscriber anonymous-group all
SCE 1000(config if)
```

default subscriber template all

Removes all user-defined subscriber templates from the system. The default template only remains.

Authorization admin

Mode LineCard Interface Configuration

EXAMPLE:

The following example removes all user-defined subscriber templates.

```
SCE 1000(config if)# default subscriber template all
SCE 1000(config if)#
```

tos-marking mode mode

Enables TOS marking. The ***SCE 1000*** can mark the IP ToS field of transmitted packets, according to the Diffserv scheme standard code points.

The platform supports the association of services to the following Diffserv classes: BE (Best effort), EF (Expedited forwarding), AF1, AF2, AF3 and AF4 (Assured forwarding 1-4, respectively). When packets exceed the bandwidth limit they are configured with, they are internally marked in RED color and dropped by the ***SCE 1000*** itself. Packets that are below their limit are marked with either green or yellow drop precedence depending on their actual relative rate.

Note When TOS marking is enabled, the first few TCP packets are associated and marked with a default AF4 class that is mapped to the IQ2 queue. This occurs because the ***SCE 1000*** transmits the first few packets before classifying the flow and identifying the application or service

Default	Disabled
Authorization	admin
Mode	LineCard Interface Configuration

PARAMETERS

mode	Mode for TOS marking. Currently the system supports only **`diffserv`**.

EXAMPLE:

```
SCE 1000(config if)#tos-marking mode diffserv
SCE 1000(config if)#
```

no tos-marking diffserv

Disables TOS marking.

Default	Disabled
Authorization	admin
Mode	LineCard Interface Configuration

EXAMPLE:

The following example disables TOS marking.

```
SCE 1000(config if)#no tos-marking diffserv
SCE 1000(config if)#
```

tos-marking set-table-entry class class color color value value

The ***SCE 1000*** supports configuration via CLI of the mapping between the class and coloring and the exposed DSCP (Diffserv Code Points) values. The default of this table is direct mapping of the Diffserv standard code points.

The TOS table reads the class and color of the packet being transmitted, and assigns the value set in the table according to the color and class.

Default Disserv defaults

Authorization admin

Mode LineCard Interface Configuration

PARAMETERS

class Internal class of service assigned to the packet. Legal values are **BE**, **AF1**, **AF2**, **AF3**, **AF4** and **EF**.

color Internal color assigned to the packet. Legal values are **green**, **yellow**, **red** and **any**.

value Value of the TOS marking, assigned to the packet IP header, as transmitted by the ***SCE 1000***. This is a 6-bit value, expressed as a hex number in the range **0x0** to **0x3f**.

EXAMPLE:

The following example sets a TOS marking table entry.

```
SCE 1000(config if)# tos-marking set-table-entry class AF4 color yellow
value 0x24
SCE 1000(config if)#
```

tos-marking reset-table

Reset TOS settings to the Disserv defaults.

Authorization admin

Mode LineCard Interface Configuration

EXAMPLE:

The following example enables TOS marking.

```
SCE 1000(config if)#tos-marking reset-table
SCE 1000(config if)#
```

[no] traffic-counter

Defines a new traffic counter. Use the **no** form of the command to delete an existing traffic counter.

Authorization admin

Mode LineCard Interface Configuration

PARAMETERS

name name to be assigned to this traffic counter.

USAGE GUIDELINES

- Use the *count-bytes* keyword to enable counting the bytes in each packet.

  The counter will increment by the number of bytes in each packet.
- Use the *count-packets* keyword to enable counting whole packets.

  The counter will increment by one for each packet.
- Use the *all* keyword with the no form to delete all existing traffic counters.

EXAMPLE 1

Following is an example of creating a traffic counter that will count bytes.

```
SCE 1000(config if)# traffic-counter name counter1 count-bytes
```

EXAMPLE 2

The following example demonstrates how to delete all traffic counters.

```
SCE 1000(config if)# no traffic-counter all
```

[no] traffic-rule

Defines a new traffic rule. Use the **no** form of the command to delete an existing traffic rule.

Authorization admin

Mode LineCard Interface Configuration

PARAMETERS

name name to be assigned to this traffic rule.

IP addresses subscriber-side and network-side <IP specification>

protocol Any one of the following protocols:

TCP/UCP/ICMP/IGRP/EIGRP/IS-IS/OSPF/Other *ports* subscriber-side and network-side <port specification>

flags TCP <flags specification>

*direction*upstream/downstream/all

traffic-counter name of traffic counter/none

action block/ignore

USAGE GUIDELINES

IP specification:

all|([all-but] (<ip-address>|<ip-range>))

- <**ip-address**> is a single IP address in dotted-decimal notation, such as 10.1.2.3
- <**ip-range**> is an IP subnet range, in the dotted-decimal notation followed by the number of significant bits, such as 10.1.2.0/24.

port specification (TCP/UDP only):

```
all|([all-but] (<port>|<port-range>))
```

- `<port>` is a single port number (0-65535)
- `<port-range>` is a port range in the following notation: <min-port>:<max-port>, such as 80:82.

<flags specification> (TCP only):

Defines criteria for matching packets based on the TCP flag values.

```
all | (SYN (0|1|all) [FIN (0|1|all) [RST (0|1|all) [ACK
(0|1|all) [URG (0|1|all) [PSH (0|1|all)]]]]])
```

For each flag a value of 0, 1, or ‘all’ can be selected. Default is “all”.

traffic-counter:

Either of the following:

- *Name of an existing traffic counter:* Packets meeting the criteria of the rule are to be counted in the specified counter. If a counter name is defined, the “count” action is also defined implicitly.
- *none:* If **none** is specified, then an action must be explicitly defined via the **action** option.

- Use the *all* keyword with the no form to delete all existing traffic rules.

EXAMPLE 1

This example creates the following traffic rule:

Name = rule2

IP addresses: subscriber side = all IP addresses, network side = all IP addresses EXCEPT the subnet 10.10.10.0/24

Protocol = TCP

Ports: subscriber side = 100, network side = 100-150

Flags = RST flag when value = 1 and all ACK flag values

Direction = downstream

Traffic counter = counter2

Action = Block

The actions performed will be counting and blocking

```
SCE 1000 (config if)# traffic-rule rule2 IP-addresses subscriber-side all
network-side all-but 10.10.10.0/24 protocol TCP ports subscriber-side 100
network-side 100:150 flags RST 1 ACK all direction downstream traffic-
counter counter2 action block
```

EXAMPLE 2

This example creates the following traffic rule:

Name = rule3

IP addresses: all

Protocol = IS-IS

Direction = upstream

Traffic counter = none

Action = ignore (required since traffic-counter = none)

Since it is not TCP/UDP, port and flags are not applicable.

The only action performed will be **Ignore**.

```
SCE 1000 (config if)# traffic-rule rule3 IP-addresses all protocol IS-IS
direction upstream traffic-counter none action ignore
```

EXAMPLE 3

The following example demonstrates how to delete all traffic rules.

```
SCE 1000(config if)# no traffic-rule all
```

[no] ip tunnel mode

Configures recognition of L2TP tunnels and skipping into the internal IP packet. User the **no** form of this command to disable tunnel recognition.

An IP tunnel is mutually exclusive with using VLAN for classification.

default	disabled (**no**)
Authorization	admin
Mode	LineCard Interface Configuration

EXAMPLE:

The following example enables recognition of L2TP tunnels.

```
SCE 1000(config if)#ip tunnel L2TP skip
```

VLAN

Configures the VLAN environment. There are three options:

- symmetric classify
- symmetric skip (default)
- a-symmetric skip

default	symmetric skip
Authorization	admin
Mode	LineCard Interface Configuration

EXAMPLE:

The following example enables recognition of L2TP tunnels.

```
SCE 1000(config if)#vlan symmetric skip
```

FastEthernet Interface Configuration Mode Commands

[no] duplex mode

Configures the duplex operation of the FastEthernet Interface to either half duplex, or full duplex. **auto** means auto-negotiation (do not force duplex on the link).

Default	Auto
Authorization	admin
Mode	FastEthernet Interface Configuration

PARAMETERS

mode	Set to **`auto`**, **`full`** or **`half`** to indicate the duplex mode.

USAGE GUIDELINES

- Changing this configuration takes effect only if the speed (see *speed* ("[no] speed speed" on page A-54)) is not configured to **auto**.

EXAMPLE:

The following example configures the FastEthernet port to half duplex mode.

```
SCE 1000(config if)#duplex half
SCE 1000(config if)#
```

ip address new-address subnet-mask

Sets the IP address and subnet mask of the FastEthernet Management Interface.

Authorization	admin
Mode	FastEthernet Interface Configuration

PARAMETERS

new-address	The new IP address.
subnet-mask	The network mask for the associated IP network.

USAGE GUIDELINES

- If there is a routing table entry mapped to the old address, but not to the new address, the command may fail.
- This command is valid for the management interface only, **`Interface FastEthernet 0/0`**.

EXAMPLE:

The following example sets the IP address of the ***SCE 1000*** to 10.1.1.1 and the subnet mask to 255.255.0.0.

```
SCE 1000(config if)#ip address 10.1.1.1 255.255.0.0
SCE 1000(config if)#
```

[no] speed speed

Configures the speed of the FastEthernet Interface to either 10 Mbps or 100 Mbps. **auto** means auto-negotiation (do not force speed on the link).

Default auto

Authorization admin

Mode FastEthernet Interface Configuration

PARAMETERS

speed The speed in Mbps or auto-negotiation. Can be set to **`10`**, **`100`** or **`auto`**.

USAGE GUIDELINES

- Changing this configuration takes effect only if the **duplex** mode is not configured to **auto**.

EXAMPLE:

The following example configures a FastEthernet port to 100 Mbps speed.

```
SCE 1000(config if)#speed 100
SCE 1000(config if)#
```

GigaBitEthernet Interface Configuration Mode Commands

[no|default] auto-negotiate

Configures the GigaBitEthernet Interface auto-negotiation mode. Use this command to either enable or disable auto-negotiation. When set to **`no auto-negotiation`**, auto-negotiation is always disabled, regardless of the connection mode.

Default On for active connection mode; Off for passive connection mode

Authorization admin

Mode GigaBitEthernet Interface Configuration

USAGE GUIDELINES

- Note that auto-negotiation does not work when the SE2000 is connected via optical splitter.

EXAMPLE:

The following example configures the SE2000 to perform no auto-negotiation.

```
SCE 1000(config if)#no auto-negotiate
SCE 1000(config if)#
```

bandwidth bandwidth burst-size burstsize

Sets Gigabit Ethernet shaping.

Default Bandwidth=100000K (100 Mega bps), burst-size=5000 (5 K bytes)

Authorization admin

Mode GigabitEthernet Interface Configuration

PARAMETERS

bandwidth	GigabitEthernet bandwidth measured in kbps.
burstsize	Burst size in bytes.

USAGE GUIDELINES

- This command is valid for the line interfaces only, **`Interface GigabitEthernet 0/#`**.

EXAMPLE:

The following sets bandwidth and burst size.

```
SCE 1000(config-if)#bandwidth 100000 burstsize 5000
SCE 1000(config-if)#
```

queue queue-number bandwidth bandwidth burst-size burstsize

Sets the queue shaping.

Default Bandwidth=100000K (100 Mega bps), burst size=8000 (8 K bytes)

Authorization admin

Mode GigabitEthernet Interface Configuration

PARAMETERS

queue-number	Queue-number from 1–4, where 4 is the highest priority (fastest). 1=BE, 2, 3=AF, and 4=EF. BE is the best effort queue, that is the lowest priority. EF is the Expedited Forwarding queue, that is the highest priority forwarding. The AF (Assured Forwarding) queues are middle-priority, with 3 being a higher priority queue, that is, packets from queue 3 are transferred faster than those in queue 2.
bandwidth	Bandwidth measured in kbps. 0 disables packet transmission from the queue. The maximum bandwidth is determined by the line rate. Bandwidth is set in resolutions of ~140Kbps, that is rounded to the nearest multiple of approximately 140 Kbps.
burstsize	Burst size in bytes, from 0–16000000.

USAGE GUIDELINES

- This command is valid for the line interfaces only, **`Interface GigabitEthernet 0/#.`**

EXAMPLES:

The following sets queue shaping for queue 1.

```
SCE 1000(config-if)#queue 2 bandwidth 20000 burstsize 1000
SCE 1000(config-if)#
```

Line Configuration Mode Commands

[no] access-class number in

Restricts Telnet server access to those addresses listed in the specified access list. Use the [**no**] form of this command to set the Telnet server to accept access from any address.

Default	No access list
Authorization	admin
Mode	Line Configuration Mode

PARAMETERS

number	An access-list number (1–99).

EXAMPLES:

The following example configures an access class for all Telnet lines.

```
SCE 1000(config-line)#access-class 1 in
SCE 1000(config-line)#
```

The following example removes an access class for Telnet lines.

```
SCE 1000(config-line)#no access-class in
SCE 1000(config-line)#
```

timeout time

Configures the timeout for the Telnet session when the Telnet session is idle. After this time, the Telnet session is disconnected.

Default	30 minutes
Authorization	admin
Mode	Line Configuration Mode

PARAMETERS

time	Timeout length in minutes.

EXAMPLE:

The following example sets the timeout to 45 minutes.

```
SCE 1000(config-line)#timeout 45
SCE 1000(config-line)#
```

no timeout

Configures the Telnet server to work with no timeout. No matter how long there is no activity on the Telnet session, the system does not automatically disconnect the Telnet session.

Authorization	admin
Mode	Line Configuration Mode

EXAMPLE:

The following example disables the timeout.

```
SCE 1000(config-line)#no timeout
SCE 1000(config-line)#
```

Privileged Exec Mode Commands

[no] attack-filter slot-number dont-filter

Prevents attack filtering for a specified IP address/protocol. If filtering is already in process, it will be stopped.

When attack filtering has been stopped, it remains stopped until explicitly restored by another CLI command (either specific or general).

Use the [no] form of this command to restore attack filtering.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

slot-number	The number of the identified slot. Enter a value of 0.
ip	IP address from which traffic will not be filtered.
protocol	**TCP** **UDP** **IMCP** **other**
attack-direction	**attack-source** **attack-destination** **both**
side	**subscriber** **network** **both**

USAGE GUIDELINES

- Use the "all" keyword to restore all filtering.

EXAMPLE 1:

The following example prevents attack filtering for the specified conditions.

```
SCE 1000#attack-filter 0 ip 10.10.10.10 protocol TCP attack-direction
attack-source side both dont-filter
SCE 1000#
```

EXAMPLE 2:

The following example restores all attack filtering.

```
SCE 1000#no attack-filter 0  dont-filter all
```

[no] attack-filter slot-number force-filter

Forces attack filtering for a specified IP address/protocol. When attack filtering has been forced, it continues until explicitly stopped by another CLI command (either specific or general).

Use the [no] form of this command to stop attack filtering.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot-number	The number of the identified slot. Enter a value of 0.
ip	IP address from which traffic will not be filtered.
action	**report**
	block
protocol	**TCP**
	UDP
	IMCP
	other
attack-direction	**attack-source**
	attack-destination
	both
side	**subscriber**
	network
	both

USAGE GUIDELINES

- Use the "all" keyword to stop all filtering.

EXAMPLE 1:

The following example forces attack filtering.

```
SCE 1000#attack-filter 0 action block ip 10.10.10.10 protocol TCP attack-
direction attack-source side both
```

EXAMPLE 2:

The following example undoes all forced attack filtering.

```
SCE 1000#no attack-filter 0 force-filter all
```

[no] blink slot slot-number

Blinks a slot LED for visual identification. Use the [**no**]form of this command to stop the slot blinking.

Default Not blinking

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot-number The number of the identified slot. Enter a value of 0.

EXAMPLE:

The following example configures the ***SCE 1000*** to stop blinking.

```
SCE 1000#no blink slot 0
SCE 1000#
```

calendar set hh:mm:ss day month year

Sets the system calendar. The calendar is a system clock that continues functioning even when the system shuts down.

Authorization admin

Mode Privileged EXEC

PARAMETERS

hh:mm:ss Current local time in hours in 24-hour format, minutes and seconds (HH:MM:SS).

day Current day (date) in the month.

month Current month (by three-letter abbreviated name).

year Current year using a 4-digit number.

USAGE GUIDELINES

- Always coordinate between the calendar and clock by using the `clock read-calendar` command after setting the calendar.

For further information on setting the clock, see *Setting the Clock* (on page 6-12).

EXAMPLE:

The following example sets the calendar to 20 minutes past 10 AM, October 13, 2001, synchronizes the real-time clock to the calendar time, and displays the result.

```
SCE 1000#calendar set 10:20:00 13 oct 2001
SCE 1000#clock read-calendar
SCE 1000#show calendar
10:20:03  UTC  THU  October  13  2001
SCE 1000#show clock
10:20:05  UTC  THU  October  13  2001
SCE 1000#
```

cd new-path

Changes the path of the current working directory.

Authorization admin

Mode Privileged EXEC

PARAMETERS

new-path	The path name of the new directory. This can be either a full path or a relative path.

USAGE GUIDELINES

- The new path should already have been created in the local flash file system.

EXAMPLE:

The following example shows the current directory and then changes the directory to the log directory located under the root directory.

```
SCE 1000#pwd
tffs0
SCE 1000#cd log
SCE 1000#pwd
tffs0:log
SCE 1000#
```

clear arp-cache

Deletes all dynamic entries from the ARP cache.

The Address Resolution Protocol (ARP) is a TCP/IP protocol that converts IP addresses to physical addresses. Dynamic entries are automatically added to and deleted from the cache during normal use. Entries that are not reused age and expire within a short period of time. Entries that are reused have a longer cache life.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example clears the ARP cache.

```
SCE 1000#clear arp-cache
SCE 1000#
```

clear interface LineCard slot-number counters

Clears the LineCard Interface counters.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot number	The number of the identified slot. Enter a value of 0.

EXAMPLE:

The following example clears the Line-Card 0 counters.

```
SCE 1000#clear interface LineCard 0 counters
SCE 1000#
```

clear interface LineCard slot-number MAC-mapping

Clear all dynamic entries from the MAC mapping table.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot number	The number of the identified slot. Enter a value of 0.

EXAMPLE:

The following example clears the Line-Card MAC mappings.

```
SCE 1000#clear interface LineCard 0 Mac-mapping
```

clear interface LineCard slot-number subscriber anonymous all

Clears all anonymous subscribers in the system.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot number	The number of the identified slot. Enter a value of 0.

EXAMPLE:

The following example clears all anonymous subscribers.

```
SCE 1000#clear interface LineCard 0 subscriber anonymous all
```

clear interface LineCard slot-number subscriber db counters

Clears the “total” and “maximum” subscribers database counters.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot number The number of the identified slot. Enter a value of 0.

EXAMPLE:

The following example clears all anonymous subscribers.

```
SCE 1000#clear interface LineCard 0 subscriber db counters
```

clear interface linecard slot-number traffic-counter

Clears the specified traffic counter.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot number The number of the identified slot. Enter a value of 0.

name Name of the traffic counter to be cleared.

Usage Guidelines:

- Use the *all* keyword to clear all traffic counters.

EXAMPLE:

The following example clears the traffic counter name counter1.

```
SCE 1000#clear interface LineCard 0 traffic-counter name counter1
```

clear logger device User-File-Log

Clears logger ***SCE 1000*** (user log files). This erases the information stored in the user log files.

Authorization admin

Mode Privileged EXEC

USAGE GUIDELINES

- The users log files have a size limit, with new entries overwriting the oldest entries. Therefore, there is no need to regularly clear the log files. Use this operation when you are certain that the information contained on the logs is irrelevant and might be confusing (For example, when re-installing the system at a new site, whose administrators should not be confused with old information).

EXAMPLE:

```
SCE 1000#clear logger SCE 1000 user-file-log
Are you sure?Y
SCE 1000#
```

clear logger device User-File-Log counters

Clears the counters of the logger ***SCE 1000*** (user log files). The counters keep track of the number of info, warning, error and fatal messages.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example clears the user log file ***SCE 1000*** counters.

```
SCE 1000#clear logger SCE 1000 user-file-log counters
Are you sure?Y
SCE 1000#
```

clear logger [device device] nv-counters

Clears the non-volatile counters for the entire log or only the specified ***SCE 1000***. These counters are not cleared during bootup, and must be cleared explicitly by using this command.

Authorization admin

Mode Privileged EXEC

PARAMETERS

SCE 1000	The name of the ***SCE 1000*** to be cleared (either **user-file-log** or **debug-file-log**.

EXAMPLE:

The following example clears the user log file non-volatile counters.

```
SCE 1000#clear logger SCE 1000 user-file-log nv-counters
Are you sure?Y
SCE 1000#
```

clear RDR-formatter

Clears the RDR formatter counters.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example clears the RDR-formatter counters.

```
SCE 1000#clear RDR-formatter
SCE 1000#
```

clock read-calendar

Synchronizes clocks by setting the system clock from the calendar.

Authorization	admin
Mode	Privileged EXEC

EXAMPLE:

The following example updates the system clock from the calendar.

```
SCE 1000#clock read-calendar
SCE 1000#
```

clock set hh:mm:ss day month year

Manually sets the system clock.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

hh:mm:ss Current local time in hours in 24-hour format, minutes and seconds (HH:MM:SS).

day Current day (date) in the month.

month Current month (by three-letter abbreviated name).

year Current year using a 4-digit number.

USAGE GUIDELINES

- Always coordinate between the calendar and clock by using the `clock update-calendar` command after setting the clock.

EXAMPLE:

The following example sets the clock to 20 minutes past 10 PM, October 13, 2001.

```
SCE 1000#clock set 22:20:00 13 oct 2001
SCE 1000#clock update-calendar
SCE 1000#show clock
22:21:10  UTC  THU  October  13  2001
SCE 1000#show calendar
22:21:18  UTC  THU  October  13  2001
SCE 1000#
```

clock update-calendar

Synchronizes clocks by setting the calendar from the system clock.

Authorization	admin
Mode	Privileged EXEC

EXAMPLE:

The following example updates the calendar according to the clock.

```
SCE 1000#clock update-calendar
SCE 1000#
```

configure

Enables the user to move from Privileged Exec Mode to Configuration Mode.

Authorization	admin
Mode	Privileged EXEC

USAGE GUIDELINES

- After the user enters the **`configure`** command, the system prompt changes from `<host-name>#` to `<host-name>(config)#`, indicating that the system is in Global Configuration Mode. To leave Global Configuration Mode and return to the Privileged Exec Mode prompt, type **`exit`**.

EXAMPLE:

The following example enters the Global Configuration Mode.

```
SCE 1000#configure
SCE 1000(config)#
```

copy ftp://username[:password]@server-address[:port]/path/source-file destination-file

Downloads a file from a remote station to the local flash file system, using FTP.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

username	The username known by the FTP server.
password	The password of the given username.
server-address	The dotted decimal IP address of the FTP server.
Port	Optional port number on the FTP server.
source-file	The name of the source file located in the on the server.
destination-file	The name of the file to be saved in the local flash file system. The file should be in 8.3 format, that is 8 digits, dot, then 3 digits.

USAGE GUIDELINES

- Use the following syntax for remote upload/download using FTP: ftp://username[:password]@serveraddress[:port]/path/file
- You can configure keyword shortcuts for the **`copy`** command using the following commands:
  - **`IP ftp password`** to configure a password shortcut.
  - **`IP ftp username`** to configure a username shortcut.

EXAMPLE:

The following example downloads the *`ftp.sli`* file from the host 10.1.1.105 with user name “vk” and password “vk”.

```
SCE 1000#copy ftp://vk:vk@10.1.1.105/p:/applications/ftp.sli
SCE 1000#
```

copy running-config startup-config

Builds a configuration file with general configuration commands called `config.txt`, which is used in successive boots.

Authorization	admin
Mode	Privileged EXEC

USAGE GUIDELINES

- This command must be entered to save newly configured parameters, so that they will be effective after a reboot. You can view the running configuration before saving it using the **`more running-config`** command.
- The old configuration file is automatically saved in the `tffs0:system/prevconf` directory.

EXAMPLE:

The following example saves the current configuration for successive boots.

```
SCE 1000#copy running-config startup-config
Backing-up configuration file...
Writing configuration file...
SCE 1000#
```

copy source-file destination-file

Copies any file from a source directory to a destination directory on the local flash file system.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

source-file	The name of the original file.
destination-file	The name of the new destination file.

USAGE GUIDELINES

- Both file names should be in 8.3 format, that is, there are a maximum of 8 characters before the period and three characters following it.

EXAMPLE:

The following example copies the local *`analysis.sli`* file located in the root directory to the *`applications`* directory.

```
SCE 1000#copy analysis.sli applications/analysis.sli
SCE 1000#
```

copy source-file ftp://username[:password]@server-address[:port]/path/destination-file

Uploads a file to a remote station, using FTP.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

source-file	The name of the source file located in the local flash file system.
username	The username known by the FTP server.
password	The password of the given username.
server-address	The dotted decimal IP address.
port	Optional port number on the FTP server.
destination-file	The name of the file to be created in the FTP server.

USAGE GUIDELINES

- Use the following format for remote upload/download using FTP: `ftp://username[:password]@serveraddress[:port]/path/file`
- You can configure keyword shortcuts for the **copy** command using the following commands:
- **IP ftp password** to configure a password shortcut.
  - **IP ftp userName** to configure a username shortcut.

EXAMPLE:

The following example uploads the analysis.sli file located on the local flash file system to the host 10.1.1.105.

```
SCE 1000#copy /appl/analysis.sli
ftp://myname:mypw@10.1.1.105/p:/applications/analysis.sli
SCE 1000#
```

copy-passive source-file ftp://username[:password]@server-address[:port]/path/destination-file [overwrite]

Uploads or downloads a file using passive FTP.

Authorization admin

Mode Privileged EXEC

PARAMETERS

source-file	The name of the source file located in the local flash file system.
username	The username known by the FTP server.
password	The password of the given username.
server-address	The dotted decimal IP address.
port	Optional port number on the FTP server.
destination-file	The name of the file to be created in the FTP server.

USAGE GUIDELINES

- Use the following format for remote upload/download using FTP: ftp://username[:password]@serveraddress[:port]/path/file
- Use the **overwrite** keyword to permit the command to overwrite an existing file.
- You can configure keyword shortcuts for the **copy** command using the following commands:
- **IP ftp password** to configure a password shortcut.
  - **IP ftp userName** to configure a username shortcut.

EXAMPLE:

The following example performs the same operation as the previous **copy ftp** example using passive FTP.

```
SCE 1000#copy-passive appl/analysis.sli
ftp://myname:mypw@10.1.1.105/p:/applications/analysis.sli
SCE 1000#
```

delete file-name [/recursive]

Deletes a file from the local flash file system.

Use the recursive switch to delete a complete directory and its contents. When used with the recursive switch, the filename argument specifies a directory rather than a file.

Authorization admin

Mode Privileged EXEC

PARAMETERS

file-name The name of the file or directory to be deleted.

EXAMPLE 1:

The following example deletes the oldlog.txt file.

```
SCE 1000#delete oldlog.txt
SCE 1000#
```

EXAMPLE 2:

The following example deletes the oldlogs directory.

```
SCE 1000#delete oldlogs /recursive
3 files and 1 directories will be deleted.
Are you sure? y
3 files and 1 directories have been deleted.
SCE 1000#
```

dir [applications] [-r]

Displays the files in the current directory.

Authorization admin

Mode Privileged EXEC

PARAMETERS

applications Filters the list of files to display only the application files in the current directory.

-r Includes all files in the subdirectories of the current directory as well as the files in the current directory.

EXAMPLE:

The following example displays the files in the current directory (root).

```
SCE 1000#dir
File list for /tffs0/
512  TUE JAN 01 00:00:00 1980  LOGDBG        DIR
512  TUE JAN 01 00:00:00 1980  LOG                DIR
7653 TUE JAN 01 00:00:00 1980         FTP.SLI
29   TUE JAN 01 00:00:00 1980  SCRIPT.TXT
512  TUE JAN 01 00:00:00 1980  SYSTEM             DIR
SCE 1000#
```

logger get support-file filename

Generates a log file for technical support. Note that this operation may take some time.

Authorization admin

Mode Privileged EXEC

PARAMETERS

filename Name of the generated log file.

EXAMPLE:

The following example generates a log file named *tech_sup* for technical support.

```
SCE 1000# logger get support-file tech_sup
SCE 1000#
```

[no] history

Enables the history feature, that is, a record of the last command lines that executed. Use the [**no**] form of this command to disable history.

Default Enabled

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example enables the **history** feature.

```
SCE 1000#history
SCE 1000#
```

[no] history size size

Sets the number of command lines that the system records in the history.

Default 10 lines

Authorization admin

Mode Privileged EXEC

PARAMETERS

size The number of command lines stored in the history of commands for quick recall.

USAGE GUIDELINES

- The size of the history buffer can be any number from 0-50. Use the [**no**] form of this command to restore the default size.

EXAMPLE:

The following example sets the history buffer size to 50 command lines.

```
SCE 1000#history size 50
SCE 1000#
```

ip ftp password password

Specifies the password to be used for FTP connections for the current session. The system will use this password if no password is given in the copy FTP command.

Default	admin
Authorization	admin
Mode	Privileged EXEC

PARAMETERS

password	The password for FTP connections.

EXAMPLE:

The following example sets the password to be used in the FTP connection to mypw.

```
SCE 1000#ip ftp password mypw
SCE 1000#
```

ip ftp userName user-name

Configures the username for FTP connections for the current session. This username will be used if no username is given in the copy FTP command.

Default	anonymous
Authorization	admin
Mode	Privileged EXEC

PARAMETERS

user-name	The username for FTP connections.

EXAMPLE:

The following example sets `myname` as the username for FTP connections.

```
SCE 1000#ip ftp username myname
SCE 1000#
```

logger add-user-message message text

Adds a message string to the user log files.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

message text	The message string you wish to add.

EXAMPLE:

```
SCE 1000#Logger add-user-message “testing 123”
```

logger get user-log file-name target-file

Outputs the current user log to a target file. The output file name can be a local path, full path, or full ftp path file name.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

target-file	The log file name where the system will write the log file information.

EXAMPLE:

The following example retrieves the current user log files.

```
SCE 1000#logger get user-log file-name
ftp://myname:mypw@10.1.1.205/d:/log.txt
SCE 1000#
```

mkdir directory-name

Creates a new directory.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

directory-name	The name of the directory to be created.

EXAMPLE:

The following example creates a new directory named mydir.

```
SCE 1000#mkdir mydir
SCE 1000#
```

more file-name

Displays the contents of a file.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

file-name	The name of the file to be displayed.

USAGE GUIDELINES

- The running-config option (see *[more | show] running-config [all-data]* (on page A-76)) displays the running configuration file.
- The startup-config option (see *[more | show] startup-config* (on page A-77)) displays the startup configuration file.

EXAMPLE:

The following partial sample output displays the content of some file.

```
SCE 1000#more somefile.txt
I am a happy little file.
SCE 1000#
```

[more | show] running-config [all-data]

Shows the current configuration.

Authorization admin

Mode Privileged EXEC

PARAMETERS

all-data Displays defaults as well as non-default settings.

USAGE GUIDELINES

- The **`all-data`** switch may to see sample usage for many CLI configuration commands.

EXAMPLE:

The following partial example shows the output of the more running-config command.

```
SCE 1000#>more running-config all-data
#This is a general configuration file (running-config).
#Created on 16:48:11  UTC  WED  June  13  2001

#cli-type 1
#version 1

service logger
…
…
no service password-encryption
enable password level 10 0 “pcube”
enable password level 15 0 “pcube”
service RDR-formatter
no RDR-formatter destination all
RDR-formatter history-size 0
clock timezone UTC 0
ip domain-lookup
no ip domain-name
no ip name-server
service telnetd
…
…
FastEthernet 0/0
ip address 10.1.5.120 255.255.0.0
speed auto
duplex auto
…
…
exit
ip default-gateway 10.1.1.1
no ip route all

line vty 0 4
no access-class in
timeout 30
exit
SCE 1000#>
```

[more | show] startup-config

Shows the startup configuration file. Use this command to review the configuration used by the ***SCE 1000*** at boot time in comparison with the current configuration to make sure that you approve of all the differences before saving the configuration by using **copy running-config startup-config** command.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows a sample output.

```
SCE 1000#more startup-config
#Created on 20:17:46  UTC  THU  January 1 2001
#cli-type 1
#version 1
logger SCE 1000 User-File-Log max-file-size 20000
ip domain-name *pcube*
ip name-server 10.1.1.1
interface FastEthernet 0/0
ip address 10.1.4.202 255.0.0.0
interface LineCard 0
silent
SCE 1000#
```

more user-log

Displays the user log on the CLI console screen.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example displays the user log on the CLI console screen.

```
SCE 1000#more user-log
 <INFO>    | 01/28/97  22:29:22 | CPU #000 | Logger: Task Initialized
successfully
```

ping host

Pings the given host to test for connectivity. The ping program sends a test message (packet) to an address and then awaits a reply. Ping output can help you evaluate path-to-host reliability, delays over the path, and whether the host can be reached or is functioning.

Authorization admin

Mode Privileged EXEC

PARAMETERS

host The host name or IP address of a remote station to ping.

EXAMPLE:

The following example pings the host 10.1.1.201.

```
SCE 1000#ping 10.1.1.201
pinging 10.1.1.201 ...
PING 10.1.1.201: 56 data bytes
64 bytes from host (10.1.1.201): icmp_seq=0. time=0. ms
64 bytes from host (10.1.1.201): icmp_seq=1. time=0. ms
64 bytes from host (10.1.1.201): icmp_seq=2. time=0. ms
64 bytes from host (10.1.1.201): icmp_seq=3. time=0. ms
----10.1.1.201 PING Statistics----
4 packets transmitted, 4 packets received, 0% packet loss
round-trip (ms)  min/avg/max = 0/0/0
SCE 1000#
```

pwd

Displays the current working directory.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the current working directory as tffs0.

```
SCE 1000#pwd
tffs0:
SCE 1000#
```

reload

Reboots the ***SCE 1000*** system. WARNING: In order not to lose the current configuration, use the **copy running-config-all startup-config-all** command before using the **reload** command.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows backing up of the configuration and performing a system reboot.

```
SCE 1000#copy running-config-all startup-config-all
SCE 1000#reload
Are you sure? Y
The system is about to reboot, this will end your CLI session
```

reload shutdown

Shuts down the ***SCE 1000*** system, preparing it for being turned off.

Authorization	admin
Mode	Privileged EXEC

USAGE GUIDELINES

- Use this command to shut down the ***SCE 1000*** system in an orderly manner, before turning it off. After issuing this command, the only way to revive the ***SCE 1000*** from its power-down state is to turn it off, then back on.
- This command can only be issued from the serial CLI console port. When issued during a telnet CLI session, an error message is returned and the command is ignored. This is done to prevent the possibility of shutting it down from a remote location, from which it is not possible to power back up.

EXAMPLE:

The following example shows the shutdown process.

```
SCE 1000#reload shutdown
You are about to shut down the system.
The only way to resume system operation after this
is to cycle the power off, and then back on.
Continue?
Y

IT IS NOW SAFE TO TURN THE POWER OFF.
```

rename existing_file_name new_file_name

Changes the file name to the specified name.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

existing-file-name	The original name of the file.
new-file-name	The new name of the file.

EXAMPLE:

The following example changes the name of file *`test1.pkg`* to *`test3.pkg`*.

```
SCE 1000#rename test1.pkg test3.pkg
```

rmdir directory-name

Removes an empty directory.

To remove a directory that is not empty, use the **`delete`** command with the recursive switch.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

directory-name	The name of the directory to be deleted.

USAGE GUIDELINES

- You can only remove an empty directory.

EXAMPLE:

The following example deletes the code directory.

```
SCE 1000#rmdir code
SCE 1000#
```

script capture script-file-name

Begins the recording of a script. It tracks all commands typed until the **`script stop`** command is used. Use this command to capture a sequence of repeated commands into a file for the purpose of executing the commands again. Use the **`script stop`** command to stop capturing the script.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

script-file-name	The name of the output file where the script is stored.

EXAMPLE:

The following example shows the script capture for the script1.txt.

```
SCE 1000#script capture script1.txt
SCE 1000#cd log
SCE 1000#cd ..
SCE 1000#pwd
SCE 1000#script stop
```

script print script-file-name

Displays a script file.

Authorization admin

Mode Privileged EXEC

PARAMETERS

script-file-name The name of the file containing the script.

EXAMPLE:

The following example prints the commands captured in script1.txt.

```
SCE 1000#script print script1.txt
cd log
cd ..
pwd
script stop
SCE 1000#
```

script run script-file-name [halt]

Runs a script. The halt parameter causes the command to break script on errors.

Authorization admin

Mode Privileged EXEC

PARAMETERS

script-file-name The name of the file containing the script.

halt Stops the script running if one of the commands results in an error.

USAGE GUIDELINES

- Use this command to run a script that you have previously created using the **`script capture`** command.

EXAMPLE:

The following example runs the script named script1.txt.

```
SCE 1000#script run script1.txt
cd log
cd ..
pwd
tffs0:
script stop
SCE 1000#
```

script stop

Stops script capture. Used in conjunction with **`script capture`**, marks the end of a script being recorded.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example stops the capturing of a script.

```
SCE 1000#script capture script1.txt
SCE 1000#cd log
SCE 1000#cd ..
SCE 1000#pwd
SCE 1000#script stop
SCE 1000#
```

setup

Invokes the setup utility, which is a dialog, or series of questions, that guides the user through the basic configuration process. This utility runs automatically upon initial connection to the local terminal. The utility may also be invoked explicitly to make changes to the system configuration.

Following is a brief list of the parameters configured via the setup command:

- Host ID parameters: IP address, subnet mask, and hostname
- Passwords: admin password, password encryption

  The root password can be configured upon initial system configuration and when accessed from the root user.
- Time settings: time zone, offset from UTC, local time and date
- SNTP configuration: multicast client, unicast server, unicast query interval
- Domain Name Server configuration: default domain name and IP address (up to 3)
- RDR-formatter destination: IP address and TCP port number
- Access Control Lists: up to 100 lists, with 20 IP addresses in each list, each entry can be designated as permitted or denied.

  Create ACLs for IP access, Telnet access, SNMP GET community access, and SNMP SET community access as needed:
- SNMP configuration: define the following:
  - GET community names (up to 20)
  - SET community names(up to 20)
  - trap managers (up to 20): IP address, community string, version
  - name of system manager
- Topology configuration: define the following:
  - connection mode
  - link-bypass mode when operational

- redundancy
- link-bypass mode when not operational
- administrative status after abnormal reboot

For a complete description of the command, see *System Configuration* (on page 4-26).

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

The setup command does not include parameters in the usual sense of the word. However, the setup utility questions prompt for many global configuration parameters. Following is a table listing all parameters for which values may be requested by the setup dialog.

The following table lists all the parameter values that are necessary to complete the initial configuration. It is recommended that you obtain all these values before beginning the setup.

EXAMPLE:

The following example runs the setup utility.

```
SCE 1000#setup
                --- System Configuration Dialog ---

At any point you may enter a question mark ‘?’ followed by ‘Enter’ for help.
Use ctrl-C to abort configuration dialog at any prompt.
Use ctrl-Z to jump to the end of the configuration dialog at any prompt.
Default settings are in square brackets ‘[]’.

Would you like to continue with the System Configuration Dialog? [yes/no]: y
```

Table A-2 Setup Command Parameters

Parameter	Definition
IP address	IP address of the ***SCE 1000***.
subnet mask	Subnet mask of the ***SCE 1000***.
default gateway	Default gateway.
hostname	Character string used to identify the ***SCE 1000***
admin password	Admin level password.
	Character string from 4-100 characters beginning with an alpha character.
root password	Root level password.
	Character string from 4-100 characters beginning with an alpha character.
password encryption status	Enable or disable password encryption?
Time Settings	
time zone name and offset	Standard time zone abbreviation and minutes offset from UTC.
local time and date	Current local time and date. Use the format:
	00:00:00 1 January 2002
SNTP Configuration	
broadcast client status	Set the status of the SNTP broadcast client.
	If enabled, the SCE will synchronize its local time with updates received from SNTP broadcast servers.
unicast query interval	Interval in seconds between unicast requests for update (64 – 1024)
unicast server IP address	IP address of the SNTP unicast server.
DNS Configuration	
DNS lookup status	Enable or disable IP DNS-based hostname translation.
default domain name	Default domain name to be used for completing unqualified host names
IP address	IP address of domain name server. (maximum of 3 servers)
RDR Formatter Destination Configuration	
IP address	IP address of the RDR-formatter destination
TCP port number	TCP port number of the RDR-formatter destination

Parameter	Definition
Access Control Lists	
Access Control List number	How many ACLs will be necessary? What IP addresses will be permitted/denied access for each management interface? You may want ACLs for the following : • Any IP access • Telnet access • SNMP GET access • SNMP SET access
list entries (maximum 20 per list)	IP address, and whether permitted or denied access.
IP access ACL	ID number of the ACL controlling IP access.
telnet ACL	ID number of the ACL controlling telnet access.
SNMP Configuration	
SNMP agent status	Enable or disable SNMP management.
GET community names	Community strings to allow GET access and associated ACLs (maximum 20).
SET community names	Community strings to allow SET access and associated ACLs (maximum 20).
trap managers	Trap manager IP address, community string, and SNMP version. (maximum 20)
Authentication Failure trap status	Set the status of the Authentication Failure trap. (See *Traps* (on page 6-34).)
enterprise traps status	Set the status of the enterprise traps. (See *Traps* (on page 6-34).)
system administrator	Name of the system administrator.
Topology Configuration	
connection mode	Is the ***SCE 1000*** installed in bump-in-the-wire topology (inline) or out of line using a switch with port mirroring (receive-only)?
link bypass mode on operational status	When the ***SCE 1000*** is operational, should it bypass traffic or not? Refer, in setup, to the table Setup Command Parameters.
redundant ***SCE 1000*** platform?	Is there a redundant ***SCE 1000*** installed as a backup?
link bypass mode on non-operational status	When the ***SCE 1000*** is not operational, should it bypass traffic or cut it off? Refer, in setup, to the table Setup Command Parameters.
operational status of the SCE after abnormal boot	After a reboot due to a failure, should the ***SCE 1000*** remain in a Failure status or move to operational status provided no other problem was detected? Refer, in setup, to the table Setup Command Parameters.

show access-lists [number]

Shows all access-lists or a specific access list.

Authorization admin

Mode Privileged EXEC

PARAMETERS

number Number of the access list to show

EXAMPLE:

The following example displays the configuration of access-list 1.

```
SCE 1000#show access-lists 1
Standard IP access list 1
    Permit 10.1.1.0, wildcard bits 0.0.0.255
    deny   any
SCE 1000#
```

show blink slot slot-number

Displays the blinking status of a slot. A slot blinks after it receives a **blink** command.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot-number The number of the identified slot. Enter a value of 0.

EXAMPLE:

The following example shows the blink status of slot 0.

```
SCE 1000#show blink slot 0
Slot 0 blink status: off
SCE 1000#
```

show calendar

Displays the time maintained by the real-time system calendar clock.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the current system calendar.

```
SCE 1000#show calendar
12:50:03  UTC  MON  November 13 2001
SCE 1000#
```

show clock

Displays the time maintained by the system clock.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the current system clock.

```
SCE 1000#show clock
12:50:03  UTC  MON  November 13 2001
SCE 1000#
```

show failure-recovery operation-mode

Displays the operation mode to apply after boot resulted from failure.

Authorization admin

Mode Privileged EXEC

USAGE GUIDELINES

- Use the **`failure-recovery operation-mode`** command to configure this.

EXAMPLE:

```
SCE 1000#show failure-recovery operation-mode
System Operation mode on failure recovery is: operational
SCE 1000#
```

show hostname

Displays the currently configured hostname.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows that ***SCE 1000*** is the current hostname.

```
SCE 1000#show hostname
SCE 1000
SCE 1000#
```

show hosts

Displays the default domain name, the address of the name server, and the content of the host table.

Authorization	admin
Mode	Privileged EXEC

EXAMPLE:

The following example shows the domain and hosts configured.

```
SCE 1000#show hosts
Default domain is cisco.com
Name/address lookup uses domain service
Name servers are 10.1.1.60, 10.1.1.61
Host                 Address
----                 -------
PC85                 10.1.1.61
SCE 1000#
```

show interface FastEthernet slot-number/interface-number

Displays the details of a FastEthernet Interface.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

slot-number	The number of the identified slot. Enter a value of 0.
interface-number	FastEthernet interface number 0, 1 or 2.

EXAMPLE:

The following example shows the FastEthernet details.

```
SCE 1000#show interface FastEthernet 0/0
ip address: 10.1.6.145
subnet mask: 255.255.0.0
Configured speed: auto, configured duplex: auto
AutoNegotiation is On, link is Up, actual speed: 100, actual duplex: half
SCE 1000#
SCE 1000#show interface FastEthernet 0/1
Configured speed: auto, configured duplex: auto
AutoNegotiation is On, link is Up, actual speed: 100Mb/s, actual duplex:
full
Bandwidth: 100000 Kbps, Burst-size: 5000 bytes
SCE 1000#
```

show interface FastEthernet slot-number/interface-number ip address

Displays the currently configured IP address and subnet mask of the Management FastEthernet Interface.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot-number The number of the identified slot. Enter a value of 0.

interface-number Enter a value of 0.

EXAMPLE:

The following example shows the configured IP address.

```
SCE 1000#show interface FastEthernet 0/0 ip address
Ip address: 10.1.5.120
Subnet mask: 225.255.0.0
SCE 1000#
```

show interface FastEthernet slot/interface counters [direction]

Displays the values of counters of a line FastEthernet interface.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot-number The number of the identified slot. Enter a value of 0.

interface-number FastEthernet interface number 1 or 2.

*direction*Optional direction specification, to show only counters of a specific direction. Use **`in`** or **`out.`**

EXAMPLE:

The following example shows the FastEthernet interface counters.

```
SCE 1000#show interface FastEthernet 0/1 counters
In total octets: 191520
In good unicast packets: 560
In good multicast packets: 0
In good broadcast packets: 0
In packets discarded: 0
In packets with CRC/Alignment error: 0
In undersized packets: 0
In oversized packets: 0
Out total octets: 0
Out unicast packets: 0
Out non unicast packets: 0
Out packets discarded: 0
SCE 1000#
```

show interface FastEthernet slot/interface duplex

Displays the configured duplex mode and the actual status of it.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

slot-number	The number of the identified slot. Enter a value of 0.
interface-number	FastEthernet interface number 0, 1 or 2.

EXAMPLE:

The following example shows the FastEthernet interface duplex mode configuration and status.

```
SCE 1000#show interface FastEthernet 0/1 duplex
Configured duplex: auto
AutoNegotiation is On, link is Up, actual duplex: half
SCE 1000#
```

show interface FastEthernet slot/interface speed

Displays the configured speed mode and the actual status of it.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

slot-number	The number of the identified slot. Enter a value of 0.
interface-number	FastEthernet interface number 0, 1 or 2.

EXAMPLE:

The following example shows the FastEthernet interface speed configuration and status.

```
SCE 1000#show interface FastEthernet 0/1 speed
Configured speed: auto
AutoNegotiation is On, link is Up, actual speed: 100
SCE 1000#
```

show interface FastEthernet slot/interface duplex

Displays the configured duplex mode and the actual status of it.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

slot-number	The number of the identified slot. Enter a value of 0.
interface-number	FastEthernet interface number 0, 1 or 2.

EXAMPLE:

The following example shows the FastEthernet interface duplex mode configuration and status.

```
SCE 1000#show interface FastEthernet 0/1 duplex
Configured duplex: auto
AutoNegotiation is On, link is Up, actual duplex: half
SCE 1000#
```

show interface FastEthernet slot/interface queue queue-number

Displays the values of counters of a queue in a line FastEthernet interface.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

slot-number	The number of the identified slot. Enter a value of 0.
interface-number	FastEthernet interface number 1 or 2.
Queue-number	Number of queue, in the range 0-3.

EXAMPLE:

The following example shows the FastEthernet interface queue number 3.

```
SCE 1000#show interface FastEthernet 0/1 queue 3
Bandwidth: 100000 Kbps, Burst-size: 8000 bytes
SCE 1000#
```

show interface LineCard slot-number

Displays information for a specific LineCard Interface.

Authorization user

Mode Privileged EXEC

PARAMETERS

slot-number The number of the identified slot. Enter a value of 0.

EXAMPLE:

The following example shows that the LineCard Interface does not currently have an application assigned to it.

```
SCE 1000#show interface linecard 0
No application is assigned to slot 0
Silent is off
Shutdown is off
SCE 1000#
```

show interface LineCard slot-number application

Displays the name of the application assigned to the LineCard Interface.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot-number The number of the identified slot. Enter a value of 0.

EXAMPLE:

The following example shows the current application.

```
SCE 1000#show interface LineCard 0 application
/tffs0/app/apricot.sli
SCE 1000#
```

show interface LineCard attack-detector

Displays the configuration of the specified attack detector.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot-number The number of the identified slot. Enter a value of 0.

USAGE GUIDELINES

- Use the "all" keyword to display the configuration of all existing attack detectors.
- Use the "default" keyword to display default attack detector configuration.

EXAMPLE 1:

The following example displays the configuration of attack detector number 3.

```
SCE 1000#show interface LineCard 0 attack-detector 3
```

EXAMPLE 2:

The following example displays the configuration of the default attack detectors.

```
SCE 1000#show interface LineCard 0 attack-detector default
```

EXAMPLE 3:

The following example displays the configuration of all existing attack detectors.

```
SCE 1000#show interface LineCard 0 attack-detector all
```

show interface LineCard attack-filter

Displays the attack filtering configuration.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot-number The number of the identified slot. Enter a value of 0.

USAGE GUIDELINES

Following is a list of options that may be displayed:

- **query IP address configured**: displays the configured threshold values and action for the attack detector for a specified IP address
- **query IP address counters**: displays the current counters for the attack detector for all protocols and attack directions for a specified IP address
- **current-attacks**: displays all currently handled attacks
- **dont-filter**: displays all existing stopped attack filters
- **force-filter**: displays all existing forced attack filters
- **subscriber-notification ports**: displays the list of subscriber-notification ports

EXAMPLE 1:

The following example displays the configuration of the attack detector for a specified IP address.

```
SCE 1000#show interface LineCard 0 attack-filter query IP address 10.10.10.10
configured
```

EXAMPLE 2:

The following example displays all existing forced attack filters.

```
SCE 1000#show interface LineCard 0 attack-filter force-filter
```

EXAMPLE 3:

The following example displays the subscriber notification ports.

```
SCE 1000#show interface LineCard 0 attack-filter subscriber-notification
ports
```

show interface LineCard slot-number connection-mode

Shows the LineCard Interface connection mode (inline or receive-only).

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

slot-number	The number of the identified slot. Enter a value of 0.

EXAMPLE:

The following example shows the LineCard connection mode configuration parameter value.

```
SCE 1000#show interface LineCard 0 connection-mode
inline
SCE 1000#
```

show interface LineCard slot-number counters

Displays the LineCard Interface hardware counters.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot-number The number of the identified slot. Enter a value of 0.

EXAMPLE:

The following example shows the hardware counters for the LineCard Interface.

```
SCE 1000#show interface linecard 0 counters
DP packets in: 100
DP packets out: 100
DP IP packets in: 90
DP Non-IP packets: 10
DP IP packets with CRC error: 0
DP IP packets with length error: 0
DP IP broadcast packets: 10
DP IP fragmented packets: 0
DP IP packets with TTL=0 error: 0
DP Non TCP/UDP packets: 10
DP TCP/UDP packets with CRC error: 0
FF counter #0: 0
FF counter #1: 0
FF counter #2: 0
FF counter #3: 0
...
```

show interface linecard link mode

Displays the configured LineCard Interface link mode.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot-number The number of the identified slot. Enter a value of 0.

EXAMPLE:

The following example shows the configured link mode for the LineCard Interface.

```
SCE 1000#show interface linecard 0 link mode
```

show interface LineCard slot-number link-bypass

Displays the current LineCard link-bypass mode, as well as the configured modes for boot- time, normal operation, and failure.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot-number The number of the identified slot. Enter a value of 0.

EXAMPLE:

The following example shows the current and configured bypass modes.

```
SCE 1000#show interface LineCard 0 link-bypass
Link-Bypass configuration according to status:
On-Boot       : Bypass
On-Operational: No-Bypass
On-Failure    : Bypass

Current bypass state is: No-Bypass
SCE 1000#
```

show interface LineCard slot-number silent

Displays the current LineCard Interface silent state. When the silent state is **Off**, the LineCard events reporting function is enabled.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot-number The number of the identified slot. Enter a value of 0.

EXAMPLE:

The following example shows the LineCard Interface silent mode.

```
SCE 1000#show interface LineCard 0 silent
Off
SCE 1000#
```

show interface LineCard slot-number subscriber aging anonymous|introduced

Displays the subscriber aging for the specified type of subscriber (anonymous or introduced).

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot-number The number of the identified slot. Enter a value of 0.

EXAMPLE:

Following is an example of how to display the aging of introduced subscribers.

```
SCE 1000# show interface linecard 0 subscriber aging introduced
SCE 1000#
```

show interface LineCard slot-number subscriber anonymous [amount] [name group-name]

Displays the subscribers in a specified anonymous subscriber group. Use the “amount” form to display the number of subscribers in the group rather than a complete listing of members.

If no group-name is specified, all anonymous subscribers in all groups are displayed.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

slot-number	The number of the identified slot. Enter a value of 0.
group-name	The anonymous subscriber group.

EXAMPLE:

Following is an example of how to display the number of subscribers in the anonymous subscriber group anon1.

```
SCE 1000# show interface linecard 0 subscriber anonymous amount name anon1
SCE 1000#
```

show interface LineCard slot-number subscriber anonymous-group [name group-name] [all]

Displays the configuration of the specified anonymous subscriber group. Use the “all” form with no group name to display all existing anonymous subscriber groups.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

slot-number	The number of the identified slot. Enter a value of 0.
group-name	The anonymous subscriber group.

EXAMPLE:

Following is an example of how to display the anonymous subscriber groups.

```
SCE 1000# show interface linecard 0 subscriber anonymous-group
SCE 1000#
```

show interface LineCard slot-number subscriber [amount] [prefix prefix] [suffix suffix] [property propertyname equals|greater-than|less-than property-val]

Displays subscribers meeting one of the following specified criteria:

- Having a value of a subscriber property that is equal to, larger than, or smaller than a specified value
- Having a subscriber name that matches a specific prefix
- Having a subscriber name that matches a specific suffix

Use the “amount” form to display the number of subscribers meeting the criteria rather than listing actual subscriber names.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot-number The number of the identified slot. Enter a value of 0.

prefix The desired subscriber name prefix to match.

suffix The desired subscriber name suffix to match.

propertyname The name of the subscriber property to match.

property val The value of the specified subscriber property. Specify whether to search for values equal to, greater than, or less than this value.

EXAMPLE:

Following is an example that lists the number of subscribers with the prefix ‘gold’ in the subscriber name.

```
SCE 1000# show interface linecard 0 subscriber amount prefix gold
SCE 1000#
```

show interface LineCard slot-number subscriber mapping [amount] [IP iprange] [intersecting IP iprange] [VLANid vlanid] [none]

Displays subscribers whose mapping meets one of the following specified criteria:

- Is within a specified range of IP addresses
- Intersects a specified IP range
- Matches a specified VLAN tag
- Has no mapping

Use the “amount” form to display the number of subscribers meeting the mapping criteria rather than listing actual subscriber names.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

slot-number	The number of the identified slot. Enter a value of 0.
iprange	Specified range of IP addresses.
vlanid	Specified VLAN tag.

EXAMPLE:

Following is an example that lists the number of subscribers with no mapping.

```
SCE 1000# show interface linecard 0 subscriber mapping amount none
SCE 1000#
```

show interface LineCard slot-number subscriber name name [mappings] [counters] [properties]

Displays information about a specified subscriber. The following information can be displayed:

- Mappings
- OS counters (bandwidth and current number of flows)
- All values of subscriber properties
- All of the above

If no category is specified, a complete listing of property values, mappings and counters is displayed.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

slot-number	The number of the identified slot. Enter a value of 0.
name	The subscriber name.
mappings	Display subscriber mappings.
counters	Display OS counters.
properties	Display values of all subscriber properties.

EXAMPLE:

Following is an example of how to list the OS counters for the specified subscriber.

```
SCE 1000# show interface linecard 0 subscriber name gold123 counters
SCE 1000#
```

show interface LineCard slot-number subscriber properties

Displays all existing subscriber templates.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

slot-number	The number of the identified slot. Enter a value of 0.

EXAMPLE:

Following is an example of how to display the subscriber templates.

```
SCE 1000# show interface linecard 0 subscriber templates
SCE 1000#
```

show interface LineCard slot-number subscriber db counters

Displays following subscriber database counters:

- Current number of subscribers
- Current number of introduced subscribers
- Current number of anonymous subscribers
- Current number of active subscribers (with active traffic sessions)
- Current number of subscribers with mappings
- Current number of IP mappings
- Current number of vlan mappings
- Max number of subscribers that can be introduced
- Max number of subscribers with mappings
- Max number of subscribers with mappings date / time
- Total aggregated number introduced
- Total number of aged subscribers
- Total number of pull events
- Number of traffic sessions currently assigned to the default subscriber

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

slot-number	The number of the identified slot. Enter a value of 0.

EXAMPLE:

The following example shows how to display the subscriber database counters:

```
SCE 1000#show interface LineCard 0 subscriber db counters
```

show interface LineCard slot-number subscriber [amount] mapping included-in TP-IP-range name | IP

Displays the existing subscriber mappings for a specified TIR or IP range.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

slot-number	The number of the identified slot. Enter a value of 0.
TP-IP-range name	Name of the TIR for which mappings should be displayed.
IP	IP range for which mappings should be displayed.

USAGE GUIDELINES

- Use the `amount` keyword to display the number of existing mappings only, rather than the mappings themselves.

EXAMPLE 1:

Following is an example of how to display all existing mappings for TIR CMTS1.

```
SCE 1000# show interface linecard 0 subscriber mapping included-in TP-IP-
range CMTS1
SCE 1000#
```

EXAMPLE 2:

Following is an example of how to display the number of existing mappings for TIR CMTS1.

```
SCE 1000# show interface linecard 0 subscriber amount mapping included-in
TP-IP-range CMTS1
SCE 1000#
```

show interface LineCard slot-number tos-marking mode

Displays the current LineCard TOS marking status.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

slot-number	The number of the identified slot. Enter a value of 0.

EXAMPLE:

The following example shows that the tos marking mode is enabled:

```
SCE 1000#show interface LineCard 0 tos-marking mode
ToS marking mode on slot 0 is enabled
SCE 1000#
```

show interface LineCard slot-number tos-marking table

Displays the current LineCard TOS marking table.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot-number The number of the identified slot. Enter a value of 0.

EXAMPLE:

The following example shows the ToS marking table:

```
SCE 1000#show interface LineCard 0 tos-marking table
                         BE           AF1          AF2          AF3
     AF4          FE
green       0x0          0xa          0x12         0x1a         0x22
     0x2e
yellow            0x0          0xc          0x14         0x1c         0x24
            0x2e
red                      0x0          0xe          0x16         0x1e
     0x24         0x2e
SCE 1000#
```

show interface linecard slot-number traffic-counter

Displays the specified traffic counter.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot number The number of the identified slot. Enter a value of 0.

name Name of the traffic counter to be dispayed.

Usage Guidelines:

- Use the *all* keyword to display all traffic counters.

EXAMPLE:

The following example displays information for all existing traffic counters.

```
SCE 1000#show interface linecard 0 traffic-counter all
Counter 'cnt' value: 0 packets. Rules using it: None.
Counter 'cnt2' value: 1284 packets. Rules using it: Rule2.
2 counters listed out of 32 available.
```

show interface linecard slot-number traffic-rule

Displays the specified traffic rule configuration.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot number The number of the identified slot. Enter a value of 0.

name Name of the traffic rule to be displayed.

Usage Guidelines:

- Use the *all* keyword to display all traffic counter rules.

EXAMPLE:

The following example displays information for the Rule1 traffic rule.

```
SCE 1000#show interface linecard 0 traffic-rule name Rule1
```

show interface LineCard slot-number [MPLS|VLAN|L2TP|IP-tunnel]

Displays the tunnel configuration.

Authorization admin

Mode Privileged EXEC

PARAMETERS

slot number The number of the identified slot. Enter a value of 0.

EXAMPLE:

The following example shows the IP tunnel configuration.

```
SCE 1000#show interface LineCard 0 ip-tunnel
tunnel mode: tunneling disable
SCE 1000#
```

show ip access-class

Shows the access list defined for global IP access to the ***SCE 1000*** system. Only IP addresses permitted access according to this access list are allowed access to the system.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the IP access class mapping.

```
SCE 1000#show ip access-class
IP layer is using access-list # 1.
SCE 1000#
```

show ip advertising [destination|interval]

Shows the status of IP advertising, the configured destination and the configured interval.

Use the [destination] and [interval] versions of the command to display only the configured destination or interval, respectively.

Authorization admin

Mode Privileged EXEC

USAGE GUIDELINES

- Use the form **show ip advertising destination** to display the IP advertising destination.
- Use the form **show ip advertising interval** to display the interval between ping commands.

EXAMPLE:

The following example shows the IP advertising status and configuration.

```
SCE 1000# show ip advertising
IP advertising is disabled
IP advertising destination is 10.10.10.10
IP advertising interval is 853 seconds
```

show ip default-gateway

Shows configured default gateway.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example displays the default gateway.

```
SCE 1000#show ip default-gateway
Default gateway: 10.1.1.1
SCE 1000#
```

show ip rmi-adapter

Displays the status of the RMI adapter (enabled or disabled) and the configured port.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the configuration of the RMI adapter.

```
SCE 1000#show ip rmi-adapter
RMI server is ONLINE
RMI server port is 1099
```

show ip rpc-adapter

Displays the status of the RPC adapter (enabled or disabled) and the configured port.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the configuration of the RPC adapter.

```
SCE 1000#show ip rpc-adapter
RPC Server is OFFLINE
RPC Server port is 14374
```

show ip route

Shows the entire routing table and the destination of last resort (default-gateway).

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the default gateway.

```
SCE 1000#show ip route
gateway of last resort is        10.1.1.1

SCE 1000#
```

show ip route prefix

Shows the routing entries with the specified prefix.

Authorization admin

Mode Privileged EXEC

PARAMETERS

prefix The prefix of the routing entries to be retrieved.

EXAMPLE:

The following example shows retrieval of the ip route.

```
SCE 1000#show ip route 10.1.60.0
gateway of last resort is      62.90.34.255
SCE 1000
```

show ip route prefix mask

Shows the routing entries from the subnet specified by the prefix and mask pair.

Authorization admin

Mode Privileged EXEC

PARAMETERS

prefix The prefix of the routing entries to be included.

mask Used to limit the search of routing entries.

EXAMPLE:

The following example shows retrieval of the ip route.

```
SCE 1000#show ip route 10.1.60.0 255.255.255.0
|    prefix       |     mask        |    next hop     |
|-----------------|-----------------|-----------------|
|       10.1.60.0 |   255.255.255.0 |        10.1.1.5 |
SCE 1000#
```

show management-agent [selected-info]

Shows Management agent status: enabled/disabled and access-list number used.

Authorization admin

Mode Privileged EXEC

PARAMETERS

selected-info Type **access-class** to view only access class status, or **enabled** to view only the enabled/disabled status.

EXAMPLE:

The following example shows the agent status.

```
SCE 1000#show management-agent
Management agent is enabled.
Agent is active
Management agent does not use any access-list.
SCE 1000#
```

The following example displays whether access lists are in use for the Management agent.

```
SCE 1000#show management-agent access-class
Management agent does not use any access-list.
SCE 1000#
```

The following example shows the Management agent is enabled.

```
SCE 1000#show management-agent enabled
Management agent is enabled.
Agent is active
SCE 1000#
```

show management-agent notifications

Displays the status of notifications sent to the Management agent.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example displays the default status for management agent notification.

```
SCE 1000#show management-agent notifications
Default status of all notifications is ON
SCE 1000#
```

show management-agent notifications counters

Displays counters of notifications sent to the Management agent, that is, the number of notifications that were sent and the number that were dropped.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example displays the counters for management agent notifications sent and dropped.

```
SCE 1000#show management-agent notifications counters
Number of notifications sent: 1320
Number of notifications dropped: 0
SCE 1000#
```

show line vty access-class in

Shows the access list configured to the Telnet server that contains the list of addresses that have access to the system.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the access list configured for telnet lines.

```
SCE 1000#show line vty access-class in
Telnet server is using access-list # 1.
SCE 1000#
```

show line vty timeout

Shows the timeout configured to the Telnet sessions.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

```
SCE 1000#show line vty timeout
Timeout is 30 minutes
SCE 1000#
```

show logger device User-File-Log

Displays the logger ***SCE 1000*** configuration status and maximum file size.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the logger User-File-Log ***SCE 1000*** status and configuration.

```
SCE 1000#show logger SCE 1000 User-File-Log
SCE 1000 User-File-Log status: Enabled
SCE 1000 User-File-Log file size: 64000
SCE 1000#
```

show logger device User-File-Log counters

Displays the logger ***SCE 1000***’s counters.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the current User-File-Log ***SCE 1000*** counters.

```
SCE 1000#show logger SCE 1000 user-file-log counters
Logger SCE 1000 User-File-Log counters:
Total info messages: 73
Total warning messages: 44
Total error messages: 0
Total fatal messages: 0
SCE 1000#
```

show logger [device device] nv-counters

Shows the non-volatile counters for the entire log or only the specified ***SCE 1000***.

Authorization admin

Mode Privileged EXEC

PARAMETERS

SCE 1000	The name of the ***SCE 1000*** to be displayed (either **user-file-log** or **debug-file-log**.

EXAMPLE:

The following example shows the user log file non-volatile counters.

```
SCE 1000#show logger SCE 1000 user-file-log nv-counters
```

show logger device User-File-Log max-file-size

Displays the logger ***SCE 1000***'s maximum file size.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the logger User-File-Log ***SCE 1000*** max file size configuration.

```
SCE 1000#show logger SCE 1000 User-File-Log max-file-size
SCE 1000 User-File-Log file size: 64000
SCE 1000#
```

show logger device User-File-Log status

Displays the logger ***SCE 1000*** configuration status.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the logger User-File-Log ***SCE 1000*** status.

```
SCE 1000#show logger SCE 1000 User-File-Log status
SCE 1000 User-File-Log status: Enabled
SCE 1000#
```

show pqi file filename info

Displays information, such as installation options, about the specified application file.

Authorization admin

Mode Privileged EXEC

PARAMETERS

filename The filename of the desired application file.

EXAMPLE:

The following example shows how to display application file information.

```
SCE 1000# show pqi file filename info
application:   sm
description:   SCE 1000 sm
target SCE 1000: SCE 1000
module names:  sm20001.pm0
```

show pqi last-installed

Displays the name of the last pqi file that was installed.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows how to display application file information.

```
SCE 1000# show pqi last-installed
package name:   pack1
package date:   Tue Jun 10 17:27:55 GMT+00:00 2003
operation:      Upgrade
```

show RDR-formatter

Displays the RDR formatter configuration.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the configuration of the RDR formatter.

```
SCE 1000#show RDR-formatter
Status: enabled
Connection is: down
Forwarding mode: redundancy
Connection table:
----------------------------------------------------------
Collector     | Port | Status   | Priority per Category:   |
IP Addres /   |      |          |--------------------------|
Host-Name     |      |          | Category1    | Category2  |
----------------------------------------------------------
10.1.1.205    |33000 | Down     | 100          | 100        |
10.1.1.206    |33000 | Down     | 60           | 60         |
10.12.12.12   |33000 | Down     | 40           | 40         |
----------------------------------------------------------

RDR:    read:         0 ,sent:         0, thrown:         0
UM:     read:         0 ,sent:         0, thrown:         0
Logger: read:         0 ,sent:         0, thrown:         0
Errors: thrown:         0
Last time these counters were cleared: 14:05:57 UTC SUN February 23 2003
SCE 1000#
```

show RDR-formatter connection-status

Shows the current RDR formatter connection table and status (main connection status: up\down, forwarding mode, and connection/activity information for each destination).

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the RDR-formatter connection status.

```
SCE 1000#show RDR-formatter connection-status
Connection is: up
Forwarding mode: redundancy
Connection table:
----------------------------------------------------------
Collector    | Port | Status  | Priority per Category:   |
IP Addres /  |      |         |--------------------------|
Host-Name    |      |         | Category1   | Category2  |
----------------------------------------------------------
10.1.1.205   |33000 | Up      | 100 primary | 100 primary|
10.1.1.206   |33000 | Down    | 60          | 60         |
10.12.12.12  |33000 | Up      | 40          | 40         |
----------------------------------------------------------
SCE 1000#
```

show RDR-formatter counters

Shows the RDR-formatter counters.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the RDR-formatter counters.

```
SCE 1000#show RDR-formatter counters
RDR:    read:         0 ,sent:         0, thrown:         0
UM:     read:         0 ,sent:         0, thrown:         0
Logger: read:         0 ,sent:         0, thrown:         0
Errors: thrown:         0
Last time these counters were cleared: 14:05:57 UTC SUN February 23 2003
SCE 1000#
```

show RDR-formatter destination

Shows the RDR-formatter destinations.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the RDR-formatter configured destinations.

```
SCE 1000#show RDR-formatter destination
Destination: 10.1.1.205
Port: 33000
Destination: 10.1.1.206
Port: 33000
Destination: 10.10.12.10
Port: 33000
SCE 1000#
```

show RDR-formatter enabled

Shows the RDR-formatter status (enabled/disabled).

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows that the RDR formatter is enabled.

```
SCE 1000#show RDR-formatter enabled
Status:  enabled
SCE 1000#
```

show RDR-formatter forwarding-mode

Shows the configured RDR-formatter forwarding-mode (redundancy/load-balancing/multicast).

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the RDR formatter forwarding-mode.

```
SCE 1000#show RDR-formatter forwarding-mode
Forwarding mode:  redundancy
SCE 1000#
```

show RDR-formatter history-size

Shows the configured size of the RDR formatter history buffer.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the size of the RDR formatter history buffer.

```
SCE 1000#show RDR-formatter history-size
History buffer size:  16000 bytes
SCE 1000#
```

show RDR-formatter protocol

Shows the RDR protocol version of the RDR formatter.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows that the RDR protocol is RDRv1.

```
SCE 1000#show RDR-formatter protocol
RDR protocol:  RDRv1
SCE 1000#
```

The following example shows that the RDR protocol is RDRv2. When the protocol is RDRv2, the connection timeout value and whether the optional header is enabled are also displayed. (These options are not supported by RDRv1.)

```
SCE 1000#show RDR-formatter protocol
RDR protocol:  RDRv2
connection timeout:   10 seconds
Cisco option:        disabled
SCE 1000#
```

show RDR-formatter statistics

Shows the current RDR formatter statistics.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the current RDR statistics.

```
SCE 1000#show RDR-formatter statistics
Total:
  sent:     0
  in-queue: 0
  thrown:   0
  rate:     0 RDRs per second
  max rate: 0 RDRs per second
Destination:    10.1.1.205  Port: 33000 Status: down  Active: no
   Sent:        0
   Rate:  0    Max:   0
Last connection establishment: 14:05:57  UTC  SUN  February  23  2003
Destination:    10.1.1.206  Port: 33000 Status: down  Active: no
   Sent:        0
   Rate:  0    Max:   0
Last connection establishment: 14:05:57  UTC  SUN  February  23  2003
Destination:   10.10.12.10  Port: 33000 Status: down  Active: no
   Sent:        0
   Rate:  0    Max:   0
Last connection establishment: 14:05:57  UTC  SUN  February  23  2003
SCE 1000#
```

show running-config

See *[more | show] running-config [all-data]* (on page A-76).

show scm last-applied

Displays the last *scm* configuration file that was applied.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the last *scm* configuration file that was applied.

```
SCE 1000# show scm last-applied
/tffs0/xmlFile.xml
```

show snmp

Displays the SNMP configuration and counters.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the SNMP server configuration and status.

```
SCE 1000#show snmp
SNMP server status: Enabled
Location: London_Office
Contact: Brenda
Authentication Trap Status: Enabled
Communities:
------------
Community: public,    Access Authorization: RO,     Access List Index: 1
Trap managers:
------------
Trap host: 10.1.1.205,  community: public,  version: SNMPv2c
SNMP stats:
    29 SNMP packets input
     0 Bad SNMP version errors
    29 Unknown community name
     0 Illegal operation for community name supplied
     0 Encoding errors
     0 Number of requested variables
     0 Number of altered variables
     0 Get-request PDUs
     0 Get-next PDUs
     0 Set-request PDUs
    29 SNMP packets output
     0 Too big errors
     0 No such name errors
     0 Bad values errors
     0 General errors
     0 Response PDUs
    29 Trap PDUs
SCE 1000#
```

show snmp community

Displays configured communities.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the SNMP manager communities.

```
SCE 1000#show snmp community
Community: public, Access Authorization: RO, Access List Index: 1
SCE 1000#
```

show snmp contact

Displays the configured MIB-2 variable sysContact.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the system contact.

```
SCE 1000#show snmp contact
Contact: Brenda@mycompany.com
SCE 1000#
```

show snmp enabled

Displays the SNMP agent status (enabled/disabled).

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the SNMP server enabled status.

```
SCE 1000#show snmp enabled
SNMP server status: Enabled
SCE 1000#
```

show snmp host

Displays the destination hosts for SNMP traps.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the destination hosts for SNMP traps.

```
SCE 1000#show snmp host
Trap host: 10.1.1.205, community: public, version: SNMPv2c
SCE 1000#
```

show snmp location

Displays the configured MIB-2 variable sysLocation.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the system location.

```
SCE 1000#show snmp location
Location: London_Office
SCE 1000#
```

show snmp MIB mib variables

Displays MIB variables.

Authorization admin

Mode Privileged EXEC

PARAMETERS

mib Name of MIB to display. Only a value of **`MIB-II`** is supported.

variables Name of group to display. Use one of the following values: `AT`, `ICMP`, `interfaces`, `IP`, `SNMP`, `system`, `TCP` or `UDP`.

EXAMPLE:

The following example shows the MIB-2 system group.

```
SCE 1000# show snmp MIB MIB-II system
sysDescr.0 = CiSco Service Engineering, SW version: Control Card Version
1.30 build 29, HW version: SCE 1000 GE “RevE”
sysObjectID.0 = 1.3.6.1.4.1.5655.1.2
sysUpTime.0 =  14 hours, 25 minutes, 59 seconds
sysContact.0 = Brenda@mycompany.com
sysName.0 = SCE 1000
sysLocation.0 = London_Office
sysServices.0 = 2
SCE 1000#
```

show snmp traps

Displays the SNMP traps generation status (enabled/disabled).

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the SNMP server traps status.

```
SCE 1000#show snmp traps
Authentication Trap Status: Enabled
Enterprise Trap Status: Enabled
SCE 1000#
```

show sntp

Displays the SNTP configuration and update statistics.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows statistics from the SNTP clients.

```
SCE 1000#show sntp
SNTP broadcast client: disabled
last update time: not available

SNTP uni-cast client: enabled
there is one server:
1: 128.182.58.100
last update time: Feb 10 2002, 14:06:41
update interval: 100 seconds

SCE 1000#
```

show system operation-status

Displays the operation status of the system.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

```
SCE 1000#show system operation-status
System Operation status is Operational
SCE 1000#
```

show telnet sessions

Displays any active Telnet sessions.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows that there is one active Telnet session.

```
SCE 1000#show telnet sessions
There is 1 active telnet session:

Index | Source
================
 0    | 10.1.1.201
SCE 1000#
```

show telnet status

Displays the status of the telnet server daemon.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows that the telnet daemon is currently enabled.

```
SCE 1000#show telnet status
Telnet deamon is enabled.
SCE 1000#
```

show timezone

Displays the current time zone and daylight saving time configuration as configured by the user.

TAuthorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the time zone configured by the user.

```
SCE 1000#show timezone
Time zone: ISR   minutes offset from UTC: 120
SCE 1000#
```

show tunnel mode

Displays the selected tunnel mode.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the selected tunnel mode.

```
SCE 1000#show tunnel mode
tunnel mode: L2TP
SCE 1000#
```

show version

Displays the configuration information for the system including the hardware version, the software version, the application used, and other configuration information.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows the current version information of the ***SCE 1000***.

```
SCE 1000#show version
System version: Version 2.5.2 Build 240
Build time: Jan 11 2005, 07:34:47
Software version is: Version 2.5.2 Build 240
Hardware information is:
rx            : 0x0075
dp            : 0x1808
tx            : 0x1708
ff            : 0x0077
cls           : 0x1721
cpld          : 0x0025
Lic           : 0x0176
rev           : G001
Bootrom       : 2.1.0
L2 cache      : Samsung 0.5
lic type      : MFE
optic mode    :
Part number: 53AA-BXC1-AAAA
Revision: A02A
Software revision: G001
Serial number: 043P6982
Power Supply type: AC

SML Application information is:
Application file: /tffs0/temp.sli
Application name:
Application help:
Original source file:
H:\work\Emb\jrt\V2.5\sml\actions\drop\drop_basic_anyflow.san
Compilation date: Wed, September 22, 2004 at 21:25:21
Compiler version: SANc v2.50 Build 32 gcc_codelets=true built on: Tue
September 22 2004 09:51:57 AM.;SME plugin v1.1
Default capacity option used.


Logger status: Enabled


Platform: SCE 2000 - 4xFE
Management agent interface version: SCE Agent 2.5.1 Build 18
Software package file:
ftp://vk:vk@10.1.8.22/P:/EMB/LatestVersion/2.5.2/se1000.pkg

SCE2000 uptime is 21 minutes, 37 seconds
SCE 1000#
```

show version all

Displays the complete version information as well as the running configuration for all components.

Authorization admin

Mode Privileged EXEC

EXAMPLE:

The following example shows version and configuration information for all the system components.

```
<SCE 1000#show version all
System version: Version 2.5.2 Build 240
Build time: Jan 11 2005, 07:34:47
Software version is: Version 2.5.2 Build 240
Hardware information is:
rx            : 0x0075
dp            : 0x1808
tx            : 0x1708
ff            : 0x0077
cls           : 0x1721
cpld          : 0x0025
Lic           : 0x0176
rev           : G001
Bootrom       : 2.1.0
L2 cache      : Samsung 0.5
lic type      : MFE
optic mode    :
Part number: 53AA-BXC1-AAAA
Revision: A02A
Software revision: G001
Serial number: 043P6982
Power Supply type: AC

SML Application information is:
Application file: /tffs0/temp.sli
Application name:
Application help:
Original source file:
H:\work\Emb\jrt\V2.5\sml\actions\drop\drop_basic_anyflow.san
Compilation date: Wed, September 22, 2004 at 21:25:21
Compiler version: SANc v2.50 Build 32 gcc_codelets=true built on: Tue
September 22 2004 09:51:57 AM.;SME plugin v1.1
Default capacity option used.


Logger status: Enabled


Platform: SCE2000 - 4xFE
Management agent interface version: SCE Agent 2.5.1 Build 18
Software package file:
ftp://vk:vk@10.1.8.22/P:/EMB/LatestVersion/2.5.2/se1000.pkg

SCE2000 uptime is 21 minutes, 37 seconds
SCE 1000#
.
Current configuration:
======================
#This is a general configuration file (running-config).
```

```
#Created on 10:14:59  UTC  TUE  January  11  2005
.
.

interface LineCard 0
connection-mode active
no silent
.
.
Software package file: Not available
Unified management package file: /tffs0/images/um13012.pkg
SCE 1000#
```

show version software

Displays version information for the current software.

Authorization	admin
Mode	Privileged EXEC

EXAMPLE:

The following example shows the current software version.

```
SCE 1000#show version software
Software version is: Version 2.5.2 Build 240
SCE 1000#
```

telnet address [port]

Starts a Telnet session.

Authorization	admin
Mode	Privileged EXEC

PARAMETERS

address Telnet access address.

ports Optional port number. Default is 23.

EXAMPLE:

```
SCE 1000#telnet 10.1.5.120
connecting to 10.1.5.120:23...
```

unzip filename

Extracts a zip file to the current directory.

Authorization admin

Mode Privileged EXEC

PARAMETERS

filename Zip file to be extracted.

EXAMPLE:

```
SCE 1000#unzip zipfile.zip
Unzipping '/tffs0/zipfile.zip'...
Zip file has 3 entries:
  1.sli, 13429 bytes extracted
  preflut.sli, 12558 bytes extracted
  temp/SLI/x/IpraeLut.sli, 12929 bytes extracted
Finished, Extracted 3 files.
```

APPENDIX B

Proprietary MIB Reference

This appendix describes the SCE proprietary MIB support by the ***SCE 1000*** platform. A MIB (Management Information Base) is a database of objects that can be monitored by a network management system (NMS). The Service Control Platform supports both the standard MIB-II and a proprietary Service Control Enterprise MIB. This proprietary **pcube** MIB enables the external management system to perform configuration, performance, troubleshooting and alerting operations specific to the SCE Platform, and therefore not provided by the standard MIB.

Service Control Enterprise MIB

The Service Control Enterprise MIB splits into four main groups: Products, Modules, Management, and Workgroup. The Service Control enterprise tree structure is defined in a MIB file named *Pcube.mib*.

- The *pcubeProducts* sub-tree contains the sysObjectIDs of the Service Control products.

  Service Control product sysObjectIDs are defined in a MIB file named *Pcube-Products-MIB*

- The *pcubeModules* sub-tree provides a root object identifier from which MIB modules can be defined.
- The *pcubeMgmt* sub-tree contains the configuration copy MIB. (See “pcubeMgmt: pcubeConfigCopyMIB“.)
- The *pcubeWorkgroup* sub-tree contains the SCE MIB, which is the main MIB for the Service Control OS products. (See “pcubeWorkgroup“.)

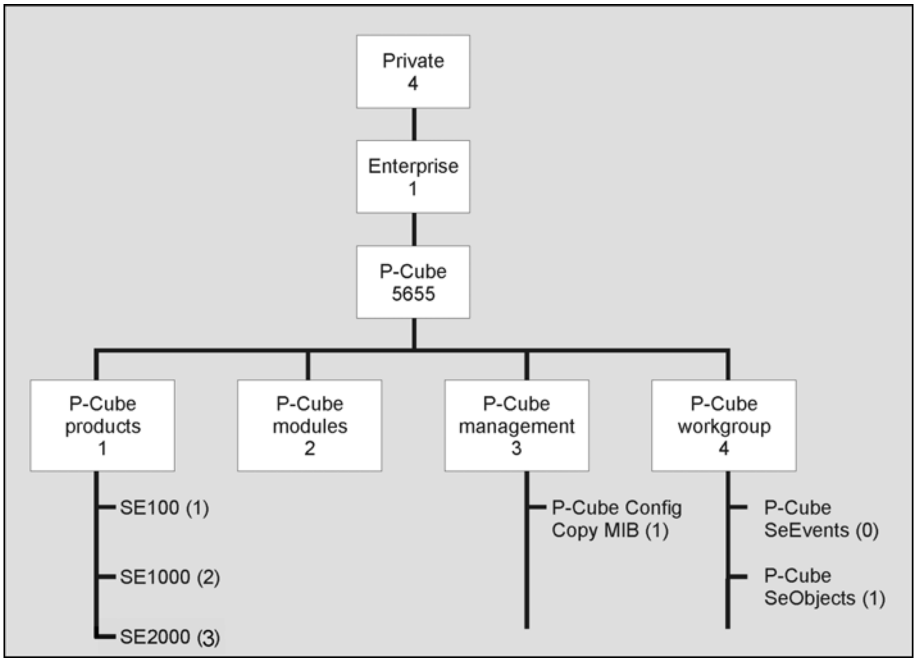
  The SCE MIB is divided into two main groups:

  - **pcubeSeEvents**
  - **pcubeSEObjs**

Note The following object identifier represents the Service Control Enterprise MIB: *1.3.6.1.4.1.5655*, or *iso.org.dod.internet.private.enterprise.pcube*.

The figure below, illustrates the Service Control Enterprise MIB structure.

Figure B-1: Service Control MIB Structure



Currently, the proprietary **pcube** MIB consists of two main sub-trees:

- The *`pcubeMgmt`* sub-tree: the *`pcubeConfigCopyMib`* enables saving the running configuration of Cisco products.
- The *`pcubeWorkgroup`* sub-tree: the *`pcubeSeMib`* provides a wide variety of configuration and runtime statistics.

Using this Reference

This reference is divided into sections according to the MIB object groups. For each object, the following information is presented:

DESCRIPTION Description of the object, including format and legal values, if applicable.

ACCESS Access control associated with the object:

- Read only (**RO**)
- Read/Write (**RW**)

SYNTAX The general format of the object.

pcubeMgmt: pcubeConfigCopyMIB

The configuration copy MIB supports only local copying of the running configuration to the startup configuration in order to save the current running configuration.

Cisco configuration copy is defined in a file called *`Pcube-Config-Copy-mib.mib`*.

Config-Copy MIB Objects

Following is a list of the Config-Copy MIB objects.

```
PcubeCopyIndex              {pcubeCopyEntry 1}
PcubeCopyEntryRowStatus  {pcubeCopyEntry 2}
pcubeCopySourceFileType {pcubeCopyEntry 3}
pcubeCopyDestFileType   {pcubeCopyEntry 4}
```

pcubeCopyIndex (pcubeCopyEntry 1)

Table index for multi asynchronous copy commands.

As the MIB does not support multiple commands in this release, the value of this index must be "1".

Access RW

SYNTAX

`INTEGER:` *`(1)`*

pcubeCopyEntryRowStatus (pcubeCopyEntry 2)

Triggers the actual copy operation.

The value must be *`"createAndGo".`*

Access RW

SYNTAX

`DisplayString`*`: (createAndGo)`*

pcubeCopySourceFileType (pcubeCopyEntry 3)

The source file type.

The value must be "*`runningConfig".`*

Access RW

SYNTAX

`ConfigFileType:` *`(runningConfig(2))`*

pcubeCopyDestFileType (pcubeCopyEntry 4)

The destination file type.

The value must be *`"startupConfig".`*

Access RW

SYNTAX

`ConfigFileType`*`: (startupConfig(1))`*

pcubeWorkgroup: pcubeSeMIB

The pcubeSeMIB is the main MIB for the Cisco OS products such as ***SCE 1000*** and ***SCE 1000***0. This MIB provides configuration and runtime status for chassis, control modules, and line modules on the Cisco OS systems.

pcubeSeMIB is defined in a file called *`Pcube-Se-mib.mib`*.

The **pcubeSeMIB** is divided into two main objects:

- **pcubeSeEvents** (**pcubeWorkgroup 0**)
- **pcubeSEObjs** (**pcubeWorkgroup 1**)

pcubeSeEvents (pcubeWorkgroup 0)

The SCE events are traps for critical asynchronous events.

SCE Events

Following is a list of the SCE events:

operationalStatusOperationalTrap	*{pcubeSeEvents 1}*
operationalStatusWarningTrap	*{pcubeSeEvents 2}*
operationalStatusFailureTrap	*{pcubeSeEvents 3}*
systemResetTrap	*{pcubeSeEvents 4}*
chassisTempAlarmOnTrap	*{pcubeSeEvents 5}*
chassisTempAlarmOffTrap	*{pcubeSeEvents 6}*
chassisVoltageAlarmOnTrap	*{pcubeSeEvents 7}*
chassisFansAlarmOnTrap	*{pcubeSeEvents 8}*
chassisPowerSupplyAlarmOnTrap	*{pcubeSeEvents 9}*
rdrActiveConnectionTrap	*{pcubeSeEvents 10}*
rdrNoActiveConnectionTrap	*{pcubeSeEvents 11}*
rdrConnectionUpTrap	*{pcubeSeEvents 12}*
rdrConnectionDownTrap	*{pcubeSeEvents 13}*
telnetSessionStartedTrap	*{pcubeSeEvents 14}*
telnetSessionEndedTrap	*{pcubeSeEvents 15}*
telnetSessionDeniedAccessTrap	*{pcubeSeEvents 16}*
telnetSessionBadLoginTrap	*{pcubeSeEvents 17}*
loggerUserLogIsFullTrap	*{pcubeSeEvents 18}*
sntpClockDriftWarnTrap	*{pcubeSeEvents 19}*
linkModeBypassTrap	*{pcubeSeEvents 20}*
linkModeForwardingTrap	*{pcubeSeEvents 21}*
linkModeCutoffTrap	*{pcubeSeEvents 22}*

pcubeSeEventGenericString1	*{cubeSeEvents 23}*
pcubeSeEventGenericString2	*{pcubeSeEvents 24}*
moduleAttackFilterActivatedTrap	*{pcubeSeEvents 25}*
moduleAttackFilterDeactivatedTrap	*{pcubeSeEvents 26}*
moduleEmAgentGenericTrap	*{pcubeSeEvents 27}*
linkModeSniffingTrap	*{pcubeSeEvents 28}*
moduleRedundancyReadyTrap	*{pcubeSeEvents 29}*
moduleRedundantConfigurationMismatchTrap	*{pcubeSeEvents 30}*
moduleLostRedundancyTrap	*{pcubeSeEvents 31}*
moduleSmConnectionDownTrap	*{pcubeSeEvents 32}*
moduleSmConnectionUpTrap	*{pcubeSeEvents 33}*
moduleOperStatusChangeTrap	*{pcubeSeEvents 34}*
portOperStatusChangeTrap	*{pcubeSeEvents 35}*
chassisLineFeedAlarmOnTrap	*{pcubeSeEvents 36}*

pcubeSEObjs (pcubeWorkgroup 1)

The SCE objects provide configuration and runtime status for the SCE Platform.

SCE-MIB Structure

Following is a summary of the structure of the SE-MIB. Note the table structure for objects that may have multiple entries, such as the RDR destination, or traffic processors.

systemGrp

sysOperationalStatus

sysFailureRecovery

sysVersion

chassisGrp

chassisSysType

chassisPowerSupplyAlarm

chassisFansAlarm

chassisTempAlarm

chassisVoltageAlarm

chassisNumSlots

chassisSlotConfig

chassisPsuType

chassisLineFeedAlarm

moduleGrp

moduleTable

moduleEntry

moduleIndex

moduleType

moduleNumTrafficProcessors

moduleSlotNum

moduleHwVersion

moduleNumPorts

moduleNumLinks

moduleConnectionMode

moduleSerialNumber

moduleUpStreamAttackFilteringTime

moduleUpStreamLastAttackFilteringTime

moduleDownStreamAttackFilteringTime

moduleDownStreamLastAttackFilteringTime

moduleAttackObjectsClearTime

moduleAdminStatus

moduleOperStatus

linkGrp

linkTable

linkEntry

linkModuleIndex

linkIndex

linkAdminModeOnActive

linkAdminModeOnFailure

linkOperMode

linkStatusReflectionEnable

linkSubscriberSidePortIndex

linkNetworkSidePortIndex

diskGrp

diskNumUsedBytes

diskNumFreeBytes

rdrFormatterGrp

rdrFormatterEnable

rdrFormatterDestTable

rdrFormatterDestEntry

rdrFormatterDestIPAddr

rdrFormatterDestPort

rdrFormatterDestPriority

rdrFormatterDestStatus

rdrFormatterDestConnectionStatus

rdrFormatterDestNumReportsSent

rdrFormatterDestNumReportsDiscarded

rdrFormatterDestReportRate

rdrFormatterDestReportRatePeak

rdrFormatterDestReportRatePeakTime

rdrFormatterNumReportsSent

rdrFormatterNumReportsDiscarded

rdrFormatterClearCountersTime

rdrFormatterReportRate

rdrFormatterReportRatePeak

rdrFormatterReportRatePeakTime

rdrFormatterProtocol

rdrFormatterForwardingMode

rdrFormatterCategoryTable

rdrFormatterCategoryEntry

rdrFormatterCategoryIndex

rdrFormatterCategoryName

rdrFormatterCategoryNumReportsSent

rdrFormatterCategoryNumReportsDiscarded

rdrFormatterCategoryReportRate

rdrFormatterCategoryReportRatePeak

rdrFormatterCategoryReportRatePeakTime

rdrFormatterCategoryDestTable

rdrFormatterCategoryDestEntry

rdrFormatterCategoryDestPriority

rdrFormatterCategoryDestStatus

loggerGrp

loggerUserLogEnable

loggerUserLogNumInfo

loggerUserLogNumWarning

loggerUserLogNumError

loggerUserLogNumFatal

loggerUserLogClearCountersTime

subscribersGrp

subscribersInfoTable

subscribersInfoEntry

subscribersNumIntroduced

subscribersNumFree

subscribersNumIpAddrMappings

subscribersNumIpAddrMappingsFree

subscribersNumIpRangeMappings

subscribersNumIpRangeMappingsFree

subscribersNumVlanMappings

subscribersNumVlanMappingsFree

subscribersNumActive

subscribersNumActivePeak

subscribersNumActivePeakTime

subscribersNumUpdates

subscribersCountersClearTime

subscribersPropertiesTable

  subscribersPropertiesEntry

spIndex

spName

spType

subscribersPropertiesValueTable

  subscribersPropertiesValueEntry

spvIndex

spvSubName

spvPropertyName

spvRowStatus

spvPropertyStringValue

spvPropertyUintValue

spvPropertyCounter

trafficProcessorGrp

tpInfoTable

  tpInfoEntry

tpModuleIndex

tpIndex

tpTotalNumHandledPackets

tpTotalNumHandledFlows

tpNumActiveFlows

tpNumActiveFlowsPeak

tpNumActiveFlowsPeakTime

tpNumTcpActiveFlows

tpNumTcpActiveFlowsPeak

tpNumTcpActiveFlowsPeakTime

tpNumUdpActiveFlows

tpNumUdpActiveFlowsPeak

tpNumUdpActiveFlowsPeakTime

tpNumNonTcpUdpActiveFlows

tpNumNonTcpUdpActiveFlowsPeak

tpNumNonTcpUdpActiveFlowsPeakTime

tpTotalNumBlockedPackets

tpTotalNumBlockedFlows

tpTotalNumDiscardedPacketsDueToBwLimit

tpTotalNumWredDiscardedPackets

tpTotalNumFragments

tpTotalNumNonIpPackets

tpTotalNumIpCrcErrPackets

tpTotalNumIpLengthErrPackets

tpTotalNumIpBroadcastPackets

tpTotalNumTtlErrPackets

tpTotalNumTcpUdpCrcErrPackets

tpClearCountersTime

tpHandledPacketsRate

tpHandledPacketsRatePeak

tpHandledPacketsRatePeakTime

tpHandledFlowsRate

tpHandledFlowsRatePeak

tpHandledFlowsRatePeakTime

tpCpuUtilization

tpCpuUtilizationPeak

tpCpuUtilizationPeakTime

tpFlowsCapacityUtilization

tpFlowsCapacityUtilizationPeak

tpFlowsCapacityUtilizationPeakTime

portGrp

portTable

portEntry

portModuleIndex

portIndex

portType

portNumTxQueues

portIfIndex

portAdminSpeed

portAdminDuplex

portOperDuplex

portLinkIndex

portOperStatus

txQueuesGrp

txQueuesTable

txQueuesEntry

txQueuesModuleIndex

txQueuesPortIndex

txQueuesQueueIndex

txQueuesDescription

txQueuesBandwidth

txQueuesUtilization

txQueuesUtilizationPeak

txQueuesUtilizationPeakTime

txQueuesClearCountersTime

globalControllersGrp

globalControllersTable

globalControllersEntry

globalControllersModuleIndex

globalControllersPortIndex

globalControllersIndex

globalControllersDescription

globalControllersBandwidth

globalControllersUtilization

globalControllersUtilizationPeak

globalControllersUtilizationPeakTime

globalControllersClearCountersTime

applicationGrp

appInfoTable

appInfoEntry

appName

appDescription

appVersion

appPropertiesTable

appPropertiesEntry

apIndex

apName

apType

appPropertiesValueTable

appPropertiesValueEntry

apvIndex

apvPropertyName

apvRowStatus

apvPropertyStringValue

apvPropertyUintValue

apvPropertyCounter

trafficCountersGrp

trafficCountersTable

trafficCountersEntry

trafficCounterIndex

trafficCounterValue

trafficCounterName

trafficCounterType

SCE Events: pcubeSeEvents

operationalStatusOperationalTrap (pcubeSeEvents 1)

The system operational state of the SCE Platform has changed to *Operational* (3).

operationalStatusWarningTrap (pcubeSeEvents 2)

The system operational state of the SCE Platform has changed to *Warning* (4).

operationalStatusFailureTrap (pcubeSeEvents 3)

The system operational state of the SCE Platform has changed to *Failure* (5).”

systemResetTrap (pcubeSeEvents 4)

The agent entity is about to reset itself either per user request or due to a fatal event.

chassisTempAlarmOnTrap (pcubeSeEvents 5)

The **chassisTempAlarm** object in this MIB has transitioned to the *On* (3) state, indicating that the temperature is too high.

chassisTempAlarmOffTrap (pcubeSeEvents 6)

The **chassisTempAlarm** object in this MIB has transitioned to the *Off* (2) state, indicating that the temperature level is back to normal.

chassisVoltageAlarmOnTrap (pcubeSeEvents 7)

The **chassisVoltageAlarm** object in this MIB has transitioned to the *On* (3) state, indicating that the voltage level is is out of safe bounds.

chassisFansAlarmOnTrap (pcubeSeEvents 8)

The **chassisFansAlarm** object in this MIB has transitioned to the *On* (3) state, indicating fan malfunction.

chassisPowerSupplyAlarmOnTrap (pcubeSeEvents 9)

The *chassisPowerSupplyAlarm* object in this MIB has transitioned to the *On* (3) state, indicating power supply malfunction.

rdrActiveConnectionTrap (pcubeSeEvents 10)

One of the RDR-formatter connections has become the active connection.

rdrNoActiveConnectionTrap (pcubeSeEvents 11)

There is no active connection between the RDR-formatter and any Collection Manager.

rdrConnectionUpTrap (pcubeSeEvents 12)

The **rdrFormatterDestConnectionStatus** object in this MIB has transitioned to *Up* (2), indicating that one of the RDR-formatter connections was established.

rdrConnectionDownTrap (pcubeSeEvents 13)

The **rdrFormatterDestConnectionStatus** object in this MIB has transitioned to *Down* (3), indicating that one of the RDR-formatter connections was disconnected.

telnetSessionStartedTrap (pcubeSeEvents 14)

The agent entity has accepted a new telnet session.

telnetSessionEndedTrap (pcubeSeEvents 15)

The agent entity has detected end of a telnet session.

telnetSessionDeniedAccessTrap (pcubeSeEvents 16)

The agent entity has refused a telnet access from an unauthorized source.

telnetSessionBadLoginTrap (pcubeSeEvents 17)

The agent entity has detected an attempt to login with a wrong password.

loggerUserLogIsFullTrap (pcubeSeEvents 18)

The User log file is full. The agent entity then rolls to the next file.

sntpClockDriftWarnTrap (pcubeSeEvents 19)

The SNTP agent has not received an SNTP time update for a long period, which may result in a time drift of the agent entity's clock.

linkModeBypassTrap (pcubeSeEvents 20)

The link mode has changed to bypass.

linkModeForwardingTrap (pcubeSeEvents 21)

The link mode has changed to forwarding.

linkModeCutoffTrap (pcubeSeEvents 22)

The link mode has changed to cutoff.

pcubeSeEventGenericString1 (pcubeSeEvents 23)

Temporary string used for traps.

pcubeSeEventGenericString2 (pcubeSeEvents 24)

Temporary string used for traps.

moduleAttackFilterActivatedTrap (pcubeSeEvents 25)

The attack filter module has detected an attack and activated a filter. The type of attack-filter that was activated is returned in pcubeSeEventGenericString1.

Following are several examples of pcubeSeEventGenericString1 for various scenarios:

- **Attack detected automatically** (the number of open flows or ddos-suspected flows has exceeded the maximum configured for the attack detector):

  - **Source of the attack is detected** (at the subscriber side, IP address = 10.1.4.134, attacking the network side using UDP., number of open flows = 10000, configured action is ‘report’):

    ```
    Attack detected: Attack from IP address 10.1.4.134, from
    subscriber side, protocol UDP. 10000 concurrent open flows
    detected, 57 concurrent Ddos-suspected flows detected.
    Action is: Report.
    ```

  - **Target of the attack is detected** (at the network side, IP address = 10.1.4.135, being attacked from the subscriber side using ICMP, number of ddos-suspected flows = 500, configured action is ‘block’):

    ```
    Attack detected: Attack on IP address 10.1.4.135, from
    subscriber side, protocol ICMP. 745 concurrent open flows
    detected, 500 concurrent Ddos-suspected flows detected.
    Action is: Block.
    ```

- **Forced filtering** using the ‘force-filter’ command:

  - Action is ‘block’, attack-direction is attack-source, side is subscriber, IP address = 10.1.1.1, and protocol is TCP:

    ```
    Attack filter: Forced block of flows from IP address
    10.1.1.1, from subscriber side, protocol TCP. Attack forced
    using a force-filter command.
    ```

  - When the action is ‘report’, attack-direction is attack-destination, side is subscriber, IP address = 10.1.1.1, and protocol is Other:

    ```
    Attack filter: Forced report to IP address 10.1.1.1, from
    network side, protocol Other. Attack forced using a force-
    filter command.
    ```

moduleAttackFilterDeactivatedTrap (pcubeSeEvents 26)

The attack filter module has removed a filter that was previously activated.

- Attack filter type: in pcubeSeEventGenericString1 (refer to corresponding moduleAttackFilterActivatedTrap)
- Reason for deactivating the filter: in pcubeSeEventGenericString2

Following are several examples of pcubeSeEventGenericString1 for various scenarios:

- **Attack end detected automatically** (the number of open flows or ddos-suspected flows drops below the minimum value configured for the attack detector):

  End-of-attack detected: Attack on IP address 10.1.4.135, from subscriber side, protocol UDP. Action is: Report. Duration 20 seconds, attack comprised of 11736 flows.

  End-of-attack detected: Attack from IP address 10.1.4.134, from subscriber side, protocol ICMP. Action is: Block. Duration 10 seconds, attack comprised of 2093 flows.

- **Attack end forced** by a ‘dont-filter’, or a previous ‘force-filter’ command is removed:

  Attack filter: Forced to end block of flows from IP address 10.1.1.1, from subscriber side, protocol TCP. Attack end forced using a 'no force-filter' or a 'dont-filter' command. Duration 6 seconds, 1 flows blocked.

Attack filter: Forced to end report to IP address 10.1.1.1, from network side, protocol Other. Attack end forced using a 'no force-filter' or a 'dont-filter' command. Duration 13 seconds, attack comprised of 1 flows.

moduleEmAgentGenericTrap (pcubeSeEvents 27)

A generic trap used by the Cisco EM agent.

- Trap name: in pcubeSeEventGenericString1 (refer to corresponding moduleAttackFilterActivatedTrap)
- Relevant parameter: in pcubeSeEventGenericString2

linkModeSniffingTrap (pcubeSeEvents 28)

The agent entity has detected that the **linkOperMode** object in this MIB has changed to sniffing(5).

moduleRedundancyReadyTrap (pcubeSeEvents 29)

The module was able to connect and synch with a redundant entity, and is now ready to handle fail-over if needed.

moduleRedundantConfigurationMismatchTrap (pcubeSeEvents 30)

The module was not able to synch with a redundant entity, due to an incompatibility in essential configuration parameters between the module and the redundant entity.

moduleLostRedundancyTrap (pcubeSeEvents 31)

The module has lost the ability to perform the fail-over procedure.

moduleSmConnectionDownTrap (pcubeSeEvents 32)

The virtual connection to the SM (smartSub Manager) is broken.

moduleSmConnectionUpTrap (pcubeSeEvents 33)

The virtual connection to the SM is up and working.

moduleOperStatusChangeTrap (pcubeSeEvents 34)

The value of **moduleOperStatus** has changed.

portOperStatusChangeTrap (pcubeSeEvents 35)

The value of the **portOperStatus** object of the **portIndex** has changed, indicating that the link was either forced down or the force down was released.

chassisLineFeedAlarmOnTrap (pcubeSeEvents 36)

The agent entity has detected that the **chassisLineFeed** object in this MIB has changed to the on(3) state.

System Group: systemGrp (pcubeSEObjs 1)

The System group provides data on the system-wide functionality of the SCE Platform.

sysOperationalStatus (systemGrp 1)

Indicates the operational status of the system.

Access RO

SYNTAX

`INTEGER` *{*

`1` *`(other):`* none of the following

`2` *`(boot):`* the system is in boot process

`3` *`(operational):`* the system is operational

`4` *`(warning):`* the system is in Warning status

`5` *`(failure):`* the system is in Failure status

}

sysFailureRecovery (systemGrp 2)

Indicates the behavior of the system after abnormal boot.

Access RO

SYNTAX

`INTEGER` *{*

`1` *`(other):`* none of the following

`2` *`(operational):`* the system should enter Operational mode after abnormal boot

`3` *`(non-operational):`* the system should enter Failure mode after abnormal boot

}

sysVersion (systemGrp 3)

The system version.

Access RO

SYNTAX

`DisplayString`

Chassis Group: chassisGrp (pcubeSEObjs 2)

The Chassis group defines and identifies the chassis, as well as environmental alarms related to the chassis.

ChassisSysType (chassisGrp 1)

The chassis system type.

Access RO

SYNTAX

INTEGER *{*

1 *(other):* none of the following

2 *(SE1000):* SE1000 platform

3 *(SE100):* SE100 platform

4 *(SE2000):* SE2000 platform

}

chassisPowerSupplyAlarm (chassisGrp 2)

Indicates whether the power supply to the chassis is normal. If the alarm is ‘on’, it means that one or more of the power supplies is not functional

Access RO

SYNTAX

INTEGER *{*

1 *(other):* none of the following

2 *(off):* the power supply to the chassis is normal

3 *(on):* the power supply to the chassis is not normal, and probably one or more of the power supplies is not functional.

}

chassisFansAlarm (chassisGrp 3)

Indicates whether all the fans on the chassis are functional.

Access RO

SYNTAX

`INTEGER` *{*

`1` *`(other):`* none of the following

`2` *`(off):`* all fans are functional

`3` *`(on):`* one or more fans is not functional.

}

chassisTempAlarm (chassisGrp 4)

Indicates the chassis temperature alarm status.

Access RO

SYNTAX

`INTEGER` *{*

`1` *`(other):`* none of the following

`2` *`(off):`* temperature is within acceptable range

`3` *`(on):`* temperature is too high.

}

chassisVoltageAlarm (chassisGrp 5)

Indicates the chassis internal voltage alarm status. If the alarm is ‘on’, it indicates that the voltage level of one or more unit in the chassis is not in the normal range.

Access RO

SYNTAX

`INTEGER` *{*

`1` *`(other):`* none of the following

`2` *`(off):`* voltage level is within normal range

`3` *`(on):`* voltage level is out of the acceptable bounds.

}

chassisNumSlots (chassisGrp 6)

Indicates the number of slots in the chassis available for plug-in modules, including both currently occupied and empty slots.

Access RO

SYNTAX

`INTEGER` *`(0..255)`*

chassisSlotConfig (chassisGrp 7)

An indication of which slots in the chassis are occupied.

This is an integer value with bits set to indicate configured modules. It is expressed as the function:

Sum of f(x) as x goes from 1 to the number of slots, where:

- no module inserted: f(x) = 0
- module inserted: f(x) = exp(2, x-1)

Access RO

SYNTAX

`INTEGER` *`(0..65535)`*

chassisPsuType (chassisGrp 8)

Indicates the type of the power supplies.

Access RO

SYNTAX

`INTEGER` *`{`*

`1` *`(other):`* none of the following

`2` *`(AC):`* AC power supply

`3` *`(DC):`* DC power supply

}

chassisLineFeedAlarm (chassisGrp 9)

Indicates whether the line feed to the chassis is connected and whether it is supplying power to the power supply unit.

Access RO

SYNTAX

`INTEGER` *{*

`1` *`(other):`* none of the following

`2` *`(OFF):`* The line feed to the chassis is connected and has power

`3` *`(ON):`* The line feed to the chassis is not normal. One or both of the line feeds may not be connected properly or have no power.

}

Module Group: moduleGrp (pcubeSEObjs 3)

The Module group identifies and defines the modules, or cards, in the SCE Platform.

moduleTable (moduleGrp 1)

A list of module entries containing information defining the modules in the chassis.

The number of entries is the number of modules in the chassis.

Access not-accessible

SYNTAX

`Sequence of moduleEntry`

moduleEntry (moduleTable 1)

Entry containing a number of parameters defining the physical characteristics of one module in the chassis.

Access not-accessible

INDEX

{moduleIndex}

SYNTAX

```
SEQUENCE {
moduleIndex
moduleType
moduleNumTrafficProcessors
moduleSlotNum
moduleHwVersion
moduleNumPorts
moduleNumLinks
moduleConnectionMode
moduleSerialNumber
moduleUpStreamAttackFilteringTime
moduleUpStreamLastAttackFilteringTime
moduleDownStreamAttackFilteringTime
moduleDownStreamLastAttackFilteringTime
moduleAttackObjectsClearTime
moduleAdminStatus
moduleOperStatus
}
```

moduleIndex (moduleEntry 1)

An ID number identifying the module. A unique value for each module within the chassis.

Access RO

SYNTAX

```
INTEGER (1..255)
```

moduleType (moduleEntry 2)

The type of module.

Access RO

SYNTAX

INTEGER *{*

1 *(other):* none of the following

2 *(gbe2Module):* 2 port Gigabit Ethernet line interface, 2 Fast Ethernet 10/100 management interfaces

3 *(fe2Module):* 2 port Fast Ethernet line interface, 1 Fast Ethernet 10/100 management interface

4 *(gbe4Module):* 4 port Gigabit Ethernet line interface, 2 Fast Ethernet 10/100 management interfaces

5 *(fe4Module):* 4 port Fast Ethernet line interface, 2 Fast Ethernet 10/100 management interfaces

6 *(oc12-4Module):* 4 port OC12 line interface, 2 Fast Ethernet 10/100 management interfaces

7 *(fe8Module):* 8 port Fast Ethernet line interface, 2 Fast Ethernet 10/100 management interfaces

}

moduleNumTrafficProcessors (moduleEntry 3)

The number of traffic processors supported by the module.

Access RO

SYNTAX

INTEGER *(0..255)*

moduleSlotNum (moduleEntry 4)

The number of the slot in the chassis in which the module is installed.

Valid entries are from 1 to the value of chassisNumSlots.

Access RO

SYNTAX

INTEGER *(1..255)*

moduleHwVersion (moduleEntry 5)

The hardware version of the module.

Access RO

SYNTAX

`DisplayString`

moduleNumPorts (moduleEntry 6)

The number of ports supported by the module.

Access RO

SYNTAX

`INTEGER` *`(0..255)`*

moduleNumLinks (moduleEntry 7)

The number of links carrying inband traffic that are supported by the module. The link is uniquely defined by the two ports that are at its endpoints.

Access RO

SYNTAX

`INTEGER` *`(0..255)`*

moduleConnectionMode (moduleEntry 8)

Indicates the connection mode of the module.

Access RO

SYNTAX

`INTEGER` *`{`*

`1` *`(other):`* none of the following

`2` *`(inline):`* SCE is both receiving and transmitting traffic on the line ports.

`3` *`(receive-only):`* SCE can only receive packets from the line ports. This mode is suitable for external splitting topology.

`4` *`(inline-cascade):`* SCE is both receiving and transmitting traffic on the line ports and the cascade ports.

`5` *`(receive-only-cascade):`* SCE can only receive packets from the line and the cascade ports. This mode is suitable for external splitting topology

moduleSerialNumber (moduleEntry 9)

The serial number of the module.

Access RO

SYNTAX

`DisplayString`

moduleUpStreamAttackFilteringTime (moduleEntry 10)

The accumulated time (in hundredths of a second) during which attack up-stream traffic was filtered.

Access RO

SYNTAX

`TimeTicks`

moduleUpStreamLastAttackFilteringTime (moduleEntry 11)

The time (in hundredths of a second) since the previous attack filtered in the up-stream traffic.

Access RO

SYNTAX

`TimeTicks`

moduleDownStreamAttackFilteringTime (moduleEntry 12)

The accumulated time (in hundredths of a second) during which attack down-stream traffic was filtered.

Access RO

SYNTAX

`TimeTicks`

moduleDownStreamLastAttackFilteringTime (moduleEntry 13)

The time (in hundredths of a second) since the previous attack filtered in the down-stream traffic.

Access RO

SYNTAX

`TimeTicks`

moduleAttackObjectsClearTime (moduleEntry 14)

The time (in hundredths of a second) since the attack objects were cleared. Writing a 0 to this object causes the counters to be cleared.

Access RO

SYNTAX

`TimeTicks`

moduleAdminStatus (moduleEntry 15)

Indicates whether the module is configured to handle traffic on startup or reboot (active), to be the hot standby.

Access RO

SYNTAX

`INTEGER` *{*

1 *`(other):`* none of the following

2 *`(primary):`* Handle traffic on startup.

3 *`(secondary):`* Fail-over module on startup.

}

moduleOperStatus (moduleEntry 16)

Indicates whether the module is currently handling (active), or is on standby.

Access RO

SYNTAX

`INTEGER` *{*

1 *`(other):`* none of the following

2 *`(active):`* Currently is handling traffic.

3 *`(standby):`* Currently is the fail-over module.

}

Link Group: linkGrp (pcubeSEObjs 4)

The Link group defines and identifies the link. It provides information regarding the mode of operation of the link defined for each status of the platform.

linkTable (linkGrp 1)

A list of link entries containing information regarding the configuration and status of the links that pass through the SCE and carry in-band traffic.

The number of entries is determined by the number of modules in the chassis and the number of links on each module.

Access not-accessible

SYNTAX

Sequence of linkEntry

linkEntry (linkTable 1)

Entry containing information about the Link.

Access not-accessible

INDEX

{linkModuleIndex, linkIndex}

SYNTAX

```
SEQUENCE {
linkModuleIndex
linkIndex
linkAdminModeOnActive
linkAdminModeOnFailure
linkOperMode
linkStatusReflectionEnable
linkSubscriberSidePortIndex
linkNetworkSidePortIndex
}
```

linkModuleIndex (linkEntry 1)

An index value (**moduleIndex**) that uniquely identifies the module where this link is located.

Access RO

SYNTAX

`INTEGER` *(1..255)*

linkIndex (linkEntry 2)

An index value that uniquely identifies the link within the specified module.

Valid entries are 1 to the value of **moduleNumLinks** for this module.

Access RO

SYNTAX

`INTEGER` *(1..255)*

linkAdminModeOnActive (linkEntry 3)

The desired mode of the link when the operating status of the module is active and it is not in boot or failure.

Possible values (*LinkModeType*):

- *Bypass*: the traffic is forwarded from one port to the other using an internal splitter.
- *Forwarding*: the traffic is forwarded by the internal hardware and software modules of the ***SCE 1000***.

Access RO

SYNTAX

LinkModeType

linkAdminModeOnFailure (linkEntry 4)

The desired mode of the link when the system status is failure.

Possible values (*LinkModeType*):

- *Bypass*: the traffic is forwarded from one port to the other using an internal splitter.
- *Cutoff*: all traffic is dropped by the SCE.

Access RO

SYNTAX

LinkModeType

linkOperMode (linkEntry 5)

The current operational mode of the link.

Possible values (*LinkModeType*):

- *Bypass*: the traffic is forwarded from one port to the other using an internal splitter with no processing taking place.
- *Forwarding*: the traffic is forwarded by the internal hardware and software modules of the SCE.
- *Sniffing*: the traffic is forwarded in the same manner as in Bypass mode, however it passes through and is analysed by the internal software and hardware modules of the SCE Platform.

Access RO

SYNTAX

LinkModeType

linkStatusReflectionEnable (linkEntry 6)

Indicates whether failure of the physical link on one interface should trigger the failure of the link on the other interface on the module.

Access RO

SYNTAX

INTEGER *{*

1 *(enabled)*

2 *(disabled)*

}

linkSubscriberSidePortIndex (linkEntry 7)

An index value that uniquely identifies this link with the related port that is connected to the subscriber side.

Access RO

SYNTAX

INTEGER *(0..255)*

linkSubscriberSidePortIndex (linkEntry 8)

An index value that uniquely identifies this link with the related port that is connected to the network side.

Access RO

SYNTAX

INTEGER *(0..255)*

Disk Group: diskGrp (pcubeSEObjs 5)

The Disk group provides data regarding the space utilization on the disk.

diskNumUsedBytes (diskGrp 1)

The number of used bytes on the disk.

Access RO

SYNTAX

Unsigned32 *(0...4294967295)*

diskNumFreeBytes (diskGrp 2)

The number of free bytes on the disk.

Access RO

SYNTAX

Unsigned32 *(0...4294967295)*

RDR Formatter Group: rdrFormatterGrp (pcubeSEObjs 6)

The RDR Formatter provides information regarding RDR Formatter destinations (Collection Managers), as well as RDR statistics.

rdrFormatterEnable (rdrFormatterGrp 1)

Indicates whether the RDR-formatter is enabled or disabled.

When the RDR-formatter is enabled, it sends the reports it gets from the traffic processors to the Collection Manager as defined in the rdrFormatterDestTable.

Access RO

SYNTAX

INTEGER *{*

1 *(enabled)*

2 *(disabled)*

}

rdrFormatterDestTable (rdrFormatterGrp 2)

This table lists the addresses of Collection Managers.

If the RDR-formatter is enabled, the destination with the highest priority to which a TCP connection can be established is designated as the active connection, and would receive the reports generated by the traffic processors.

The table may contain a maximum of three entries.

Access not-accessible

SYNTAX

Sequence of rdrFormatterDestEntry

rdrFormatterDestEntry (rdrFormatterDestTable 1)

Entry defining one RDR destination.

Access not-accessible

INDEX

{ rdrFormatterDestIPAddr, rdrFormatterDestPort }

SYNTAX

```
SEQUENCE {
rdrFormatterDestIPAddr
rdrFormatterDestPort
rdrFormatterDestPriority
rdrFormatterDestStatus
rdrFormatterDestConnectionStatus
rdrFormatterDestNumReportsSent
rdrFormatterDestNumReportsDiscarded
rdrFormatterDestReportRate
rdrFormatterDestReportRatePeak
rdrFormatterDestReportRatePeakTime
}
```

rdrFormatterDestIPAddr (rdrFormatterDestEntry 1)

The IP address of a Collection Manager.

Access RO

SYNTAX

IP Address

rdrFormatterDestPort (rdrFormatterDestEntry 2)

The TCP port on which the Collection Manager listens and the to which the RDR-Formatter should connect.

Access RO

SYNTAX

INTEGER *(1...65535)*

rdrFormatterDestPriority (rdrFormatterDestEntry 3)

The priority given to the Collection Manager. The active Collection Manager is the Collection Manager with the highest priority whose TCP connection is up.

Access RO

SYNTAX

INTEGER *(1...100)*

rdrFormatterDestStatus (rdrFormatterDestEntry 4)

Indicates whether this destination is the active one.

In redundancy and simple-load-balancing modes there can be only one ‘active’ destination, which is the one to which the reports are sent. In multicast mode all destinations receive the active mode.

Access RO

SYNTAX

INTEGER *{*

1 *(other):* none of the following

2 *(active):* this destination is where the reports are sent

3 *(standby):* this destination is a backup

}

rdrFormatterDestConnectionStatus (rdrFormatterDestEntry 5)

The status of TCP connection to this destination.

Access RO

SYNTAX

INTEGER *{*

1 *(other):* none of the following

2 *(up):* the TCP connection to this destination is up

3 *(down):* the TCP connection to this destination is down

}

rdrFormatterDestNumReportsSent (rdrFormatterDestEntry 6)

The number of reports sent by the RDR-formatter to this destination.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

rdrFormatterDestNumReportsDiscarded (rdrFormatterDestEntry 7)

The number of reports dropped by the RDR-formatter at this destination.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

rdrFormatterDestReportRate (rdrFormatterDestEntry 8)

The current rate (in reports per second) of sending reports to this destination.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

rdrFormatterDestReportRatePeak (rdrFormatterDestEntry 9)

The maximum rate of sending reports to this destination.

ACCESS **RO**

SYNTAX

`Unsigned32` *`(0...4294967295)`*

rdrFormatterDestReportRatePeakTime (rdrFormatterDestEntry 10)

The time (in hundredths of a second) since the **rdrFormatterDestReportRatePeak** value occurred.

Access RO

SYNTAX

`TimeTicks`

rdrFormatterNumReportsSent (rdrFormatterGrp 3)

The number of reports sent by the RDR-formatter.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

rdrFormatterNumReportsDiscarded (rdrFormatterGrp 4)

The number of reports dropped by the RDR-formatter.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

rdrFormatterClearCountersTime (rdrFormatterGrp 5)

The time (in hundredths of a second) since the RDR-formatter counters were last cleared. Writing a 0 to this object causes the RDR-formatter counters to be cleared.

Access RW

SYNTAX

`TimeTicks`

rdrFormatterReportRate (rdrFormatterGrp 6)

The current rate (in reports per second) of sending reports to all destinations.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

rdrFormatterReportRatePeak (rdrFormatterGrp 7)

The maximum rate of sending reports to all destinations.

ACCESS **RO**

SYNTAX

`Unsigned32` *`(0...4294967295)`*

rdrFormatterReportRatePeakTime (rdrFormatterGrp 8)

The time (in hundredths of a second) since the **rdrFormatterReportRatePeak** value occurred.

Access RO

SYNTAX

`TimeTicks`

rdrFormatterProtocol (rdrFormatterGrp 9)

The RDR protocol currently in use.

Access RO

SYNTAX

`INTEGER` *{*

`1` *`(other):`* none of the following

`2` *`(RDRv1):`* `RDR protocol version 1`

`3` *`(RDRv2):`* `RDR protocol version 2`

}

rdrFormatterForwardingMode (rdrFormatterGrp 10)

The manner in which the RDR formatter sends the reports to the destinations.

Access RO

SYNTAX

`INTEGER` *{*

`1` *`(other):`* none of the following

`2` *`(redundancy):`* `all RDRs are sent to the primary (active) destination, and all other destinations are in standby`

`3` *`(simpleLoadBalancing):`* `each successive RDR is sent to a different destination, one destination after the other, in a round robin manner`

`4` *`(multicast):`* `all RDRs are sent to all destinations`

}

rdrFormatterCategoryTable (rdrFormatterGrp 11)

This table describes the different categories of RDRs and supplies some statistical information about the RDRs sent to these categories

Access not-accessible

SYNTAX

`Sequence of rdrFormatterCategoryEntry`

rdrFormatterCategoryEntry (rdrFormatterCategoryTable 1)

Entry containing information about the RDR formatter categories.

Access not-accessible

INDEX

{rdrFormatterCategoryIndex}

SYNTAX

```
SEQUENCE {
rdrFormatterCategoryIndex
rdrFormatterCategoryName
rdrFormatterCategoryNumReportsSent
rdrFormatterCategoryNumReportsDiscarded
rdrFormatterCategoryReportRate
rdrFormatterCategoryReportRatePeak
rdrFormatterCategoryReportRatePeakTime
rdrFormatterCategoryNumReportsQueued
}
```

rdrFormatterCategoryIndex (rdrFormatterCategoryEntry 1)

The RDR formatter category number.

Access RO

SYNTAX

`INTEGER` *`(1..4)`*

rdrFormatterCategoryName (rdrFormatterCategoryEntry 2)

The name of the category.

Access RO

SYNTAX

`DisplayString`

rdrFormatterCategoryNumReportsSent (rdrFormatterCategoryEntry 3)

The number of reports sent by the RDR-formatter to this category.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

rdrFormatterCategoryNumReportsDiscarded (rdrFormatterCategoryEntry 4)

The number of reports dropped by the RDR formatter for this category.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

rdrFormatterCategoryReportRate (rdrFormatterCategoryEntry 5)

The rate of the reports (in reports per second) currently sent to this category.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

rdrFormatterCategoryReportRatePeak (rdrFormatterCategoryEntry 6)

The maximum report rate sent to this category.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

rdrFormatterCategoryReportRatePeakTime (rdrFormatterCategoryEntry 7)

The time (in hundredths of a second) since the **rdrFormatterCategoryReportRatePeak** value occurred.

Access RO

SYNTAX

`TimeTicks`

rdrFormatterCategoryDestTable (rdrFormatterGrp 12)

This table describes the partition of the RDR destinations between the different categories and the priority and status of each destination in each category

Access not-accessible

SYNTAX

`Sequence of rdrFormatterCategoryDestEntry`

rdrFormatterCategoryDestEntry (rdrFormatterCategoryDestTable 1)

A destination table entry.

Access not-accessible

INDEX

{rdrFormatterCategoryIndex, rdrFormatterDestIPAddr, rdrFormatterDestPort}

SYNTAX

```
SEQUENCE {
rdrFormatterCategoryDestPriority
rdrFormatterCategoryDestStatus
}
```

rdrFormatterCategoryDestPriority (rdrFormatterCategoryDestEntry 1)

The priority assigned to the Collection Manager for this category.

The active Collection Manager is the Collection Manager with the highest priority and a TCP connection that is up.

Access RO

SYNTAX

```
INTEGER (1...100)
```

rdrFormatterCategoryDestStatus (rFormatterCategoryDestEntry 2)

Indicates whether the destination is currently active or standby.

In redundancy and in simple Load Balancing **rdrFormatterForwardingMode** there can be only one active destination, which is where the reports are currently being sent. In multicast mode, all destinations will be assigned the active(2) status

Access RO

SYNTAX

INTEGER {

1 (other): none of the following

2 (active): this is the destination to which reports are currently being sent

3 (standby): this destination is a backup

}

Logger Group: loggerGrp (pcubeSEObjs 7)

The Logger group is responsible for logging the system synchronous and asynchronous events.

loggerUserLogEnable (loggerGrp 1)

Indicates whether the logging of user information is enabled or disabled.

Access RO

SYNTAX

`INTEGER` *{*

`1` *`(enabled)`*

`2` *`(disabled)`*

}

loggerUserLogNumInfo (loggerGrp 2)

The number of Info messages logged into the user log file since last reboot or last time the counter was cleared

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

loggerUserLogNumWarning (loggerGrp 3)

The number of **Warning** messages logged into the user log file since last reboot or last time the counter was cleared.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

loggerUserLogNumError (loggerGrp 4)

The number of **Error** messages logged into the user log file since last reboot or last time the counter was cleared.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

loggerUserLogNumFatal (loggerGrp 5)

The number of **Fatal** messages logged into the user log file since last reboot or last time the counter was cleared

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

loggerUserLogClearCountersTime (loggerGrp 6)

The time (in hundredths of a second) since user log counters were last cleared.

Writing a 0 to this object causes the user log counters to be cleared.

Access RW

SYNTAX

`TimeTicks`

Subscribers Group: subscribersGrp (pcubeSEObjs 8)

The Subscribers group provides statistics concerning the number of subscribers and subscriber mappings. It also provides data on the subscriber properties and the value of those properties for a specified subscriber.

subscribersInfoTable (subscribersGrp 2)

Data regarding subscriber management operations performed.

Access not-accessible

SYNTAX

Sequence of subscribersInfoEntry

subscribersInfoEntry (subscribersInfoTable 1)

Entry describing the subscriber management operations performed on a certain module.

Access not-accessible

INDEX

{moduleIndex}

SYNTAX

SEQUENCE {

subscribersNumIntroduced

subscribersNumFree

subscribersNumIpAddrMappings

subscribersNumIpAddrMappingsFree

subscribersNumIpRangeMappings

subscribersNumIpRangeMappingsFree

subscribersNumVlanMappings

subscribersNumVlanMappingsFree

subscribersNumActive

subscribersNumActivePeak

subscribersNumActivePeakTime

subscribersNumUpdates

subscribersCountersClearTime

}

subscribersNumIntroduced (subscribersInfoEntry 1)

The current number of subscribers introduced to the SCE. These subscribers may or may not have IP address or VLAN mappings. Subscribers who do not have mappings of any kind cannot be associated with traffic, and will be served by the SCE according to the default settings.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

subscribersNumFree (subscribersInfoEntry 2)

The number of subscribers that may be introduced in addition to the currently introduced subscribers.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

subscribersNumIpAddrMappings (subscribersInfoEntry 3)

The current number of IP address to subscriber mappings.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

subscribersNumIpAddrMappingsFree (subscribersInfoEntry 4)

The number of free IP address to subscriber mappings that are available for defining new mappings.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

subscribersNumIpRangeMappings (subscribersInfoEntry 5)

The current number of IP-range to subscriber mappings.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

subscribersNumIpRangeMappingsFree (subscribersInfoEntry 6)

The number of free IP range to subscriber mappings that are available for defining new mappings.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

subscribersNumVlanMappings (subscribersInfoEntry 7)

The current number of VLAN to subscriber mappings

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

subscribersNumVlanMappingsFree (subscribersInfoEntry 8)

The number of free VLAN to subscriber mappings that are available for defining new mappings.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

subscribersNumActive (subscribersInfoEntry 9)

The current number of active subscribers. These subscribers necessarily have IP address or VLAN mappings that define the traffic to be served according to the subscriber service agreement.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

subscribersNumActivePeak (subscribersInfoEntry 10)

The peak value of **subscribersNumActive** since the last time it was cleared or the system started.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

subscribersNumActivePeakTime (subscribersInfoEntry 11)

The time (in hundredths of a second) since the s**ubscribersNumActivePeak** value occurred.

Access RO

SYNTAX

`TimeTicks`

subscribersNumUpdates (subscribersInfoEntry 12)

The accumulated number of subscribers database updates received by the SCE.

Access RO

SYNTAX

Unsigned32 *(0...4294967295)*

subscribersCountersClearTime (subscribersInfoEntry 13)

The time (in hundredths of a second) since the subscribers counters were cleared.

Writing a 0 to this object causes the counters to be cleared.

Access RW

SYNTAX

TimeTicks

subscribersPropertiesTable (subscribersGrp 2)

List of all subscriber properties. This table is updated each time an application is loaded on the SCE Platform.

Access not-accessible

SYNTAX

Sequence of subscribersPropertiesEntry

subscribersPropertiesEntry (subscribersPropertiesTable 1)

Entry describing subscriber properties of the application relevant for a certain module.

Access not-accessible

INDEX

{moduleIndex, spIndex}

SYNTAX

SEQUENCE *{*

spIndex

spName

spType

}

spIndex (subscribersPropertiesEntry 1)

An index value that uniquely identifies the subscriber property.

Access RO

SYNTAX

`INTEGER` *`(1..255)`*

spName (subscribersPropertiesEntry 2)

Name of the subscriber property.

Access RO

SYNTAX

`DisplayString`

spType (subscribersPropertiesEntry 3)

Property type in respect to: variable type (integer, boolean, string etc), number of elements (scalar or array), and restrictions, if any.

Access RO

SYNTAX

`DisplayString`

subscriberPropertiesValuesTable (subscribersGrp 3)

The subscriber properties value table is used to provide values for the subscriber properties for a specific subscriber introduced into the SCE Platform.

An entry must be created by setting the entry spvRowStatus object with CreateAndGo (4) before setting the name of the subscriber and the property requested. The property requested must be one of the properties from the subscribersPropertiesTable. To remove an entry set the spvRowStatus object with Destroy (6).

To poll the subscriber property, either of these objects should be polled:

- spvPropertyStringValue
- spvPropertyUnitValue

The table is cleared when the application is unloaded.

Access not-accessible

SYNTAX

`Sequence of subscribersPropertiesValueEntry`

subscriberPropertiesValueEntry (subscriberPropertiesValueTable 1)

Entry providing information on the value of one of the specified subscriber properties.

Access not-accessible

INDEX

{moduleIndex, spvIndex}

SYNTAX

SEQUENCE *{*

SpvIndex

spvSubName

spvPropertyName

spvRowStatus

spvPropertyStringValue

spvPropertyUintValue

spvPropertyCounter64Value

}

spvIndex (subscriberPropertiesValueEntry 1)

An index value that uniquely identifies the entry.

Access RO

SYNTAX

INTEGER *(1.. 1024)*

spvSubName (subscriberPropertiesValueEntry 2)

A name that uniquely identifies the subscriber.

Access RC

SYNTAX

DisplayString *(Size 1...40)*

spvPropertyName (subscriberPropertiesValueEntry 3)

A name that uniquely identifies the subscriber property.

Array-type properties may be accessed one element at a time in C-like format. (For example: x[1], or y[1][2])

Access RC

SYNTAX

DisplayString *(Size 1...128)*

spvRowStatus (subscriberPropertiesValueEntry 4)

Controls creation of a table entry. Only setting CreateAndGo (4) and Destroy (6) will change the status of the entry.

Access RC

SYNTAX

`RowStatus`

spvPropertyStringValue (subscriberPropertiesValueEntry 5)

The value of the subscriber property in display string format.

Access RO

SYNTAX

`DisplayString` *`(SIZE 0...128)`*

spvPropertyUintValue (subscriberPropertiesValueEntry 6)

The value of the subscriber property in Uint format.

If the property cannot be cast to Uint format, getting this object returns zero.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

spvPropertyCounter64Value (subscriberPropertiesValueEntry 7)

The value of the subscriber property in Counter64 format.

If the property cannot be cast to Counter64 format, getting this object returns zero.

Access RO

SYNTAX

`Counter64`

Traffic Processor Group: trafficProcessorGrp (pcubeSEObjs 9)

The Traffic Processor group provides statistics regarding the traffic flow handled by each traffic processor.

tpInfoTable (trafficProcessorGrp 1)

The Traffic Processor Info table consists of data regarding traffic handled by the traffic processors, classified by packets and flows.

Access not-accessible

SYNTAX

Sequence of TpInfoEntry

tpInfoEntry (tpInfoTable)

Entry containing information from the traffic processors.

Access not-accessible

INDEX

{ tpModuleIndex, tpIndex }

SYNTAX

SEQUENCE *{*

tpModuleIndex

tpIndex

tpTotalNumHandledPackets

tpTotalNumHandledFlows

tpNumActiveFlows

tpNumActiveFlowsPeak

tpNumActiveFlowsPeakTime

tpNumTcpActiveFlows

tpNumTcpActiveFlowsPeak

tpNumTcpActiveFlowsPeakTime

tpNumUdpActiveFlows

tpNumUdpActiveFlowsPeak

tpNumUdpActiveFlowsPeakTime

tpNumNonTcpUdpActiveFlows

tpNumNonTcpUdpActiveFlowsPeak

tpNumNonTcpUdpActiveFlowsPeakTime

```
tpTotalNumBlockedPackets
tpTotalNumBlockedFlows
tpTotalNumDiscardedPacketsDueToBwLimit
tpTotalNumWredDiscardedPackets
tpTotalNumFragments
tpTotalNumNonIpPackets
tpTotalNumIpCrcErrPackets
tpTotalNumIpLengthErrPackets
tpTotalNumIpBroadcastPackets
tpTotalNumTtlErrPackets
tpTotalNumTcpUdpCrcErrPackets
tpClearCountersTime
tpHandledPacketsRate
tpHandledPacketsRatePeak
tpHandledPacketsRatePeakTime
tpHandledFlowsRate
tpHandledFlowsRatePeak
tpHandledFlowsRatePeakTime
tpCpuUtilization
tpCpuUtilizationPeak
tpCpuUtilizationPeakTime
tpFlowsCapacityUtilization
tpFlowsCapacityUtilizationPeak
tpFlowsCapacityUtilizationPeakTime
}
```

tpModuleIndex (tpInfoEntry 1)

An index value (**moduleIndex**) that uniquely identifies the module in which this traffic processor is located.

Access RO

SYNTAX

INTEGER *(1...255)*

tpIndex (tpInfoEntry 2)

An index value that uniquely identifies the traffic processor within the specified module. The value is determined by the location of the traffic processor on the module.

Valid entries are 1 to the value of **moduleNumTrafficProcessors** for the specified module.

Access RO

SYNTAX

`INTEGER` *`(1...255)`*

tpTotalNumHandledPackets (tpInfoEntry 3)

The accumulated number of packets handled by this traffic processor since last reboot or last time this counter was cleared.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpTotalNumHandledFlows (tpInfoEntry 4)

The accumulated number of flows handled by this traffic processor since last reboot or last time this counter was cleared.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpNumActiveFlows (tpInfoEntry 5)

The number of flows currently being handled by this traffic processor.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpNumActiveFlowsPeak (tpInfoEntry 6)

The peak value of **tpNumActiveFlows** since the last time it was cleared or the system started.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpNumActiveFlowsPeakTime (tpInfoEntry 7)

The time (in hundredths of a second) since the **tpNumActiveFlowsPeak** value occurred.

Access RO

SYNTAX

`TimeTicks`

tpNumTcpActiveFlows (tpInfoEntry 8)

The number of TCP flows currently being handled by this traffic processor

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

TpNumTcpActiveFlowsPeak (tpInfoEntry 9)

The peak value of **tpNumTcpActiveFlows** since the last time it was cleared or the system started.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpNumTcpActiveFlowsPeakTime (tpInfoEntry 10)

The time (in hundredths of a second) since the **tpNumTcpActiveFlowsPeak** value occurred.

Access RO

SYNTAX

`TimeTicks`

tpNumUdpActiveFlows (tpInfoEntry 11)

The number of UDP flows currently being handled by the traffic processor.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpNumUdpActiveFlowsPeak (tpInfoEntry 12)

The peak value of **tpNumUdpActiveFlows** since the last time it was cleared or the system started.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpNumUdpActiveFlowsPeakTime (tpInfoEntry 13)

The time (in hundredths of a second) since the **tpNumUdpActiveFlowsPeak** value occurred.

Access RO

SYNTAX

`TimeTicks`

tpNumNonTcpUdpActiveFlows (tpInfoEntry 14)

The number of non TCP/UDP flows currently being handled by the traffic processor.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpNumNonTcpUdpActiveFlowsPeak (tpInfoEntry 15)

The peak value of **tpNumNonTcpUdpActiveFlows** since the last time it was cleared or the system started.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpNumNonTcpUdpActiveFlowsPeakTime (tpInfoEntry 16)

The time (in hundredths of a second) since the **tpNumNonTcpUdpActiveFlowsPeak** value occurred.

Access RO

SYNTAX

`TimeTicks`

tpTotalNumBlockedPackets (tpInfoEntry 17)

The accumulated number of packets discarded by the traffic processor according to application blocking rules.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpTotalNumBlockedFlows (tpInfoEntry 18)

The accumulated number of flows discarded by the traffic processor according to application blocking rules.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpTotalNumDiscardedPacketsDueToBwLimit (tpInfoEntry 19)

The accumulated number of packets discarded by the traffic processor due to subscriber bandwidth limitations.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpTotalNumWredDiscardedPackets (tpInfoEntry 20)

The accumulated number of packets discarded by the traffic processor due to congestion in the queues.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpTotalNumFragments (tpInfoEntry 21)

The accumulated number of fragmented packets handled by the traffic processor.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpTotalNumNonIpPackets (tpInfoEntry 22)

The accumulated number of non IP packets handled by the traffic processor.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpTotalNumIpCrcErrPackets (tpInfoEntry 23)

The accumulated number of packets with IP CRC error handled by the traffic processor.

Access RO

SYNTAX

Unsigned32 *(0...4294967295)*

tpTotalNumIpLengthErrPackets (tpInfoEntry 24)

The accumulated number of packets with IP length error handled by the traffic processor.

Access RO

SYNTAX

Unsigned32 *(0...4294967295)*

tpTotalNumIpBroadcastPackets (tpInfoEntry 25)

The accumulated number of IP broadcast packets handled by the traffic processor.

Access RO

SYNTAX

Unsigned32 *(0...4294967295)*

tpTotalNumTtlErrPackets (tpInfoEntry 26)

The accumulated number of packets with TTL error handled by the traffic processor.

Access RO

SYNTAX

Unsigned32 *(0...4294967295)*

tpTotalNumTcpUdpCrcErrPackets (tpInfoEntry 27)

The accumulated number of TCP/UDP packets with CRC error handled by the traffic processor.

Access RO

SYNTAX

Unsigned32 *(0...4294967295)*

tpClearCountersTime (tpInfoEntry 28)

The time (in hundredths of a second) since the traffic processor statistics counters were last cleared. Writing a 0 to this object causes the RDR-formatter counters to be cleared.

Access RW

SYNTAX

TimeTicks

tpHandledPacketsRate (tpInfoEntry 29)

The rate in packets per second of the packets handled by this traffic processor..

Access RO

SYNTAX

`Unsigned32` *`(0... 4294967295)`*

tpHandledPacketsRatePeak (tpInfoEntry 30)

The peak value of **tpHandledPacketsRate** since the last time it was cleared or the system started.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpHandledPacketsRatePeakTime (tpInfoEntry 31)

the time (in hundredths of a second) since the **tpHandledPacketsRatePeak** value occurred.

Access RO

SYNTAX

`TimeTicks`

tpHandledFlowsRate (tpInfoEntry 32)

The rate in flows start per second of the flows handled by this traffic processor.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpHandledFlowsRatePeak (tpInfoEntry 33)

The peak value of **tpHandledFlowsRate** since the last time it was cleared or the system started.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

tpHandledFlowsRatePeakTime (tpInfoEntry 34)

the time (in hundredths of a second) since the **tpHandledFlowsRatePeak** value occurred.

Access RO

SYNTAX

`TimeTicks`

tpCpuUtilization (tpInfoEntry 35)

The current percentage of CPU utilization

Access RO

SYNTAX

INTEGER *(1..100)*

tpCpuUtilizationPeak (tpInfoEntry 36)

The peak value of t**pCpuUtilization** since the last time it was cleared or the system started.

Access RO

SYNTAX

INTEGER *(1..100)*

tpCpuUtilizationPeakTime (tpInfoEntry 37)

The time (in hundredths of a second) since the **pCpuUtilizationPeak** value occurred.

Access RO

SYNTAX

TimeTicks

tpFlowsCapacityUtilization (tpInfoEntry 38)

The percentage of flows capacity utilization.

Access RO

SYNTAX

INTEGER *(1..100)*

tpFlowsCapacityUtilizationPeak (tpInfoEntry 39)

The peak value of tpFlowsCapacityUtilization since the last time it was cleared or the system started.

Access RO

SYNTAX

INTEGER *(1..100)*

tpFlowsCapacityUtilizationPeakTime (tpInfoEntry 40)

The time (in hundredths of a second) since the t**pFlowsCapacityUtilizationPeak** value occurred.

Access RO

SYNTAX

`TimeTicks`

Port Group: portGrp (pcubeSEObjs 10)

The Port group provides data regarding the port, such as its type and speed.

portTable (portGrp 1)

A list of port entries.

The number of entries is determined by the number of modules in the chassis and the number of ports on each module.

Access not-accessible

SYNTAX

Sequence of portEntry

portEntry (portTable 1)

Entry containing information for a specified port on a module.

Access not-accessible

INDEX

{portModuleIndex, portIndex}

SYNTAX

```
SEQUENCE {
portModuleIndex
portIndex
portType
ortNumTxQueues
portIfIndex
portAdminSpeed
portAdminDuplex
portOperDuplex
portLinkIndex
portOperStatus
}
```

portModuleIndex (portEntry 1)

An index value (**moduleIndex**) that uniquely identifies the module where the port is located.

Access RO

SYNTAX

INTEGER *(1..255)*

portIndex (portEntry 2)

An index value that uniquely identifies the port within the specified module. The value is determined by the location of the port on the module.

Valid entries are 1 to the value of **moduleNumPorts** for this module.

Access RO

SYNTAX

INTEGER *(1..255)*

portType (portEntry 3)

The type of physical layer medium dependent interface on the port.

Access RO

SYNTAX

INTEGER *{*

1 *(other):* none of the following

11 *(e100BaseTX):* UTP Fast Ethernet (Cat 5)

28 *(e1000BaseSX):* Short Wave fiber Giga Ethernet

}

portNumTxQueues (portEntry 4)

The number of transmit queues supported by this port.

Access RO

SYNTAX

INTEGER *(1..255)*

portIfIndex (portEntry 5)

The value of the instance of the ifIndex object, defined in MIB-II, for this port.

Access RO

SYNTAX

INTEGER *(1..255)*

portAdminSpeed (portEntry 6)

The desired speed of the port. The current operational speed of the port can be determined from ifSpeed.

Access RO

SYNTAX

INTEGER *{*

1 *(autoNegotiation):*

10000000 *(s10000000):* 10 Mbps

100000000 *(s100000000):* 100 Mbps

1000000000 *(s1000000000):* 1 Gbps

}

portAdminDuplex (portEntry 7)

The desired duplex of the port.

Access RO

SYNTAX

INTEGER *{*

1 *(half)*

2 *(full)*

4 *(auto)*

}

portOperDuplex (portEntry 8)

Indicates whether the port is operating in half-duplex or full-duplex.

Access RO

SYNTAX

INTEGER *{*

1 *(half)*

2 *(full)*

}

portLinkIndex (portEntry 9)

The **linkIndex** of the link to which this port belongs.

Value of 0 indicates that this port is not associated with any link.

Value of -1 indicates that this port is associated with multiple links.

Access RO

SYNTAX

`INTEGER` *`(-1..255)`*

portOperStatus (portEntry 10)

The status of the port. If the port is down, the reason is indicated.

Access RO

SYNTAX

`INTEGER` *`{`*

`1` *`(other):`* none of the following

`2` *`(up):`* the port is up

`3` *`(reflectionForcingDown):`* the port is currently forced down due to the link reflection mechanism

`4` *`(redundancyForcingDown):`* the port is currently forced down due to redundancy reasons

`5` *`(otherDown):`* the port is down due to other reasons

}

Transmit Queues Group: txQueuesGrp (pcubeSEObjs 11)

The Transmit Queues group provides data regarding the transmit queue counters.

txQueuesTable (txQueuesGrp 1)

A list of information for each SCE transmit queue.

Access not-accessible

SYNTAX

Sequence of txQueuesEntry

txQueuesEntry (txQueuesTable 1)

Entry containing information for a specified SCE transmit queue.

Access not-accessible

INDEX

{txQueuesModuleIndex, txQueuesPortIndex, txQueuesQueueIndex}

SYNTAX

```
SEQUENCE {
txQueuesModuleIndex
txQueuesPortIndex
txQueuesQueueIndex
txQueuesDescription
txQueuesBandwidth
txQueuesUtilization
txQueuesUtilizationPeak
txQueuesUtilizationPeakTime
}
```

txQueuesModuleIndex (txQueuesEntry 1)

An index value (**moduleIndex**) that uniquely identifies the module where the queue is located.

Access RO

SYNTAX

INTEGER *(1..255)*

txQueuesPortIndex (txQueuesEntry 2)

An index value that uniquely identifies the port on which the queue is located.

Access RO

SYNTAX

`INTEGER` *`(1..255)`*

txQueuesQueueIndex (txQueuesEntry 3)

An index value that uniquely identifies the queue within the specified port. The value is determined by the location of the queue on the port.

Valid entries are 1 to the value of **portNumTxQueues** for the specified port.

Access RO

SYNTAX

`INTEGER` *`(1..255)`*

txQueuesDescription (txQueuesEntry 4)

Description of the transmit queue.

Access RO

SYNTAX

`DisplayString`

txQueuesBandwidth (txQueuesEntry 5)

The bandwidth in kbps configured for this queue.

Access RO

SYNTAX

`INTEGER` *`(1...1000000)`*

txQueuesUtilization (txQueuesEntry 6)

The percentage of bandwidth utilization relative to the to the configured rate.

Access RO

SYNTAX

`INTEGER` *`(0...100)`*

txQueuesUtilizationPeak (txQueuesEntry 7)

The peak value of **txQueuesUtilization** since the last time it was cleared or the system started.

Access RO

SYNTAX

`INTEGER` *`(0...100)`*

txQueuesUtilizationPeakTime (txQueuesEntry 8)

The time (in hundredths of a second) since the **txQueuesUtilizationPeak** value occurred.

Access RO

SYNTAX

`TimeTicks`

txQueuesClearCountersTime (txQueuesEntry 9)

The time (in hundredths of a second) since the transmit queues statistics counters were last cleared.

Writing a 0 to this object causes the transmit queues counters to be cleared.

Access RW

SYNTAX

`TimeTicks`

Global Controllers Group: globalControllersGrp (pcubeSEObjs 12)

The Global Controllers group provides data regarding the Global Controllers configuration and counters.

globalControllersTable (globalControllersGrp 1)

A list of information for each global controller.

Access not-accessible

SYNTAX

Sequence of globalControllersEntry

globalControllersEntry (globalControllersTable 1)

Entry containing information for a specified global controller.

Access not-accessible

INDEX

{globalControllersModuleIndex, globalControllersPortIndex, globalControllersIndex}

SYNTAX

```
SEQUENCE {
globalControllersModuleIndex
globalControllersPortIndex
globalControllersIndex
globalControllersDescription
globalControllersBandwidth
globalControllersUtilization
globalControllersUtilizationPeak
globalControllersUtilizationPeakTime
globalControllersClearCountersTime
}
```

globalControllersModuleIndex (globalControllersEntry 1)

An index value (**moduleIndex**) that uniquely identifies the module where the Global Controller is located.

Access RO

SYNTAX

```
INTEGER (1..255)
```

globalControllersPortIndex (globalControllersEntry 2)

An index value that uniquely identifies the port on which the Global Controller is located.

Access RO

SYNTAX

`INTEGER` *`(1..255)`*

globalControllersIndex (globalControllersEntry 3)

An index value that uniquely identifies this Global Controller within the specified port.

Access RO

SYNTAX

`INTEGER` *`(1..255)`*

globalControllersDescription (globalControllersEntry 4)

Description of the Global Controller.

Access RO

SYNTAX

`DisplayString`

globalControllersBandwidth (globalControllersEntry 5)

The bandwidth in kbps configured for this Global Controller.

Access RO

SYNTAX

`INTEGER` *`(1...1000000)`*

globalControllersUtilization (globalControllersEntry 6)

The percentage of bandwidth utilization relative to the to the configured rate (**globalControllersBandwidth**).

Access RO

SYNTAX

`INTEGER` *`(0...100)`*

globalControllersUtilizationPeak (globalControllersEntry 7)

The peak value of **bwLimitersUtilization** since the last time it was cleared or the system started.

Access RO

SYNTAX

`INTEGER` *`(0...100)`*

globalControllersUtilizationPeakTime (globalControllersEntry 8)

The time (in hundredths of a second) since the **globalControllersUtilizationPeak** value occurred.

Access RO

SYNTAX

`TimeTicks`

globalControllersClearCountersTime (globalControllersEntry 9)

The time (in hundredths of a second) since the Global Controller statistics counters were last cleared.

Writing a 0 to this object causes the Global Controller counters to be cleared.

Access RW

SYNTAX

`TimeTicks`

Application Group: applicationGrp (pcubeSEObjs 13)

The Application group indicates which application is installed in the SCE Platform, and what the properties of the application and values of those properties are.

appInfoTable (applicationGrp 1)

Information identifying the application that is currently installed in the SCE Platform.

Access not-accessible

SYNTAX

Sequence of appInfoEntry

appInfoEntry (appInfoTable 1)

Entry containing identifying information for the application that is currently installed in the SCE Platform.

Access not-accessible

INDEX

{moduleIndex}

SYNTAX

```
SEQUENCE {
appName
appDescription
appVersion
}
```

appName (appInfoEntry 1)

Name of the application currently installed in the SCE Platform. This object returns an empty string if no application is currently installed.

Access RO

SYNTAX

DisplayString

appDescription (appInfoEntry 2)

Description of the application currently installed in the SCE Platform.

Access RO

SYNTAX

DisplayString

appVersion (appInfoEntry 3)

Version information for the application currently installed in the SCE Platform.

Access RO

SYNTAX

```
DisplayString
```

appPropertiesTable (applicationGrp 2)

List of all properties available for the application. The table is cleared when the application is unloaded.

Access not-accessible

SYNTAX

```
Sequence of appPropertiesEntry
```

appPropertiesEntry (appPropertiesTable 1)

Entry describing one of the properties available for the application.

Access not-accessible

INDEX

```
{moduleIndex, apIndex}
```

SYNTAX

```
SEQUENCE {
apIndex
apName
apType
}
```

apIndex (appPropertiesEntry 1)

An index value that uniquely identifies the property.

Access RO

SYNTAX

```
INTEGER (1..255)
```

apName (appPropertiesEntry 2)

Name of the property.

Access RO

SYNTAX

`DisplayString`

apType (appPropertiesEntry 3)

Property type in respect to: variable type (integer, boolean, string etc), number of elements (scalar or array), and restrictions, if any.

Access RO

SYNTAX

`DisplayString`

appPropertiesValuesTable (applicationGrp 3)

The applications properties value table is used to provide specific values for the applications properties.

An entry must be created by setting the entry apvRowStatus object with CreateAndGo (4) before setting the name of the property requested. The property requested must be one of the properties from the appPropertiesTable. To remove an entry set the apvRowStatus object with Destroy (6).

To poll the application property, any of these objects should be polled:

- apvPropertyValue
- apvPropertyUnitValue
- apvPropertyCounter64 object.

The table is cleared when the application is unloaded.

Access not-accessible

SYNTAX

`Sequence of appPropertiesValueEntry`

appPropertiesValueEntry (appPropertiesValueTable 1)

Entry providing information on the value of one of the specified application properties.

Access not-accessible

INDEX

{moduleIndex, apvIndex}

SYNTAX

SEQUENCE *{*

apvIndex

apvPropertyName

apvRowStatus

apvPropertyStringValue

apvPropertyUintValue

apvPropertyCounter64Value

}

apvIndex (appPropertiesValueEntry 1)

An index value that uniquely identifies the property.

Access RO

SYNTAX

INTEGER *(1.. 1024)*

apvPropertyName (appPropertiesValueEntry 2)

A name that uniquely identifies the application property.

Array-type properties may be accessed one element at a time in C-like format. (For example: x[1], or y[1][2])

Access RC

SYNTAX

DisplayString

apvRowStatus (appPropertiesValueEntry 3)

Controls creation of a table entry.

Access RC

SYNTAX

RowStatus

apvPropertyStringValue (appPropertiesValueEntry 4)

The value of the application property in display string format.

Access RO

SYNTAX

`DisplayString` *`(SIZE 0...128)`*

apvPropertyUintValue (appPropertiesValueEntry 5)

The value of the application property in Uint format.

If the property cannot be cast to Uint format, getting this object returns zero.

Access RO

SYNTAX

`Unsigned32` *`(0...4294967295)`*

apvPropertyCounter64Value (appPropertiesValueEntry 6)

The value of the application property in Counter64 format.

If the property cannot be cast to Counter64 format, getting this object returns zero.

Access RO

SYNTAX

`Counter64`

Traffic Counters Group: trafficCountersGrp (pcubeSEObjs 14)

The Traffic Counters group provides information regarding the value of different the traffic counters.

trafficCountersTable (trafficCountersGrp 1)

A list of information for each traffic counter.

Access not-accessible

SYNTAX

Sequence of trafficCountersEntry

trafficCountersEntry (trafficCountersTable 1)

Entry containing information for a specified traffic counter**.**

Access not-accessible

INDEX

{trafficCounterIndex}

SYNTAX

```
SEQUENCE {
trafficCounterIndex
trafficCounterValue
trafficCounterName
trafficCounterType
}
```

trafficCounterIndex (trafficCountersEntry 1)

An index value that uniquely identifies the counter.

Access RO

SYNTAX

INTEGER (*1..255)*

trafficCounterValue (trafficCountersEntry 2)

The 64 bit counter value.

Access RO

SYNTAX

Counter64

trafficCounterName (trafficCountersEntry 3)

The name of the counter.

Access RO

SYNTAX

```
DisplayString
```

trafficCounterType (trafficCountersEntry 4)

Defines whether the traffic counters counts by packets (3) or by bytes (2).

Access RO

SYNTAX

```
INTEGER {
```

1 **(other):** none of the following

2 (bytes): counts by bytes

3 (packets): counts by packets

}

Supported Standards

SCE 1000 supports the SNMP related standards listed in the following table.

Table B-1 Supported SNMP Standards

Document Name	Description
RFC 1155: Structure and Identification of Management Information for TCP/IP-based Internets	K. McCloghrie and M. T. Rose, (May 1990). Contains MIB object definitions. (Obsoletes RFC 1065)
RFC 1157: A Simple Network Management Protocol	J. D. Case, M. Fedor, M. L. Schoffstall, and C. Davin, (May 1990). Defines SNMP. (Obsoletes RFC 1098)
RFC 1212: Concise MIB Definitions	K. McCloghrie (March 1991). Defines a format for producing MIB modules
RFC 1213: Management Information Base Network Management of TCP/IP based internets: MIB-II	K. McCloghrie and M. T. Rose, eds., (March 1991). Defines MIB-II. (Obsoletes RFC 1158)
RFC 1215: Convention for Defining Traps for Use with the SNMP	M. T. Rose, ed. (March 1991).
RFC 1901: Introduction to Community-based SNMPv2	SNMPv2 WG, J.Case, K. McCloghrie, M.T.Rose, S. Waldbusser, (January 1996). Defines “Community-based SNMPv2.” (Experimental. Obsoletes RFC 1441)
RFC 1905: Protocol Operations for Version 2 of the Simple Network Management Protocol (SNMPv2)	Obsoletes: 1448 (January 1996)
RFC 1906: Transport Mappings for Version 2 of the Simple Network Management Protocol (SNMPv2)	Obsoletes: 1449 (January 1996)

Glossary of Terms

A

Access Control List (ACL)

Permits or denies incoming connections on any of the management interfaces. It is an ordered list of entries, each consisting of an IP address and an optional wildcard “mask” defining an IP address range, and a permit/deny field.

Auto-negotiation

Gigabit Ethernet auto-negotiation allows the link to synchronize with its peer automatically.

B

Bump-in-the-wire topology

The SCE Platform physically resides on the data link between the subscriber side and the network side, and can both receive and transmit traffic.

Bypass module

Separated hardware mechanism in SCE Platforms, that forwards traffic independently of the status of the rest of the modules in the platforms.

C

Collection Manager (CM)

A software application that is responsible for receiving RDRs from SCE Platforms and processing them.

Command Line Interface (CLI)

One of the management interfaces to the SCE Platform. It is accessed through a Telnet session or directly via the console port on the front panel of the SCE Platform.

Cutoff

Mechanism that cuts the link so that there is no forwarding of traffic, and the physical link is forced down (cutoff at layer 1).

D

DDoS Attack Filtering

The aim of DDoS attack filtering is to detect attacks that occur in the traffic flowing through the SCE platform, to report such attacks via management channels, and to handle these attacks by blocking them, if configured to do so. In addition, if the application loaded to the ***SCE 1000*** supports the ‘subscriber-notification’ feature, a subscriber whose IP address is associated with an attack that was identified can be notified about the attack on-line by the ***SCE 1000***.

There are two main aspects of attack filtering:

- Attack detection: Detect attacks based on their common IP address and number of flows found to/from that IP address.
- Attack handling: Attack flows may be blocked or processed as usual.

In addition, a subscriber associated with the attack may be notified about the attack.

The ***SCE 1000*** maintains a list of the most active IP addresses flowing through it, with a measure of the activity of each IP address. (Activity is measured by number of flows opened to/from that address). If there are IP addresses in the table whose number of flows is above the configured threshold, these IP addresses are assumed to be attacking, or being attacked. If the ***SCE 1000***is configured to block the attack, it drops the attack packets.

Duplex

Duplex refers to the bi-directional capacity of the link, that is, the link can both receive and transmit.

Full duplex data transmission means that data can be received and transmitted simultaneously.

Half duplex data transmission means that the line can transmit in only one direction at a time. When data is being transmitted, it cannot be received and vice versa.

F

Flow

All packets travelling in both directions on a single application layer connection (such as a TCP or UDP connection). A flow is identified by the tuple information: <Source IP, Destination IP, Source Port, Destination Port, IP Protocol>. (Note that if the IP protocol is neither TCP or UDP, the port number is defined as '0'.)

IN this guide, the term 'flow' represents bi-directional flows (packets from both the client and server of each connection). When referencing a uni-directional flow, this is explicitly mentioned.

Flow Bundle

A group of one or more flows comprising the set of application-layer connections (such as a TCP or UDP connection) used in a single, logical application session. The semantics of flow-bundles are application dependant, and relate to the way each application spawns and negotiates additional flows as part of a single session. A few common examples are:

- An SIP (VoIP) flow bundle comprises the signaling flow as well as all the RTP/UDP flows containing the actual media data (voice).
- An RTSP (Streaming) flow bundle comprises the signaling flow as well as the RTP/UDP flows containing the audio and/or video transmissions.
- AN FTP (file transfer) flow bundle comprises the control flow (used to login an FTP server) and the actual file-transfer flows

In each of these cases, the ***SCE 1000*** tracks the application communication to identify new connections created and bundle them into a single context. This is important for classification and accounting purposes, as otherwise these spawned flows would be unclassifiable.

I

Inline connection mode

The ***SCE 1000*** physically resides bump-in-the-wire on the data links between the subscriber and the network

L

Link mode

A specified behavior that may be enforced on the link. This may be useful during installation and for debugging the network.

The available link modes are:

- forwarding
- bypass

- cutoff

O

optical splitter topology

In this topology, the ***SCE 1000*** does not reside physically on the data link. Data is forwarded to the ***SCE 1000*** via an optical splitter, which splits the traffic on the link, sending all information to the ***SCE 1000*** in parallel with its transmission through the optical splitter. The optical splitter is connected physically on the Gigabit Ethernet link and only the receive inputs of the data link GBE interfaces in the ***SCE 1000*** are connected to the optical splitter.

P

PQI (Service Control Application Installation) File

An application package file that is installed on the SCE Platform and the Collection Manager.

R

RDR (Raw Data Record)

A data record produced by the SCE Platform that reports on events in the traffic. RDRs produced by the SCE Platform are sent to the Collection Manager and then stored in the Collection Manager database or forwarded to third-party systems. The RDR typically contains quota (see Quota) request or reports service usage.

RDR Formatter

An internal component of the SCE Platform that gathers the Raw Data Records (RDRs), formats them, and sends them to an external data collector.

Receive-only connection mode

The SCE Platform does not reside physically on the data link, and therefore can only receive data and does not transmit.

S

SCE Platform

The SCE Platform is a purpose-built service component and active enforcing system designed for enhancing service providers and backbone carrier networks. By identifying, classifying, and manipulating complex traffic flows at wire-speed, the SCE Platform transforms simple transport networks into differentiated service delivery infrastructures for a wide variety of value-added IP applications, such as video streaming, VoIP, tiered services, and bilateral application-level SLAs.

The SCE Platform seamlessly interfaces with existing network elements—including routers, switches, aggregators, subscriber management devices, and operational support systems—using industry standard interfaces and communications protocols.

The need to guarantee that packets passing through the network are processed at the rate they arrive makes it necessary to provide a custom-made hardware solution.

The SCE Platform comes in three models: SCE 1000 2xGBE, SCE 2000 4xGBE and SCE 2000 4/8xFE. There may be one or more SCE Platform on the provider network. Within the SCE Platforms, network transactions are analyzed and mapped to services that enforce the provider’s policies.

In addition, the SCE Platform implements the business logic of the system solution and performs the transaction analysis in real time. When so instructed, the SCE Platform creates a Raw Data Record (RDR) to be sent for storage to the system’s data repository, the Collection Manager (CM); or carries out some other operation such as bandwidth and volume control.

Service Control

The basic Cisco concept for enabling service providers to differentiate subscribers, detect real-time events, create premium services, actively control applications, and leverage their existing infrastructure.

Service Control Application

An SML program that determines how the SCE Platform operates.

SLI (SML Loadable Image) File

An SLI file is a software package (part of a Service Control application) that contains the SML application that is loaded onto a SCE Platform. The SML application determines the behavior of the SCE Platform. Different SCE Platforms can have different SML applications, even when they are within the same POP. (Operators do not need to access the SLI file.)

smartSUB Manager (SM)

A middleware software component used in cases where dynamic binding of subscriber information and service configurations is required. The SM manages subscriber information and provisions it in real time to multiple SCE Platforms. The SM can store subscriber service configurations information internally, and act as a state-full bridge between the AAA system (for example, RADIUS and DHCP) and the SCE Platforms.

SML (Service Modeling Language)

The Cisco scripting language, which enables the definition of service-related events and the execution of actions on those events.

Subscriber

A Service Provider’s client, and an entity for which the Service Control solutions provide monitoring and active policy enforcement in a single context.

T

Tunneling Protocols

A tunneling protocol adds headers to the basic protocol stack in order to route the packet across the network. Therefore, the system must be configured to recognize and either process or skip the additional tunnel headers as necessary.

W

Warm start

Restarting the computer by performing a reset operation.

Index

?

? • A-3

[

[more | show] running-config [all-data] • A-70
[more | show] startup-config • A-72
[no | default] failure-recovery operation-mode mode • A-10
[no | default] snmp-server enable traps [snmp [snmp trap name]] [enterprise [enterprise trap name]] • A-29
[no] access-class number in • A-52
[no] attack-detector <number> • A-33
[no] attack-detector default • A-32
[no] attack-filter • A-34
[no] attack-filter slot-number dont-filter • A-54
[no] attack-filter slot-number force-filter • A-55
[no] attack-filter subscriber-notification ports • A-35
[no] blink slot slot-number • A-56
[no] boot system ftp //username[password]@server-address[port]/path/source-file destination-file • A-8
[no] clock timezone zone hours [minutes] • A-9
[no] duplex mode • A-49
[no] history • A-67
[no] history size size • A-67
[no] ip advertising [destination destination] [interval interval] • A-13
[no] ip default-gateway x.x.x.x • A-14
[no] ip domain-lookup • A-14
[no] ip domain-name domain-name • A-14
[no] ip name-server server-address1 [server-address2] [server-address3] • A-16
[no] ip rmi-adapter • A-16
[no] ip rpc-adapter • A-18
[no] ip tunnel mode • A-48
[no] link failure-reflection [on-all-ports] • A-36
[no] management-agent system package-file-name • A-20
[no] RDR-formatter category-number[1-4] name category name • A-21
[no] service password encryption • A-26
[no] service RDR-formatter • A-26
[no] service telnetd • A-27
[no] silent • A-38
[no] snmp-server community community-string [read-option] [acl-number] • A-28
[no] snmp-server contact contact • A-28
[no] snmp-server host address [traps] [version version] community-string • A-30
[no] snmp-server location location • A-30
[no] sntp broadcast client • A-31
[no] sntp server address/hostname • A-31
[no] speed speed • A-50
[no] subscriber aging anonymous|introduced [timeout aging-time] • A-40
[no] traffic-counter • A-46
[no] traffic-rule • A-46
[no|default] auto-negotiate • A-51

A

Access Control List (ACL) • 1
Access control lists • 4-35, 6-2
access-list number permission address • A-7
Adding Entries to an Access List • 6-3
Adding IP Routing Entry to Routing Table • 6-8

Aging Subscribers • 8-4
Airflow • 4-4
All Modes • A-3
Anonymous Groups and Subscriber Templates • 8-5
apIndex (appPropertiesEntry 1) • B-69
apName (appPropertiesEntry 2) • B-69
appDescription (appInfoEntry 2) • B-68
appInfoEntry (appInfoTable 1) • B-67
appInfoTable (applicationGrp 1) • B-67
Application
  configuring • 6-44
  installing • 6-44
  loading and testing • 4-55
  upgrading • 6-44
Application Group
  applicationGrp (pcubeSEObjs 13) • B-67
appName (appInfoEntry 1) • B-68
appPropertiesEntry (appPropertiesTable 1) • B-69
appPropertiesTable (applicationGrp 2) • B-68
appPropertiesValueEntry (appPropertiesValueTable 1) • B-70
appPropertiesValuesTable (applicationGrp 3) • B-70
appVersion (appInfoEntry 3) • B-68
apType (appPropertiesEntry 3) • B-69
apvIndex (appPropertiesValueEntry 1) • B-70
apvPropertyCounter64Value (appPropertiesValueEntry 6) • B-71
apvPropertyName (appPropertiesValueEntry 2) • B-71
apvPropertyStringValue (appPropertiesValueEntry 4) • B-71
apvPropertyUintValue (appPropertiesValueEntry 5) • B-71
apvRowStatus (appPropertiesValueEntry 3) • B-71
Argument Help • 3-11
Associating an Access List to Telnet Interface • 6-5
Attaching a Chassis Ground Connection • 4-15
Attack detection • 9-1
  configuring • 9-5
  managing • 9-12
  monitoring • 9-14
  subscriber notification • 9-4, 9-11
  thresholds • 9-3
Attack Detection • 9-2
Attack Detection Thresholds • 9-3
Attack detectors
  configuring • 9-5
  default • 9-7
  sample configuration • 9-10
  specific • 9-8
Attack Filtering • 9-1
Attack Handling • 9-3
attack-detector <number> access-list • A-34
audience • xxvii
Audience • xxvii
Australia SA/NZS 3260 Warning • xxxvii
Authorization and Command Levels (Hierarchy) • 3-1
autonegotiate • **7-16**
Auto-negotiation • 4-50, 7-16, A-51, 1

B

Back Panel • 4-14
bandwidth bandwidth burst-size burstsize • A-51
Battery Handling Warning • xl
Bump-in-the-Wire (Inline) Topology • 2-4, 4-49
Bump-in-the-wire topology • 1
Bypass Mechanism • 2-2
Bypass module • 1

C

calendar set hh
  mm

ss day month year • A-56

Categories • 6-20
cd new-path • A-57
Changing Directories • 5-4
Changing Passwords • 5-17
Chassis Group
  chassisGrp (pcubeSEObjs 2) • B-18
Chassis Power Connection Warning (DC platform only) • xl
chassisFansAlarm (chassisGrp 3) • B-19
chassisFansAlarmOnTrap (pcubeSeEvents 8) • B-13

chassisLineFeedAlarm (chassisGrp 9) • B-21
chassisLineFeedAlarmOnTrap (pcubeSeEvents 36) • B-17
chassisNumSlots (chassisGrp 6) • B-20
chassisPowerSupplyAlarm (chassisGrp 2) • B-18
chassisPowerSupplyAlarmOnTrap (pcubeSeEvents 9) • B-13
chassisPsuType (chassisGrp 8) • B-20
chassisSlotConfig (chassisGrp 7) • B-20
ChassisSysType (chassisGrp 1) • B-18
chassisTempAlarm (chassisGrp 4) • B-19
chassisTempAlarmOffTrap (pcubeSeEvents 6) • B-13
chassisTempAlarmOnTrap (pcubeSeEvents 5) • B-13
chassisVoltageAlarm (chassisGrp 5) • B-19
chassisVoltageAlarmOnTrap (pcubeSeEvents 7) • B-13
Cisco Enterprise MIB • 6-39
Cisco Service Control Specific Solutions • 1-6
Cisco TAC Website • xxx
Class 1/I Laser Product Warning • xl
clear arp-cache • A-57
clear interface LineCard slot-number counters • A-58
clear interface LineCard slot-number MAC-mapping • A-58
clear interface LineCard slot-number subscriber anonymous all • A-58
clear interface LineCard slot-number subscriber db counters • A-59
clear interface linecard slot-number traffic-counter • A-59
clear logger [device device] nv-counters • A-60
clear logger device User-File-Log • A-59
clear logger device User-File-Log counters • A-60
clear RDR-formatter • A-60
Clearing the User Log • 5-25
CLI • 6-37
CLI (Command Line Interface) • 3-1
- authorization levels • 3-1, 3-2
- command hierarchy • 3-4
- help features • 3-11
- reference • A-1
- scrpts • 3-14
- shortcuts • 3-12, 3-13

CLI Authorization Levels • 3-2
CLI Command Hierarchy • 3-4
CLI Command Reference • A-1
CLI Help Features • 3-11
CLI Scripts • 3-14
clock read-calendar • A-61
clock set hh
- mm

ss day month year • A-61
clock update-calendar • A-61
Collection • 1-6
Collection Manager (CM) • 1
Command History • 3-12
Command Line Interface • 3-1
Command Line Interface (CLI) • 1
Community strings • 6-31
Config-Copy MIB Objects • B-3
Configuration
- and management • 5-1
- completing and saving • 4-44
- global • 6-1
- IP • 6-7
- recovering • 5-14
- saving • 5-12
- viewing • 5-7

Configuration and Management • 5-1
Configuration via SNMP • 6-31
configure • A-62
Configuring Access Control Lists (ACLs) • 6-2
Configuring Applications • 6-44
Configuring Attack Detectors • 9-5
Configuring Auto-Negotiation • 4-50
Configuring GigabitEthernet Auto-Negotiation • 7-16
Configuring IP Advertising • 6-9
Configuring IP Tunnels • 7-3
Configuring SNMP Community Strings • 6-32
Configuring Subscriber Notifications • 9-11
Configuring the Available Interfaces • 6-2
Configuring the Currently Installed Application • 6-46

Configuring the Duplex Operation of the FastEthernet Interface • 6-42
Configuring the GBE Interface Parameters • 4-50
Configuring the GigabitEthernet Auto-negotiation Mode • 7-16
Configuring the L2TP Environment • 7-4
Configuring the Management Interface Speed and Duplex Parameters • 6-42
Configuring the MPLS Environment • 7-4
Configuring the Physical Network Interface Parameters • 3-7
Configuring the RDR Formatter • 6-22
Configuring the RDR Formatter Categories • 6-25
Configuring the RDR Formatter Destinations • 6-24
Configuring the Speed of the FastEthernet Interface • 6-42
Configuring the VLAN Environment • 7-3
Configuring TOS Marking • 7-12
Configuring Traffic Counters • 7-7
Configuring Traffic Rules • 7-7
Configuring Traffic Rules and Counters • 7-5
Configuring Traps • 6-34
Configuring Tunneling Protocols • 7-2
Connecting
  line ports • 4-49
  local console • 4-23, 4-24
  management port • 4-47
  network port • 4-51, 4-53
  subscriber port • 4-51, 4-52
Connecting Subscriber Side and Network Side Ports • 4-51
Connecting Subscriber Side Interface to the SCE 1000 • 4-52
Connecting the AC Power Supply Cable • 4-17
Connecting the DC Power Supply • 4-18
Connecting the FE Management Port • 4-47
Connecting the line ports to the network • 4-49
Connecting the Local Console • 4-23
Connecting the Network Side Interface to the SCE 1000 • 4-53
Connecting to the Power Supply • 4-13
Connection mode • 2-2, 2-8, 4-42, 7-13, A-35
Connection Mode Parameter • 2-8
connection-mode • A-35
Connectivity, testing • 4-53
Control Configuration • 6-1
copy ftp • A-62
copy running-config startup-config • A-63
copy source-file destination-file • A-63
copy source-file ftp• A-64
Copying a File • 5-6
Copying the User Log • 5-22
copy-passive source-file ftp• A-65
Creating a Directory • 5-3
CSA NRTL (Canada) • xxxv
Cutoff • 1

D

DDoS attack detection • 9-1, 9-2
  configuring • 9-5
  managing • 9-12
  monitoring • 9-14
  threholds • 9-3
DDoS Attack Filtering • 1
Default Attack Detector • 9-7
Default Gateway • 6-7
default ip advertising destination|interval • A-13
default ip rmi-adapter port • A-17
default ip rpc-adapter port • A-19
default subscriber template all • A-43
Defining the Global Access List • 6-4
Defining the SNTP unicast update interval • 6-15
delete file-name [/recursive] • A-66
Deleting a Directory • 5-3
Deleting a File • 5-5
dir [applications] [-r] • A-66
Directories, working with • 5-3
disable [level] • A-4
Disable sending RDRs • 6-29, A-38
Disabling SNMP • 6-7
Disabling SNTP multicast client • 6-14
Disabling SNTP unicast client • 6-15
Disabling the LineCard from Sending RDRs • 6-29
Disk Group
  diskGrp (pcubeSEObjs 5) • B-29
diskNumFreeBytes (diskGrp 2) • B-30
diskNumUsedBytes (diskGrp 1) • B-30
Display SNTP information • 6-15
Displaying Anonymous Subscriber Information • 8-16

Displaying File Contents • 5-7
Displaying RDR Formatter Configuration and Statistics • 6-28
Displaying Subscriber Information • 8-15
Displaying Subscribers • 8-11
- By IP Address or VLAN ID • 8-13
- By Subscriber Property or Prefix • 8-12

Displaying Tunneling Configuration • 7-5
Displaying Working Directory • 5-4
Document
- content • xxviii
- conventions • xxix

Document Content • xxviii
Document Conventions • xxix, 10-1
Domain Name • 6-17
Domain Name (DNS) Settings • 6-16
Domain Name Server (DNS) • 4-33, 6-16
Duplex • 6-42, 2

E

EC Declaration of Conformity • xxxiv
Editing the Connection Mode • 7-13
enable [level] • A-5
enable password [level level] [encryption-type] password • A-9
Enabling and Disabling Link Failure Reflection • 7-15
Enabling and Disabling the User Log • 5-21
Enabling and Disabling TOS Marking • 7-12
Enabling SNMP • 6-6
Enabling SNTP multicast client • 6-14
Enabling SNTP unicast client • 6-14
Enabling Specific-IP Detection • 9-7
Encryption • 5-18
Enforcing the Link Mode • 7-14
Entering and Exiting Global Configuration Mode • 3-6, 5-15, 6-1
Entering FastEthernet (Management) Interface Configuration Mode • 3-7, 6-41
Entering GigabitEthernet Line Interface Configuration Mode • 3-8, 7-16
Entering LineCard Interface Configuration Mode • 3-8, 6-43, 7-2
Entry Formats • 4-35
Examining the LEDs • 4-53
Exec Mode Commands • A-4
exit • A-3
Exiting Modes • 3-10
External Optical Splitter (Receive-only) Topology • 4-49
External Splitting (Receive-only) Topology • 2-4

F

Failure
- and recovery • 2-6
- detection • 2-2
- recovery mode • 6-28

Failure and Recovery • 2-6
Failure Detection Mechanism • 2-2
Failure Recovery Mode • 6-40
Fan Tray Removal Warning • xli
Fans • 4-5
- replacing • 11-2

Fast Ethernet interface
- configuring • 3-7, 6-42
- duplex • 6-42
- speed • 6-42

FastEthernet Interface Configuration Mode Commands • A-49
FCC Warning • xxxix
Federal Communications Commission (FCC) Compliance Notice: • xxxv
File-system Operations • 5-3
Final Tests • 4-55
Flow • 2
Flow Bundle • 2
Forcing Attack Filtering • 9-13
Forwarding Modes • 6-22
Front Panel • 4-19
Front Panel LEDs • 10-2
FTP User Name and Password • 3-14
Functional Information • A-2
Functionality • 2-3

G

GBE Interfaces Connectivity • 10-10
Generating a File for Technical Support • 5-25
Gigabit Ethernet interface
- auto-negotiation • 4-50, 7-16
- configuring • 3-8, 4-50, 7-16

GigaBitEthernet Interface Configuration Mode Commands • A-51
Global Configuration Mode Commands • 6-38, A-7
Global Controllers Group

globalControllersGrp (pcubeSEObjs 12) • B-64
globalControllersBandwidth (globalControllersEntry 5) • B-66
globalControllersClearCountersTime (globalControllersEntry 9) • B-67
globalControllersDescription (globalControllersEntry 4) • B-66
globalControllersEntry (globalControllersTable 1) • B-65
globalControllersIndex (globalControllersEntry 3) • B-66
globalControllersModuleIndex (globalControllersEntry 1) • B-65
globalControllersPortIndex (globalControllersEntry 2) • B-65
globalControllersTable (globalControllersGrp 1) • B-64
globalControllersUtilization (globalControllersEntry 6) • B-66
globalControllersUtilizationPeak (globalControllersEntry 7) • B-66
globalControllersUtilizationPeakTime (globalControllersEntry 8) • B-66
Ground Conductor Warning • xxxviii
Ground Connection Warning • xxxviii
Grounded Equipment Warning • xxxviii
Grounding Warning • xxxviii

H

help • A-6
Host Table • 6-18
hostname host-name • A-11

I

Identifying And Preventing Distributed-Denial-Of-Service Attacks • 9-1
Importing/Exporting Anonymous Groups • 8-7
Importing/Exporting Subscriber Information • 8-6
Importing/Exporting Subscriber Templates • 8-8
Importing/Exporting Subscribers • 8-7
Industry EMC, Safety, and Environmental Standards • xxxiv
Initial Settings • 4-24, 4-28, 4-29
Inline connection mode • 2
Installation • 4-6
Installation and Startup • 4-1
Installation Precautions • 4-7
Installation Warnings • xxxvii
Installing an Application • 6-44
Installing the SCE 1000 on a Workbench or Tabletop • 4-7
Installlation • 4-1
in a rack • 4-8
on a workbench • 4-7
precautions • 4-7
interface
configuration and management • 7-1
configuring • 6-2
SCE platform management • 6-2
SNMP • 6-6
telnet • 6-5
Interface Configuration Modes • 3-7, 3-9
interface FastEthernet slot-number/interface-number • A-11
interface LineCard slot-number • A-12
IP
advertising • 6-9
configuration • 6-7
routing • 6-7
ip access-class number • A-12
ip address new-address subnet-mask • A-50
IP Advertising • 6-9
IP Configuration • 6-7
ip ftp password password • A-68
ip ftp userName user-name • A-68
ip host hostname ip-address • A-15
ip rmi-adapter port port-number • A-16
ip route prefix mask next-hop • A-17
IP Routing Table • 6-7
ip rpc-adapter port port-number • A-18
Issues to Be Considered • 2-1

J

Jewelry Removal Warning • xxxvii

K

Keyboard Shortcuts • 3-13

L

L2TP identify-by • A-35
LEDs
examining • 4-53
front panel • 4-19
Lightning Activity Warning • xxxvii
Line Configuration • 7-1
Line Configuration Mode Commands • A-52

Line Gigabit Ethernet Interfaces • 7-15
line vty start-number [end-number] • A-19
LineCard Interface Configuration Mode Commands • A-32
Link
  failure reflection parameter • 2-9
Link failure reflection • 2-9
Link Failure Reflection Parameter • 2-9
Link Group
  linkGrp (pcubeSEObjs 4) • B-26
link mode • A-36
Link mode • 2
linkAdminModeOnActive (linkEntry 3) • B-28
linkAdminModeOnFailure (linkEntry 4) • B-28
linkEntry (linkTable 1) • B-27
linkIndex (linkEntry 2) • B-28
linkModeBypassTrap (pcubeSeEvents 20) • B-14
linkModeCutoffTrap (pcubeSeEvents 22) • B-14
linkModeForwardingTrap (pcubeSeEvents 21) • B-14
linkModeSniffingTrap (pcubeSeEvents 28) • B-16
linkModuleIndex (linkEntry 1) • B-27
linkOperMode (linkEntry 5) • B-28
linkStatusReflectionEnable (linkEntry 6) • B-29
linkSubscriberSidePortIndex (linkEntry 7) • B-29
linkSubscriberSidePortIndex (linkEntry 8) • B-29
linkTable (linkGrp 1) • B-27
Listing Files in Current Directory • 5-4
Loading and Activating a Service Control Application • 4-55
Loading the MIB Files • 6-40
logger add-user-message message text • A-68
logger device User-File-Log max-file-size size • A-20
logger device User-File-Log status • A-19
logger get support-file filename • A-67
logger get user-log file-name target-file • A-69
Logger Group
  loggerGrp (pcubeSEObjs 7) • B-38
loggerUserLogClearCountersTime (loggerGrp 6) • B-40
loggerUserLogEnable (loggerGrp 1) • B-39
loggerUserLogIsFullTrap (pcubeSeEvents 18) • B-14
loggerUserLogNumError (loggerGrp 4) • B-9
loggerUserLogNumFatal (loggerGrp 5) • B-39
loggerUserLogNumInfo (loggerGrp 2) • B-39
loggerUserLogNumWarning (loggerGrp 3) • B-39
Login and User Levels • A-2
logout • A-6

M

Maintaining the Network Links vs Maintaining SCE 1000 Platform Functionality • 2-7
Maintenance • 11-1
Management
  and collection • 1-5
  collection • 1-6
  network • 1-5
  service configuration • 1-6
  subscriber • 1-6
Management and Collection • 1-5
Management Interface Configuration Mode • 6-42
Management Link • 10-5
Managing Attack Filtering • 9-12
Managing Subscribers • 8-1
Managing Traffic Rules and Counters • 7-10
MIB • 6-38, B-1
  MIB-II • 6-38
  reference • B-1
  Service Control enterprise • 6-39, B-1
MIB-II • 6-38
MIBs • 6-38
mkdir directory-name • A-69
Modifying the TOS Table • 7-13
Module Group
  moduleGrp (pcubeSEObjs 3) • B-21
moduleAdminStatus (moduleEntry 15) • B-26
moduleAttackFilterActivatedTrap (pcubeSeEvents 25) • B-14

moduleAttackFilterDeactivatedTrap (pcubeSeEvents 26) • B-15
moduleAttackObjectsClearTime (moduleEntry 14) • B-26
moduleConnectionMode (moduleEntry 8) • B-24
moduleDownStreamAttackFilteringTime (moduleEntry 12) • B-25
moduleDownStreamLastAttackFilteringTime (moduleEntry 13) • B-25
moduleEmAgentGenericTrap (pcubeSeEvents 27) • B-16
moduleEntry (moduleTable 1) • B-22
moduleHwVersion (moduleEntry 5) • B-24
moduleIndex (moduleEntry 1) • B-22
moduleLostRedundancyTrap (pcubeSeEvents 31) • B-16
moduleNumLinks (moduleEntry 7) • B-24
moduleNumPorts (moduleEntry 6) • B-24
moduleNumTrafficProcessors (moduleEntry 3) • B-23
moduleOperStatus (moduleEntry 16) • B-26
moduleOperStatusChangeTrap (pcubeSeEvents 34) • B-16
moduleRedundancyReadyTrap (pcubeSeEvents 29) • B-16
moduleRedundantConfigurationMismatchTrap (pcubeSeEvents 30) • B-16
moduleSerialNumber (moduleEntry 9) • B-25
moduleSlotNum (moduleEntry 4) • B-23
moduleSmConnectionDownTrap (pcubeSeEvents 32) • B-16
moduleSmConnectionUpTrap (pcubeSeEvents 33) • B-16
moduleTable (moduleGrp 1) • B-21
moduleType (moduleEntry 2) • B-23
moduleUpStreamAttackFilteringTime (moduleEntry 10) • B-25
moduleUpStreamLastAttackFilteringTime (moduleEntry 11) • B-25
Monitoring Attack Filtering • 9-14
Monitoring Subscribers • 8-10
Monitoring the Subscriber Database • 8-10
more file-name • A-69
more user-log • A-72
Mounting the SCE 1000 in a Rack • 4-8
MPLS • A-37
Multiple entry parameters (Lists) • 5-2

N

Name Servers • 6-17
Navigating between the Interface Configuration Modes • 3-9
Navigational and Shortcut Features • 3-12
Network links
  maintaining • 2-7
Network Management • 1-5
no access-list number • A-8
no enable password [level level] • A-10
no ip access-class • A-12
no ip host hostname [ip-address] • A-15
no ip route all • A-18
no ip route prefix mask • A-17
no RDR-formatter destination all • A-25
no RDR-formatter destination ip-address port port-number [category {name category name }| {number [1-4]}] • A-25
no snmp-server • A-27
no snmp-server community all • A-28
no snmp-server host all • A-30
no sntp server all • A-31
no subscriber [name subscriber-name] [all] • A-42
no subscriber anonymous-group [name group-name] [all] • A-43
no timeout • A-53
no tos-marking diffserv • A-44

O

Obtaining Technical Assistance • xxix
On-Failure Mode Parameter • 2-8
Opening a TAC Case • xxx
operationalStatusFailureTrap (pcubeSeEvents 3) • B-12
operationalStatusOperationalTrap (pcubeSeEvents 1) • B-12
operationalStatusWarningTrap (pcubeSeEvents 2) • B-12
optical splitter topology • 3
Order of Entries • 4-36
Overview • 1-1

P

Packing List Parts • 4-2
Partial Help • 3-11
Parts

and tools • 4-2
Parts list • 4-2
Passwords • 4-30, 5-16
pcubeCopyDestFileType (pcubeCopyEntry 4) • B-3
pcubeCopyEntryRowStatus (pcubeCopyEntry 2) • B-3
pcubeCopyIndex (pcubeCopyEntry 1) • B-3
pcubeCopySourceFileType (pcubeCopyEntry 3) • B-3
pcubeMgmt
pcubeConfigCopyMIB • B-2
pcubeSeEventGenericString1 (pcubeSeEvents 23) • B-14
pcubeSeEventGenericString2 (pcubeSeEvents 24) • B-14
pcubeSeEvents (pcubeWorkgroup 0) • B-4
pcubeSEObjs (pcubeWorkgroup 1) • B-5
pcubeWorkgroup
pcubeSeMIB • B-4
Physical Installation • 2-3, 2-7
ping host • A-73
Port Group
portGrp (pcubeSEObjs 10) • B-57
portAdminDuplex (portEntry 7) • B-60
portAdminSpeed (portEntry 6) • B-60
portEntry (portTable 1) • B-58
portIfIndex (portEntry 5) • B-59
portIndex (portEntry 2) • B-59
portLinkIndex (portEntry 9) • B-61
portModuleIndex (portEntry 1) • B-58
portNumTxQueues (portEntry 4) • B-59
portOperDuplex (portEntry 8) • B-60
portOperStatus (portEntry 10) • B-61
portOperStatusChangeTrap (pcubeSeEvents 35) • B-16
portTable (portGrp 1) • B-58
portType (portEntry 3) • B-59
Power
AC, connecting • 4-17
DC, connecting • 4-18
turning on • 4-23
Power Disconnection Warning • xxxix
Power Supply Disconnection Warning • xxxix
Power Supply Warning • xxxix
Powering up • 4-23
PQI (Service Control Application Installation) File • 3
pqi install file filename [options options] • A-37
pqi rollback file filename • A-38
pqi uninstall file filename • A-37
pqi upgrade file filename [options options] • A-39
Preface • xxvii
Pre-Installation Requirements • 4-1
Preventing Attack Filtering • 9-13
Preventing Telnet Access • 6-5
Priority • 4-42, 6-21
Privileged Exec Mode Commands • 6-37, A-54
Product Disposal Warning • xxxvii
Prompt Indications • 3-10
Proprietary MIB Reference • B-1
Protective Earth Warning • xxxviii
Protocol Version • 6-21
Purpose • xxvii
pwd • A-73

Q

queue queue-number bandwidth bandwidth burst-size burstsize • A-52

R

Rack, mounting to • 4-8
RDR (Raw Data Record) • 3
RDR formatter • 6-19
categories • 6-20
configuring • 6-22
destinations • 4-34, 6-19, A-24
RDR Formatter • 3
RDR Formatter Destinations • 6-19
RDR Formatter Group
rdrFormatterGrp (pcubeSEObjs 6) • B-30
RDR Reports • 10-6
rdrActiveConnectionTrap (pcubeSeEvents 10) • B-13
rdrConnectionDownTrap (pcubeSeEvents 13) • B-13
rdrConnectionUpTrap (pcubeSeEvents 12) • B-13
RDR-formatter destination ip-address port port-number [category {name category name }| {number [1-4]}] [priority priority-value] • A-24
RDR-formatter forwarding-mode mode • A-22
RDR-formatter history-size • A-21

RDR-formatter protocol protocol [force-reset] • A-22
RDR-formatter protocol RDRv2 connection-timeout time • A-23
rdrFormatterCategoryDestEntry (rdrFormatterCategoryDestTable 1) • B-38
rdrFormatterCategoryDestPriority (rdrFormatterCategoryDestEntry 1) • B-38
rdrFormatterCategoryDestStatus (rFormatterCategoryDestEntry 2) • B-38
rdrFormatterCategoryDestTable (rdrFormatterGrp 12) • B-37
rdrFormatterCategoryEntry (rdrFormatterCategoryTable 1) • B-36
rdrFormatterCategoryIndex (rdrFormatterCategoryEntry 1) • B-36
rdrFormatterCategoryName (rdrFormatterCategoryEntry 2) • B-36
rdrFormatterCategoryNumReportsDiscarded (rdrFormatterCategoryEntry 4) • B-37
rdrFormatterCategoryNumReportsSent (rdrFormatterCategoryEntry 3) • B-36
rdrFormatterCategoryReportRate (rdrFormatterCategoryEntry 5) • B-37
rdrFormatterCategoryReportRatePeak (rdrFormatterCategoryEntry 6) • B-37
rdrFormatterCategoryReportRatePeakTime (rdrFormatterCategoryEntry 7) • B-37
rdrFormatterCategoryTable (rdrFormatterGrp 11) • B-35
rdrFormatterClearCountersTime (rdrFormatterGrp 5) • B-34
rdrFormatterDestConnectionStatus (rdrFormatterDestEntry 5) • B-32
rdrFormatterDestEntry (rdrFormatterDestTable 1) • B-31
rdrFormatterDestIPAddr (rdrFormatterDestEntry 1) • B-31
rdrFormatterDestNumReportsDiscarded (rdrFormatterDestEntry 7) • B-33
rdrFormatterDestNumReportsSent (rdrFormatterDestEntry 6) • B-32
rdrFormatterDestPort (rdrFormatterDestEntry 2) • B-31
rdrFormatterDestPriority (rdrFormatterDestEntry 3) • B-32
rdrFormatterDestReportRate (rdrFormatterDestEntry 8) • B-33
rdrFormatterDestReportRatePeak (rdrFormatterDestEntry 9) • B-33
rdrFormatterDestReportRatePeakTime (rdrFormatterDestEntry 10) • B-33
rdrFormatterDestStatus (rdrFormatterDestEntry 4) • B-32
rdrFormatterDestTable (rdrFormatterGrp 2) • B-30
rdrFormatterEnable (rdrFormatterGrp 1) • B-30
rdrFormatterForwardingMode (rdrFormatterGrp 10) • B-35
rdrFormatterNumReportsDiscarded (rdrFormatterGrp 4) • B-33
rdrFormatterNumReportsSent (rdrFormatterGrp 3) • B-33
rdrFormatterProtocol (rdrFormatterGrp 9) • B-34
rdrFormatterReportRate (rdrFormatterGrp 6) • B-34
rdrFormatterReportRatePeak (rdrFormatterGrp 7) • B-34
rdrFormatterReportRatePeakTime (rdrFormatterGrp 8) • B-34
rdrNoActiveConnectionTrap (pcubeSeEvents 11) • B-13
Reboot, status after • 2-9, 4-42
Rebooting and Shutting Down the SCE Platform • 5-25
Rebooting the SCE Platform • 5-25
Receive-only connection mode • 3
Recovering a Previous Configuration • 5-14
Redundancy • 2-5, 2-7
Regulatory Compliance • xxxiii
Regulatory Compliance and Safety Information • xxxiii
Regulatory Symbols • xxxv
Related Publications • xxix
reload • A-73
reload shutdown • A-74
Removing an Access List • 6-4
Removing Current Time Zone Setting • 6-13
Removing Subscribers and Templates • 8-8
rename existing_file_name new_file_name • A-74
Renaming a File • 5-5
Replacing the Battery • 11-1
Replacing the Fan Module • 11-2
Replacing the Power Module • 11-3
Requirements

- pre-installation • 4-1
- site • 4-3, 4-5

Requiring Passwords • 5-16
Restricted Area Warning (DC platform only) • xxxix
rmdir directory-name • A-75

S

Sample Attack Detector Configuration • 9-10
Saving the Configuration Settings • 5-12
SCE 1000 Dimensions • 4-3
SCE Events • B-4
- pcubeSeEvents • B-12

SCE Platform • 3
- back panel • 4-14
- front panel • 4-19
- overview • 1-4

SCE Platform Configuration • 2-2
SCE Platform Management Interfaces • 6-2
SCE-MIB Structure • B-6
scm apply file file-name • A-39
script capture script-file-name • A-75
script print script-file-name • A-76
script run script-file-name [halt] • A-76
script stop • A-77
Security considerations • 6-31
Security Considerations • 6-31
Selecting the Tunneling Mode • 7-3
SELV Circuit Warning • xl
Service Configuration Management • 1-6
Service control
- capabilities • 1-3
- concept • 1-1

Service Control • 4
Service Control Application • 4
Service Control Application Suite for Broadband • 1-7
Service Control Application Suite for Mobile • 1-7
Service Control Capabilities • 1-3
Service Control Enterprise MIB • B-1
Service Control for Cable MSOs • 1-2
Service Control for DSL Providers and ISPs • 1-2
Service Control for Wireless Service Providers • 1-2
Service Control solution
- specific solutions • 1-6

Service Personnel Warning • xxxvii
Setting the Calendar • 6-12
Setting the Clock • 6-11
Setting the Time Zone • 6-12
Setting Up the Local Console • 4-24
setup • 4-26, 5-1, A-77
Setup Command Parameters • 4-26, A-78
Setup Utility • 5-1
show access-lists [number] • A-80
show blink slot slot-number • A-81
show calendar • A-81
show clock • A-81
show failure-recovery operation-mode • A-81
show hostname • A-82
show hosts • 6-18, A-82
show interface FastEthernet slot/interface counters [direction] • A-84
show interface FastEthernet slot/interface duplex • A-84, A-85
show interface FastEthernet slot/interface queue queue-number • A-86
show interface FastEthernet slot/interface speed • A-85
show interface FastEthernet slot-number/interface-number • A-83
show interface FastEthernet slot-number/interface-number ip address • A-83
show interface LineCard attack-detector • A-87
show interface LineCard attack-filter • A-87
show interface linecard link mode • A-89
show interface LineCard slot-number • A-86
show interface LineCard slot-number [MPLS|VLAN|L2TP|IP-tunnel] • A-97
show interface LineCard slot-number application • A-86
show interface LineCard slot-number connection-mode • A-88
show interface LineCard slot-number counters • A-89
show interface LineCard slot-number link-bypass • A-90
show interface LineCard slot-number silent • A-90
show interface LineCard slot-number subscriber [amount] [prefix prefix] [suffix suffix] [property propertyname equals|greater-than|less-than property-val] • A-91

show interface LineCard slot-number subscriber [amount] mapping included-in TP-IP-range name | IP • A-94
show interface LineCard slot-number subscriber aging anonymous|introduced • A-90
show interface LineCard slot-number subscriber anonymous [amount] [name group-name] • A-91
show interface LineCard slot-number subscriber anonymous-group [name group-name] [all] • A-91
show interface LineCard slot-number subscriber db counters • A-93
show interface LineCard slot-number subscriber mapping [amount] [IP iprange] [intersecting IP iprange] [VLANid vlanid] [none] • A-92
show interface LineCard slot-number subscriber name name [mappings] [counters] [properties] • A-93
show interface LineCard slot-number subscriber properties • A-93
show interface LineCard slot-number tos-marking mode • A-95
show interface LineCard slot-number tos-marking table • A-95
show interface linecard slot-number traffic-counter • A-96
show interface linecard slot-number traffic-rule • A-96
show ip access-class • A-97
Show IP Advertising • 6-10
show ip advertising [destination|interval] • A-97
show ip default-gateway • A-98
show ip rmi-adapter • A-98
show ip route • A-98
Show IP Route • 6-8
show ip route prefix • A-99
show ip route prefix mask • A-99
show ip rpc-adapter • A-98
show line vty access-class in • A-100
show line vty timeout • A-101
show logger [device device] nv-counters • A-102
show logger device User-File-Log • A-101
show logger device User-File-Log counters • A-101
show logger device User-File-Log max-file-size • A-102
show logger device User-File-Log status • A-102
show management-agent [selected-info] • A-99
show management-agent notifications • A-100
show management-agent notifications counters • A-100
show pqi file filename info • A-103
show pqi last-installed • A-103
show RDR-formatter • A-104
show RDR-formatter connection-status • A-104
show RDR-formatter counters • A-105
show RDR-formatter destination • A-105
show RDR-formatter enabled • A-105
show RDR-formatter forwarding-mode • A-106
show RDR-formatter history-size • A-106
show RDR-formatter protocol • A-106
show RDR-formatter statistics • A-107
show running-config • A-107
show scm last-applied • A-107
show snmp • A-108
show snmp community • A-108
show snmp contact • A-109
show snmp enabled • A-109
show snmp host • A-109
show snmp location • A-109
show snmp MIB mib variables • A-110
show snmp traps • A-110
show sntp • A-111
show system operation-status • A-111
show telnet sessions • A-111
show telnet status • A-112
show timezone • A-112
show tunnel mode • A-112
show version • A-113
show version all • A-114
show version software • A-115
Showing Calendar Time • 6-11
Showing System Time • 6-11
Shutting Down the SCE Platform • 5-26
Site Requirement Guidelines • 4-3
Site Requirements • 4-5
SLI (SML Loadable Image) File • 4
smartSUB Manager (SM) • 4
SML (Service Modeling Language) • 4

SNMP (Simple Network Management Protocol) • 4-39, 6-30
  CLI • 6-37
  community strings • 6-31
  traps • 6-33
SNMP Community Strings • 6-31
SNMP Configuration and Management • 6-v30
SNMP Interface • 6-6
SNMP Protocol • 6-30
SNTP • 4-31, 6-13
sntp update-interval interval • A-32
sntpClockDriftWarnTrap (pcubeSeEvents 19) • B-14
Software Package Installation • 10-12
Specific Attack Detectors • 9-8
spIndex (subscribersPropertiesEntry 1) • B-44
spName (subscribersPropertiesEntry 2) • B-45
spType (subscribersPropertiesEntry 3) • B-45
spvIndex (subscriberPropertiesValueEntry 1) • B-46
spvPropertyCounter64Value (subscriberPropertiesValueEntry 7) • B-47
spvPropertyName (subscriberPropertiesValueEntry 3) • B-46
spvPropertyStringValue (subscriberPropertiesValueEntry 5) • B-47
spvPropertyUintValue (subscriberPropertiesValueEntry 6) • B-47
spvRowStatus (subscriberPropertiesValueEntry 4) • B-47
spvSubName (subscriberPropertiesValueEntry 2) • B-46
Status of the SCE 1000 After Abnormal Boot • 2-9
Step 1
  Attaching the Brackets to the SCE 1000 • 4-8
  Configuring Initial Settings • 4-28
  Unpacking • 4-1
Step 10
  Completing and Saving the Configuration • 4-44
Step 2
  Attaching the Crossrail Supports to the Rack • 4-9
  Checking Shipping Contents • 4-2
  Configuring the Hostname • 4-29
Step 3
  Mounting the System to a Rack • 4-11
  Preparing to Install • 4-2
  Setting the Passwords • 4-30
Step 4
  Configuring Time Settings • 4-31
Step 5
  Configuring the DNS Settings • 4-33
Step 6
  Configuring the RDR Formatter Destination • 4-34
Step 7
  Configuring Access Control Lists (ACLs) • 4-35
Step 8
  Configuring SNMP • 4-39
Step 9
  Configuring the Topology-Dependent Parameters • 4-42
Subscriber • 4
Subscriber Aging • 8-18
Subscriber anonymous groups csv file format • 8-6
subscriber anonymous-group export csv-file filename • A-41
subscriber anonymous-group import csv-file filename • A-41
Subscriber default csv file format • 8-5
subscriber export csv-file filename • A-40
Subscriber Files • 8-5
subscriber import csv-file filename • A-40
Subscriber Management • 1-6
Subscriber modes
  Subscriber notification • 9-4
configuring • 9-11
Subscriber Modes in Service Control Solutions • 8-3
Subscriber Notification • 9-4
Subscriber Notification Ports • 9-11
Subscriber Overview • 8-1
subscriber template export csv-file filename • A-42
subscriber template import csv-file filename • A-42
subscriberPropertiesValueEntry (subscriberPropertiesValueTable 1) • B-46

subscriberPropertiesValuesTable (subscribersGrp 3) • B-45

Subscribers
- aging • 8-18
- anonymous groups • 8-5, 8-7, 8-16
- csv files • 8-5, 8-6
- importing/exporting • 8-6
- managing via SCE CLI • 8-1
- monitoring • 8-10
- removing • 8-8
- templates • 8-5, 8-8

Subscribers Group
- subscribersGrp (pcubeSEObjs 8) • B-40

subscribersCountersClearTime (subscribersInfoEntry 13) • B-44

subscribersInfoEntry (subscribersInfoTable 1) • B-41

subscribersInfoTable (subscribersGrp 2) • B-40

subscribersNumActive (subscribersInfoEntry 9) • B-43

subscribersNumActivePeak (subscribersInfoEntry 10) • B-43

subscribersNumActivePeakTime (subscribersInfoEntry 11) • B-43

subscribersNumFree (subscribersInfoEntry 2) • B-42

subscribersNumIntroduced (subscribersInfoEntry 1) • B-41

subscribersNumIpAddrMappings (subscribersInfoEntry 3) • B-42

subscribersNumIpAddrMappingsFree (subscribersInfoEntry 4) • B-42

subscribersNumIpRangeMappings (subscribersInfoEntry 5) • B-42

subscribersNumIpRangeMappingsFree (subscribersInfoEntry 6) • B-42

subscribersNumUpdates (subscribersInfoEntry 12) • B-43

subscribersNumVlanMappings (subscribersInfoEntry 7) • B-43

subscribersNumVlanMappingsFree (subscribersInfoEntry 8) • B-43

subscribersPropertiesEntry (subscribersPropertiesTable 1) • B-44

subscribersPropertiesTable (subscribersGrp 2) • B-44

support • xxix

Supported Standards • B-73

Syntax and Conventions • A-3

sysFailureRecovery (systemGrp 2) • B-17

sysOperationalStatus (systemGrp 1) • B-17

System Configuration • 4-26

System Group
- systemGrp (pcubeSEObjs 1) • B-17

systemResetTrap (pcubeSeEvents 4) • B-13

sysVersion (systemGrp 3) • B-17

T

Tab Completion • 3-13

TAC Case Priority Definitions • xxx

telnet address [port] • A-115

Telnet Interface • 6-5

Telnet Timeout • 6-6

telnetSessionBadLoginTrap (pcubeSeEvents 17) • B-14

telnetSessionDeniedAccessTrap (pcubeSeEvents 16) • B-14

telnetSessionEndedTrap (pcubeSeEvents 15) • B-14

telnetSessionStartedTrap (pcubeSeEvents 14) • B-13

Testing Connectivity
- Examining Link LEDs and Counters • 4-53

The [no] Prefix • 3-12

The Cisco Service Control Concept • 1-1

The Logging System • 5-20

The RDR Formatter • 6-19

The SCE Platform • 1-4

The User Log • 5-20

Time Clocks and Time Zone • 6-10

Time settings • 4-31, 6-10, 6-13

timeout time • A-53

Tools and Parts Required • 4-2

Topology • 2-1
- bump-in-the-wire • 2-4
- considerations • 2-1
- optical splitter • 2-4
- physical installation and • 2-3
- related parameters • 2-2, 2-7, 4-42
- summary table • 2-9

Topology-Related Parameters • 2-7

TOS marking • 7-12

tos-marking mode mode • A-43

tos-marking reset-table • A-45

tos-marking set-table-entry class class color color value value • A-45

tpClearCountersTime (tpInfoEntry 28) • B-55

tpCpuUtilization (tpInfoEntry 35) • B-56
tpCpuUtilizationPeak (tpInfoEntry 36) • B-56
tpCpuUtilizationPeakTime (tpInfoEntry 37) • B-57
tpFlowsCapacityUtilization (tpInfoEntry 38) • B-57
tpFlowsCapacityUtilizationPeak (tpInfoEntry 39) • B-57
tpFlowsCapacityUtilizationPeakTime (tpInfoEntry 40) • B-57
tpHandledFlowsRate (tpInfoEntry 32) • B-56
tpHandledFlowsRatePeak (tpInfoEntry 33) • B-56
tpHandledFlowsRatePeakTime (tpInfoEntry 34) • B-56
tpHandledPacketsRate (tpInfoEntry 29) • B-55
tpHandledPacketsRatePeak (tpInfoEntry 30) • B-55
tpHandledPacketsRatePeakTime (tpInfoEntry 31) • B-55
tpIndex (tpInfoEntry 2) • B-50
tpInfoEntry (tpInfoTable) • B-49
tpInfoTable (trafficProcessorGrp 1) • B-48
tpModuleIndex (tpInfoEntry 1) • B-50
tpNumActiveFlows (tpInfoEntry 5) • B-51
tpNumActiveFlowsPeak (tpInfoEntry 6) • B-51
tpNumActiveFlowsPeakTime (tpInfoEntry 7) • B-51
tpNumNonTcpUdpActiveFlows (tpInfoEntry 14) • B-52
tpNumNonTcpUdpActiveFlowsPeak (tpInfoEntry 15) • B-53
tpNumNonTcpUdpActiveFlowsPeakTime (tpInfoEntry 16) • B-53
tpNumTcpActiveFlows (tpInfoEntry 8) • B-51
TpNumTcpActiveFlowsPeak (tpInfoEntry 9) • B-51
tpNumTcpActiveFlowsPeakTime (tpInfoEntry 10) • B-52
tpNumUdpActiveFlows (tpInfoEntry 11) • B-52
tpNumUdpActiveFlowsPeak (tpInfoEntry 12) • B-52
tpNumUdpActiveFlowsPeakTime (tpInfoEntry 13) • B-52
tpTotalNumBlockedFlows (tpInfoEntry 18) • B-53
tpTotalNumBlockedPackets (tpInfoEntry 17) • B-53
tpTotalNumDiscardedPacketsDueToBwLimit (tpInfoEntry 19) • B-53
tpTotalNumFragments (tpInfoEntry 21) • B-54
tpTotalNumHandledFlows (tpInfoEntry 4) • B-51
tpTotalNumHandledPackets (tpInfoEntry 3) • B-50
tpTotalNumIpBroadcastPackets (tpInfoEntry 25) • B-54
tpTotalNumIpCrcErrPackets (tpInfoEntry 23) • B-54
tpTotalNumIpLengthErrPackets (tpInfoEntry 24) • B-54
tpTotalNumNonIpPackets (tpInfoEntry 22) • B-54
tpTotalNumTcpUdpCrcErrPackets (tpInfoEntry 27) • B-55
tpTotalNumTtlErrPackets (tpInfoEntry 26) • B-55
tpTotalNumWredDiscardedPackets (tpInfoEntry 20) • B-54
Traffic counters • 7-6
Traffic Counters Group
    trafficCountersGrp (pcubeSEObjs 14) • B-72
Traffic Processor Group
    trafficProcessorGrp (pcubeSEObjs 9) • B-47
Traffic Rules • 7-6
trafficCounterIndex (trafficCountersEntry 1) • B-72
trafficCounterName (trafficCountersEntry 3) • B-73
trafficCountersEntry (trafficCountersTable 1) • B-72
trafficCountersTable (trafficCountersGrp 1) • B-72
trafficCounterType (trafficCountersEntry 4) • B-73
trafficCounterValue (trafficCountersEntry 2) • B-72
Transmit Queues Group
    txQueuesGrp (pcubeSEObjs 11) • B-61
Traps • 6-33, B-12
Troubleshooting • 10-1

Tunneling Protocols • 4
Tunneling, configuring • 7-2
Two Platforms on Parallel Links in Bump-in-the-Wire Topology • 2-5
txQueuesBandwidth (txQueuesEntry 5) • B-63
txQueuesClearCountersTime (txQueuesEntry 9) • B-64
txQueuesDescription (txQueuesEntry 4) • B-63
txQueuesEntry (txQueuesTable 1) • B-62
txQueuesModuleIndex (txQueuesEntry 1) • B-62
txQueuesPortIndex (txQueuesEntry 2) • B-62
txQueuesQueueIndex (txQueuesEntry 3) • B-63
txQueuesTable (txQueuesGrp 1) • B-61
txQueuesUtilization (txQueuesEntry 6) • B-63
txQueuesUtilizationPeak (txQueuesEntry 7) • B-63
txQueuesUtilizationPeakTime (txQueuesEntry 8) • B-64

U

ULC (Canada) • xxxv
unzip filename • A-116
Unzipping a File • 5-7
Upgrading SCE Platform Firmware • 5-19
User Log • 10-13
Using this Reference • B-2

V

Verifying Operational Status • 4-55
Viewing Configuration and Status • 5-7
Viewing the Counters to See that the Network Traffic is Reaching the Device • 4-54
Viewing the User Log • 4-56, 5-24
Viewing/Clearing the User Log Counters • 5-22
VLAN • A-49

W

WAN Port Static Shock Warning • xl
Warm start • 4
Warning Definition Statement • xxxvi
Working with Directories • 5-3
Working with Files • 5-5
Wrist Strap Warning • xxxix