# Security Certificates for the SRC Software

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The information in this document is current as of the date on the title page.

YEAR 2000 NOTICE

Juniper Networks hardware and software products are Year 2000 compliant. Junos OS has no known time-related limitations through the year 2038. However, the NTP application is known to have some difficulty in the year 2036.

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# Table of Contents

# List of Tables

# About the Documentation



## Documentation and Release Notes

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If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.

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## Supported Platforms

For the features described in this document, the following platforms are supported:

- C Series

## Documentation Conventions

Table 1 on page viii defines notice icons used in this guide.

### Table 1: Notice Icons

| Icon | Meaning | Description |
|---|---|---|
|  | Informational note | Indicates important features or instructions. |
|  | Caution | Indicates a situation that might result in loss of data or hardware damage. |
|  | Warning | Alerts you to the risk of personal injury or death. |
|  | Laser warning | Alerts you to the risk of personal injury from a laser. |

## Documentation Conventions

Table 1 on page viii defines the notice icons used in this guide. Table 3 on page viii defines text conventions used throughout this documentation.

### Table 2: Notice Icons

| Icon | Meaning | Description |
|---|---|---|
|  | Informational note | Indicates important features or instructions. |
|  | Caution | Indicates a situation that might result in loss of data or hardware damage. |
|  | Warning | Alerts you to the risk of personal injury or death. |
|  | Laser warning | Alerts you to the risk of personal injury from a laser. |

### Table 3: Text Conventions

| Convention | Description | Examples |
|---|---|---|
| **Bold text like this** | • Represents keywords, scripts, and tools in text.<br>• Represents a GUI element that the user selects, clicks, checks, or clears. | • Specify the keyword **exp-msg**.<br>• Run the **install.sh** script.<br>• Use the **pkgadd** tool.<br>• To cancel the configuration, click **Cancel**. |

Table 3: Text Conventions *(continued)*

| | | |
|---|---|---|
| **Bold text like this** | Represents text that the user must type. | **user@host# set cache-entry-age** *cache-entry-age* |
| `Fixed-width text like this` | Represents information as displayed on your terminal's screen, such as CLI commands in output displays. | `nic-locators {`<br>`  login {`<br>`  resolution {`<br>`  resolver-name /realms/`<br>`  login/A1;`<br>`  key-type LoginName;`<br>`  value-type SaeId;`<br>`  }` |
| **Regular sans serif typeface** | • Represents configuration statements.<br>• Indicates SRC CLI commands and options in text.<br>• Represents examples in procedures.<br>• Represents URLs. | • **system ldap server{ stand-alone;**<br>• Use the **request sae modify device failover** command with the **force** option<br>• **user@host# . . .**<br>• http://www.juniper.net/techpubs/software/management/sdx/api-index.html |
| ***Italic sans serif typeface*** | Represents variables in SRC CLI commands. | **user@host# set local-address** ***local-address*** |
| Angle brackets | In text descriptions, indicate optional keywords or variables. | Another runtime variable is <gfwif>. |
| Key name | Indicates the name of a key on the keyboard. | Press Enter. |
| Key names linked with a plus sign (+) | Indicates that you must press two or more keys simultaneously. | Press Ctrl + b. |
| *Italic typeface* | • Emphasizes words.<br>• Identifies book names.<br>• Identifies distinguished names.<br>• Identifies files, directories, and paths in text but not in command examples. | • There are two levels of access: *user* and *privileged*.<br>• *SRC-PE Getting Started Guide.*<br>• *o=Users, o=UMC*<br>• The */etc/default.properties* file. |
| Backslash | At the end of a line, indicates that the text wraps to the next line. | Plugin.radiusAcct-1.class=\<br>net.juniper.smgt.sae.plugin\<br>RadiusTrackingPluginEvent |
| Words separated by the \| symbol | Represent a choice to select one keyword or variable to the left or right of this symbol. (The keyword or variable may be either optional or required.) | diagnostic \| line |

## Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can send your comments to **techpubs-comments@juniper.net**, or fill out the documentation feedback form at

https://www.juniper.net/cgi-bin/docbugreport/ . If you are using e-mail, be sure to include the following information with your comments:

- Document or topic name
- URL or page number
- Software release version (if applicable)

## Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or JNASC support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf .
- Product warranties—For product warranty information, visit http://www.juniper.net/support/warranty/ .
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

### Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: http://www.juniper.net/customers/support/
- Search for known bugs: http://www2.juniper.net/kb/
- Find product documentation: http://www.juniper.net/techpubs/
- Find solutions and answer questions using our Knowledge Base: http://kb.juniper.net/
- Download the latest versions of software and review release notes: http://www.juniper.net/customers/csc/software/
- Search technical bulletins for relevant hardware and software notifications: https://www.juniper.net/alerts/
- Join and participate in the Juniper Networks Community Forum: http://www.juniper.net/company/communities/
- Open a case online in the CSC Case Management tool: http://www.juniper.net/cm/

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: https://tools.juniper.net/SerialNumberEntitlementSearch/

## Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at http://www.juniper.net/cm/ .
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see http://www.juniper.net/support/requesting-support.html .

PART 1

# Overview

CHAPTER 1

# Software Features Overview



## SRC Component Overview

The SRC software is a dynamic system. It contains many components that you use to build a subscriber management environment. You can use these tools to customize and extend the SRC software for your use and to integrate the SRC software with other systems. The SRC software also provides the operating system and management tools for C Series Controllers.

Table 4 on page 3 gives a brief description of the components that make up the SRC software.

### Table 4: Descriptions of SRC Components

| Component | Description |
|---|---|
| **Server Components** | |
| Service activation engine (SAE) | • Authorizes, activates, and deactivates subscriber and service sessions by interacting with systems such as Juniper Networks routers, cable modem termination system (CMTS) devices, RADIUS servers, and directories.<br>• Collects accounting information about subscribers and services from routers, and stores the information in RADIUS accounting servers, flat files, and other accounting databases.<br>• Provides plug-ins and application programming interfaces (APIs) for starting and stopping subscriber and service sessions and for integrating with systems that authorize subscriber actions and track resource usage. |
| Subscriber Information Collector (SIC) | Used in conjunction with the MX Series router running the packet-triggered subscribers and policy control (PTSP) solution, the SIC listens for RADIUS accounting events from IP edge devices (accounting clients) and stores them in the Session State Registrar (SSR), or forwards them to a remote AAA server, allowing the SRC software to gain increased subscriber awareness. Additionally, the SIC can optionally edit accounting events before routing them. |
| Juniper Policy Server (JPS) | Acts as a policy decision point (PDP) and policy enforcement point (PEP) that manages the relationships between application managers and CMTS devices in a PCMM environment. |

Table 4: Descriptions of SRC Components *(continued)*

| Component | Description |
|---|---|
| Network information collector (NIC) | Collects information about the state of the network and can provide a mapping from a given type of network data to another type of network data. |
| Redirect Server | Redirects HTTP requests received from IP Filter to a captive portal page. |
| 3GPP Gateway | The SRC Third-Generation Partnership Project (3GPP) gateway is a Diameter-based component in the SRC software, which provides integration with 3GPP Policy and Charging Control environments, to provide fixed-mobile convergence (FMC). The SRC 3GPP gateway provides Gx-based integration with the Policy and Charging Rules Function (PCRF). The SRC 3GPP gateway uses the Gx interface to mediate between the PCRF and Juniper Networks routers like the E Series Broadband Services routers and MX Series routers. The Gx interface on the SRC 3GPP gateway communicates with the PCRF using the Diameter protocol. |
| Web Application Service | The SRC software includes a Web application server that hosts the Web Services Gateway and the Volume Tracking Application (SRC VTA). In production environments, this application server is designed to host only these applications. However, you can load your own applications into this server for testing or demonstration purposes. |
| Web Services Gateway | Allows a gateway client—an application that is not part of the SRC network—to interact with SRC components through a Simple Object Access Protocol (SOAP) interface.<br><br>The Web Services Gateway provides the Dynamic Service Activator which allows a gateway client to dynamically activate and deactivate SRC services for subscribers and to run scripts that manage the SAE. |
| **Repository** | |
| Directory | The SRC software includes the Juniper Networks database, which is a built-in Lightweight Directory Access Protocol (LDAP) directory for storing all SRC data including services, policies, and small subscriber databases.<br><br>For large subscriber databases, you must supply your own directory. |
| Session State Registrar (SSR) | The SSR is a stateless, highly reliable and highly available database cluster. When used in conjunction with an MX Series router running the packet-triggered subscribers and policy control (PTSP) solution, the SSR stores the IP edge attachment subscriber sessions data learned from IP edge devices in the centralized SSR database. |
| **SRC Configuration and Management Tools** | |

Table 4: Descriptions of SRC Components *(continued)*

| Component | Description |
|---|---|
| SRC command line interface (CLI) | Provides a way to configure the SRC software on a C Series Controller from a Junos OS–like CLI. The SRC CLI includes the policies, services, and subscribers CLI, which has separate access privileges. |
| C-Web interface | Provides a way to configure, monitor, and manage the SRC software on a C Series Controller through a Web browser. The C-Web interface includes a policies, services, and subscribers component, which has separate access privileges. |
| Simple Network Management Protocol (SNMP) agent | Monitors system performance and availability. It runs on all the SRC hosts and makes management information available through SNMP tables and sends notifications by means of SNMP traps. |
| **Service Management Applications (Run on external system)** | |
| IMS Services Gateway | Integrates into an IP multimedia system (IMS) environment. The SRC software provides a Diameter protocol-based interface that allows the SRC software to integrate with services found on the application layer of IMS. |
| | |
| | |
| **SRC Programming Interfaces** | |
| NETCONF API | Allows you to configure or request information from the NETCONF server on a C Series Controller that runs the SRC software. Applications developed with the NETCONF API run on a system other than a C Series Controller. |
| CORBA plug-in service provider interface (SPI) | Tracks sessions and enables linking the rest of the service provider's operations support system (OSS) with the SRC software so that the OSS can be notified of events in the life cycle of SAE sessions. Hosted plug-ins only. |
| CORBA remote API | Provides remote access to the SAE core API. Applications that use these extensions to the SRC software run on a system other than a C Series Controller. |
| NIC access API | Performs NIC resolutions. Applications that use these extensions to the SRC software run on a system other than a C Series Controller. |
| SAE core API | Controls the behavior of the SRC software. Applications that use these extensions to the SRC software run on a system other than a C Series Controller. |

Table 4: Descriptions of SRC Components *(continued)*

| Component | Description |
|---|---|
| Script services | Provides an interface to call scripts that supply custom services such as provisioning policies on a number of systems across a network. |
| VTA API | The Volume Tracking Application (VTA) API is a Simple Object Access Protocol (SOAP) interface that allows developers to create gateway clients and that administrators use to manage VTA subscribers and sessions. The SRC Web Services Gateway allows a gateway client—an application that is not part of the SRC network—to interact with SRC components, such as the VTA, through a SOAP interface. |
| **Authorization and Accounting Applications** | |
| AAA RADIUS servers | Authenticates subscribers and authorizes their access to the requested system or service. Accepts accounting data—time active and volume of data sent—about subscriber and service sessions. RADIUS servers run on a system other than a C Series Controller. |
| SRC Admission Control Plug-In (SRC ACP) | Authorizes and tracks subscribers' use of network resources associated with services that the SRC application manages. |
| Flat file accounting | Stores tracking data to accounting flat files that can be made available to external systems that send the data to a rating and billing system. |
| Volume Tracking Application | The SRC Volume Tracking Application (SRC VTA) is an SRC component that allows service providers to track and control the network usage of subscribers and services. You can control volume and time usage on a per-subscriber or per-service basis. This level of control means that service providers can offer tiered services that use volume as a metric, while also controlling abusive subscribers and applications.<br><br>When a subscriber or service exceeds bandwidth limits (or quotas), the SRC VTA can take actions including imposing rate limits on traffic, sending an e-mail notification, or charging extra for additional bandwidth consumed. |
| **Demonstration Applications (available on the Juniper Networks Web site)** | |
| Enterprise Audit Plug-In | Defines a callback interface, which receives events when IT managers complete specified operations. |
| Enterprise Manager Portal | Allows service providers to provision services for enterprise subscribers on routers running JunosE or Junos OS and allows IT managers to manage services.<br><br>Enterprise Manager Portal can be used with NAT Address Management Portal to allow service providers to manage public IP addresses for use with NAT services on routers running Junos OS and to all IT managers to make requests about public IP addresses through the Enterprise Manager Portal. |

Table 4: Descriptions of SRC Components *(continued)*

| Component | Description |
|---|---|
| | |
| Monitoring Agent application | Integrates IP address managers, such as a DHCP server or a RADIUS server, into an SRC-managed network so that the SAE is notified about subscriber events. The Monitoring Agent application runs on a Solaris platform. |
| | |
| | |
| Residential service selection portals | Provides a framework for building Web applications that allow residential and enterprise subscribers to manage their own network services. It comes with several full-featured sample Web applications that are easy to customize and suitable for deployment. The Residential service selection portals run on a Solaris platform. |
| Sample enterprise service portal | Lets service providers supply an interface to their business customers for managing and provisioning services. |
| | |
| | |
| | |

**Related Documentation**

- SRC Product Description

CHAPTER 2

# Security Digital Certificates



## Overview of Digital Certificates

The SRC software provides support for digital certificates for use by other protocols to protect communications between the SRC software and other applications or network devices. You can manage certificates to:

- Support HTTPS connections between the SRC software and Web browsers.
- Allow BEEP TLS connections between the SRC software and routers running Junos OS.

You can use SRC CLI commands to manage certificates manually, or through the Simple Certificate Enrollment Protocol (SCEP).

Certificates are in the format defined in the X.509 standard for public key infrastructure. The certificate requests are in the Public Key Cryptology Standard (PKCS) #10 format.

**Related Documentation**


- Before You Use Digital Certificates on page 9
- Commands to Manage Digital Certificates on page 21
- Manually Obtaining Digital Certificates (SRC CLI) on page 13
- Obtaining Digital Certificates through SCEP (SRC CLI) on page 14
- Viewing Information About Security Certificates (SRC CLI) on page 19


## Before You Use Digital Certificates

Before you use digital certificates, you should:

- Have a working relationship with a certificate authority (CA).
- Have a good working knowledge of how to work with certificates.
- Decide whether or not to use SCEP to assist with certificate management.

- Identify which connections should be secured by a protocol that requires digital certificates.
- Know how to use the file management commands in the CLI.

**Related Documentation**

- Overview of Digital Certificates on page 9
- Commands to Manage Digital Certificates on page 21
- Manually Obtaining Digital Certificates (SRC CLI) on page 13
- Obtaining Digital Certificates through SCEP (SRC CLI) on page 14
- Viewing Information About Security Certificates (SRC CLI) on page 19

PART 2

# Administration

CHAPTER 3

# Managing Digital Certificates



## Manually Obtaining Digital Certificates (SRC CLI)

You can manually add digital certificates, or you can use SCEP to help manage how you obtain certificates.

For information about using SCEP to obtain certificates, see "Obtaining Digital Certificates through SCEP (SRC CLI)" on page 14 .

To manually add a signed certificate:

1. Create a certificate signing request.

   user@host> **request security generate-certificate-request subject** ***subject*** **password** ***password***

   where:

   - **subject** is the distinguished name of the SRC host; for example **cn=cseries1,ou=pop,o=Juniper,l=kanata,st=Ontario,c=Canada**.
   - **password** is the password received from the certificate authority for the specified subject.

     By default, this request creates the file **/tmp/certreq.csr** and encodes the file by using Privacy-Enhanced Mail (pem) encoding.

2. Copy the file generated to another system, and submit the certificate signing request file generated to the certificate authority.

   You can transfer the file through FTP by using the **file copy** command.

   user@host> **file copy** ***source_file*** **ftp://** ***username*** **@** ***server*** **[:** ***port*** **]/** ***destination_file***

   The remote system prompts you for your password.

3. When you receive the signed certificate, copy the file back to the system to the **/tmp** directory.

   You can transfer the file through FTP, as shown in Step 2.

4. Add the certificate to the SRC configuration.

   user@host> **request security import-certificate file-name** *file-name* **identifier** *identifier*

   where

   - **file-name** is the name of the certificate file in the **/tmp** folder. The file has one of the following extensions:
     - CER—Windows extension
     - PEM—Privacy-Enhanced Mail encoding
     - DER—Binary encoding
     - BER—Binary encoding
   - **identifier** is the name of the certificate.

   For example, to import the file **sdx.cer** that is identified as web:

   user@host> **request security import-certificate file-name sdx.cer identifier web**

5. Verify that the certificate is part of the SRC configuration.

   ```
   user@host> show security certificate
   web subject:CN=host
   ```

   If there are no certificates on the system, the CLI displays the following message:

   ```
   user@host> show security certificate
   No entity certificates in key store
   ```

**Related Documentation**

- Before You Use Digital Certificates on page 9
- Removing a Certificate Request on page 16
- Overview of Digital Certificates on page 9
- Commands to Manage Digital Certificates on page 21

## Obtaining Digital Certificates through SCEP (SRC CLI)

You can use SCEP to help manage how you obtain digital certificates, or you can manually add certificates.

For information about manually obtaining certificates, see "Manually Obtaining Digital Certificates (SRC CLI)" on page 13.

To add a signed certificate that you obtain through SCEP:

1. Request a CA certificate through SCEP.

user@host> **request security get-ca-certificate url** *url* **ca_identifier** *ca_identifier*

where:

- **url** is the URL of the certificate authority (which is the SCEP server).
- **ca-identifier** is the identifier that designates the authority.

For example, to request a certificate from the CA authority SdxCA at a specified URL on the server security_server:

```
user@host> request security get-ca-certificate url
http://security_server:8080/ejbca/publicweb/apply/scep/pkiclient.exe
ca-identifier SdxCA

Version: 3
Serial Number: 5721058705923989279
Signature Algorithm: SHA1withRSA
Issuer: CN=SdxCA
Valid From: Wed Sep 06 17:00:55 EDT 2006
Valid Until: Sat Sep 03 17:10:55 EDT 2016
Subject: CN=SdxCA
Public key: RSA
Thumbprint Algorithm: SHA1
Thumbprint: 3c 57 a9 77 af 83 3 e9 c7 1e ee e2 4a e8 ff f3 89 f4 11 a9
Do you want to add the above certificate as a trusted CA [yes,no] ? (no) y
```

2. Request that the certificate authority automatically sign the certificate request.

   user@host> **request security enroll subject** *subject* **password** *password*

   where:

   - **subject** is the distinguished name of the SRC host; for example **cn=myhost**.
   - **password** is the password received from the certificate authority for the specified subject.

   For example, to request a certificate from the CA authority SdxCA at a specified URL on the server security_server:

```
user@host> request security enroll url
http://security_server:8080/ejbca/publicweb/apply/scep/pkiclient.exe identifier
 web ca-identifier SdxCA subject cn=myhost password mypassword

Received certificate:
Version: 3
Serial Number: 6822890691617224432
Signature Algorithm: SHA1withRSA
Issuer: CN=SdxCA
Valid From: Tue Sep 19 16:33:11 EDT 2006
Valid Until: Thu Sep 18 16:43:11 EDT 2008
Subject: CN=myhost
Public key: RSA
Do you want to install the above certificate [yes,no] ? (no) y
```

3. Verify that the certificate is part of the SRC configuration.

```
user@host> show security certificate
web subject:CN=myhost
```

   If there are no certificates on the system, the CLI displays the following message:

```
No entity certificates in key store
```

**Related Documentation**

- Before You Use Digital Certificates on page 9
- Removing a Certificate Request on page 16
- Overview of Digital Certificates on page 9
- Commands to Manage Digital Certificates on page 21

## Removing a Certificate Request

To remove a certificate request:

1. Review the certificate request files on the system. These files are in the **/tmp** directory and have the file extension **.csr**.
2. Issue the **clear security certificate-request** command to remove a file. For example:

   user@host> **clear security certificate-request certreq.csr**

**Related Documentation**

- Manually Obtaining Digital Certificates (SRC CLI) on page 13
- Obtaining Digital Certificates through SCEP (SRC CLI) on page 14

## Removing a Certificate

To remove a certificate:

1. Issue the **show security certificate** command to view information about the local certificates. For example:

   ```
   user@host> show security certificate
   web subject:CN=myhost
   CAcert1 subject:CN=myhost
   ```

2. Issue the **clear security certificate command** to remove a certificate. Use the trusted option if the certificate is a CA certificate.

   clear security certificate <trusted> <identifier *identifier* >

   For example:

   - To remove the certificate web (that is not a trusted certificate) from myhost:

     user@host>**clear security certificate web**

   - To remove a trusted (CA) certificate from myhost:

     user@host>**clear security certificate trusted CAcert 1**

**Related Documentation**

- Removing a Certificate Request on page 16
- Manually Obtaining Digital Certificates (SRC CLI) on page 13

CHAPTER 4

# Routine Monitoring



## Viewing Information About Security Certificates (SRC CLI)

**Purpose** View information about security certificates that reside on the system.

**Action**

```
user@host> show security certificate
web subject:CN=myhost
CAcert1 subject:CN=myhost
```

**Meaning** If no security certificates reside on the system, the CLI return a message to that effect:

```
user@host> show security certificate
No entity certificates in key store
```

**Related Documentation**

- Viewing Information About Security Certificates (C-Web Interface) on page 19
- For information about managing security digital certificates, see Overview of Digital Certificates on page 9

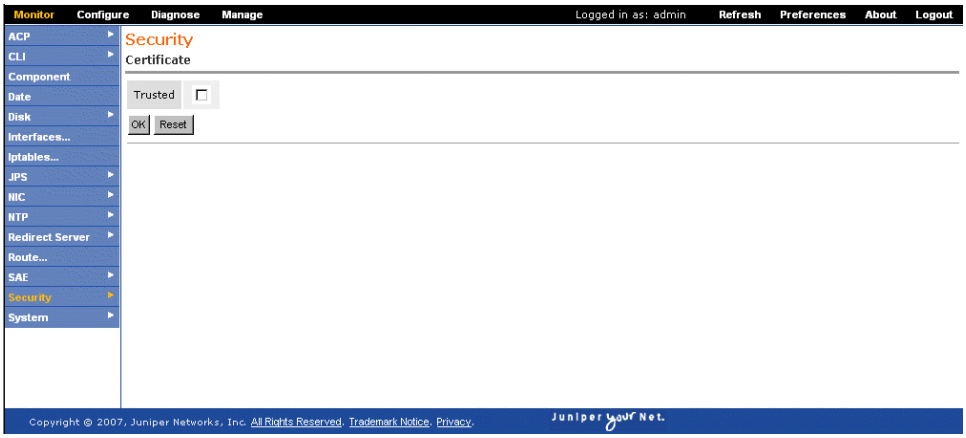
## Viewing Information About Security Certificates (C-Web Interface)

**Purpose** View messages generated during SRC software startup.

**Action**

1. Click **Monitor**>**Security**>**Certificate**.

   The Certificate pane appears.




2. To display authority certificates, select the **Trusted** check box.
3. Click **OK**.

   The Certificate pane displays the security certificates.

**Related Documentation**

- Viewing Information About Security Certificates (SRC CLI) on page 19
- For information about managing security digital certificates, see Overview of Digital Certificates on page 9

CHAPTER 5

# Management Commands



## Commands to Manage Digital Certificates

You can use the following operational mode commands to manage digital certificates. Which commands you use depends on whether or not you use SCEP.

- **clear security certificate**
- **clear certificate request**
- **request security generate-certificate-request**
- **request security enroll** (SCEP)
- **request security get-ca-certificate** (SCEP)
- **request security import-certificate**
- **show security certificate**

**Related Documentation**

- Manually Obtaining Digital Certificates (SRC CLI) on page 13
- Obtaining Digital Certificates through SCEP (SRC CLI) on page 14
- For detailed information about each command, see the *SRC PE CLI Command Reference*

PART 3

# Index

# Index