Cisco SRE Service Module Configuration and Installation Guide

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Cisco Services Ready Engine (Cisco SRE) service modules (SMs) installed in one of the SM slots in the Cisco 2900 Series or Cisco 3900 Series Integrated Services Router Generation 2 (Cisco ISR G2) enables the router to host Cisco, third-party, and custom applications.

Contents

About the Cisco Service Modules

Cisco Internal Service Module-Services Ready Engine (Cisco ISM-SRE) and Cisco Service Module-Services Ready Engine (Cisco SM-SRE) hosted by the Cisco ISR G2 have their own processors, storage, network interfaces, and memory that operate independently of the host router resources. This configuration helps to ensure maximum concurrent routing and application performance. A service-ready deployment model enables branch-office applications to be provisioned remotely on the modules at any time. The Cisco ISM-SRE and Cisco SM-SRE also support Cisco Software Licensing (CSL) and Pay-as-you-Grow (PAY-GO) features.

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Factory Installed Cisco SRE

Customers can buy a service-ready Cisco 2911, Cisco 2921, Cisco 2951, Cisco 3925, or Cisco 3945 Series ISR G2 in which the module slots are already filled with Cisco ISM-SRE or SM-SRE modules. These modules may or may not have software already installed on them. Cisco SRE software supports this hardware-software decoupling, or PAY-GO model, by permitting you to provision and pay for software services separately from the hardware and after the services are deployed.

The Cisco SRE bootloader allows for greater flexibility and eliminates the requirement for a separate bootloader for each new application software to be installed. Cisco SRE supports installing and uninstalling Cisco-authorized software, such as Cisco Unity Express, Cisco Application eXtension Platform (Cisco AXP), and Cisco IP Video Surveillance using Cisco IOS software commands and prevents unauthorized software and applications from running on Cisco SRE modules.

Installing the Cisco SRE Hardware

If the Cisco SRE is not preinstalled in the host router at the factory, you must first install the Cisco SRE hardware in your host Cisco 2911, Cisco 2921, Cisco 2951, or Cisco 3900 Series ISR G2. To install the module, see the "Cisco Internal Service Module: Cisco ISM-SRE" section on page 5 or the "Cisco Service Module: Cisco SM-SRE" section on page 6, depending on whether your Cisco SRE is a Cisco ISM-SRE or an SM-SRE.

After installing the Cisco SRE hardware, use Cisco IOS commands to configure the Cisco SRE as an SM interface of the host router. To configure the Cisco SRE as an interface to the Cisco ISR G2, see the "Configuring the Cisco SRE Module Interface" section on page 8.

Installing the Cisco-Authorized Application

To install Cisco-authorized software applications on Cisco SRE modules, see the "Installing a Cisco-Authorized Application on a Cisco SRE Module" section on page 16.

Cisco SRE also supports a common uninstall process across all supported software. To uninstall Cisco-authorized software applications on a Cisco SRE module, see the "Uninstalling a Cisco-Authorized Application on a Cisco SRE Module" section on page 18.

Table 1 lists those Cisco-authorized applications that are compatible with the Cisco SRE.

Table 1 Cisco-Authorized Applications Compatible with Cisco SRE Module

Cisco-Authorized Application
Cisco AXP
Cisco Unified SRSV-CUE[1] release 8.0.2 and later versions
Cisco Unity Express
Cisco UMG[2] release 8.0.2 and later versions
Cisco Video Management and Storage System
WAAS[3]

1. Cisco Unified Survivable Remote Site Voicemail-Cisco Unity Express
2. Cisco Unified Messaging Gateway
3. WAAS = Wide Area Application Services.

If you are already familiar with the parameters to be configured, you can manually enter the values to be used without having to run the installer for user interaction. For example, instead of being prompted with the language options for Cisco Unity Express, you can enter the appropriate variable string and the installer verifies the values against the valid language options and does not prompt you for that option during the interactive portion of the installation process.

See your application's command-line interface (CLI) administrator guide for details on how to configure application parameters using the CLI.

Some configuration options may be set using Cisco Configuration Professional web-based applications. See www.cisco.com/go/ciscocp for more details about downloading and using Cisco Configuration Professional.

To upgrade Cisco SRE software to the later version, see the application's installation and upgrade guide.

After the application software is installed, the SMs have their own startup and run-time configurations that are independent of the Cisco IOS configuration on the host router. The SMs do not have an external console port. Instead, you launch and configure each module through the host router by means of a configuration session on the module. After the session, you can return to the router's CLI and clear the session.

The host router and the SM (the module is also referred to as an *appliance* or *blade* or, with installed software, a *service module*)—provide a router-integrated application platform for accelerating data-intensive applications.

Typically, such applications involve the following services:

- Application-oriented networking
- Contact centers and interactive voice-response applications
- Content caching and delivery
- Data and video storage
- Voice mail and auto-attendant applications

To configure and manage the Cisco ISM-SRE and SM-SRE modules, you should understand the following topics:

- Prerequisites, page 4
- Restrictions, page 4
- Recommended Practices for Cisco Service Modules, page 5
- Cisco Internal Service Module: Cisco ISM-SRE, page 5
- Cisco Service Module: Cisco SM-SRE, page 6
- Cisco ISM-SRE and SM-SRE Network Interfaces, page 6

Prerequisites

Router

- Plan software installations, upgrades, or downgrades for times when you can take all applications that run on the host router out of service or offline.
- Ensure that you have the appropriate Cisco 2911, Cisco 2921, Cisco 2951, or Cisco 3900 Series ISR G2s to serve as the host router. The Cisco ISM-SRE and SM-SRE are supported on the following routers:
  - Cisco 2911, Cisco 2921, Cisco 2951, and Cisco 3900 Series ISR G2s
- Ensure that the host router is running Cisco IOS Release 15.0(1)M or a later software release. To see which release your router is currently running, examine the output from the **show version** command. Also, see your platform documentation for the required Cisco IOS software release.

Note When minimum release requirements are met, you can change images on either the router or the SRE modules without affecting performance.

- Software, including its release version, must be compatible with Cisco ISM-SRE or SM-SRE. For more information on compatibility, see your software application documentation.
- Ensure that you have an FTP or HTTP server to which an installation file (in ZIP format) can be downloaded from Cisco.com and unzipped prior to installation being performed from the router.
- There must be a 100-kpbs or faster effective link between the router and the FTP server.

Restrictions

- Cisco router and Cisco SRE module on which software is to be installed or uninstalled must be compatible with Cisco SRE, such as a Cisco ISM-SRE or SM-SRE installed in a Cisco 2911, Cisco 2921, Cisco 2951, or Cisco 3900 Series ISR G2.
- In releases earlier than Cisco IOS Release 15.1(4)M, you cannot use the Cisco router to install or uninstall software on two or more Cisco SRE modules in the same router, at the same time. You must wait until the install or uninstall completes before issuing a command to initiate a second process on the same module. This restriction does not apply to Cisco IOS Release 15.1(4)M and later releases.
- While installing or uninstalling software, you cannot use the **reset** or **shutdown** commands in Cisco IOS software to reset or shut down the Cisco SRE module.
- The following hard disk drive (HDD) spare assemblies are not exchangeable:
  - SM-HDDA-SATA500GB for the SM-SRE-700-K9 and SM-SRE-900-K9
  - SM-HDDB-SATA500GB for SM-SRE-710-K9 and SM-SRE-910-K9

Recommended Practices for Cisco Service Modules

This section describes recommended practices for safe and effective installation of the hardware described in this document, and includes the following sections:

Preventing Electrostatic Discharge Damage

Electrostatic discharge can damage equipment and impair electrical circuitry. Electrostatic discharge occurs when electronic printed circuit cards, such as those used in Cisco service modules and network modules, are improperly handled and can result in complete or intermittent equipment failure. Always observe the following electrostatic discharge damage (ESD) prevention procedures when installing, removing, and replacing Cisco service modules, Cisco network modules, Cisco interface cards, Cisco expansion modules, or other electronic printed circuit cards:

- We recommend use of shielded cable on the Gigabit Ethernet (GE) port for maximum ESD protection.
- Make sure that the router chassis is electrically connected to earth ground.
- Wear an ESD-preventive wrist strap, and make sure that it makes good contact with your skin.
- Connect the wrist strap clip to an unpainted portion of the chassis frame to channel unwanted ESD voltages to ground.

Caution The wrist strap and clip must be used correctly to ensure proper ESD protection. Periodically confirm that the resistance value of the ESD-preventive wrist strap is between 1 and 10 megohms (Mohm).

- If no wrist strap is available, ground yourself by touching the metal part of the router chassis.

Cisco Internal Service Module: Cisco ISM-SRE

- Install the Cisco ISM-SRE in the internal service module (ISM) slot of the Cisco 1900 Series, 2900 Series, or Cisco 3900 Series ISR G2 router. See the following for installation details:
  - *Cisco 1900 Series Hardware Installation Guide*
  - *Cisco 2900 Series and 3900 Series Hardware Installation Guide*
  - *Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information*
- All Cisco ISM-SRE models ship from the factory with the hardware preinstalled as listed in Table 2.

Table 2 Cisco ISM-SRE Hardware

Model	Processor	eUSB Flash	Memory
ISM-SRE-300-K9	1.066 GHz	4 GB	512 MB

Cisco Service Module: Cisco SM-SRE

- Install the Cisco SM-SRE in one of the SM slots in the Cisco 2911, Cisco 2921, Cisco 2951, or Cisco 3900 Series router. See *Installing Cisco Network Modules and Service Modules in Cisco Access Routers* and *Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information*.
- All Cisco SM-SRE models ship from the factory with the hardware preinstalled as listed in Table 3. **Note:** Modules SM-SRE-900-K9 and SM-SRE-910-K9 have 2 x 500 GB hard drives giving a total of 1 TB with RAID 1 architecture. (RAID = Redundant Array of Independent Disks.)

Table 3 Cisco SM-SRE Hardware

Model	Processor	Hard Disk(s)	Memory	eUSB Flash
SM-SRE-700-K9	1.86 GHz single core	1 x 500 GB (SATA) 5400 RPM	4 GB	2 GB
SM-SRE-710-K9	1.86 GHz single core	1 x 500 GB (SATA) 7200 RPM	4 GB	2 GB
SM-SRE-900-K9	1.86 GHz dual core	2 x 500 GB (SATA) 5400 RPM	4 GB	2 GB
SM-SRE-910-K9	1.86 GHz dual core	2 x 500 GB (SATA) 7200 RPM	4 GB	2 GB

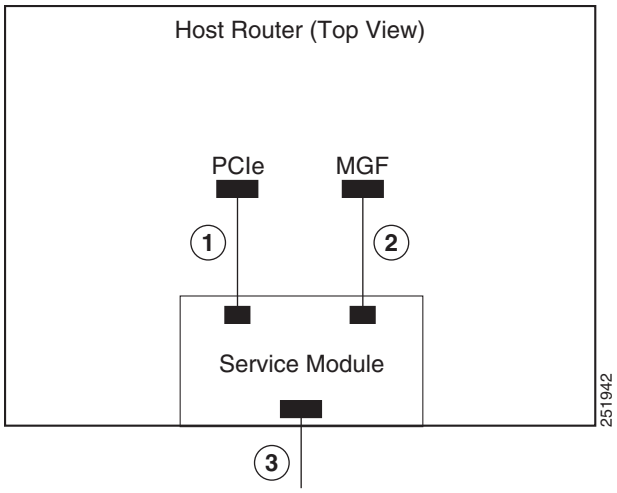
- Make a note of the SM's location in the host router:
  - *slot*—Number of the router slot in which the SM is installed. After you install the module, you can get this information from the router's **show running-config** command output.
  - *port*—Port number of the module interface. This value is always 0.

You need this information for the "Configuring the SRE Interface on the Router" section on page 8 and the "Opening and Closing a Session" section on page 12.

Cisco ISM-SRE and SM-SRE Network Interfaces

The SM communicates with the host router through two internal Gigabit Ethernet (GE) interfaces (see Figure 1). One GE interface connects to the router Peripheral Component Interconnect Express (PCIe) backplane and is configured and managed using the Cisco IOS CLI; the other GE interface connects to the multi-gigabit fabric (MGF) which is configured using the Cisco IOS CLI and managed by the Cisco-authorized application installed on the module. This section covers the following topics:

Figure 1 Router and Cisco ISM-SRE and SM-SRE Interfaces



Callout	ISM-SRE Interface	Interface Numbering	Location	Configure From
1	Service-Module interface (Module interface to router)	*slot*/0	PCIe	Cisco IOS CLI
2	MGF interface (Module interface to MGF)	*slot*/1	MGF	Cisco IOS CLI

Callout	SM-SRE Interface	Interface Numbering	Location	Configure From
1	Service-Module interface (Module interface to router)	*slot*/0	PCIe	Cisco IOS CLI
2	MGF interface (Module interface to MGF)	*slot*/1	MGF	Cisco IOS CLI
3	External interface (Module interface to external link)	application dependent	SM-SRE faceplate	SM CLI

Service-Module Interface

The service-module interface is used to access the SM console for configuration. Visible only to the Cisco IOS software on the host router, the service-module interface is an internal Gigabit Ethernet interface between the router and the Cisco ISM-SRE or the SM-SRE. The service-module interface connects to the router's PCIe backplane, and all configuration and management of the service-module interface is performed using the Cisco IOS CLI.

MGF Interface

Note The MGF interface is not supported by Cisco WAAS.

The MGF interface enables the Cisco ISM-SRE or the SM-SRE to communicate with one or more SMs installed in the host router. This interface is an internal Gigabit Ethernet interface using a High-Speed Intrachassis Module Interconnect (HIMI) connection to the router's MGF, providing a logical connection between SMs. Configuration of the MGF interface is performed from the Cisco IOS CLI. The Cisco-authorized application running on the Cisco ISM-SRE or the SM-SRE manages the connections. For more information on configuring the MGF, see the Multi-Gigabit Fabric on the Router chapter of the *Cisco 3900 Series, 2900 Series, and 1900 Series Integrated Services Routers Software Configuration Guide*.

Cisco SM-SRE External Service Module Interface

The external service-module interface can be used to monitor LAN traffic. You can also select the external interface as the management interface for the SM. The external interface cannot be used for downloading applications.

Visible only to the SM software on the Cisco SM-SRE, the external service-module interface is the Gigabit Ethernet interface connector on the Cisco SM-SRE faceplate. The external interface supports data requests and data transfers from outside sources, and it provides direct connectivity to the LAN through an RJ-45 connector.

Configuring the Cisco SRE Module Interface

This section describes how to configure basic network parameters for the SM using the Cisco IOS CLI.

This section contains the following tasks:

- Configuring the SRE Interface on the Router, page 8
- Opening and Closing a Session, page 12
- Shutting Down and Starting Up the Cisco SRE Module, page 14

Note If you lose power or connection during any of the following procedures, the system usually detects the interruption and tries to recover. If it fails to recover, reinstall the system using the boothelper.

Configuring the SRE Interface on the Router

Your first configuration task is to set up the internal interface between the Cisco ISM-SRE or SM-SRE module and the host router, which then enables you to access the SM to install and configure Cisco applications.

To configure the Cisco ISM-SRE or SM-SRE interface to the host router, complete the following steps.

SUMMARY STEPS

From the Host-Router CLI

1. **enable**
2. **configure terminal**

3. **interface ism 0/0**
   or
   interface sm *slot*/**0**
4. **ip address** *router-side-ip-address subnet-mask*
   or
   ip unnumbered *type number*
5. **service-module ip address** *module-side-ip-address subnet-mask*
6. **service-module ip default-gateway** *gateway-ip-address*
7. **no shutdown**
8. **end**
9. **ip route** *prefix mask ip-address*
10. **copy running-config startup-config**
11. **show running-config**

DETAILED STEPS

	Command or Action	Purpose
	From the Host-Router CLI	
Step 1	**enable** *password* **Example:** `Router> enable` `Router> password` `Router#`	Enters privileged EXEC mode on the host router. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode on the host router.
Step 3	**interface ism 0/0** or **interface sm** *slot*/**0** **Example:** `Router(config)# interface ism 0/0` or `Router(config)# interface sm 1/0`	Enters interface configuration mode for the slot and port where the ISM resides. or Enters interface configuration mode for the slot and port where the SM resides.

	Command or Action	Purpose
Step 4	**ip address** *router-side-ip-address subnet-mask* or **ip unnumbered** *type number* **Example:** `Router(config-if)# ip address 192.168.1.1 255.255.255.0` or `Router(config-if)# ip unnumbered gigabitethernet 1/0`	Specifies the IP address for the router side of the interface. • *router-side-ip-address subnet-mask*—IP address and subnet mask for the router. or Enables IP processing on an interface without assigning an explicit IP address to the interface. • *type*—Type of interface on which the router has an assigned IP address. • *number*—Number of the interface on which the router has an assigned IP address. **Note** The unnumbered interface cannot be another unnumbered interface.
Step 5	**service-module ip address** *module-side-ip-address subnet-mask* **Example:** `Router(config-if)# service-module ip address 192.168.1.2 255.255.255.0`	Specifies the IP address for the module side of the interface. • *module-side-ip-address*—IP address for the module. • *subnet-mask*—Subnet mask to append to the IP address; must be in the same subnet as the host router
Step 6	**service-module ip default-gateway** *gateway-ip-address* **Example:** `Router(config-if)# service-module ip default-gateway 192.168.1.1`	Specifies the IP address of the default gateway for the module. • *gateway-ip-address*—IP address for the default router. **Note** If you configured the **ip unnumbered** command on the SM interface in Step 4, set the IP address of the default gateway to the IP address of the unnumbered interface.
Step 7	**no shutdown** **Example:** `Router(config-if)# no shutdown`	Restarts a disabled interface.
Step 8	**end** **Example:** `Router(config-if)# end`	Returns to global configuration mode on the host router.
Step 9	**ip route** *prefix mask ip-address* **Example:** `Router# ip route 192.168.1.1 255.255.255.255 sm1/0`	Establishes static routes. **Note** When the **ip unnumbered** command is configured on the SM interface in Step 4, you must use the **ip route** command to add a static route to the SM.

	Command or Action	Purpose
Step 10	**copy running-config startup-config** **Example:** `Router# copy running-config startup-config`	Saves the router's new running configuration as the startup configuration.
Step 11	**show running-config** **Example:** `Router# show running-config`	Displays the router's running configuration, so that you can verify address configurations.

Examples

The following example shows the configuration of the internal interface between the Cisco ISM-SRE and the router:

```
interface ISM0/0
 ip address 192.168.1.1 255.255.255.0
 service-module ip address 192.168.1.2 255.255.255.0
 service-module default-gateway 192.168.1.1
 hold-queue 60 out
```

The following example shows the configuration of the internal interface between the Cisco SM-SRE and the router:

```
interface SM1/0
 ip address 192.168.1.1 255.255.255.0
 service-module ip address 192.168.1.2 255.255.255.0
 service-module ip default-gateway 192.168.1.1
 hold-queue 60 out
```

The following example shows the configuration of the internal interface between the Cisco SM-SRE and the router where the **ip unnumbered** command is configured on the interface and a static route to the SM is created:

```
Interface G0/0
ip address 192.168.1.1 255.255.255.0
hold-queue 60 out


interface SM1/0
ip unnumbered g0/0
service-module ip address 192.168.1.2 255.255.255.0
service-module default-gateway 192.168.1.1
hold-queue 60 out

ip route 192.168.1.2 255.255.255.255 sm1/0
```

Opening and Closing a Session

You can now open and close a session on the Cisco ISM-SRE or SM-SRE.

Note

- Before you install your application software, opening a session brings up the bootloader. At the bootloader prompt, the module status will be "is trying to recover from error." After you install the software, opening a session brings up the application.
- You can conduct only one session at a time.

To first check the running status and then open or close a session with the SRE module, complete the following steps:

SUMMARY STEPS

From the Host-Router CLI

1. **enable**
2. **service-module ism 0/0 status**
   or
   service-module sm *slot*/**0 status**
3. **service-module ism 0/0 session**
   or
   service-module sm *slot*/**0 session**

From the Service-Module Interface

4. Perform configuration or other procedures.
5. **Control-Shift-6 x**

From the Host-Router CLI

6. **service-module ism 0/0 session clear**
   or
   service-module sm *slot*/**0 session clear**

DETAILED STEPS

	Command or Action	Purpose
	From the Host-Router CLI	
Step 1	**enable** *password* **Example:** `Router> enable` `Router> password` `Router#`	Enters privileged EXEC mode on the host router. Enter your password if prompted.

	Command or Action	Purpose
Step 2	**service-module ism 0/0 status** or **service-module sm** *slot*/**0 status** **Example:** `Router# service-module ism 0/0 status` or `Router# service-module sm 1/0 status`	Displays the status of the Cisco ISM-SRE module, or displays the status of the Cisco SM-SRE module, so that you can ensure that the module is running (that is, in steady state). **Note** If the module is not running, start it with one of the startup commands listed in the "Shutting Down and Starting Up the Cisco SRE Module" section on page 14.
Step 3	**service-module ism 0/0 session** or **service-module sm** *slot*/**0 session** **Example:** `Router# service-module ism 0/0 session` `Trying 10.10.10.1, 2065 ... Open` or `Router# service-module sm 1/0 session` `Trying 10.10.10.1, 2065 ... Open`	Begins a session on the Cisco ISM-SRE module, or begins a session on the Cisco SM-SRE module. Perform one of the following: • To interrupt the auto-boot sequence and access the bootloader, quickly type ***. • To start a configuration session, press **Enter**.
	From the Service-Module Interface	
Step 4	. . . **Example (Bootloader):** `ServicesEngine boot-loader> config` **Example (Configuration):** `SE-Module> configure terminal` `SE-Module(config)>` . . . `SE-Module(config)>exit` `SE-Module> write`	Enters bootloader or configuration commands on the module as needed. Use bootloader commands for debugging and troubleshooting purposes only. • Bootloader command choices include **boot**, **config**, **exit**, **help**, **ping**, **reboot**, **show**, and **verify**. • Enter configuration commands. Exit global configuration mode with the **exit** command. Save your new configuration with the **write** command. Notice that you do not use the **enable** command and the prompt does not change from **>**.
Step 5	Press **Control-Shift-6 x**.	Closes the service-module session and returns to the host router CLI. **Note** The service-module session stays up until you clear it in the next step. While it remains up, you can return to it from the router CLI by pressing **Enter**.

	Command or Action	Purpose
	From the Host-Router CLI	
Step 6	**service-module ism 0/0 session clear** **or** **service-module sm** *slot*/**0 session clear** **Example:** `Router# service-module ism 0/0 session clear` or `Router# service-module sm 1/0 session clear`	Clears the service-module session for the Cisco ISM-SRE module, or Clears the service-module session for the Cisco SM-SRE module. When prompted to confirm this command, press **Enter**.

Shutting Down and Starting Up the Cisco SRE Module

To shut down or start up the SM, select from the common router commands listed in Table 4.

Note The tables in these sections list only the most common router commands.

- To view a complete list of available interface commands, type **?** at the prompt (Example: `Router(config-if)# ?`).
- To view a complete list of command keyword options, type **?** at the end of the command (Examples: `Router# service-module ism ?` or `Router# service-module sm ?`).

Note

- Some shutdown commands can potentially disrupt service. If the command output for such a command displays a confirmation prompt, confirm by pressing **Enter** or cancel by typing **n** and pressing **Enter**. You can prevent the prompt from displaying by using the **no-confirm** keyword.
- Some commands shut the module or application down and then immediately restart it.

Table 4 Common Shutdown and Startup Commands

Configuration Mode	Command	Purpose
`Router#`	**service-module ism 0/0 reload** or **service-module sm** *slot*/**0 reload**	Shuts down the SM operating system gracefully and then restarts it from the bootloader.
`Router#`	**service-module ism 0/0 reset** or **service-module sm** *slot*/**0 reset**	Resets the hardware on a module. Use this command only to recover from shutdown or a failed state. **Caution** Using this command does *not* provide an orderly software shutdown and may impact file operations that are in progress.
`Router#`	**service-module ism 0/0 session** or **service-module sm** *slot*/**0 session**	Accesses the specified service engine and begins an SM configuration session.
`Router#`	**service-module ism 0/0 shutdown** or **service-module sm** *slot*/**0 shutdown**	Shuts down the SM operating system gracefully. Use when removing or replacing a hot-swappable module during OIR.[1] After shutting down the operating system using these commands, use the **service-module ism reset** or **service-module sm reset** command to restart it.
`Router#`	**service-module ism 0/0 status** **or** **service-module sm** *slot*/**0 status**	Displays configuration and status information for the SM hardware and software.
`Router(config)#`	**shutdown**	Shuts down the entire system (both the host router and the SM) gracefully.

1. OIR = online insertion and removal.

Installing and Uninstalling a Cisco Application on the Cisco SRE

This section contains the following topics:

Prerequisites

- Follow the instructions in your application-specific documentation for obtaining and preparing your application files for installation. After downloading your application's installation file(s) onto an FTP or HTTP server, make sure that all the installation files are in the same directory.
- Configure the SRE module interface as described in the "Configuring the Cisco SRE Module Interface" section on page 8.

Installing a Cisco-Authorized Application on a Cisco SRE Module

To use Cisco SRE to install, reinstall, or update Cisco-authorized software, complete the following steps. See the installation and upgrade documentation for the specific application to be installed for more details.

Note To stop the install while the files are being downloaded and before the actual installation begins, use the **service-module ism install abort** or **service-module sm install abort** command. For more information, see *Cisco IOS Interface and Component Command Reference*.

Once the installation begins, do not enter commands on the module until the "Installation successful..." message appears.

To install a Cisco-authorized software application on the SRE module, complete the following steps.

SUMMARY STEPS

1. **enable**
2. **service-module ism** *slot/port* **install url** *url* [**script** *filename*] [**argument "***string***"**] [**force**]
   or
   service-module sm *slot/port* **install url** *url* [**script** *filename*] [**argument "***string***"**] [**force**]
3. **service-module ism** *slot/port* **status**
   or
   service-module sm *slot/port* **status**
4. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** *password* **Example:** `Router> enable` `Router> password` `Router#`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**service-module ism** *slot*/**0 install url** *url* [**script** *filename*] [**argument "***string***"**] [**force**] or **service-module sm** *slot*/**0 install url** *url* [**script** *filename*] [**argument "***string***"**] [**force**] **Example:** `Router# service-module ism 0/0 install url ftp://username:passwd@server.com/axp-k9.sme.1.6.1.pkg` or `Router# service-module sm 1/0 install url ftp://ftp-server/dir-name/WAAS-release_version-K9.bin` or `Router# service-module ism 0/0 install url ftp://test:test@10.50.10.25/cue-vm-k9.sme.8.0.1.pkg` or `Router# service-module sm 1/0 install url http://10.50.10.25/download/pkg_dir/WAAS-4.2.0-K9.bin` or `Router# service-module sm 1/0 install url http://username:password@10.50.10.25/download/pkg_dir/WAAS-4.2.0-K9.bin`	Runs bootloader to start installation of an application on the specified Cisco SRE module. • *slot*/*port*—Position of target module in router chassis. For Cisco ISM-SRE or SM-SRE, always use 0 for the port number. The slash (/) is required between the slot and port numbers. • **url** *url*—URL, as defined in RFC 2396, of the server and directory on which the application packages and Tcl script are located. The URL should include the .bin or .pkg file on the FTP or HTTP server, for example: `ftp://username:passwd@server.com/axp-k9.sme.1.6.1.pkg` The router downloads and installs all other files required to complete the application installation. **Note** If you use two or more of the following optional keywords with this command, you must use them in the order listed. • (Optional) **script** *filename*—Runs the specified Tcl script rather than the default installer script. • (Optional) **argument "***string***"**—Passes contents of *string* directly to the Tcl script via the command line. • (Optional) **force**—Installs the application without first prompting for user input. If you use this keyword and if the application requires you to provide certain variables during the installation, you should also use the **argument "***string***"** keyword/argument combination to manually provide the required variables because the **force** keyword will direct the installer to bypass all user interaction during the installation.

	Command or Action	Purpose
Step 3	**service-module ism** *slot*/**0 status** or **service-module sm** *slot*/**0 status** **Example:** `Router# service-module ism 0/0 status` or `Router# service-module sm 2/0 status`	(Optional) Monitors progress of the installation.
Step 4	**exit** **Example:** `Router# exit`	Exits privileged EXEC mode.

Installing a Cisco-Authorized Application on a Cisco SRE Module: Example

The following example is a snapshot of an installation of Cisco Unity Express version 8.0.1 on a Cisco ISM-SRE. Commands entered and significant output appear in bold text.

```
c2911# service-module ism 0/0 install url
ftp://test:test@10.50.10.25/cue-vm-k9.sme.8.0.1.pkg

Delete the installed Cisco Unity Express and proceed with new installation? [no]: y
Loading 8.0.1/cue-vm-k9.sme.8.0.1.pkg.install.sre !
[OK - 22272/4096 bytes]
.
.
.
Application-specific messages
.
.
.
c2911# Install successful on ISM0/0
```

Uninstalling a Cisco-Authorized Application on a Cisco SRE Module

To use Cisco SRE to uninstall Cisco-authorized software and to uninstall a Cisco-authorized software application on the SRE module, perform the following steps:

Note This procedure completely erases the disk or compact flash on the services engine and removes the application keys. It does not remove application licenses.

SUMMARY STEPS

1. **enable**
2. **service-module ism** *slot/port* **uninstall** [**force**]

or

service-module sm *slot/port* **uninstall** [**force**]

3. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** *password* **Example:** `Router> enable` `Router> password` `Router#`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**service-module ism** *slot*/**0 uninstall** [**force**] or **service-module sm** *slot*/**0 uninstall** [**force**] **Example:** `Router# service-module ism 0/0 uninstall` or `Router# service-module sm 2/0 uninstall`	Uninstalls the SRE-supported application on the specified Cisco SRE module. • This command completely erases the disk or compact flash on the Cisco SRE module and removes application keys. It does not remove application licenses. • *slot*/*port*—Position of target module in the router chassis. For Cisco ISM-SRE or SM-SRE, always use 0 for the port number. The slash (/) is required between the slot and port numbers. • (Optional) **force**—Uninstalls the application without first prompting for confirmation.
Step 3	**exit** **Example:** `Router# exit`	Returns to privileged EXEC mode.

Uninstalling a Cisco-Authorized Application on a Cisco SRE Module: Example

The following example is a snapshot of the process of uninstalling Cisco Unity Express version 8.0.1 on a Cisco ISM-SRE. Commands entered and significant output appear in bold text:

```
Router# service-module ism 0/0 uninstall

Delete the installed Cisco Unity Express permanently? [no]: yes

Router#

Service module in slot 0 shutting down in 105 seconds...

Service module in slot 0 shutting down in 90 seconds...

Service module in slot 0 shutting down in 75 seconds...

Service module in slot 0 shutting down in 60 seconds...

Service module in slot 0 shutting down in 45 seconds...

Service module in slot 0 shutting down in 30 seconds...
```

```
Service module in slot 0 shutting down in 15 seconds...

Uninstall successful on ISM0/0
```

Configuring the MGF Interface on the Module

Note The MGF interface is not supported by Cisco WAAS.

Cisco 3900 series and Cisco 2900 series Generation 2 ISRs use MGF for the modules and interface cards to inter-communicate on the router. MGF configuration is optional. Legacy modules that support Cisco HIMI also support MGF to inter-communicate on the router. Next generation module drivers integrate with the MGF to perform port configurations, configure packet flow, and control traffic buffering.

This procedure applies to Cisco SREs running software releases earlier than Cisco IOS Release 15.1(3)T. The commands used to configure the MGF interface in this procedure are not available in Cisco IOS Release 15.1(3)T and later software releases.

SUMMARY STEPS

From the Host-Router CLI

1. **enable**
2. **configure terminal**
3. **interface ism 0/1**
   or
   interface sm *slot*/**1**
4. **service-module ip address** *module-side-ip-address subnet-mask*
5. **end**
6. **copy running-config startup-config**
7. **show running-config**

DETAILED STEPS

	Command or Action	Purpose
	From the Host-Router CLI	
Step 1	**enable** *password* **Example:** `Router> enable` `Router> password` `Router#`	Enters privileged EXEC mode on the host router. Enter your password if prompted.

	Command or Action	Purpose
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode on the host router.
Step 3	**interface ism 0/1** or **interface sm** *slot*/**1** **Example:** `Router(config)# interface ism 0/1` or `Router(config)# interface sm 1/1`	Enters interface configuration mode for the slot and port where the Cisco ISM-SRE resides. or Enters interface configuration mode for the slot and port where the Cisco SM-SRE resides.
Step 4	**service-module ip address** *module-side-ip-address subnet-mask* **Example:** `Router(config-if)# service-module ip address 10.10.10.1 255.255.255.0`	Specifies the IP address for the module side of the interface. • *module-side-ip-address*—IP address for the module. • *subnet-mask*—Subnet mask to append to the IP address; must be in the same subnet as the host router
Step 5	**end** **Example:** `Router(config-if)# end`	Returns to global configuration mode on the host router.
Step 6	**copy running-config startup-config** **Example:** `Router# copy running-config startup-config`	Saves the router's new running configuration as the startup configuration.
Step 7	**show running-config** **Example:** `Router# show running-config`	Displays the router's running configuration, so that you can verify address configurations.

Examples

The following example shows the configuration of the interface between the Cisco ISM-SRE and the MGF:

```
interface ISM0/1
 service-module ip address 10.10.10.1 255.255.255.0
```

The following example shows the configuration of the interface between the Cisco SM-SRE and the MGF:

```
interface SM1/1
 service-module ip address 10.10.10.1 255.255.255.0
```

Cisco IOS Software Command Reference

The following commands are new or have been modified.

- **service-module sm install abort**
- **service-module sm install**
- **service-module sm log clear**
- **service-module sm log show**
- **service-module sm uninstall**
- **service-module sm status**

For information about commands in this guide, see the *Cisco IOS Interface and Hardware Component Command Reference* at http://www.cisco.com/en/US/docs/ios/interface/command/reference/ir_book.html.

For information about all Cisco IOS commands, use the Command Lookup Tool at http://tools.cisco.com/Support/CLILookup or the *Cisco IOS Master Command List, All Releases*, at http://www.cisco.com/en/US/docs/ios/mcl/allreleasemcl/all_book.html.

service-module sm install abort

To abort the installation of a specific application module that is SRE-enabled, use the **service-module sm install abort** command in privileged EXEC mode.

service-module sm *slot/port* **install abort** [**force**]

Syntax Description

slot/port	Location of the services engine module in the router. For service modules, the slot number is 1 to 4 and the port number must be 0.
force	(Optional) Specifies to bypass all user interaction during the abort process. The Tcl script automatically stops the installation and no confirmation prompt is shown.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.0(1)M	This command was introduced.

Usage Guidelines

Use this command to abort the installation of an SRE-enabled application module if any failure occurs. You will not be prompted to confirm the action. After entering this command, you have to wait for the final abort message to appear on the console before proceeding with a new installation.

Examples

The following example aborts the installation of an SRE-enabled application module:

```
WAE# service-module sm 1/0 install abort
```

service-module sm install

To use Cisco SRE to install an application on a service module (Cisco SM-SRE), use the **service-module sm install** command in privileged EXEC mode.

service-module sm *slot/port* **install url** *url* [**script** *filename*] [**argument "***string***"**] [**force**]

Syntax Description

slot/port	Location of the services engine module in the router. For service modules, the slot number is 1 to 4 and the port number must be 0.
url *url*	Address of FTP or HTTP server, as defined in RFC 2396, on which application packages and Tcl scripts are located.
script	(Optional) Changes name of Tcl script to be run from default value to script specified by *filename* argument.
filename	Name of Tcl script.
argument	(Optional) Does not present options for the variable specified in the *string* argument.
string	Alphanumeric characters of variable to be passed directly to the Tcl script via the command line. Variable must be enclosed in quotation marks (“”)
force	(Optional) Specifies to proceed with the installation without prompting for user input. The Tcl script proceeds automatically.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.0(1)M	This command was introduced.

Usage Guidelines

This command uses a common module-dependent bootloader on Cisco SRE to install a Linux-based application, such as Cisco Unity Express or Cisco AXP, on a service module (Cisco SM-SRE).

The slash mark (**/**) is required between the *slot* argument and the *port* argument.

You can only issue one instance of this command at a time on a router. You cannot use this command to install an application on two or more services engine modules in the same router at a time.

The Tcl script to be run must reside in the same FTP or HTTP server and directory as the application packages to be installed. If a credential is required, the user name and password must be imbedded in the url as shown in the following example:

```
Router# service-module sm 1/0 install url
ftp://username:passwd@server.com/axp-k9.sme.1.6.1.pkg
```

If two or more of the optional keyword/argument combinations are used with this command, they must be issued in the order presented in the command syntax. For example, you cannot use the **force** keyword before the **script** or **argument** keywords nor the **argument** keyword before the **script** keyword when you issue this command.

Use the **script** *filename* keyword/argument combination with this command to specify that the Cisco IOS software use some Tcl script other than the default installer during the installation.

Use the **argument "***string***"** keyword/argument combination with this command to manually provide variables during installation process and bypass the user interaction feature of the installer. The variable must include the left and right quotation marks ("").

Use the **force** keyword with this command to install an application without prompting for user input. If you use this keyword and if the application requires you to provide certain variables during the installation, you should also use the **argument "***string***"** keyword/argument combination to manually provide the required variables because the **force** keyword will direct the installer to bypass all user interaction during the installation.

To stop the install while the Tcl script is being downloaded, use the **service-module sm install abort** command. This command cannot be used once the actual installation begins.

Examples

The following example shows how to use this command to run a "help.sre" Tcl script rather than the default installation Tcl script:

```
Router# service-module sm 1/0 install url ftp://server.com/cue script help.sre
Router#
```

The following example shows how to direct the installer to use the specified language variable for US English instead of prompting you with language options for Cisco Unity Express:

```
Router# service-module sm 1/0 install url ftp://server.com/cue argument "lang=en_us"
Router#
```

The following example shows the messages displayed on the module console during a successful installation using Cisco SRE:

```
Feb  6 19:09:22.526 EDT: %SM_INSTALL-6-INST_PROG: Service-Module-SM 1/0 PROGRESSING:
Validating package signature ...1 .
Feb  6 19:09:23.058 EDT: %SM_INSTALL-6-INST_PROG: Service-Module-SM 1/0 PROGRESSING:
Parsing package manifest files ...1 .
Feb  6 19:09:44.742 EDT: %SM_INSTALL-6-INST_PROG: Service-Module-SM 1/0 PROGRESSING:
Starting payload download1 .
Feb  6 19:09:52.022 EDT: %SM_INSTALL-6-INST_PROG: Service-Module-SM 1/0 PROGRESSING:
Performing Hot install ...1 .
Install successful on Service-Module-SM 1/0 Feb  6 19:10:28.826 EDT:
%SM_INSTALL-6-INST_SUCC: Service-Module-SM 1/0 SUCCESS: install-completed .
```

Related Commands

Command	Description
service-module sm install abort	Stops the install and returns to the boot-loader prompt.
service-module sm uninstall	Uses Cisco SRE to uninstall an SRE-supported application on an SRE-enabled services engine module.

service-module sm log clear

To clear all entries in the Cisco SRE operations log, use the **service-module sm log clear** command in privileged EXEC mode.

service-module sm *slot/port* **log clear**

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.2(1)T	This command was introduced.

Usage Guidelines

The Cisco SRE operations log records the last 25 operations and the results of each operation for a maximum of 50 messages. The operations are stored in time order. Use this command to clear all entries from the log.

Examples

The following example clears all entries from the Cisco SRE operations log:

```
Router# service-module sm 1/0 log clear
```

service-module sm log show

To display the last 25 operations executed on the Cisco SRE and the results of each operation, use the **service-module sm log show** command in privileged EXEC mode.

service-module sm *slot/port* **log show**

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.2(1)T	This command was introduced.

Usage Guidelines

The Cisco SRE operations log records the last 25 operations and the results of each operation for a maximum of 50 messages. The operations are stored in time order.

Examples

The following example shows that the last operation performed on the Cisco SRE was a successful package installation.

```
Router# service-module sm 1/0 log show
"Total number of logs = 2

1 Jun 15 2011 19:50:53.910:Install initiated for SM1/0: pkg_name:
cue-vm-k9.SPA.sme.8.6.1.pkg, script: , arg: , force: 0
2 Jun 15 2011 19:57:17.712:Install successful on SM1/0. Please wait for module to reset
before next operation."
```

service-module sm uninstall

To use Cisco SRE to uninstall an application on a service module (Cisco SM-SRE), use the **service-module sm uninstall** command in privileged EXEC mode.

service-module sm *slot/port* **uninstall** [**force**]

Syntax Description

slot/port	Location of the services engine module in the router. For service modules, the slot number is 1 to 4 and port number must be 0.
force	(Optional) Specifies to proceed without prompting the user for confirmation.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.0(1)M	This command was introduced.

Usage Guidelines

This command completely erases the disk or compact flash of the SRE-enabled services engine module and removes the application keys. It does not remove application licenses.

The slash mark (**/**) is required between the *slot* argument and the *port* argument.

You can only issue one instance of this command at a time on a router. You cannot use this command to uninstall an application on two or more services engine modules in a router at a time.

Use the **force** keyword with this command to uninstall an application without first prompting for confirmation.

Examples

The following example shows how to use this command to uninstall an application without first prompting for confirmation:

```
Router# service-module sm uninstall 1/0 force
Router#
```

Related Commands

Command	Description
service-module sm install	Uses Cisco SRE to install an SRE-supported application on an SRE-enabled services engine module.

service-module sm status

To display configuration information related to the hardware and software on an SM-SRE service module, use the **service-module sm status** command in privileged EXEC mode.

service-module sm *slot*/*port* **status** [**detailed**]

Syntax Description

slot	Router slot in which the service module is installed. Range: 1 to 4.
/*port*	Port number of the module interface. Always use 0. The slash mark (/) is required.
detailed	(Optional) Display detailed information.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.0(1)M	This command was introduced.

Usage Guidelines

Use this command to:

- Display the SM-SRE's software release version
- Check the SM-SRE status (steady or down)
- Display hardware information for the SM-SRE, including CPU, memory, and interface information

Examples

The following example displays information for an SM-SRE:

```
Router# service-module sm 1/0 status
Service Module is Cisco SM1/0
Service Module supports session via TTY line 67
Service Module is in Steady state
Service Module heartbeat-reset is enabled
Getting status from the Service Module, please wait..
Cisco Unity Express 8.6.1.2
CUE Running on SM

Module resource information:
  CPU Frequency: 1862 MHz
  Memory Size: 4016 MB
  Disk 0 Size: 500107 MB
  Disk 1 Size: 1887 MB

No install/uninstall in progress
```

The following example displays detailed information for an SM-SRE:

```
# service-module SM 1/0 status detailed
Service Module is Cisco SM1/0
```

```
Service Module supports session via TTY line 67
Service Module is in Steady state
Service Module heartbeat-reset is enabled
Getting status from the Service Module, please wait..
Cisco Unity Express 8.6.1.2
CUE Running on SM

Module resource information:
  CPU Frequency: 1862 MHz
  Memory Size: 4016 MB
  Disk 0 Size: 500107 MB
  Disk 1 Size: 1887 MB

No install/uninstall in progress

No localstore
```

Related Commands

Command	Description
interface sm	Configures an interface for an SM-SRE and enters interface configuration mode.
show diag	Displays controller information for service modules.
show interfaces sm	Displays basic interface configuration information for SM-SREs.

Module Command Reference

The following commands are new or have been modified.

- **show log name**
- **show software install history**

show log name

To display a log file on the module, use the **show log name** command in privileged EXEC mode.

show log name *filename*

Syntax Description

filename	Name of the log file to be displayed.

Defaults

None

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.1(4)M	This command was introduced.

Usage Guidelines

Use this command to display specified log file on the module.

Examples

The following example shows the output options for the **show log name** command:

```
se-172-25-223-77# show log name install.log | ?
  begin             Begin with the line that matches
  exclude           Exclude lines that match
  include           Include lines that match
  page              Paginate output (--More--)
```

Related Commands

Command	Description
show logs	Displays the log files on the module.

show software install history

To display a history of installed and upgraded applications from the module, use the **show software install history** command in privileged EXEC mode.

show software install history [paged]

Syntax Description		
	paged	Display in paged format.

Defaults None

Command Modes Privileged EXEC (#)

Command History	Release	Modification
	15.1(4)M	This command was introduced.

Usage Guidelines Use this command to display a history of installed and upgraded applications on the module.

Examples The following example shows the prepositioned applications on the module:

```
se-172-25-223-77# show software install history
```

Additional References

The following sections provide references related to the Cisco SM-SRE.

Related Documents

Related Topic	Document Title
Cisco applications supported on the Cisco SRE	• Cisco Application eXtension Platform • Cisco Unity Express • Cisco Video Management and Storage System • Cisco Wide Area Application Services
Cisco IOS commands	• *Cisco IOS Interface and Hardware Component Command Reference* • *Cisco IOS IP Addressing Services Command Reference*
Service module installation	• *Installing Cisco Network Modules and Service Modules in Cisco Access Routers* • *Cisco 3900 Series, 2900 Series, and 1900 Series Integrated Services Routers Software Configuration Guide* • *Cisco High-Speed Intrachassis Module Interconnect (HIMI) Configuration Guide* • *Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information*

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/techsupport

Glossary

ARP	Address Resolution Protocol. Internet protocol used to map an IP address to a MAC address.
blade	Alternate term for *service module*.
boothelper	A small subset of the system software that runs on the module. It boots the module from the network and assists in software installation and upgrades, disaster recovery, and other operations when the module cannot access its software.
bootloader	A small set of system software that runs when the system first powers up. It loads the operating system (from the disk, network, or CompactFlash), which loads and runs the Cisco <App Name> application. The bootloader may optionally load and run the boothelper.
eUSB	Embedded flash (internal USB flash memory module).
FTP	File Transfer Protocol. Application protocol, part of the TCP/IP protocol stack, used for transferring files between network nodes.
NTP	Network Time Protocol. Protocol built on top of TCP that ensures accurate local timekeeping with reference to radio and atomic clocks located on the Internet. This protocol is capable of synchronizing distributed clocks within milliseconds over long time periods.
service (or services) engine	Alternate term for service module with installed application software.

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