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Cisco ASR 9000 Aggregation Services Router ISM Line Card Installation Guide

May 2012

CONTENTS

Preface

This preface contains the following sections:

Changes to This Document

Table 1   Changes to This Document

Revision	Date	Change Summary
OL-24905-02	May 2012	Describes the ISM single hardware PID solution introduced in Cisco IOS XR Software Release 4.2.1. Previously, you installed the appropriate services applications manually. With the ISM single hardware PID solution, an IOS XR CLI command is used to select which service application to run (e.g. CGN).
OL-24905-01	April 2011	Initial release of this document.

Audience

The *Cisco ASR 9000 Aggregation Services Router ISM Line Card Installation Guide* is written for hardware installers and system administrators of Cisco routers.

This publication assumes that the user has a substantial background in installing and configuring router and switch-based hardware. The reader should also be familiar with electronic circuitry and wiring practices, and have experience as an electronic or electromechanical technician.

Purpose

This installation guide contains procedures for installing line cards into the router, verifying the installation, and creating a basic startup configuration file.

Document Organization

This installation and configuration guide is organized into the following chapters and appendixes:

- Chapter 1, "Installing ISM (Integrated Service Module) Line Cards in the Cisco ASR 9000 Series Router," provides instructions for installing the ISM line card hardware and connecting external network interface cables.

- Chapter 2, "Verifying and Troubleshooting the Line Card Installation," provides procedures for verifying the ISM line card installation.

- Appendix A, "Technical Specifications," provides a summary of physical, electrical, and environmental specifications for the router and the ISM line card.

- Index

Document Conventions

This publication uses the following conventions:

- **Ctrl** represents the key labeled *Control*. For example, the key combination **Ctrl-Z** means hold down the **Control** key while you press the **Z** key.

Command descriptions use these conventions:

- Examples that contain system prompts denote interactive sessions, indicating the commands that you should enter at the prompt. For example:

    RP/0/RSP0/CPU0:router#

- Commands and keywords are in **bold** font.

- Arguments for which you supply values are in *italic* font.

- Elements in square brackets ([ ]) are optional.

- Alternative but required keywords are grouped in braces ({ }) and separated by vertical bars (|).

⚠️

Caution   Means *be careful*. You are capable of doing something that might result in equipment damage or loss of data.

✎

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

⏱

Timesaver   Means *the described action saves time*. You can save time by performing the action described in the paragraph.

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. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.** Statement 1071

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

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Installing ISM (Integrated Service Module) Line Cards in the Cisco ASR 9000 Series Router

This guide contains instructions for installing ISM (Integrated Service Module) line cards in the Cisco ASR 9000 Series Aggregation Services Router.

Contents

This installation and configuration guide includes the following sections:

Pre-Installation Information

This section contains information about the following topics:

ISM (Integrated Service Module) Line Card Product Numbers

Table 1-1 lists the Cisco product numbers to which this publication applies.

Table 1-1   Product Numbers for Line Cards

ISM (Integrated Service Module) Line Card	Cisco Product Number
ISM (Integrated Service Module) Line Card	A9K-ISM-100

Router Hardware Installation

For hardware installation and configuration information for the Cisco ASR 9000 Series Router, refer to the *Cisco ASR 9000 Series Aggregation Services Router Installation Guide.* The guide includes information on how to install, maintain, and replace router subsystems, such as cooling fans, power supplies, chassis backplanes, and so on. In addition, the installation guide describes the router switch fabric and how it affects operation of the line card, as well as line card slot locations, slot width, and other requirements.

Supported Platforms

Table 1-2 lists the supported router platforms for line cards.

Table 1-2   Supported Router Platforms for ISM (Integrated Service Module) Line Cards

ISM (Integrated Service Module) Card	Supported Platform
ISM (Integrated Service Module) Line Card	Cisco ASR 9010 Router, Cisco ASR 9006 Router

Cisco IOS XR Software Release and Hardware Revision Requirements

The line cards have certain Cisco IOS XR software requirements. *Also, to ensure compatibility with the software, your* line card*s should have a specific hardware revision number. The number is printed on a label affixed to the component side of the card and is displayed by the* **show diag** *command.*

Table 1-3 lists the hardware and software requirements for line cards.

Table 1-3   ISM (Integrated Service Module) Line Cards and Cisco IOS XR Release and Hardware Version Compatibility

ISM (Integrated Service Module) Line Card	Line Card Part Number	Minimum IOS XR Software Release	Required Hardware Version
ISM (Integrated Service Module) Line Card	A9K-ISM-100	4.1.0	1.0

The **show diag** *slot_number* and **show version** commands display the current hardware configuration of the router, including the system software version that is currently loaded and running. For complete descriptions of **show** commands, refer to the command reference or configuration guide for the *installed Cisco IOS XR release.*

If the command displays indicate that the Cisco IOS XR software is a version earlier than you need, check the contents of flash memory to determine if the required images are available on your system. The **dir** *devicename* command displays a list of all files stored in flash memory. If you do not have the correct software version, contact Cisco customer service.

For software configuration information, refer to the Cisco IOS XR software configuration and command reference publications for the installed Cisco IOS XR release. Also refer to the Cisco IOS XR software release notes for additional information.

Related Documentation

This publication describes the basic installation and initial configuration of line cards. For complete configuration information, refer to the following publications:

- Cisco ASR 9000 Series Aggregation Services Router Installation and Configuration Guide
- Cisco ASR 9000 Series Aggregation Services Router Getting Started Guide
- Cisco ASR 9000 Series Aggregation Services Router Regulatory Compliance and Safety Guide

See the "Obtaining Documentation and Submitting a Service Request" for information on how to obtain these publications.

ISM (Integrated Service Module) Line Card Product Overview

The following sections provide information about the ISM (Integrated Service Module) line card product:

- ISM (Integrated Service Module) Line Card Description, page 1-3
- SAM (Service Acceleration Module) Description, page 1-4
- Preparing for Installation, page 1-13

ISM (Integrated Service Module) Line Card Description

The ISM (Integrated Service Module) line card provides two bays for installation of SAM modules.

Each SAM module has four LEDs visible on their front panels. These four LED indicates the status of the associated SAM, as described in Table 1-4 on page 1-6 through Table 1-7 on page 1-6.

An example of the ISM (Integrated Service Module) line card is shown in Figure 1-1 on page 1-4.

Figure 1-1   ISM (Integrated Service Module) Line Card
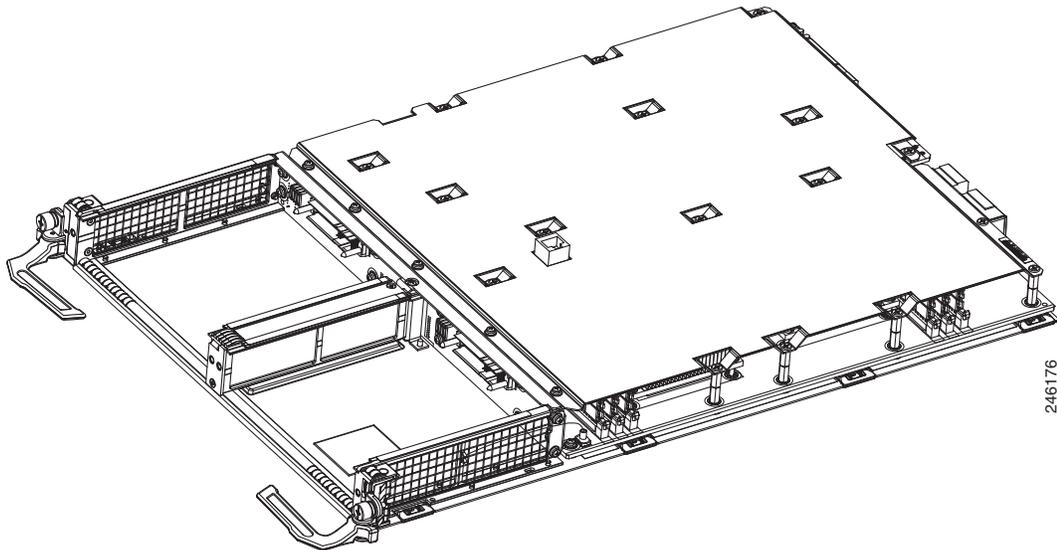
SAM (Service Acceleration Module) Description

The Flash Service Acceleration Module (SAM) provides a solid-state based solution for the video cache requirements of the ISM video solution. Each Flash Module provides two terabytes (2 TB) of memory. From this two terabytes, 1.6 terabytes are available as video caching capacity. The remainder is used for wear level of the flash drives. There is a maximum of two SAMs per ISM, thus, the maximum amount of ISM video cache is 3.2 TB cache per ISM slot.

Note   The Flash Service Acceleration Module (SAM) is not needed for the ISM (Integrated Service Module)-based CGv6 applications.

There are four LEDs on each Flash Service Acceleration Module (SAM). 2 to the right and 2 to the left. The SAM Status LED and the SAM Attention LED are to the right side of the SAM. The SAM Status LED is to the rightmost and one before that is the SAM Attention LED. The other two LEDs are located to the Left side of SAM. The leftmost is the Flash Module Fault LED and one next to it is Flash Module Active LED. Refer to Figure 1-3 on page 1-5.

The display states and display meanings of the SAM Status LED are described in Table 1-4 on page 1-6.

The display states and display meanings of the SAM Attention LED are described in Table 1-5 on page 1-6.

The display states and display meanings of the SAM Flash Module Fault LED are described in Table 1-6 on page 1-6.

The display states and display meanings of the SAM Flash Module Active LED are described in Table 1-7 on page 1-6.

An example of the SAM (Service Acceleration Module) line card is shown in Figure 1-2 on page 1-5.

Figure 1-2   Flashback Service Acceleration Module (SAM) Line Card
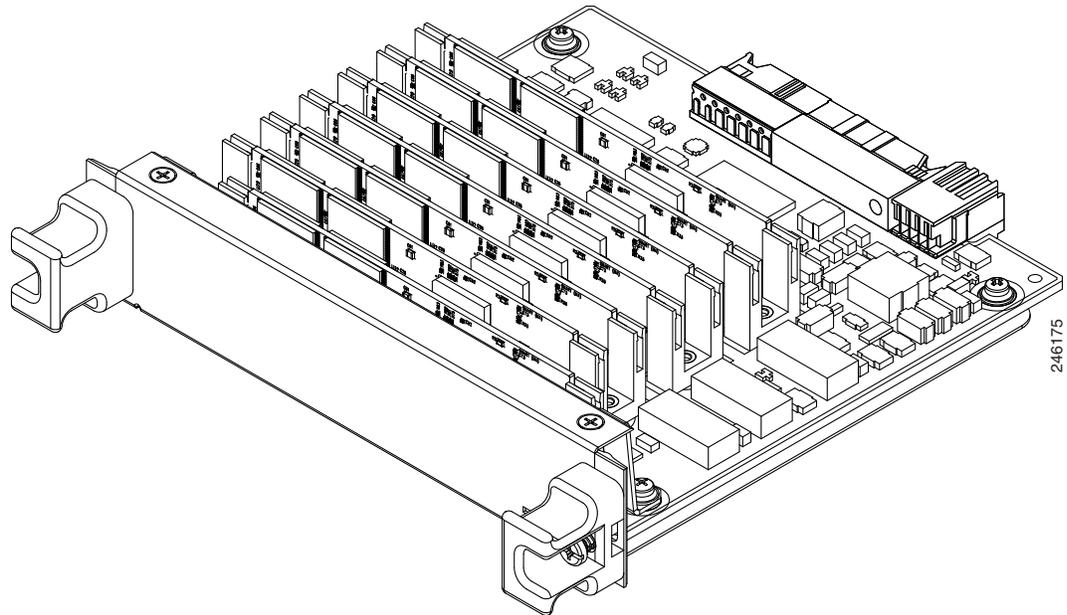
Figure 1-3   Flashback Service Acceleration Module (SAM) Line Card Faceplate
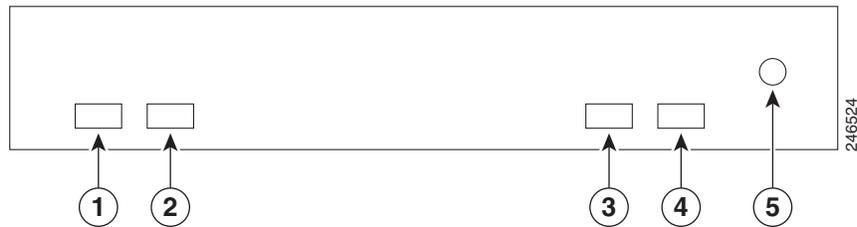
1	SAM Flash Module Fault LED	5	Shutdown Button (recessed to avoid being pressed inadvertently)
2	SAM Flash Module Attention LED		
3	SAM Attention LED		
4	SAM Status LED		

SAM LEDs

The SAM Status LED is a dual color LED, displaying either Green or Amber while the SAM is powered up.

Table 1-4   SAM Status LED

LED Color	Description
Off	Indicates that the SAM is powered off. SAM main power has been removed.
Green	Indicates that the SAM is ready and operational.
Amber	Indicates that the SAM is in power transition. An amber LED during power up indicates that the SAM is being configured. An amber LED during power down indicates that hot plug circuitry and software are in the process of removing power to the SAM.

The SAM Attention LED is a single red LED.

Table 1-5   SAM Attention LED

LED Color	Description
Off	No attention needed.
Red	Indicates that there is a SAM error and that the SAM needs attention.
Blinking Red	Indicates that someone has pressed the Shutdown Button.

The SAM Flash Module Fault LED is a a single red LED.

Table 1-6   SAM Flash Module Fault LED

LED Color	Description
Off	Indicates that the SAM is powered off or that no flash module fault is present.
Red	Indicates that the SAM has one or more flash module faults present.

The SAM Flash Module Active LED is a single green LED.

Table 1-7   SAM Flash Module Active LED

LED Color	Description
Off	Indicates that the SAM is powered off or that there are no activities on flash module and ASIC.
Green	Indicates that the SAM is powered up and that the SAM flash module and ASIC are active.
Blinking Green	Indicates that the SAM is in the process of powering up and/or that activity is occuring on the SAM flash module and ASIC.

SAM Shutdown Button

The Shutdown Button is recessed to avoid being pressed inadvertently.

When the Shutdown Button is pressed the following processes occur:

Step 1   The SAM shutdown process starts.The Status LED changes from green to amber.

Step 2   The software begins removing drivers from the system. The Status LED remains amber.

Step 3   Once the software removes the drivers from the system, the SAM will be powered off.

Step 4   When the Status LED changes from amber to off, indicating that the SAM is fully powered off, the SAM can be safely removed.

> **Note**   It is mandatory to shut down the SAMs before each SAM is removed physically. If not, the ISM line card must be reloaded to recover from any errors that are seen.

Step 5   If the ISM line card must be reloaded to recover from any errors, complete Steps 6 and 7 before physically removing each SAM from the ISM.

Step 6   To reload the ISM, either remove and then physically reinsert it or, if you haven't removed the ISM, execute the **hw-module location 0/1/CPU0 service stop** command in admin mode to stop service on ISM LC's before a soft reload or shutdown or power disable or manual online inservice removal of linecard is performed. This command is supported only for ISM linecards.

Executing the **hw-module location 0/1/CPU0 service stop** command in admin mode ensures that services are taken offline gracefully before the card can be reloaded/removed.

> **Note**   This command needs to be used after graceful migration of traffic. Executing the **hw-module location 0/1/CPU0 service stop** command in admin mode does not ensure graceful migration of traffic. Please refer application specific manual for graceful migration of traffic.

Step 7   Execute the **hw-module location 0/1/CPU0 service stop** command in admin mode to take any active services offline gracefully before the ISM card is reloaded/removed.

```
RP/0/RSP0/CPU0:VKG-2#

RP/0/RSP0/CPU0:VKG-2#admin hw-module location 0/1/CPU0 service stop
LC/0/1/CPU0:Apr 13 10:22:59.175 EST: avsm_agent[126]: %INFRA-6-INFO : Stopping application
...
LC/0/1/CPU0:Apr 13 10:23:31.319 EST: avsm_agent[126]: %INFRA-5-NOTICE : Application is
shutdown. To re-start application, please refer user guide.
```

Step 8   To reload the ISM, either remove and then physically reinsert it or, if you haven't removed the ISM, execute the **hw-module location reload** command in admin mode to perform a soft reinsert.

The syntax is **hw-module location 0/*x*/CPU0 reload** or **hw-module location 0/*x*/CPU1 reload**, where *x* is the slot number.

Here is the example output from executing the **hw-module location 0/1/CPU0 reload command:**

```
RP/0/RSP0/CPU0:VKG-2#hw-module location 0/1/CPU0 reload
WARNING: This will take the requested node out of service.
Do you wish to continue?[confirm(y/n)]y
```

```
RP/0/RSP0/CPU0:Apr 13 13:21:01.329 EST: shelfmgr[357]: %PLATFORM-SHELFMGR-6-USER_RESET :
Node 0/1/CPU0 is reset due to user reload request
RP/0/RSP0/CPU0:Apr 13 13:21:01.335 EST: shelfmgr[357]:
%PLATFORM-SHELFMGR-6-NODE_STATE_CHANGE : 0/1/CPU0 A9K-ISM-100 state:IOS XR FAILURE
LC/0/1/CPU0:Apr 13 13:21:01.338 EST: vkg_sis[293]: Received SYSDB_EVENT_SET
Notification.....
LC/0/1/CPU0:Apr 13 13:21:01.338 EST: avsm_se_sm[127]: %PLATFORM-SIM_SE-5-STATE_CHANGE :
Service Engine is in shutting down state.
LC/0/1/CPU0:Apr 13 13:21:01.340 EST: ipv4_mfwd_partner[224]: Deactivating MCAST APIV ...
LC/0/1/CPU0:Apr 13 13:21:01.340 EST: l2fib[231]: Deactivating APIV module
MOD_ID_AVSM_L2FIB...
LC/0/1/CPU0:Apr 13 13:21:01.340 EST: vkg_sis[293]: Starting of SI APIV Deletion ...
RP/0/RSP0/CPU0:Apr 13 13:21:01.417 EST: invmgr[235]: %PLATFORM-INV-6-OIROUT : OIR: Node
0/1/SAM0 removed
RP/0/RSP0/CPU0:Apr 13 13:21:01.419 EST: eem_ed_oir[185]: Messge received content : Event 1
NodeId: 0x81c
RP/0/RSP0/CPU0:Apr 13 13:21:01.434 EST: invmgr[235]: %PLATFORM-INV-6-OIROUT : OIR: Node
0/1/SAM1 removed
RP/0/RSP0/CPU0:Apr 13 13:21:01.435 EST: eem_ed_oir[185]: Messge received content : Event 1
NodeId: 0x81d
LC/0/1/CPU0:Apr 13 13:21:03.003 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.003 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.004 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.004 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.005 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.005 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.005 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.005 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.006 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.006 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.007 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.007 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.007 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/3, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.008 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/3, changed state to Down
RP/0/RSP0/CPU0:Apr 13 13:21:08.968 EST: invmgr[235]: %PLATFORM-INV-6-NODE_STATE_CHANGE :
Node: 0/1/SAM1, state: BRINGDOWN
RP/0/RSP0/CPU0:Apr 13 13:21:08.979 EST: invmgr[235]: %PLATFORM-INV-6-NODE_STATE_CHANGE :
Node: 0/1/SAM0, state: BRINGDOWN
RP/0/RSP0/CPU0:Apr 13 13:22:01.474 EST: shelfmgr[357]:
%PLATFORM-SHELFMGR-6-NODE_STATE_CHANGE : 0/1/CPU0 A9K-ISM-100 state:BRINGDOWN
RP/0/RSP0/CPU0:Apr 13 13:22:01.541 EST: invmgr[235]: %PLATFORM-INV-6-OIROUT : OIR: Node
0/1/SAM0 removed
RP/0/RSP0/CPU0:Apr 13 13:22:01.546 EST: eem_ed_oir[185]: Messge received content : Event 1
NodeId: 0x81c
RP/0/RSP0/CPU0:Apr 13 13:22:01.572 EST: invmgr[235]: %PLATFORM-INV-6-OIROUT : OIR: Node
0/1/SAM1 removed
RP/0/RSP0/CPU0:Apr 13 13:22:01.573 EST: eem_ed_oir[185]: Messge received content : Event 1
NodeId: 0x81d
RP/0/RSP0/CPU0:Apr 13 13:22:01.584 EST: invmgr[235]: %PLATFORM-INV-6-NODE_STATE_CHANGE :
Node: 0/1/CPU0, state: BRINGDOWN
```

```
RP/0/RSP0/CPU0:Apr 13 13:22:13.235 EST: shelfmgr[357]:
%PLATFORM-SHELFMGR-6-NODE_STATE_CHANGE : 0/1/CPU0 A9K-ISM-100 state:ROMMON
RP/0/RSP0/CPU0:Apr 13 13:22:44.043 EST: shelfmgr[357]:
%PLATFORM-SHELFMGR_HAL-6-BOOT_REQ_RECEIVED : Boot Request from 0/1/CPU0, RomMon Version:
1.2
RP/0/RSP0/CPU0:Apr 13 13:22:44.046 EST: shelfmgr[357]: %PLATFORM-MBIMGR-7-IMAGE_VALIDATED
: Remote location 0/1/CPU0: : MBI tftp:/disk0/asr9k-os-mbi-4.1.0.35I/lc/mbiasr9k-lc.vm
validated
RP/0/RSP0/CPU0:Apr 13 13:22:44.047 EST: shelfmgr[357]:
%PLATFORM-SHELFMGR-6-NODE_STATE_CHANGE : 0/1/CPU0 A9K-ISM-100 state:MBI-BOOTING
RP/0/RSP0/CPU0:Apr 13 13:23:35.447 EST: shelfmgr[357]:
%PLATFORM-SHELFMGR-6-NODE_STATE_CHANGE : 0/1/CPU0 A9K-ISM-100 state:MBI-RUNNING
LC/0/1/CPU0:15: init[65540]: %OS-INIT-7-MBI_STARTED : total time 9.242 seconds
LC/0/1/CPU0:Apr 13 13:23:38.912 EST: insthelper[61]: %INSTALL-INSTHELPER-7-PKG_DOWNLOAD :
MBI running; starting software download
LC/0/1/CPU0:Apr 13 13:23:53.184 EST: sysmgr[89]: %OS-SYSMGR-5-NOTICE : Card is COLD
started
LC/0/1/CPU0:Apr 13 13:23:53.490 EST: init[65540]: %OS-INIT-7-INSTALL_READY : total time
28.024 seconds
LC/0/1/CPU0:Apr 13 13:23:54.820 EST: sysmgr[316]: %OS-SYSMGR-6-INFO : Backup system
manager is ready
LC/0/1/CPU0:Apr 13 13:23:55.989 EST: syslog_dev[87]: dumper_config[153]:
LC/0/1/CPU0:Apr 13 13:23:56.027 EST: syslog_dev[87]: dumper_config[153]:  The node id is
2065
LC/0/1/CPU0:Apr 13 13:23:58.631 EST: linux_maint_fpd_agent[236]: linux_maint_fpd_agent:
Registering the handlers
LC/0/1/CPU0:Apr 13 13:23:58.645 EST: linux_maint_fpd_agent[236]:
update_linux_maint_sw_version Updated the sw_ver 6
LC/0/1/CPU0:Apr 13 13:23:58.648 EST: linux_maint_fpd_agent[236]: publish_maint_fpd_info
Publishing FPD info : type 1, subtype 4, card type 16777989, module 0, instance 0, sw_ver
6, hw_ver 1
LC/0/1/CPU0:Apr 13 13:23:58.878 EST: vkg_sis[293]: Initializing APIV modules ...
LC/0/1/CPU0:Apr 13 13:23:58.890 EST: vkg_sis[293]: Registering for SysDB notifications ...
LC/0/1/CPU0:Apr 13 13:23:58.897 EST: vkg_sis[293]: Registering for SysDB SE READY
notifications ...
LC/0/1/CPU0:Apr 13 13:23:59.997 EST: fca_server[165]: bridge_asic_get_ver: msg send
problem: Invalid argument
LC/0/1/CPU0:Apr 13 13:23:59.999 EST: fca_server[165]: bridge_asic_get_ver: msg send
problem: Invalid argument
LC/0/1/CPU0:Apr 13 13:24:03.156 EST: vkg_sis[293]: Received SYSDB_EVENT_SET
Notification.....
LC/0/1/CPU0:Apr 13 13:24:03.543 EST: sysmgr[89]: %OS-SYSMGR-7-DEBUG :
sysmgr_admin_plane_check:SYSMGR_PLANE_ADMIN Notification sent.
LC/0/1/CPU0:Apr 13 13:24:04.113 EST: sync_agent[310]: %PLATFORM-FSYNC-6-UNKNOWN_BOARD_TYPE
: Frequency Synchronization feature does not recognize hardware board type 0x1000305
LC/0/1/CPU0:Apr 13 13:24:04.163 EST: sync_agent[310]: %PLATFORM-FSYNC-6-NOT_SUPPORTED :
Frequency Synchronization is not supported on this line card.
RP/0/RSP0/CPU0:Apr 13 13:24:04.464 EST: syslog_dev[93]: envmon[199]:
RP/0/RSP0/CPU0:Apr 13 13:24:04.466 EST: syslog_dev[93]: envmon[199]:
envmon_sam_sensor_cens_handler:359 mytype is not ENS_CMD_WRITE
LC/0/1/CPU0:Apr 13 13:24:06.247 EST: BM-ADJ[129]: Registering for SysDB notifications ...
LC/0/1/CPU0:Apr 13 13:24:07.585 EST: fib_mgr[167]: Initializing APIV modules ...
LC/0/1/CPU0:Apr 13 13:24:07.600 EST: fib_mgr[167]: Registering for SysDB notifications ...
LC/0/1/CPU0:Apr 13 13:24:08.350 EST: vkg_sis[293]: Received SYSDB_EVENT_SET
Notification.....
LC/0/1/CPU0:Apr 13 13:24:16.422 EST: canb_upg_agt[134]: %PLATFORM-UPGRADE_FPD-4-DOWN_REV :
cbc instance 0 is down-rev (V18.04), upgrade to (V18.05). Use the "upgrade hw-module fpd"
CLI in admin mode.
LC/0/1/CPU0:Apr 13 13:24:16.910 EST: l2fib[231]: Initializing L2 FIB APIV modules ...
LC/0/1/CPU0:Apr 13 13:24:16.937 EST: l2fib[231]:  L2fib Registering for SysDB
notifications ...
RP/0/RSP0/CPU0:Apr 13 13:24:21.806 EST: shelfmgr[357]:
%PLATFORM-SHELFMGR-6-NODE_STATE_CHANGE : 0/1/CPU0 A9K-ISM-100 state:IOS XR RUN
```

```
RP/0/RSP0/CPU0:Apr 13 13:24:21.826 EST: invmgr[235]: %PLATFORM-INV-6-NODE_STATE_CHANGE :
Node: 0/1/CPU0, state: IOS XR RUN
LC/0/1/CPU0:Apr 13 13:24:22.738 EST: ifmgr[189]: %PKT_INFRA-LINK-5-CHANGED : Interface
Service-Mgmt0/1/0/3, changed state to Administratively Down
LC/0/1/CPU0:Apr 13 13:24:22.741 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:22.741 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:22.741 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:22.741 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:22.741 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:22.741 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:22.744 EST: cfgmgr-lc[138]: %MGBL-CONFIG-6-OIR_RESTORE :
Configuration for node '0/1/0' has been restored.
LC/0/1/CPU0:Apr 13 13:24:22.754 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/2, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:22.755 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/1, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:22.755 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/0, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:22.758 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/2, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:22.764 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/1, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:22.767 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/0, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:25.046 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/3, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:25.046 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/3, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:25.046 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:25.046 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:25.047 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:25.047 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:25.047 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:25.047 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:25.049 EST: cfgmgr-lc[138]: %MGBL-CONFIG-6-OIR_RESTORE :
Configuration for node '0/1/0' has been restored.
LC/0/1/CPU0:Apr 13 13:24:25.052 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/3, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:25.053 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/2, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:25.053 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/1, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:25.054 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/0, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:25.055 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/3, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:25.058 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/2, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:25.061 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/1, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:25.064 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/0, changed state to Up
```

```
LC/0/1/CPU0:Apr 13 13:24:26.107 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.107 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.108 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.108 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.110 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.110 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.111 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/3, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.112 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/3, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.115 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.116 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.117 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.118 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.119 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.120 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:50.648 EST: vkg_sis[293]: Received SYSDB_EVENT_SET
Notification.....
LC/0/1/CPU0:Apr 13 13:25:04.333 EST: ipv4_mfwd_partner[224]: Registering for SysDB
notifications ...
LC/0/1/CPU0:Apr 13 13:25:07.458 EST: ipv4_mfwd_partner[224]: Initializing APIV modules ...
LC/0/1/CPU0:Apr 13 13:25:07.458 EST: l2fib[231]: Starting of APIV version negotiation ...
LC/0/1/CPU0:Apr 13 13:25:07.458 EST: fib_mgr[167]: Starting of APIV version negotiation
...
LC/0/1/CPU0:Apr 13 13:25:07.458 EST: BM-ADJ[129]: Starting of APIV version negotiation ...
LC/0/1/CPU0:Apr 13 13:25:07.459 EST: vkg_sis[293]: Starting of APIV version negotiation
(CREATE) ...
LC/0/1/CPU0:Apr 13 13:25:08.094 EST: inv_agent[196]: %PLATFORM-INV_AGENT-7-INFO : Sending
SIM x86 inventory info
LC/0/1/CPU0:Apr 13 13:25:09.634 EST: vkg_sis[293]: SIS APIV is up
LC/0/1/CPU0:Apr 13 13:25:10.471 EST: ipv4_mfwd_partner[224]: MCAST APIV is up
LC/0/1/CPU0:Apr 13 13:25:10.489 EST: l2fib[231]: ISM L2FIB: IPCP is up fd:50099c58,
stats_fd:0
LC/0/1/CPU0:Apr 13 13:25:11.624 EST: vkg_sis[293]: Received SYSDB_EVENT_SET
Notification.....
LC/0/1/CPU0:Apr 13 13:25:13.620 EST: fib_mgr[167]: L3 FIB, FRR, LOOKUP & MISC APIV is up
LC/0/1/CPU0:Apr 13 13:25:13.622 EST: fib_mgr[167]: Initialized FIB State Machine!!!
LC/0/1/CPU0:Apr 13 13:25:16.737 EST: vkg_sis[293]: Received SYSDB_EVENT_SET
Notification.....
LC/0/1/CPU0:Apr 13 13:25:16.737 EST: vkg_sis[293]: Received SE Operation Ready
Notification.....
LC/0/1/CPU0:Apr 13 13:25:16.740 EST: avsm_se_sm[127]: %PLATFORM-SIM_SE-5-STATE_CHANGE :
Service Engine is in ready state.
LC/0/1/CPU0:Apr 13 13:25:16.742 EST: avsm_se_sm[127]: %PLATFORM-SIM_SE-5-SW_INFO : Service
Engine heartbeat started on A9K-ISM-100
LC/0/1/CPU0:Apr 13 13:25:26.744 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/0, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.745 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/0, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.745 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/1, changed state to Up
```

```
LC/0/1/CPU0:Apr 13 13:25:26.745 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/1, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.746 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/2, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.746 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/2, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.747 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/3, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.747 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/0, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.750 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/0, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.758 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/1, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.760 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/1, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.763 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/2, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.765 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/2, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.806 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/3, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:29.814 EST: avsm_agent[126]: %ISM_SIA-6-INFO : Interface # 0 XAUI
link status changed to UP!!
LC/0/1/CPU0:Apr 13 13:25:29.815 EST: avsm_agent[126]: %ISM_SIA-6-INFO : Interface # 1 XAUI
link status changed to UP!!
LC/0/1/CPU0:Apr 13 13:25:29.817 EST: avsm_agent[126]: %ISM_SIA-6-INFO : Interface # 2 XAUI
link status changed to UP!!
LC/0/1/CPU0:Apr 13 13:25:29.821 EST: avsm_agent[126]: %ISM_SIA-6-INFO : Interface # 3 XAUI
link status changed to UP!!
LC/0/1/CPU0:Apr 13 13:25:29.824 EST: avsm_agent[126]: %ISM_SIA-6-INFO : Interface # 4 XAUI
link status changed to UP!!
LC/0/1/CPU0:Apr 13 13:25:29.827 EST: avsm_agent[126]: %ISM_SIA-6-INFO : Interface # 5 XAUI
link status changed to UP!!
LC/0/1/CPU0:Apr 13 13:25:29.830 EST: avsm_agent[126]: %ISM_SIA-6-INFO : Interface # 7 XAUI
link status changed to UP!!
RP/0/RSP0/CPU0:Apr 13 13:26:23.489 EST: invmgr[235]: %PLATFORM-INV-6-NODE_STATE_CHANGE :
Node: 0/1/SAM0, state: OK
RP/0/RSP0/CPU0:Apr 13 13:26:23.716 EST: invmgr[235]: %PLATFORM-INV-6-OIRIN : OIR: Node
0/1/SAM0 inserted
RP/0/RSP0/CPU0:Apr 13 13:26:23.718 EST: eem_ed_oir[185]: Messge received content : Event 0
NodeId: 0x81c
RP/0/RSP0/CPU0:Apr 13 13:26:36.684 EST: invmgr[235]: %PLATFORM-INV-6-NODE_STATE_CHANGE :
Node: 0/1/SAM1, state: OK
RP/0/RSP0/CPU0:Apr 13 13:26:36.697 EST: invmgr[235]: %PLATFORM-INV-6-OIRIN : OIR: Node
0/1/SAM1 inserted
RP/0/RSP0/CPU0:Apr 13 13:26:36.699 EST: eem_ed_oir[185]: Messge received content : Event 0
NodeId: 0x81d
RP/0/RSP0/CPU0:Apr 13 13:29:30.316 EST: invmgr[235]: %PLATFORM-INV-6-NODE_STATE_CHANGE :
Node: 0/1/SAM0, state: OK
RP/0/RSP0/CPU0:Apr 13 13:29:41.314 EST: invmgr[235]: %PLATFORM-INV-6-NODE_STATE_CHANGE :
Node: 0/1/SAM1, state: OK
LC/0/0/CPU0:Apr 13 13:29:44.527 EST: stp_io[314]: %L2-STP_IO-7-BPDU_ON_UNPROTECTED_PORT :
Received a BPDU on a port that does not have MSTP configured on it:
GigabitEthernet0/0/0/14
LC/0/0/CPU0:Apr 13 13:30:44.671 EST: stp_io[314]: %L2-STP_IO-7-BPDU_ON_UNPROTECTED_PORT :
Received a BPDU on a port that does not have MSTP configured on it:
GigabitEthernet0/0/0/14
LC/0/0/CPU0:Apr 13 13:31:44.817 EST: stp_io[314]: %L2-STP_IO-7-BPDU_ON_UNPROTECTED_PORT :
Received a BPDU on a port that does not have MSTP configured on it:
GigabitEthernet0/0/0/14
```

Step 9   Once the ISM has reloaded, you can reload the SAM.

Step 10   To reload the SAM, either physically reinsert it or, if you haven't removed the SAM, execute the **hw-module location reload** command in admin mode to perform a soft reinsert.

The syntax is **hw-module location 0/*x*/SAM0 reload** or **hw-module location 0/*x*/SAM1 reload**, where *x* is the slot number.

Preparing for Installation

The following sections provide information about preparing to install line cards:

Safety Guidelines

Before you perform any procedure in this publication, review the safety guidelines in this section to avoid injuring yourself or damaging the equipment.

The following guidelines are for your safety and to protect equipment. The guidelines do not include all hazards. Be alert.

> **Note**   Before installing, configuring, or maintaining a line card, review the safety warnings listed in the *Cisco ASR 9000 Series Aggregation Services Router Regulatory Compliance and Safety Information* publication that accompanied your router.

- Keep the work area clear and dust free during and after installation. Do not allow dirt or debris to enter into any laser-based components.
- Do not wear loose clothing, jewelry, or other items that could get caught in the router while working with line cards.
- Cisco equipment operates safely when it is used in accordance with its specifications and product usage instructions.

> **Caution**   Before working with laser optics, read the "Laser Safety" section on page 2-11.

Preventing Electrostatic Discharge

Electrostatic discharge (ESD) damage, which can occur when electronic cards or components are improperly handled, results in complete or intermittent failures. Electromagnetic interference (EMI) shielding is an integral component of the line card. Cisco recommends using an ESD-preventive strap whenever you are handling network equipment or one of its components.

The following are guidelines for preventing ESD damage:

- Always use an ESD-preventive wrist or ankle strap and ensure that it makes good skin contact. Connect the equipment end of the connection cord to an ESD connection socket on the router or to bare metal on the chassis.

- Avoid touching card circuit boards or connector pins. When sliding cards in or out of slots, you should handle them only by the faceplate or metal card carrier.

- When carrying a card, carry it only by the metal card carrier or inside a static shielding bag.

⚠

Caution   To avoid damaging card mechanical components, never carry an RSP or line card by the captive installation screws or ejector levers. Doing so can damage these components and cause card insertion problems.

- Place removed line cards component-side-up on an antistatic surface or in a static shielding bag. If you plan to return the component to the factory, immediately place it in a static shielding bag.

- Avoid contact between the line cards and clothing. The wrist strap only protects the board from ESD voltages on the body; ESD voltages on clothing can still cause damage.

⚠

Caution   For safety, periodically check the resistance value of the ESD strap. The measurement should be between 1 and 10 megohms.

Required Tools and Equipment

You need the following tools and parts to remove and install line cards:

- Flat-blade or Phillips screwdriver

- ESD-preventive wrist or ankle strap and instructions

- Interface cables to connect the line card with another router or switch

- Any SFP/XFP modules you need to install (and are not already installed)

✎

Note   If you need additional equipment, see Cisco.com or your service representative for ordering information.

Refer to the individual line card descriptions in the "ISM (Integrated Service Module) Line Card Product Overview" section on page 1-3 for more information. Table 1-3 on page 1-2 summarized the hardware version requirements for each line card.

Removing and Installing a Line Card

The following sections provide procedures for removing or installing a line card:

- Guidelines for Line Card Removal and Installation, page 1-15

- Removing a Line Card, page 1-16

- Installing a Line Card, page 1-18

> **Note**   See the "Guidelines for Line Card Removal and Installation" section on page 1-15 before removing a line card while power to the router is on.

Guidelines for Line Card Removal and Installation

Guidelines for line card removal and installation include the following:

> **Caution**   Be careful to avoid damaging the electromagnetic interference (EMI) gasket that runs along the full length of the card front panel edges. Damage to the EMI gasket can affect your system's ability to meet EMI requirements.

- Online insertion and removal (OIR) is supported, enabling you to remove and install line cards while the router is operating. OIR is seamless to users on the network, maintains all routing information, and ensures session preservation.

> **Caution**   When installing a line card, always fully tighten both captive installation screws to ensure that the card is correctly seated in the backplane connector. A card that is only partially seated in the backplane might not operate properly, even if it boots.

> **Caution**   The router may indicate a hardware failure if you do not follow proper procedures. Remove or insert only one line card at a time. Allow at least 15 seconds for the router to complete the preceding tasks before removing or inserting another line card.
>
> After removing and inserting a line card into the same slot, allow at least 60 seconds before removing or inserting another line card.

- Line cards have two ejector levers to release the card from its backplane connector. Use the levers when you are removing the line card and to seat the line card firmly in its backplane connector when you are installing the line card. The ejector levers align and seat the card connectors in the backplane.

> **Caution**   When you remove a line card, always use the ejector levers to ensure that the connector pins disconnect from the backplane in the sequence expected by the router. Any card that is only partially connected to the backplane can halt the router.
>
> When you install a line card, always use the ejector levers to ensure that the card is correctly aligned with the backplane connector; the connector pins should make contact with the backplane in the correct order, indicating that the card is fully seated in the backplane. If a card is only partially seated in the backplane, the router will hang and subsequently crash.

> **Caution**   To avoid damaging card mechanical components, never carry an RSP or line card by the captive installation screws or ejector levers. Doing so can damage these components and cause card insertion problems.

For line card configuration information, see the "Verifying and Troubleshooting ISM Line Card and SAM Installation" section on page 2-1.

Removing a Line Card

If you are replacing a failed line card, remove the existing line card first, then install the new line card in the same slot. To remove a line card, use Figure 1-4 or Figure 1-5 as a reference and follow these steps:

Step 1   Attach an ESD-preventive wrist or ankle strap and follow its instructions for use.

Step 2   Disconnect and remove all interface cables from the ports; note the current connections of the cables to the ports on the line card.

Step 3   Detach the line card cable-management bracket from the line card.

Step 4   Use a screwdriver to loosen the captive screw at each end of the line card faceplate (see Figure 1-4a or Figure 1-5a).

Figure 1-4   Line Card Removal and Installation for the Cisco ASR 9010 Router
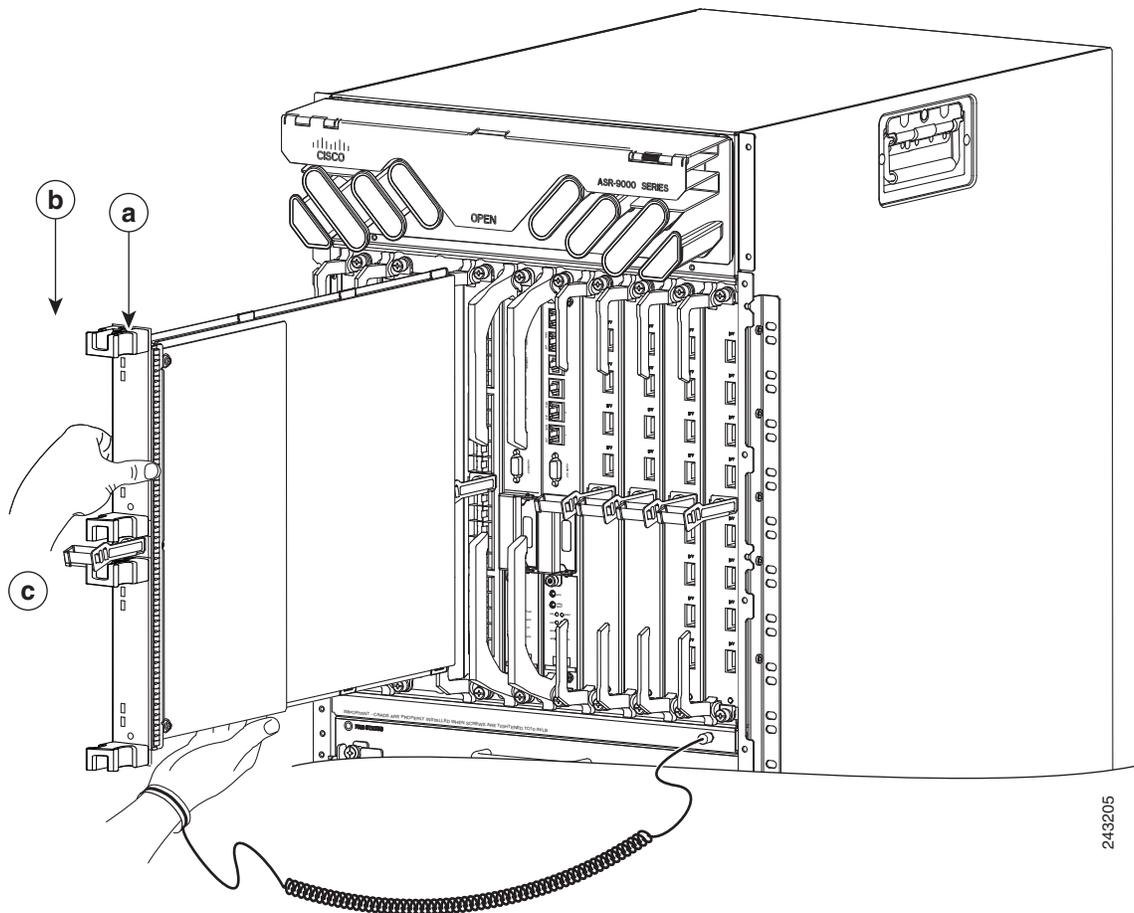
Figure 1-5   Line Card Removal and Installation for the Cisco ASR 9006 Router
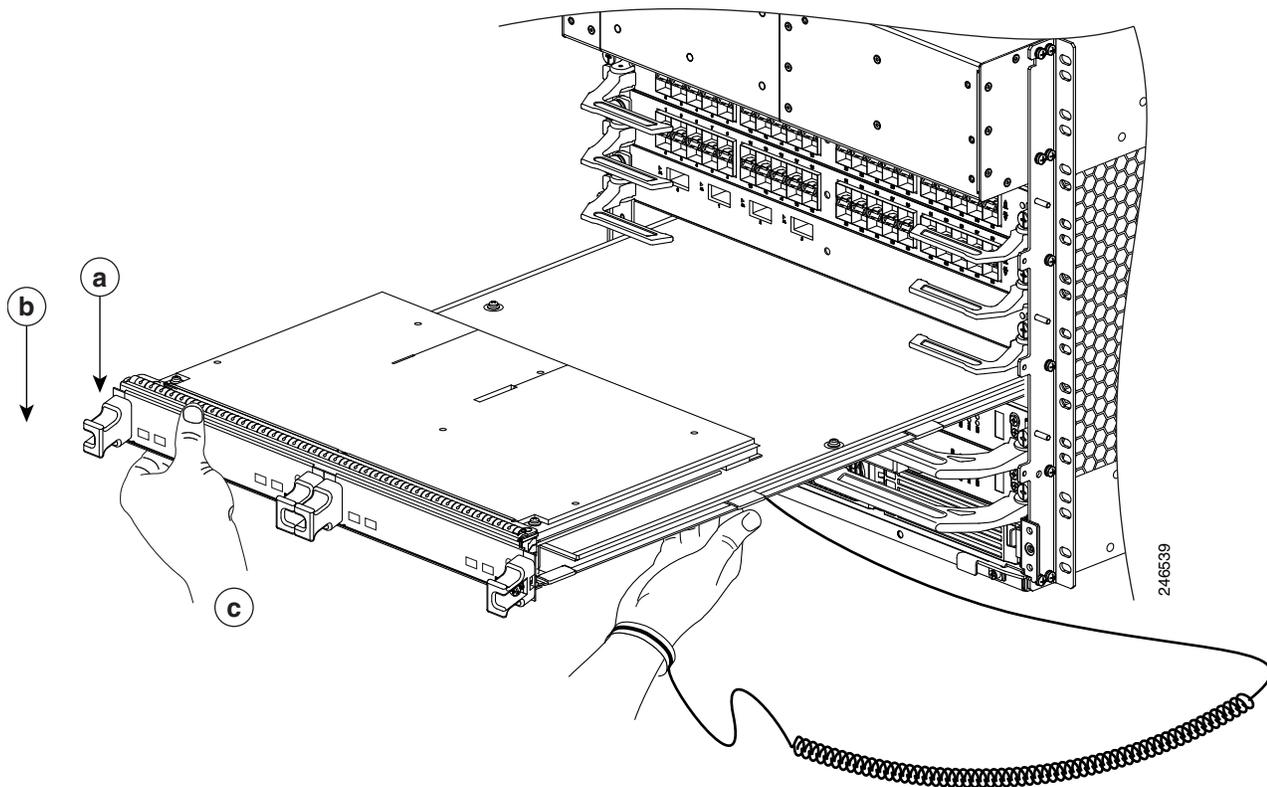
⚠ **Caution**   When you remove a line card, always use the ejector levers to ensure that the line card connector pins disconnect from the backplane in the logical sequence expected by the router. Any line card that is only partially connected to the backplane can halt the router.

Step 5   Simultaneously pivot the ejector levers away from each other to release the line card from the backplane connector (see Figure 1-4b or Figure 1-5b).

Step 6   Grasp the ejector levers and pull the line card halfway out of the slot.

Step 7   Grasp the line card and gently pull it straight out of the slot, keeping your other hand under the line card to guide it (see Figure 1-4c or Figure 1-5c). Avoid touching the line card printed circuit board, components, or any connector pins.

Step 8   Place the removed line card on an antistatic mat, or immediately place it in an antistatic bag if you plan to return it to the factory.

Step 9   If the line card slot is to remain empty, install a line card blank (Product Number A9K-LC-FILR) to keep dust out of the chassis and to maintain proper airflow through the line card compartment. Secure the line card blank to the chassis by tightening its captive screws.

⚠
Caution   Be careful not to damage or disturb the EMI spring fingers located on the front edge of the card face plate.

✎
Note   Always insert a dust plug in an optical port opening for each port that is not in use.

Installing a Line Card

A line card slides into almost any available line card slot and connects directly to the backplane. If you install a new line card, you must first remove the line card blank from the available slot.

✎
Note   Refer to the installation and configuration guide for your router for information on line card slot types, slot width, and slot location.

⚠
Caution   When installing a line card, always fully tighten both captive installation screws to ensure that the card is correctly seated in the backplane connector. A card that is only partially seated in the backplane might not operate properly, even if it boots.

⚠
Caution   The router may indicate a hardware failure if you do not follow proper procedures. Remove or insert only one line card at a time. Allow at least 15 seconds for the router to complete the preceding tasks before removing or inserting another line card.

To install a line card, follow these steps:

Step 1   Attach an ESD-preventive wrist or ankle strap and follow its instructions for use.

Step 2   Choose an available line card slot for the line card, and verify that the line card interface cable is long enough for you to connect the line card with any external equipment.

⚠
Caution   To prevent ESD damage, handle line cards only by the metal card carrier. Do not touch any of the electrical components or circuitry.

⚠
Caution   To avoid damaging card mechanical components, never carry an RSP or line card by the captive installation screws or ejector levers. Doing so can damage these components and cause card insertion problems.

Step 3   Grasp the faceplate of the line card with one hand and place your other hand under the metal card carrier to support the weight of the card (see Figure 1-4 or Figure 1-5). Position the card for insertion into the card cage slot. Avoid touching the line card printed circuit board, components, or any connector pins.

Step 4   Carefully slide the line card into the slot until the ejector levers make contact with the edges of the card cage, then *stop* when the ejector lever hooks catch the lip of the card cage. If they do not catch, try reinserting the line card until the ejector levers are fully latched.

$\triangle$

Caution   When you install a line card, always use the ejector levers to ensure that the card is correctly aligned with the backplane connector, the card connector pins make contact with the backplane in the correct order, and the card is fully seated in the backplane. A card that is only partially seated in the backplane can cause the router to hang.

Step 5   Simultaneously pivot both ejector levers toward each other until they are perpendicular to the line card faceplate. This action firmly seats the card in the backplane.

Step 6   Tighten the captive screw on each end of the line card faceplate to ensure proper EMI shielding and to prevent the line card from becoming partially dislodged from the backplane. Tighten the captive screws to a torque of 10 +/–1 in-lb.

$\triangle$

Caution   To ensure adequate space for additional line cards, always tighten the captive installation screws on each newly installed line card *before* you insert any additional line cards. These screws also ensure correct seating in the backplane connector, prevent accidental removal, and provide proper grounding and EMI shielding for the router.

For information on verifying and troubleshooting the hardware installation, see the "Verifying and Troubleshooting ISM Line Card and SAM Installation" section on page 2-1.

ISM (Integrated Service Module) Line Cards

This section describes how to install or remove ISM (Integrated Service Module) line cards on Cisco ASR 9000 Series Aggregation Services Routers. This chapter contains the following sections:

Handling ISM (Integrated Service Module) Line Cards

Each ISM (Integrated Service Module) line card circuit board is mounted to a metal carrier and is sensitive to electrostatic discharge (ESD) damage. Before you begin installation, read "Preparing to Install a SAM (Service Acceleration Module) or an ISM (Integrated Service Module) Line Card" for a list of parts and tools required for installation.

$\triangle$

Caution   Always handle the ISM (Integrated Service Module) line card by the carrier edges and handle; never touch the ISM (Integrated Service Module) line card components or connector pins. (See Figure 1-9.)

When a slot is not in use, a blank must fill the empty slot to allow the router to conform to electromagnetic interference (EMI) emissions requirements and to allow proper airflow across the installed modules. If you plan to install an ISM (Integrated Service Module) line card in a slot that is not in use, you must first remove the blank.

Figure 1-6   *Handling an ISM (Integrated Service Module) Line Card*
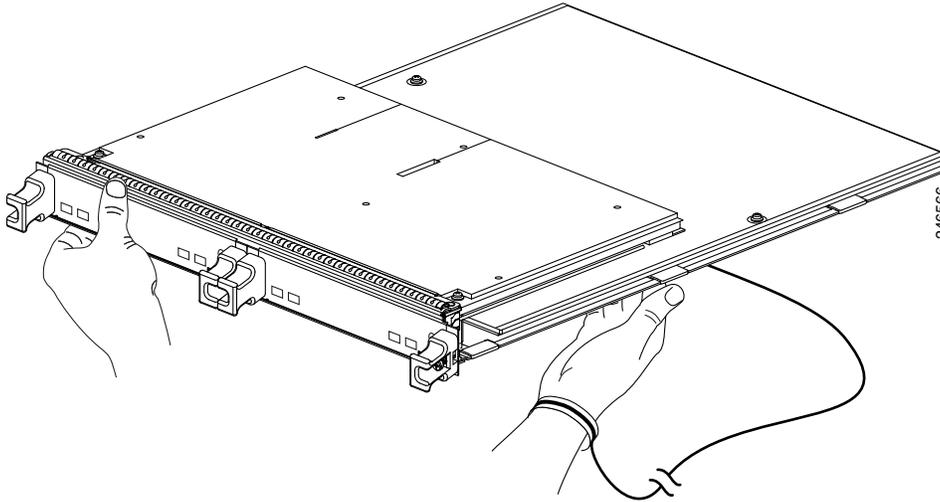
Removing and Installing an ISM (Integrated Service Module) Line Card

The following sections describe the procedures for removing and installing ISM (Integrated Service Module) line cards:

- Guidelines for ISM (Integrated Service Module) Line Card Removal and Installation
- Removing a Line Card
- Installing an ISM (Integrated Service Module) Line Card

Note   Some of the procedures in the following sections use illustrations of a 10-slot
Cisco ASR 9000 Series Router to support the descriptions of removing and installing ISM (Integrated
Service Module) line cards. Although the card cages of Cisco ASR-9000 Series Routers differ (vertical
slot orientation for the 10-slot Cisco ASR 9000 Series Router, horizontal slot orientation for the 6-slot
Cisco ASR 9000 Series Router), the designated use of slots and the process of installing and removing
an ISM (Integrated Service Module) line card are basically the same. Therefore, separate procedures and
illustrations are not included in this publication.

Guidelines for ISM (Integrated Service Module) Line Card Removal and Installation

Guidelines for ISM (Integrated Service Module) line card removal and installation include the following:

- Online insertion and removal (OIR) is supported, enabling you to remove and install ISM (Integrated
  Service Module) line cards while the router is operating.

> ✎
>
> **Note**   With OIR, notifying the software or resetting the power is not required. However, you have the option of using the **hw-module loc rack/slot/CPU0 maint** command before removing an ISM (Integrated Service Module) line card.

> ✎
>
> **Note**   To avoid solid state disk failures, it is mandatory to shutdown the ISM (Integrated Service Module) line card before OIR.

- After you reinstall an ISM (Integrated Service Module) line card, the router automatically downloads the necessary software from the Route Switch Processor (RSP).

> ⚠
>
> **Caution**   The router may indicate a hardware failure if you do not follow proper procedures. Remove or insert only one ISM (Integrated Service Module) line card at a time. Allow at least 15 seconds for the router to complete the preceding tasks before removing or inserting another ISM (Integrated Service Module) line card.

- ISM (Integrated Service Module) line cards have two ejector levers to release the card from its backplane connector. Use the levers when you are removing the ISM (Integrated Service Module) line card and to seat the ISM (Integrated Service Module) line card firmly in its backplane connector when you are installing the ISM (Integrated Service Module) line card. The ejector levers align and seat the card connectors in the backplane.

> ⚠
>
> **Caution**   When you remove an ISM (Integrated Service Module) line card, always use the ejector levers to ensure that the connector pins disconnect from the backplane in the logical sequence expected by the router. Any card that is only partially connected to the backplane can halt the router.
>
> When you install an ISM (Integrated Service Module) line card, always use the ejector levers to ensure that the card is correctly aligned with the backplane connector; the connector pins should make contact with the backplane in the correct order, indicating that the card is fully seated in the backplane. A card that is only partially seated in the backplane will cause the router to hang and subsequently crash.

Removing an ISM (Integrated Service Module) Line Card

If you are replacing a failed ISM (Integrated Service Module) line card, remove the existing ISM (Integrated Service Module) line card first, then install the new ISM (Integrated Service Module) line card in the same slot. To remove an ISM (Integrated Service Module) line card, use Figure 1-4 as a reference and follow these steps:

Step 1   Attach an ESD-preventive wrist strap and follow its instructions for use.

Step 2   Use a screwdriver to loosen the captive screw at each end of the ISM (Integrated Service Module) line card faceplate. (See Figure 1-8.)

Figure 1-7   *ISM (Integrated Service Module) Line Card Removal and Installation*
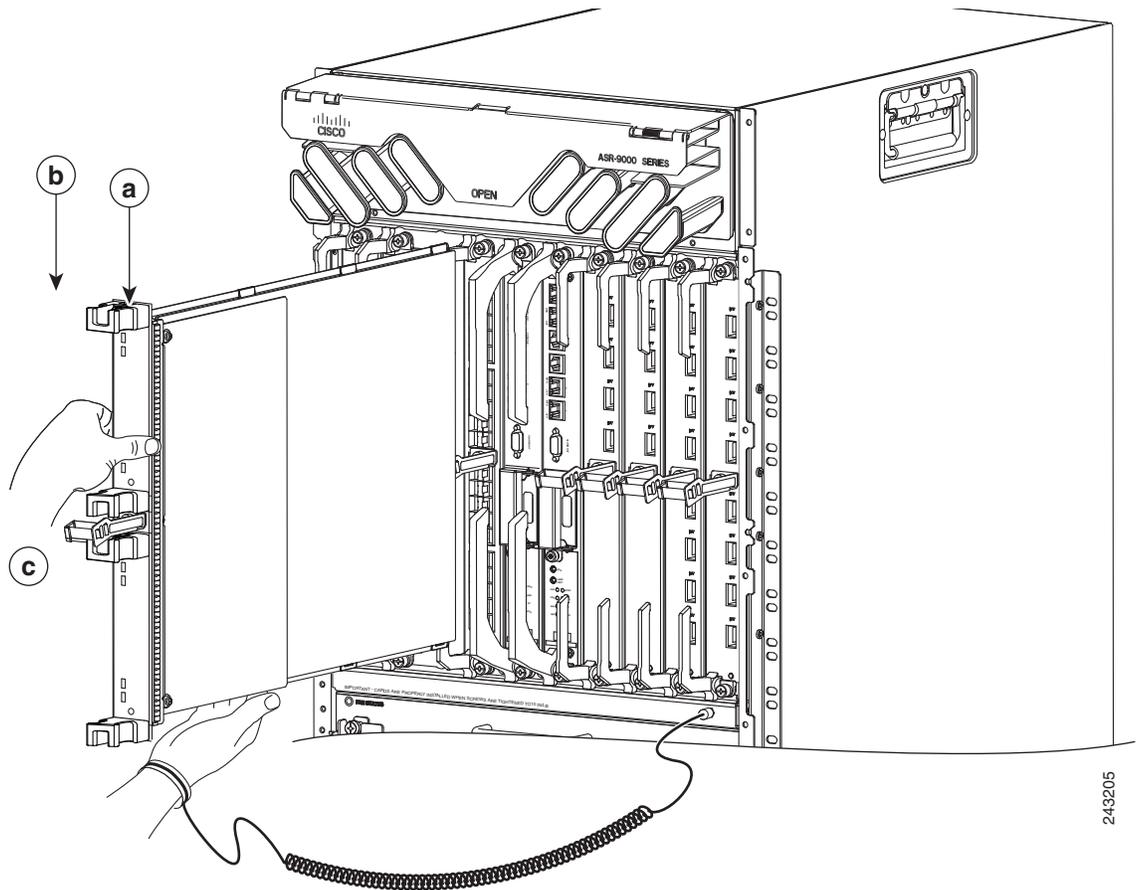
⚠️
Caution   When you remove an ISM (Integrated Service Module) line card, always use the ejector levers to ensure
that the ISM (Integrated Service Module) line card connector pins disconnect from the backplane in the
logical sequence expected by the router.

Step 3   Simultaneously pivot the ejector levers away from each other to release the ISM (Integrated Service
Module) line card from the backplane connector. (See Figure 1-8.)

Step 4   Grasp the ejector levers and pull the ISM (Integrated Service Module) line card halfway out of the slot.

Step 5   Grasp the ISM (Integrated Service Module) line card and gently pull it straight out of the slot, keeping
your other hand under the ISM (Integrated Service Module) line card to guide it. (See Figure 1-7.) Avoid
touching the ISM (Integrated Service Module) line card printed circuit board, components, or any
connector pins.

Step 6   Place the removed ISM (Integrated Service Module) line card on an antistatic mat, or immediately place
it in an antistatic bag if you plan to return it to the factory.

Step 7   If the ISM (Integrated Service Module) line card slot is to remain empty, install a line card blank to keep
dust out of the chassis and to maintain proper airflow through the ISM (Integrated Service Module) line
card compartment. Secure the line card blank to the chassis by tightening its captive screws.

Installing an ISM (Integrated Service Module) Line Card

An ISM (Integrated Service Module) line card slides into any available line card slot and connects directly to the backplane. If you install a new ISM (Integrated Service Module) line card, you must first remove the line card blank from the available slot.

> ✎
> **Note**   Refer to Figure 2-6 Cisco ASR 9010 Router Components and Slot Numbering and Figure 2-7 Cisco ASR 9006 Router Components and Slot Numbering in the Unpacking and Installing the Chassis chapter of the *Cisco ASR 9000 Series Aggregation Services Router Hardware Installation Guide* for information on line card slot types in order to determine an appropriate slot in which to install the ISM (Integrated Service Module) line card.

> ⚠
> **Caution**   The router may indicate a hardware failure if you do not follow proper procedures. Remove or insert only one ISM (Integrated Service Module) line card at a time. Allow at least 15 seconds for the router to complete the preceding tasks before removing or inserting another ISM (Integrated Service Module) line card.

To install an ISM (Integrated Service Module) line card, follow these steps:

Step 1   Attach an ESD-preventive wrist or ankle strap and follow its instructions for use.

Step 2   Choose an available ISM (Integrated Service Module) line card slot for the ISM (Integrated Service Module) line card.

> ⚠
> **Caution**   To prevent ESD damage, handle ISM (Integrated Service Module) line cards by the captive installation screws, the ejector levers, or the card carrier edges only. Do not touch any of the electrical components or circuitry.

Step 3   Grasp the handle of the ISM (Integrated Service Module) line card with one hand and place your other hand under the card carrier to support the weight of the card; position the card for insertion into the card cage slot. Avoid touching the ISM (Integrated Service Module) line card printed circuit board, components, or any connector pins.

Step 4   Carefully slide the ISM (Integrated Service Module) line card into the slot until the ejector levers make contact with the edges of the card cage, then *stop* when the ejector lever hooks catch the lip of the card cage. If they do not catch, try reinserting the ISM (Integrated Service Module) line card until the ejector lever hooks are fully latched. (See Figure 1-8.)

Figure 1-8   ISM (Integrated Service Module) Card Ejector Lever Positions During Installation
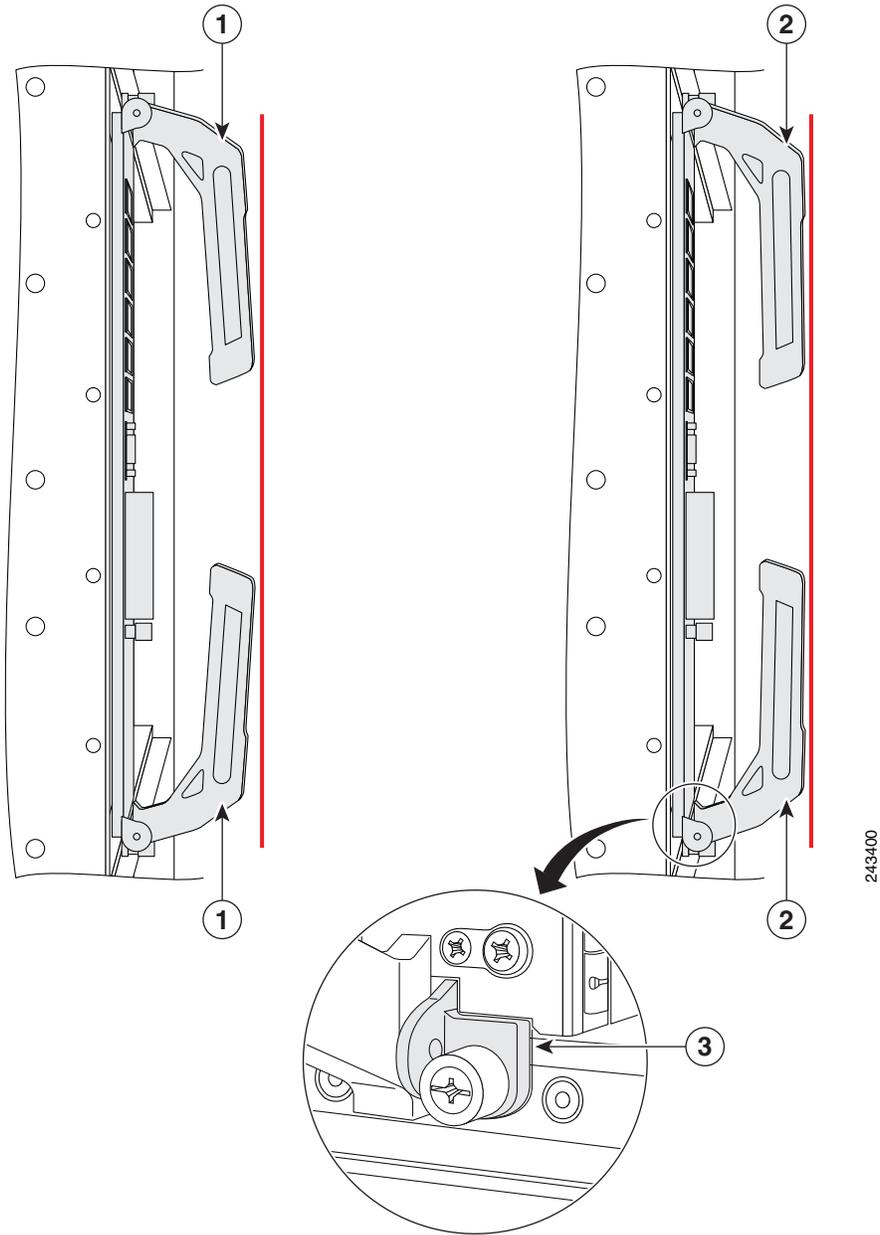
Note: Vertical red lines in Figure 1-8 indicate a line fully parallel to the ISM (Integrated Service Module) card front panel.

| 1	Slightly loose position of ejector levers when the ISM (Integrated Service Module) card is fully seated in the backplane, but the captive installation screws are not fully tightened	2	Fully parallel position of ejector levers when the ISM (Integrated Service Module) card is fully seated in the backplane and captive installation screws are fully tightened	3	Slight gap that may be present when the ISM (Integrated Service Module) card is fully seated in the backplane and captive installation screws are fully tightened

⚠

Caution   When you install an ISM (Integrated Service Module) line card, always use the ejector levers to ensure that the card is correctly aligned with the backplane connector, the card connector pins make contact with the backplane in the correct order, and the card is fully seated in the backplane. A card that is only partially seated in the backplane can cause the router to hang and subsequently crash.

Step 5   Simultaneously pivot both ejector levers toward each other until they are perpendicular to the ISM (Integrated Service Module) line card faceplate. This action firmly seats the card in the backplane.

Step 6   Use a 3/16-inch flat-blade screwdriver to tighten the captive screw on each end of the ISM (Integrated Service Module) line card faceplate to ensure proper EMI shielding and to prevent the ISM (Integrated Service Module) line card from becoming partially dislodged from the backplane. Tighten the locking thumbscrews on both sides of the ISM (Integrated Service Module) line card to a torque of between 8.3 and 11 inch-pounds (94 to 124 N-cm). Do not overtighten.

⚠

Caution   To ensure adequate space for additional ISM (Integrated Service Module) line cards, always tighten the captive installation screws on each newly installed ISM (Integrated Service Module) line card *before* you insert any additional ISM (Integrated Service Module) line cards. These screws also prevent accidental removal and provide proper grounding and EMI shielding for the router.

Step 7   Install the SAMs (Service Acceleration Modules) into each newly installed ISM (Integrated Service Module) line card.

✎

Note   The Flash Service Acceleration Module (SAM) is not needed for the ISM (Integrated Service Module)-based CGv6 applications. If you are running ISM (Integrated Service Module)-based CGv6 applications, go to the "Checking the Installation" section below.

SAMs (Service Acceleration Modules)

This section describes how to install or remove SAMs (Service Acceleration Modules) on the Cisco ASR-9000 Series Router. This section contains the following procedures:

- Handling SAMs (Service Acceleration Modules), page 1-26
- Online Insertion and Removal, page 1-26
- SAM (Service Acceleration Module) Installation and Removal, page 1-26
- Checking the Installation, page 1-27

✎

Note   The Flash Service Acceleration Module (SAM) is not needed for the ISM (Integrated Service Module)-based CGv6 applications. If you are running ISM (Integrated Service Module)-based CGv6 applications, go to the "Checking the Installation" section on page 1-27 below.

Handling SAMs (Service Acceleration Modules)

Each SAM (Service Acceleration Module) circuit board is mounted to a metal carrier and is sensitive to electrostatic discharge (ESD) damage. Before you begin installation, read "Preparing to Install a SAM (Service Acceleration Module) or an ISM (Integrated Service Module) Line Card" for a list of parts and tools required for installation.

⚠ **Caution**   Always handle the SAM (Service Acceleration Module) by the carrier edges and handle; never touch the SAM (Service Acceleration Module) components or connector pins. (See Figure 1-9.)

When a bay is not in use, a blank must fill the empty bay to allow the router or switch to conform to electromagnetic interference (EMI) emissions requirements and to allow proper airflow across the installed modules. If you plan to install a SAM (Service Acceleration Module) in a bay that is not in use, you must first remove the blank.

Figure 1-9   *Handling a SAM (Service Acceleration Module)*
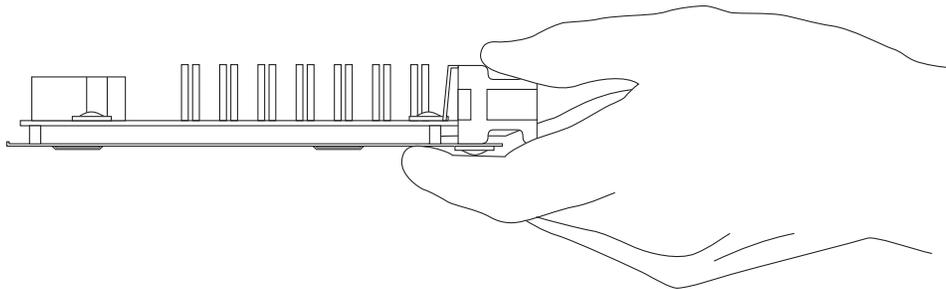
Online Insertion and Removal

Cisco ASR 9000 Series Router ISM (Integrated Service Module) line cards and SAMs (Service Acceleration Modules) support online insertion and removal (OIR). SAMs (Service Acceleration Modules) can be inserted or removed independently from the ISM (Integrated Service Module) line card. OIR of a ISM (Integrated Service Module) line card with installed SAMs (Service Acceleration Modules) is also supported.

SAM (Service Acceleration Module) Installation and Removal

This section provides step-by-step instructions for removing and installing a SAM (Service Acceleration Module) in an ISM (Integrated Service Module) line card.

⚠ **Caution**   When performing the following procedures, wear a grounding wrist strap to avoid ESD damage to the SAM (Service Acceleration Module). Some platforms have an ESD connector for attaching the wrist strap. Do not directly touch the midplane or backplane with your hand or any metal tool, or you could shock yourself.

To remove and install a SAM (Service Acceleration Module) in an ISM (Integrated Service Module) line card, refer to Figure 1-10 and do the following:

Step 1   To insert the SAM (Service Acceleration Module) in the ISM (Integrated Service Module) line card, locate the guide rails inside the ISM (Integrated Service Module) line card that hold the SAM (Service Acceleration Module) in place. They are at the top and bottom of the SAM (Service Acceleration Module) slot and are recessed about an inch, as shown in C of Figure 1-10.

Step 2   Carefully slide the SAM (Service Acceleration Module) all the way in the ISM (Integrated Service Module) line card until the SAM (Service Acceleration Module) is firmly seated in the SAM (Service Acceleration Module) interface connector. When fully seated, the SAM (Service Acceleration Module) might be slightly behind the ISM (Integrated Service Module) line card faceplate.

> **Note**   The SAM (Service Acceleration Module) will slide easily into the slot if it is properly aligned on the tracks. If the SAM (Service Acceleration Module) does not slide easily, do NOT force it. Remove the SAM (Service Acceleration Module) and reposition it, paying close attention to engaging it on the tracks.

Step 3   To remove the SAM (Service Acceleration Module) from the ISM (Integrated Service Module) line card, first press the recessed Shutdown Button, then wait for the LEDs to go off (normally 10 seconds but up to 2 minutes).

Step 4   Grasp the SAM (Service Acceleration Module) and pull the SAM (Service Acceleration Module) from the ISM (Integrated Service Module) line card.

Figure 1-10   *SAM (Service Acceleration Module) Installation and Removal*
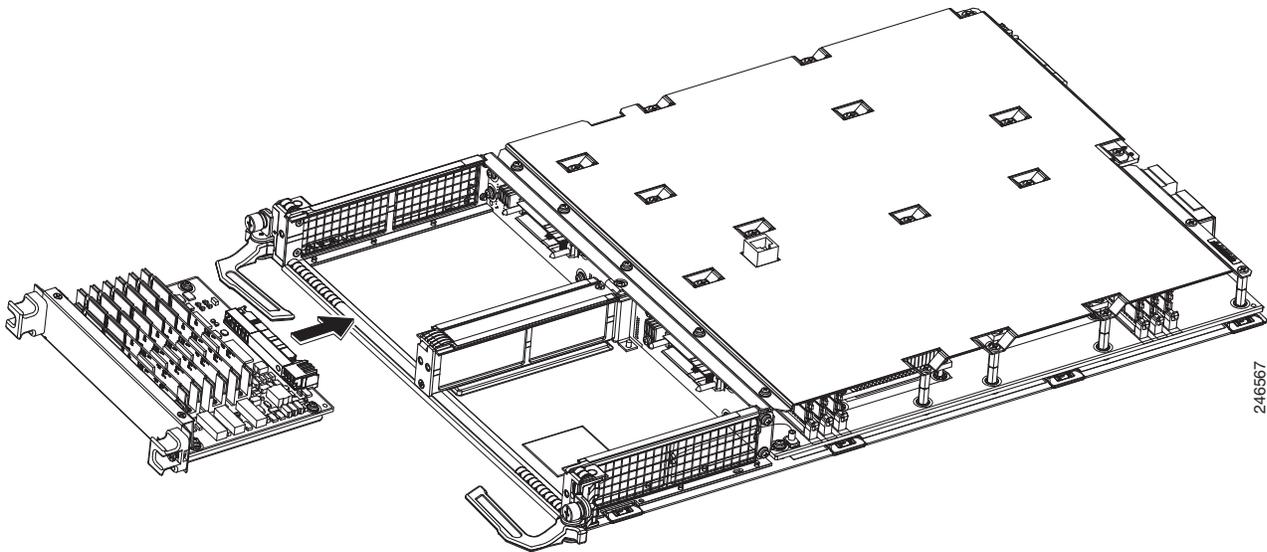
Checking the Installation

This section describes the procedures you can use to verify the ISM (Integrated Service Module) line card and SAM (Service Acceleration Module) installation, and includes information on the following topics:

Verifying the Installation

This section describes how to verify the ISM (Integrated Service Module) line card and SAM (Service Acceleration Module) installation by observing the SAM (Service Acceleration Module) LED states.

When the system has re initialized, the ISM (Integrated Service Module) line card status is confirmed through observation of the four SAM (Service Acceleration Module) LEDs. The SAM Status LED should be green (on). The SAM Attention LED should be off. A red SAM Attention LED indicates that there is a SAM error and that the SAM needs attention. If the SAM Attention LED is flashing red, that indicates that someone has pressed the Shutdown Button.If the SAM Flash Module Fault LED is red, that indicates that the SAM has one or more flash module faults present. The SAM Flash Module Active LED on the Service Acceleration Modules (SAMs) front panel should be green. No light indicates that the SAM is powered off or that there are no activities on flash module and ASIC. If the SAM Flash Module Active LED is flashing green, that indicates that the SAM is in the process of powering up and/or that activity is occuring on the SAM flash module and ASIC. The SAM Flash Module Active LED should eventually transition from flashing green to solid green, indicating that the SAM is powered up and that the SAM flash module and ASIC are active.

Use the following procedure to verify that a ISM (Integrated Service Module) line card and SAM (Service Acceleration Module) are installed correctly:

Step 1 Observe the console display messages and verify that the system discovers the ISM (Integrated Service Module) line card, while the system re initializes, as follows:

- As an ISM (Integrated Service Module) line card and the Service Acceleration Modules (SAMs) are initialized, the SAM Status LED will first be amber, indicating that power is on, but the ISM (Integrated Service Module) line card and the Service Acceleration Modules (SAMs) are both being configured. When the ISM (Integrated Service Module) line card and the Service Acceleration Modules (SAMs) are both active, the SAM Status LED will illuminate green.

- SAMs (Service Acceleration Modules) will follow the same sequence after the ISM (Integrated Service Module) line card has completed its initialization. The SAM (Service Acceleration Module) STATUS LEDs will illuminate amber, turning to green when the SAMs (Service Acceleration Modules) become active.

Step 2 If the ISM (Integrated Service Module) line cards and SAMs (Service Acceleration Modules) have not become active within three minutes, refer to the system console messages. If there is no indication that a field-programmable device (FPD) upgrade is underway, see Chapter 2, "Verifying and Troubleshooting the Line Card Installation."

Using show Commands to Verify ISM (Integrated Service Module) Line Card and SAM (Service Acceleration Module) Status

The following procedure uses **show** commands to verify that the new SAMs (Service Acceleration Modules) are installed correctly and operating correctly.

Step 1   Use the **show running-config** command to display the system configuration.

Step 2   Display information about the installed ISM (Integrated Service Module) line cards using the **show diag** command.

Step 3   Use the **show hw-module fpd location** *<rack/slot/subslot>* command to verify the FPD version information of the SAMs (Service Acceleration Modules) installed in the system. The **hw-module fpd location** *<rack/slot/subslot>* command can be used for upgrading the FPD version on the installed ISM (Integrated Service Module) line cards and/or the SAMs (Service Acceleration Modules).

> ✎
> **Note**   If a SAM (Service Acceleration Module) does not meet the minimum version required, the FPD may need to be updated. Refer to *Cisco ASR 9000 Series Aggregation Services Router System Management Configuration Guide* for instructions. If the update fails, the failing module is powered down and an error message displays on the system console.

Step 4   Use the **show platform** command to check the state of all the boards in the chassis, including the ISM (Integrated Service Module) line card and the SAMs (Service Acceleration Modules).

The SAM (Service Acceleration Module) state should be "OK" and the ISM (Integrated Service Module) line card state should be "IOS XR RUN" in the **show platform** command output. The CPU1 status should be "SEOS-READY".

Step 5   Finally, you can use the **show version** command to obtain software version information for the installed ISM (Integrated Service Module) line cards. The **show platform summary location 0/1/CPU0** command provides the application software version that is running on this board.

Using show Commands to Display SAM (Service Acceleration Module) Information

Table 1-8 describes the **show** commands you can use to display SAM (Service Acceleration Module) information.

Table 1-8   show Commands to Display SAM (Service Acceleration Module) Information

Command	Type of Information Provided
show platform	Router's installed linecard and SAM (Service Acceleration Module) type, slot, and state information.
show diag	SAM (Service Acceleration Module) type in that slot, hardware revision, part number, and EEPROM contents.
show hw-module fpd location *<rack/slot/subslot>*	FPD version information of SAMs (Service Acceleration Modules) in the system.

Table 1-8   show Commands to Display SAM (Service Acceleration Module) Information

Command	Type of Information Provided
show version	Cisco IOS XR software version, names and sources of configuration files, and boot images.
show inventory	Information about all the Cisco products that are installed in the router.

Table 1-9   show Commands to Display SAM (Service Acceleration Module) Information

Command	Type of Information Provided	Example
show diag *rack/slot/subslot/*	SAM (Service Acceleration Module) type in that slot, hardware revision, part number, and EEPROM contents.	**show diag 0/1/SAM0** or **show diag 0/1/SAM1** **show diag 0/1/CPU0** (for ISM)
show version	Cisco IOS XR software version and boot images.	**show version**

The following sample display shows the events logged by the system as you insert a new ISM (Integrated Service Module) line card in module slot 0.

```
Router#
18:05:25: %LINEPROTO-5-UPDOWN: Service-Engine0/0/0/0, Change State to Up
```

Use the following procedure to verify that the ISM (Integrated Service Module) line card is installed correctly:

Step 1   Observe the console display messages and verify that the system discovers the ISM (Integrated Service Module) line card.

Step 2   Verify that the STATUS LED on the SAM (Service Acceleration Module) goes on (is green) and remains on after the reinstallation is complete. If the STATUS LED remains on, proceed to Step 5. If the STATUS LED does not remain on, proceed to Step 3.

Step 3   If the STATUS LED on a SAM (Service Acceleration Module) fails to go on, the SAM (Service Acceleration Module) or the ISM (Integrated Service Module) line card might not be fully seated.

 • Remove the SAM (Service Acceleration Module) from the ISM (Integrated Service Module) line card.

 • Inspect the SAM (Service Acceleration Module). Verify there are no bent pins or parts and that there is nothing lodged in the two devices that could prevent a good connection.

 • Insert the SAM (Service Acceleration Module) in the ISM (Integrated Service Module) line card by sliding the SAM (Service Acceleration Module) all the way in the ISM (Integrated Service Module) line card until the SAM (Service Acceleration Module) is firmly seated in the SAM (Service Acceleration Module) interface connector. When fully seated in the ISM (Integrated Service Module) line card, the SAM (Service Acceleration Module) might be slightly behind the ISM (Integrated Service Module) line card faceplate.

> ✎
>
> **Note**   The SAM (Service Acceleration Module) will slide easily into the slot if it is properly aligned on the tracks. If the SAM (Service Acceleration Module) does not slide easily, do NOT force it. Remove the SAM (Service Acceleration Module) and reposition it, paying close attention to engaging it on the tracks.

- After the system re initialization, the STATUS LED on the SAM (Service Acceleration Module) should go on and remain on. If the STATUS LED remains on, proceed to Step 5. If it does not, try reseating the SAM (Service Acceleration Module) in a different subslot within the ISM (Integrated Service Module) line card.

- If the STATUS LED on a SAM (Service Acceleration Module) fails to go on after reseating the SAM (Service Acceleration Module) in a different subslot within the ISM (Integrated Service Module) line card, proceed to Step 4.

Step 4   If the STATUS LED on a SAM (Service Acceleration Module) still fails to go on, remove the SAM (Service Acceleration Module) from the ISM (Integrated Service Module) line card, then remove the ISM (Integrated Service Module) line card and install it in another available slot on the router. Wait for the STATUS LED on the ISM (Integrated Service Module) line card to turn green.

- If the STATUS LED goes on, suspect a failed backplane port in the original slot.

- If the STATUS LED fails to go on, remove the ISM (Integrated Service Module) line card and ensure the SAM (Service Acceleration Module) is firmly seated in its slot. Remove and reinstall it accordingly.

- If the STATUS LED still fails to go on, but other LEDs on the SAM (Service Acceleration Module) go on to indicate activity, proceed to Step 5 to resume the installation checkout; suspect that the STATUS LED on the SAM (Service Acceleration Module) or the SAM (Service Acceleration Module) bay has failed. Contact a service representative to report the problem and obtain further instructions.

- If no LEDs on the SAM (Service Acceleration Module) go on:

  - Verify that the SAM (Service Acceleration Module) is supported on the ISM (Integrated Service Module) line card and that it has the required hardware revision. If the SAM (Service Acceleration Module) is not supported or has an old hardware revision, the **show diag** command indicates that the ISM (Integrated Service Module) line card is deactivated.

  - If there is another ISM (Integrated Service Module) line card available in the router, to test your SAM (Service Acceleration Module) move the SAM (Service Acceleration Module) to the other ISM (Integrated Service Module) line card.

  - Suspect a faulty ISM (Integrated Service Module) line card. Contact a service representative to report the problem and obtain further instructions.

Note   If you move the SAM (Service Acceleration Module) to a different subslot in the ISM (Integrated Service Module) line card and it works, there are probably issues with the subslot in the ISM (Integrated Service Module) line card. Contact a service representative re: the broken subslot. If you test the SAM (Service Acceleration Module) in another ISM (Integrated Service Module) line card and it works, the original ISM (Integrated Service Module) line card probably has some issues and needs troubleshooting. Contact a service representative to report the problem and obtain further instructions.

Step 5   If the SAM (Service Acceleration Module) is new and is not a replacement, configure the new SAM (Service Acceleration Module) using the instructions in *Cisco IOS XR Getting Started Guide for the Cisco ASR 9000 Series Router* and *Cisco ASR 9000 Series Aggregation Services Router Interface and Hardware Component Configuration Guide*.

Step 6   If the ISM (Integrated Service Module) line card is a replacement, use the **show platform** command to verify the status of the SAMs (Service Acceleration Modules). (See the "Using show Commands to Verify ISM (Integrated Service Module) Line Card and SAM (Service Acceleration Module) Status" section.)

Step 7   Repeat Step 1 through Step 6 to verify that any additional ISM (Integrated Service Module) line cards are properly installed.

If you experience other problems that you are unable to solve, contact TAC (see the "Obtaining Documentation and Submitting a Service Request" section in the Preface) or a service representative for assistance.

To configure the new interface, use *Cisco ASR 9000 Series Aggregation Services Router Interface and Hardware Component Configuration Guide*.

Note   ACL-based-routing on Service-engine interfaces connecting to an ISM (Integrated Service Module) line card is not supported.

Note   VRF on Service-engine interfaces connecting to an ISM (Integrated Service Module) line card is not supported.

Verifying and Troubleshooting the Line Card Installation

This chapter contains information about the following topics:

Verifying and Troubleshooting ISM Line Card and SAM Installation

After installing the hardware, you need to look at the LEDs on the Flashback Service Acceleration Modules (SAMs) to verify that the ISM (Integrated Service Module) line card and the Service Acceleration Modules (SAMs) were installed correctly. If they were not, you need to troubleshoot to find the problem. The following sections provide information about how to verify and troubleshoot ISM (Integrated Service Module) line card and Service Acceleration Modules (SAMs) installations:

Troubleshooting using Cisco IOS XR commands is briefly described in the "Configuring and Troubleshooting the Service Acceleration Modules (SAMs)" section on page 2-4.

Initial Boot Process

During a typical ISM (Integrated Service Module) line card boot process, the following events occur:

1. The ISM (Integrated Service Module) line card receives power and begins executing initialization software.

2. The ISM (Integrated Service Module) line card performs internal checks, and prepares to accept the Cisco IOS XR software from the RSP.

3. The RSP loads the line card with its Cisco IOS XR software.

To verify that the ISM (Integrated Service Module) line card and Service Acceleration Modules (SAMs) are working properly:

Step 1   Check that the SAM Status LED is on (green) to verify that the card is operating normally.

Step 2   Check that the SAM Attention LED for the SAM you're troubleshooting is off (not lit red) to verify that there is no SAM error and that the SAM does not need attention. If the SAM Attention LED is lit red, there may be an error. If the SAM Attention LED is flashing, someone has pressed the Shutdown Button.

Step 3   Check that the SAM Flash Module Fault LED for the SAM you're troubleshooting is off (not lit red) to verify that there is no SAM Flash Module Fault error and that the SAM does not need attention. If the SAM Flash Module Fault LED is lit red, there may be an error.

Step 4   Check that the SAM Attention LED for the SAM you're troubleshooting is off (not lit red) to verify that there is no SAM error and that the SAM does not need attention. If the SAM Attention LED is lit red, there may be an error. If the SAM Attention LED is flashing, someone has pressed the Shutdown Button.

Step 5   If one of the conditions above is not met, refer to the "Advanced ISM (Integrated Service Module) Line Card and Service Acceleration Modules (SAMs) Troubleshooting" section on page 2-6 to identify any possible problems.

Status LEDs

You can use the SAM Status LED , the SAM Attention LED , the SAM Flash Module Fault LED, or the SAM Flash Module Active LED on the Service Acceleration Modules (SAMs) front panels to verify proper operation or troubleshoot a failure (Refer to Table 2-1 through Table 2-4).

Table 2-1   SAM Status LED

LED Color	Description
Off	Indicates that the SAM is powered off. SAM main power has been removed.
Green	Indicates that the SAM is ready and operational.
Amber	Indicates that the SAM is in power transition. An amber LED during power up indicates that the SAM is being configured. An amber LED during power down indicates that hot plug circuitry and software are in the process of removing power to the SAM.

Table 2-2   SAM Attention LED

LED Color	Description
Off	No attention needed.

Table 2-2   SAM Attention LED (continued)

LED Color	Description
Red	Indicates that there is a SAM error and that the SAM needs attention.
Blinking Red	Indicates that someone has pressed the Shutdown Button.

Table 2-3   SAM Flash Module Fault LED

LED Color	Description
Off	Indicates that the SAM is powered off or that no flash module fault is present.
Red	Indicates that the SAM has one or more flash module faults present.

Table 2-4   SAM Flash Module Active LED

LED Color	Description
Off	Indicates that the SAM is powered off or that there are no activities on flash module and ASIC.
Green	Indicates that the SAM is powered up and that the SAM flash module and ASIC are active.
Blinking Green	Indicates that the SAM is in the process of powering up and/or that activity is occuring on the SAM flash module and ASIC.

Troubleshooting the Installation

If the the SAM Status LED , the SAM Attention LED , the SAM Flash Module Fault LED, or the SAM Flash Module Active LED on the Service Acceleration Modules (SAMs) front panels indicates some issue, there is either a problem with the line card installation or a hardware failure. To verify that the line card is installed correctly, follow these steps:

Step 1   If a Port Status LED fails to go on (no activity), but the Card Status LED is on, verify that the initialization sequence has completed successfully. If this is the case, verify that the interface is not shut down. If the interface is not shut down, suspect a circuitry problem with the Port Status LED and contact a service representative for further assistance.

Step 2   If the Card Status LED fails to go on, check the router connections as follows:

    a.   Verify that the line card board connector is fully seated in the backplane. Loosen the captive installation screws and firmly pivot the ejector levers toward each other until both are parallel to the line card faceplate. Tighten the captive installation screws.

    b.   Verify that all power cords and data cables are firmly connected at both ends.

    c.   Verify that all components on the card are fully seated and secured to their sockets.

After the line card re initializes, the Card Status LED on the line card should go on. If the Card Status LED goes on, the installation is complete; if the Card Status LED does not go on, proceed to the next step.

Step 3   If the Card Status LED still fails to go on, remove the line card and try installing it in another available line card slot.

- If the Card Status LED goes on when the line card is installed in the new slot, suspect a failed backplane port in the original line card slot.

- If the Card Status LED still does not go on, halt the installation. Contact a service representative to report the faulty equipment and obtain further instructions.

Step 4   If an error message displays on the console terminal during the line card initialization, see the appropriate reference publication for error message definitions.

If you experience other problems that you cannot solve, contact a Cisco service representative for assistance.

Configuring and Troubleshooting the Service Acceleration Modules (SAMs)

After the person who installed the hardware verifies that the new Service Acceleration Modules (SAMs) are installed correctly by examining the LEDs, the network administrator can configure the Service Acceleration Modules (SAMs). The following sections provide information on configuring and troubleshooting the Service Acceleration Modules (SAMs):

- Configuration Parameters, page 2-4
- Line Card Interface Address, page 2-5
- Using Configuration Commands, page 2-5
- Basic Line Card Configuration, page 2-5
- Advanced ISM (Integrated Service Module) Line Card and Service Acceleration Modules (SAMs) Troubleshooting, page 2-6

Configuration Parameters

Table 2-5 lists the default configuration parameters that are present on the the ISM (Integrated Service Module) line card and Service Acceleration Modules (SAMs). Refer to Cisco IOS XR software documentation for complete information about these parameters.

Table 2-5   ISM (Integrated Service Module) Line Card and Service Acceleration Modules (SAMs) Configuration Default Values

Parameter	Configuration File Entry	Default Value
Flow control	flow-control	egress on ingress off
MTU	mtu	9014 bytes for normal frames
MAC address	mac address	Hardware burned-in address (BIA)

Line Card Interface Address

A Cisco ASR 9000 Series Router identifies an interface address by its rack number, line card slot number, instance number, and port number, in the format *rack/slot/instance/port*. The *rack* parameter is reserved for multirack systems, so is always 0 (zero) for the Cisco ASR 9000 Series. The line card slots are numbered from 0 to 7.

Instance numbers are reserved for cards that have subslots. This parameter is currently always 0 (zero) for line cards in the Cisco ASR 9000 Series. The ports on the line card are numbered 0, 1, 2, and so on. For example, the *rack/slot/instance/port* address of the fourth port of a line card installed in line card slot 1 is 0/1/0/3. Even if the line card contains only one port, you must use the *rack/slot/instance/port* notation.

Using Configuration Commands

The command line interface (CLI) for Cisco IOS XR software is divided into different command modes. To configure a line card, you enter the correct mode and then enter the commands you need.

When you first log in, you are automatically in EXEC mode. Next, enter the **configure** command to access configuration mode. Then, enter the **interface** command to enter interface configuration mode and specify the interface. You are now in the command mode where you can configure the new interface. Be prepared with the information you will need, such as the interface IP address.

Basic Line Card Configuration

The following procedure is for creating a basic configuration—enabling an interface and specifying IP routing. You might also need to enter other configuration subcommands, depending on the requirements for your system configuration.

The following example shows one way to configure the basic parameters of a line card:

Step 1   Enter EXEC mode:

```
Username: username
Password: password
RP/0/RSP0/CPU0:router#
```

Step 2   Check the status of each port by entering the **show interface** command:

```
RP/0/RSP0/CPU0:router# show interface
```

Step 3   Enter global configuration mode and specify that the console terminal will be the source of the configuration commands:

```
RP/0/RSP0/CPU0:router# configure terminal
```

Step 4   At the prompt, specify the new interface to configure by entering the **interface** command, followed by the *type* (for example, **gigabitethernet** or **tengige**) and *rack/slot/instance/port* (line card rack, slot number, subslot number, port number). Remember that Cisco ASR 9000 Series rack and subslot values are always 0 (zero). For example, to configure port 4 on an 8-Port 10 Gigabit Ethernet line card in line card slot 1:

```
RP/0/RSP0/CPU0:router# interface tengige 0/1/0/3
```

You are now in interface configuration mode.

Step 5 Assign an IP address and subnet mask to the interface with the **ipv4 address** configuration subcommand, as in the following example:

```
RP/0/RSP0/CPU0:router(config-if)# ipv4 address 10.1.2.3 255.255.255.0
```

Step 6 Change the shutdown state to up and enable the interface:

```
RP/0/RSP0/CPU0:router(config-if)# no shutdown
```

The **no shutdown** command passes an **enable** command to the line card. It also causes the line card to configure itself based on the most recent configuration commands received by the line card.

Step 7 If you want to disable the Cisco Discovery Protocol (CDP), which is not required, use this command:

```
RP/0/RSP0/CPU0:router(config-if)# no cdp
```

Step 8 Add any other configuration subcommands required to enable routing protocols and adjust the interface characteristics. Examples of such subcommands are:

```
RP/0/RSP0/CPU0:router(config-if)# flow-control ingress
RP/0/RSP0/CPU0:router(config-if)# mtu 1448
RP/0/RSP0/CPU0:router(config-if)# mac-address 0001.2468.ABCD
```

Step 9 When you have included all the configuration subcommands to complete the configuration, enter the **commit command to commit all changes you made to the running configuration.**

```
RP/0/RSP0/CPU0:router(config-if)# commit
```

Step 10 **Enter Ctrl-Z** (hold down the **Control** key while you press **Z**) to exit configuration mode. If you did not enter the commit command, you will be prompted to do so:

```
RP/0/RSP0/CPU0:router(config-if)#
Uncommitted changes found, commit them before exiting(yes/no/cancel)? [cancel]:
```

Answer **yes** to commit, **no** to exit without a commit, or **cancel** to cancel the exit (default).

Step 11 Write the new configuration to memory:

```
RP/0/RSP0/CPU0:router# copy run disk0:/config/running/alternate_cfg:/router.cfg
Destination file name (control-c to abort): [/router.cfg]?
The destination file already exists. Do you want to overwrite? [no]: yes
Building configuration.
223 lines built in 1 second
[OK]
```

The system displays an OK message when the configuration has been stored.

Advanced ISM (Integrated Service Module) Line Card and Service Acceleration Modules (SAMs) Troubleshooting

This section briefly describes advanced troubleshooting commands that can be used in the event of an ISM (Integrated Service Module) line card and/or Service Acceleration Module (SAM) failure.

Note This section assumes that you possess basic proficiency in the use of Cisco IOS XR software commands.

By using the commands listed in this section, you should be able to determine the nature of the problems you are having with your line card. The first step is to identify the cause of the line card failure or console errors that you are seeing.

To discover which card may be at fault, it is essential to collect the output from the following commands:

- **show logging**
- **show diag** *slot*
- **show context location** *slot*

Along with these **show** commands, you should also gather the following information:

- Console Logs and Syslog Information—This information is crucial if multiple symptoms are occurring. If the router is configured to send logs to a Syslog server, you may see some information on what has occurred. For console logs, it is best to be directly connected to the router on the console port with logging enabled.

- Additional Data—The **show tech-support** command is a compilation of many different commands, including **show version**, **show running-config**, and **show stacks**. This information is required when working on issues with the Cisco Technical Assistance Center (Cisco TAC).

For examples of how to use these commands and the resulting output, refer to the *Cisco ASR 9000 Series Troubleshooting Guide*.

✎
Note   It is important to collect the **show tech-support** data before doing a reload or power cycle. Failure to do so can cause all information about the problem to be lost.

✎
Note   Output from these commands will vary slightly depending on which line card you are using, but the basic information will be the same.

Collecting SAM Information

Here is the example output for the **show platform** command:

```
RP/0/RSP0/CPU0:VKG-2#sh platform
Node            Type                     State            Config State
--------------------------------------------------------------------------
0/RSP0/CPU0     A9K-RSP-4G(Active)       IOS XR RUN       PWR,NSHUT,MON
0/RSP1/CPU0     A9K-RSP-4G(Standby)      IOS XR RUN       PWR,NSHUT,MON
0/0/CPU0        A9K-2T20GE-E             IOS XR RUN       PWR,NSHUT,MON
0/1/CPU0        A9K-ISM-100(LCP)         IOS XR RUN       PWR,NSHUT,MON
0/1/CPU1        A9K-ISM-100(SE)          SEOS-READY
0/1/SAM0        A9K-SAM-2TB              OK               PWR,NSHUT,NMON
0/1/SAM1        A9K-SAM-2TB              OK               PWR,NSHUT,NMON
0/3/CPU0        A9K-4T-B                 IOS XR RUN       PWR,NSHUT,MON
0/5/CPU0        A9K-8T-L                 IOS XR RUN       PWR,NSHUT,MON
0/6/CPU0        A9K-8T-L                 IOS XR RUN       PWR,NSHUT,MON
0/7/CPU0        A9K-SIP-700              IOS XR RUN       PWR,NSHUT,MON
0/7/0           SPA-8XOC3-POS            OK               PWR,NSHUT,MON
0/7/1           SPA-4XT3/E3              OK               PWR,NSHUT,MON
0/7/3           SPA-1XCHSTM1/OC3         OK               PWR,NSHUT,MON
```

Here is the example output for the **show platform summary location** command:

```
RP/0/RSP0/CPU0:ios#show platform summary location 0/1/CPU0
--------------------------------------------------------------------------------
     Platform Node : 0/1/CPU0 (slot 1)
             PID : A9K-SIM-100
        Card Type : Integrated Services Module
          VID/SN : N/A / FHH144500K4
        Oper State : IOS XR RUN
        Last Reset : Shutdown due to unknown reason
                   : Wed Apr 13 10:32:59 2011
     Configuration : Power is enabled
                     Bootup enabled.
                     Monitoring enabled
        Rommon Ver : Version 1.2(20091201:235620)
        IOS SW Ver : 4.1.0.35I
        Main Power : Power state Enabled. Estimate power 630 Watts of power required.
           Faults : N/A
--------------------------------------------------------------------------------
     Platform Node : 0/1/CPU1 (slot 1)
        Card Type : Integrated Services Module (Service Engine)
        Oper State : SEOS-READY
        Last Reset : Unknown
      Last Failure : Unknown
   Last Start Time : Wed Apr 13 10:35:07 2011
   Last Ready Time : Wed Apr 13 10:36:16 2011
            Uptime : 02:33:49
          BIOS Ver : 0.17 (Thurley.3.60.18.0033)
            SW Ver : cdstv-2.4.1-riobravo-b35
        App Status : (For detailed CDS health, refers to CDSM Monitoring screen)
                     File System: Ok
                     CServer Cache: Ok
                     CDS Application Services: Ok
                     SAM1: Ok
                     SAM2: Ok
                     AVS stream count: 1000

--------------------------------------------------------------------------------
```

Here is the example output for the **show inventory** command:

```
RP/0/RSP0/CPU0:ios#show inventory
Wed Sep  2 23:59:02.054 UTC
NAME: "module 0/RSP0/CPU0", DESCR: "ASR9K Fabric, Controller, 4G memory"
PID: A9K-RSP-4G        , VID: V01, SN: FOC132981P4

NAME: "module compact-Flash 0/RSP0/CPU0", DESCR: " CompactFlash"
PID: cFLASH            , VID: N/A, SN: 000000000301

NAME: "module 0/1/CPU0", DESCR: "ASR9K Advanced Video Streaming Module"
PID: A9K-SIM-100      , VID: V01, SN: FHH1234009J

NAME: "module 0/1/1", DESCR: "1.6TB Flash Memory Services Acceleration Module"
PID: A9K-SIM-100, VID: V01, SN: PRTA6404148
```

Below is a description of fields for the **show hw-module fpd location all** command.

- Location: Location of the LC.

- Card Type: Type of the AVSM or SAM card, "TBD".

- Type: LC or SAM.

- Subtype: FPGA, ROMMON, BIOS or FW.

- Instance: A unique ID used by the FPD process.

- Current SW Version: Currently running FPD image.

- HW Version: Hardware version of the card.

- Upg/Dng: Specifies whether an FPD upgrade or downgrade is required. For BIOS and SAM upgrades this is dependent on the underlying hardware version.

Here is the example output for the **show hw-module fpd location all** command:

```
RP/0/RSP1/CPU0:ios(admin)#show hw-module fpd location all

==================================== ==========================================
                                     Existing Field Programmable Devices
                                     ==========================================
                                     HW                        Current SW Upg/
Location       Card Type             Version Type Subtype Inst Version    Dng?
================================================================================
0/2/CPU0       AVSM-TYPE             1.0     lc   fpga    0    0.21       No
                                             lc   rommon  0    0.52       Yes[1]
                                             lc   bios    0    1.3        Yes
                                     ------------------------------------------
0/2/0          SAM-TYPE              1.0     SAM  FW      0    0.8        No
0/2/1          SAM-TYPE              1.0     SAM  FW      0    0.8        No
                                     ------------------------------------------
```

Here is the example output for the **show hw-module fpd location 0/1/CPU0** command:

```
RP/0/RSP0/CPU0:VKG-2#show hw-module fpd location 0/1/CPU0

================================  ==========================================
                                  Existing Field Programmable Devices
==============================================================================================
              HW                                             Current SW  Upg/
Location Card Type  Version Description              Type Subtype Inst  Version     Dng?
==============================================================================================
0/1/CPU0 A9K-ISM-100 1.00   Amistad LC6               lc   fpga1   0     0.25        No
                     1.0    Can Bus Ctrl (CBC)LC6     lc   cbc     0     18.05       No
                     1.00   CPUCtrl LC6               lc   cpld1   0     0.01        No
                     1.00   ROMMONB LC6               lc   rommon  0     1.02        No
                     1.00   ISM BIOS                  lc   fpga7   0     0.17        No
                     1.00   ISM WESSON CPLD           lc   cpld3   0     0.16        No
                     0.1    Maintenance LC6           lc   fpga2   0     0.06        No
                     ------------------------------------------------------------------
```

If the upg/dng? column says Yes, it means that one or more FPD needs an upgrade or a downgrade. This can be accomplished using the **admin upgrade hw-module fpd** command.

Here is the example output for the **show hw-module fpd location 0/1/SAM0** command:

```
RP/0/RSP0/CPU0:VKG-2#show hw-module fpd location 0/1/SAM0

================================  ==========================================
                                  Existing Field Programmable Devices
==============================================================================================
```

1. One or more FPD needs an upgrade or a downgrade. This can be accomplished using the **admin upgrade hw-module fpd** command.

```
                          HW                               Current SW  Upg/
Location  Card Type   Version  Description       Type Subtype Inst   Version  Dng?
=================================================================================
0/1/SAM0  A9K-SAM-2TB 1.0   SAM ADM1066          SAM  fpga4   0      0.09     No
                      1.0   SAM Control CPLD      SAM  cpld4   0      0.145    No
                      1.0   SAM Host Bus Adaptor  SAM  fpga5   0      0.01     No
                      1.0   SAM Flash Controller  SAM  fpga6   0      1.65     No
---------------------------------------------------------------------------------
```

Here is the example output for the **show hw-module fpd location 0/1/SAM1** command:

```
RP/0/RSP0/CPU0:VKG-2#show hw-module fpd location 0/1/SAM1

=================================   ==========================================
                                    Existing Field Programmable Devices
=================================================================================
                          HW                               Current SW  Upg/
Location  Card Type   Version  Description       Type Subtype Inst   Version  Dng?
=================================================================================
0/1/SAM1  A9K-SAM-2TB 1.0   SAM ADM1066          SAM  fpga4   1      0.09     No
                      1.0   SAM Control CPLD      SAM  cpld4   1      0.145    No
                      1.0   SAM Host Bus Adaptor  SAM  fpga5   1      0.01     No
                      1.0   SAM Flash Controller  SAM  fpga6   1      1.65     No
---------------------------------------------------------------------------------
```

Similarly for the **show fpd package** command the output fields are:

- Card Type: Type of the ISM or SAM card, "TBD".

- FPD Description: Description of all available FPD packages for the card.

- Type: LC or SAM.

- Subtype: FPGA or ROMMON, BIOS or FW image names, these are the values used in the **upgrade hw-module fpd** command.

- SW Version: FPD software version required.

- Min Req HW Version: Minimum Hardware version for the associated FPD image

Here is the example output for the **show fpd package** command:

```
RP/0/RSP0/CPU0:ios(admin)#show fpd package

================================ =================================================
                                 Field Programmable Device Package
                                 =================================================
                                                        SW       Min Req  Min Req
Card Type             FPD Description         Type Subtype Version  SW Ver   HW Vers
================== ======================= ==== ======= =========== ======== =======

A9K-ISM-100           Can Bus Ctrl (CBC) LC6  lc   cbc     18.05        0.0      0.1
                      CPUCtrl LC6             lc   cpld1   0.01         0.0      0.1
                      Maintenance LC6         lc   fpga2   0.06         0.0      0.1
                      Amistad LC6             lc   fpga1   0.25         0.0      0.20
                      ROMMONA LC6             lc   rommonA 1.02         0.0      0.1
                      ROMMONB LC6             lc   rommon  1.02         0.0      0.1


========================================================================================
                      Externally Managed FPD images at node node0_1_CPU0
========================================================================================
A9K-SAM-2TB           SAM Host Bus Adaptor    SAM  fpga5   0.01         0.0      0.0
A9K-SAM-2TB           SAM Flash Controller    SAM  fpga6   1.65         0.0      0.0
A9K-ISM-100           ISM BIOS                lc   fpga7   0.17         0.0      0.1
```

```
A9K-SAM-2TB          SAM Control CPLD          SAM  cpld4    0.145     0.0    0.0
A9K-SAM-2TB          SAM ADM1066               SAM  fpga4    0.09      0.0    0.0
A9K-ISM-100          ISM WESSON CPLD           lc   cpld3    0.16      0.0    0.1
```

Regulatory, Compliance, and Safety Information

This section contains information on laser safety.

For other regulatory, compliance, and safety information, including translated safety warnings, refer to the *Cisco ASR 9000 Series Aggregation Services Router Regulatory Compliance and Safety Information* publication.

Laser Safety

Single-mode Ethernet line cards (all of the line cards) are equipped with a Class 1 laser. Multimode Ethernet line cards (Gigabit Ethernet) are equipped with a Class 1 LED. These devices emit invisible radiation. Do not stare into operational line card ports. The following laser warnings apply to the line cards:

- General Laser Warning
- Class 1 Laser Product Warning (Single-mode)
- Class 1 LED Product Warning (Multimode)

Class 1 Laser Product Warning (Single-mode)

Warning   **Class 1 laser product.** Statement 1008

Class 1 LED Product Warning (Multimode)

Warning   **Class 1 LED product.** Statement 1027

General Laser Warning

Warning   **Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.** Statement 1051

Technical Specifications

This appendix lists the specifications for the ISM line cards and SAMs for the Cisco ASR 9000 Series Aggregation Services Router.

The specifications are presented in the following tables:

Table A-1 lists the environmental specifications for the Cisco ASR 9000 Series Router.

Table A-1 Cisco ASR 9000 Series Environmental Specifications

Description	Value
Operating Temperature:	41 degrees to 104 degrees F (5 degrees to 40 degrees C)
Operating Temperature (Short term)[1]:	23 degrees to 131 degrees F (–5 degrees to 55 degrees C)[2]
Nonoperating Temperature	–4 degrees to 149 degrees F (–20 degrees to 65 degrees C)
Humidity	Operating: 10 to 85 percent noncondensing
	Nonoperating: 5 to 95 percent noncondensing
Altitude	Operating: 0 to 13,000 ft (0 to 4,000 m)
	Nonoperating: 0 to 15,000 ft (0 to 4,570 m)
Power Dissipation (Cisco ASR 9010 Router)	7600 W maximum
Power Dissipation (Cisco ASR 9006 Router)	4556 W maximum
Acoustic noise	78 dB at 80.6 degrees F (27 degrees C) maximum

Table A-1   ***Cisco ASR 9000 Series Environmental Specifications (continued)***

Description	Value
Shock	Operating (halfsine): 21 in/sec (0.53 m/sec)
	Nonoperating (trapezoidal pulse): 20 G[3], 52 in/sec (1.32 m/sec)
Vibration	Operating: 0.35 Grms[4] from 3 to 500 Hz
	Nonoperating: 1.0 Grms from 3 to 500 Hz

1. Short-term refers to a period of not more than 96 consecutive hours and a total of no more than 15 days in 1 year. (This refers to a total of 360 hours in any given year, but no more than 15 occurrences during that 1-year period.).

2. Operating temperature specifications for the router will differ from those listed in this table when 40-port Gigabit Ethernet line cards using GLC-GE-100FX SFP transceiver modules are installed in the router. This is due to the lower temperature specifications of the SFP module. Please contact a Cisco representative for more information.

3. G is a value of acceleration, where 1G equals 32.17 ft/sec^2 (9.81 m/sec^2).

4. Grms is the root mean square value of acceleration.

Table A-2 lists the power consumption specifications for the RSP card, line cards, and fan tray.

⚠

Caution   Be sure that the chassis configuration complies with the required power budgets. Failure to properly verify the configuration may result in an unpredictable state if one of the power units fails. Contact your local sales representative for assistance.

Table A-2   ***Card and Fan Tray Power Consumption Specifications***

Description	Value
RSP Card	
Power consumption	170 W at 86 degrees F (30 degrees C)
	195 W at 104 degrees F (40 degrees C)
	205 W at 131 degrees F (55 degrees C)
ISM Line Card	
Power consumption	551 W at 86 degrees F (30 degrees C)
	665 W at 104 degrees F (40 degrees C)
	685 W at 131 degrees F (55 degrees C)
Fan Tray	
Power consumption	160 W at 86 degrees F (30 degrees C)
	300 W at 104 degrees F (40 degrees C)
	475 W at 131 degrees F (55 degrees C)

Pin Definitions

Table A-3   ***SAM Power Connector Pin Assignments***

SAM POWER CONNECTOR

Table A-3   SAM Power Connector Pin Assignments

A1	GND	B1	GND	C1	9.6V-13.2V	D1	9.6V-13.2V
A2	GND	B2	GND	C2	9.6V-13.2V	D2	9.6V-13.2V

Table A-4   SAM Signal Connector Pin Assignments

SAM 76460-2020 CONNECTOR											
A1	GND	B1	REFCLK+	C1	REFCLK-	D1	GND	E1	RXREF	F1	SYSREF
A2	ATTN	B2	SMCLK	C2	GND	D2	VAUX	E2	SMDAT	F2	GND
A3	GND	B3	PCIeRXp0	C3	PCIeRXn0	D3	GND	E3	PCIeRXp1	F3	PCIeRXn1
A4	PCIeRXp2	B4	PCIeRXn2	C4	GND	D4	PCIeRXp3	E4	PCIeRXn3	F4	GND
A5	GND	B5	PCIeRXp4	C5	PCIeRXn4	D5	GND	E5	PCIeRXp5	F5	PCIeRXn5
A6	PCIeRXp6	B6	PCIeRXn6	C6	GND	D6	PCIeRXp7	E6	PCIeRXp7	F6	GND
A7	GND	B7	FlexRXp0	C7	FlexRXn0	D7	GND	E7	FlexRXp1	F7	FlexRXn1
A8	FlexRXp2	B8	FlexRXn2	C8	GND	D8	FlexRXp3	E8	FlexRXn3	F8	GND
A9	GND	B9	FlexRXp4	C9	FlexRXn4	D9	GND	E9	FlexRXp5	F9	FlexRXn5
A10	FlexRXp6	B10	FlexRXn6	C10	GND	D10	FlexRXp7	E10	FlexRXn7	F10	GND
SAM 76460-4020 CONNECTOR											
A11	GND	B11	PRSTN#	C11	TCK	D11	GND	E11	PERST#	F11	RSVD
A12	PCIeTXp0	B12	PCIeTXn0	C12	GND	D12	PCIeTXp1	E12	PCIeTXn1	F12	GND
A13	GND	B13	PCIeTXp2	C13	PCIeTXn2	D13	GND	E13	PCIeTXp3	F13	PCIeTXn3
A14	PCIeTXp4	B14	PCIeTXn4	C14	GND	D14	PCIeTXp5	E14	PCIeTXn5	F14	GND
A15	GND	B15	PCIeTXp6	C15	PCIeTXn6	D15	GND	E15	PCIeTXp7	F15	PCIeTXn7
A16	FlexTXp0	B16	FlexTXn0	C16	GND	D16	FlexTXp1	E16	FlexTXn1	F16	GND
A17	GND	B17	FlexTXp2	C17	FlexTXn2	D17	GND	E17	FlexTXp3	F17	FlexTXn3
A18	FlexTXp4	B18	FlexTXn4	C18	GND	D18	FlexTXp5	E18	FlexTXn5	F18	GND
A19	GND	B19	FlexTXp6	C19	FlexTXn6	D19	GND	E19	FlexTXp7	F19	FlexTXn7
A20	TRST	B20	TMS	C20	GND	D20	TDO	E20	TDI	F20	GND

APPENDIX **B**

ISM (Integrated Service Module) Line Card Software Installation Overview

This appendix describes the required steps to install Cisco IOS XR software in support of the ISM (Integrated Service Module) line card on the Cisco ASR 9000 Series Aggregation Services Router.

It includes the following sections:

- Upgrading Field-Programmable Devices
- Entering System Recovery Mode
- Configuring the ISM Service-Management Interface
- Copying and Extracting the Image Files
- Reloading the ISM Line Card (CDS-TV Example Shown)
- Installing the ISO Image File
- Configuring the Service Engine Interfaces to the ISM (CDS Only)
- Running the cdsconfig Script
- Single Hardware PID (Role Based Installation)

Upgrading Field-Programmable Devices

Follow the set of steps below to upgrade field-programmable devices on the ISM (Integrated Service Module) line card.

Step 1 Check if the FPD upgrade is required by executing the **show hw-module fpd location** command:

```
RP/0/RSP1/CPU0:VKG-2#show hw-module fpd location 0/4/CPU0
```

```
=================================== =================================================================
                                              Existing Field Programmable Devices
                                      =================================================================
                                 HW                                           Current SW Upg/
Location     Card Type           Version     Description        Type Subtype Inst  Version    Dng?
============ ==================== =======  ======================= ==== ======= ==== =========== ====
0/4/CPU0     A9K-ISM-100         0.32     Amistad LC6             lc   fpga1   0       0.25     No
                                 1.0      Can Bus Ctrl (CBC) LC6  lc   cbc     0      18.05     No
                                 0.32     CPUCtrl LC6             lc   cpld1   0       0.01     No
                                 0.32     ROMMONB LC6             lc   rommon  0       1.02     No
                                 0.32     ISM BIOS                lc   fpga7   0       0.17     No
                                 0.32     ISM WESSON CPLD         lc   cpld3   0       0.16     No
```

```
                                      0.1   Maintenance LC6        lc   fpga2  0     0.04     Yes
-------------------------------------------------------------------------------------------------
NOTES:
1.  One or more FPD needs an upgrade or a downgrade.  This can be accomplished
    using the "admin upgrade hw-module fpd" CLI.
```

> ✎
> **Note**   An auto upgrade is performed on ISM BIOS and ISM WESSON CPLD field-programmable
> devices during the ISM line card boot up. This auto upgrade process causes a reload of the ISM
> line card. A manual upgrade may be needed on the other field-programmable devices.

Step 2   In the example shown in Step 1, FPGA2 needs an upgrade. Enter the following command to upgrade
FPGA2:

```
RP/0/RSP1/CPU0:VKG-2(admin)#upgrade hw-module fpd fpga2 force location 0/4/CPU0


***** UPGRADE WARNING MESSAGE: *****
   * This upgrade operation has a maximum timout of 90 minutes.  *
   * If you are executing the cmd for one specific location and  *
   * card in that location reloads or goes down for some reason  *
   * you can press CTRL-C to get back the RP's prompt.           *
   * If you are executing the cmd for _all_ locations and a node *
   * reloads or is down please allow other nodes to finish the   *
   * upgrade process before pressing CTRL-C.                     *

% RELOAD REMINDER:
   - The upgrade operation of the target module will not interrupt its normal
     operation. However, for the changes to take effect, the target module
     will need to be manually reloaded after the upgrade operation. This can
     be accomplished with the use of "hw-module <target> reload" command.
   - If automatic reload operation is desired after the upgrade, please use
     the "reload" option at the end of the upgrade command.
   - The output of "show hw-module fpd location" command will not display
     correct version information after the upgrade if the target module is
     not reloaded.
NOTE: Chassis CLI will not be accessible while upgrade is in progress.
Continue? [confirm] Y

FPD upgrade in progress on some hardware, reload/configuration change
on those is not recommended as it might cause HW programming failure
and result in RMA of the hardware.

Starting the upgrade/download of following FPD:
=========== ==== ======= ======= =========== =========
                                  Current     Upg/Dng
Location    Type Subtype Upg/Dng  Version     Version
=========== ==== ======= ======= =========== =========
0/4/CPU0    lc   fpga2   upg      0.04        0.06
--------------------------------------------------
Successfully upgraded    fpga2 for        A9K-ISM-100 on location   0/4/CPU0 from
0.04 to  0.06

FPD upgrade has ended.
```

Entering System Recovery Mode

Step 1   Enter the following command to place the system into recovery mode:

```
RP/0/RSP1/CPU0:VKG-2#admin download recovery-image location 0/4/CPU0

ERROR: Failed to get SE node state (No error)
WARNING: 0/4/CPU1 reloading while in the current state is not recommended and may result
in having to reinstall the service application.  Use 'show platform' to ensure that the
module is not in 'CHECKING DISK', 'SEOS-BOOTING', 'UPDATING FPD','SEOS-INIT' state before
executing this command.
Do you want to proceed anyway?[confirm] Y <<<<< This will cause CPU1 alone to reload, not
the entire LC.
RP/0/RSP1/CPU0:VKG-2#LC/0/4/CPU0:May  3 08:39:24.739 EST: ifmgr[189]:
%PKT_INFRA-LINK-3-UPDOWN : Interface Service-Engine0/4/0/0, changed state to Down
LC/0/4/CPU0:May  3 08:39:24.740 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/4/0/0, changed state to Down
LC/0/4/CPU0:May  3 08:39:24.740 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/4/0/1, changed state to Down
LC/0/4/CPU0:May  3 08:39:24.741 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/4/0/2, changed state to Down
LC/0/4/CPU0:May  3 08:39:24.742 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/4/0/2, changed state to Down
LC/0/4/CPU0:May  3 08:39:24.743 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/4/0/3, changed state to Down
LC/0/4/CPU0:May  3 08:39:24.743 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/4/0/3, changed state to Down
LC/0/4/CPU0:May  3 08:41:13.416 EST: avsm_agent[126]: %SE_SYSMGR-4-CPU_TEMP_LOW_THRESHOLD
: SE CPU temperature crossed low threshold: current temperature=100 100 100 100 100 100
100 100 100 100 100 100 C threshold=90 C
LC/0/4/CPU0:May  3 08:41:23.033 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/4/0/0, changed state to Up
LC/0/4/CPU0:May  3 08:41:23.034 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/4/0/0, changed state to Up
LC/0/4/CPU0:May  3 08:41:23.034 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/4/0/1, changed state to Up
LC/0/4/CPU0:May  3 08:41:23.035 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/4/0/2, changed state to Up
LC/0/4/CPU0:May  3 08:41:23.035 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/4/0/2, changed state to Up
LC/0/4/CPU0:May  3 08:41:23.036 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/4/0/3, changed state to Up
LC/0/4/CPU0:May  3 08:41:23.036 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/4/0/3, changed state to Up

ISM LOG:

<7>(ixgbe_request_msix_irqs) Requesting MSI-X lsc irq 116
ixgbe: eth7: ixgbe_watchdog_task: NIC Link is Up 10 Gbps, Flow Control: None
ixgbe: eth3: ixgbe_watchdog_task: NIC Link is Up 10 Gbps, Flow Control: None
ixgbe: eth1: ixgbe_watchdog_task: NIC Link is Up 10 Gbps, Flow Control: None
ixgbe: eth5: ixgbe_watchdog_task: NIC Link is Up 10 Gbps, Flow Control: None
```

Step 2   From the Cisco ASR 9000 Series Aggregation Services Router console or vty session execute the following command:

```
RP/0/RSP1/CPU0:VKG-2# run attachCon 0/ISM slot number on ASR9000/CPU1 115200
```

For example, to access the Cisco ASR 9000 Series Aggregation Services Router ISM (Integrated Service Module) line card in slot 4 use the following command:

```
RP/0/RSP1/CPU0:VKG-2# run attachCon 0/4/CPU1 115200

Sat June 18 17:45:03.373 UTC

        attachCon: Starting console session to node 0/6/CPU1
        attachCon: To quit console session type 'detach'
        Current Baud 115200
        Setting Baud to 115200
```

Note that the prompt changes to rescue:

```
[root@sim100-rescue-linux /]#
```

Step 3   Verify that the ISM is in recovery mode by entering the **show platform** command:

```
RP/0/RSP1/CPU0:VKG-2#show platform
Node             Type                   State             Config State
-----------------------------------------------------------------------------
0/RSP0/CPU0      A9K-RSP-4G(Standby)    IOS XR RUN        PWR,NSHUT,MON
0/RSP1/CPU0      A9K-RSP-4G(Active)     IOS XR RUN        PWR,NSHUT,MON
0/0/CPU0         A9K-2T20GE-E           IOS XR RUN        PWR,NSHUT,MON
0/1/CPU0         A9K-ISM-100(LCP)       IOS XR RUN        PWR,NSHUT,MON
0/1/CPU1         A9K-ISM-100(SE)        SEOS-READY
0/1/SAM0         A9K-SAM-2TB            OK                PWR,NSHUT,NMON
0/1/SAM1         A9K-SAM-2TB            OK                PWR,NSHUT,NMON
0/3/CPU0         A9K-4T-B               IOS XR RUN        PWR,NSHUT,MON
0/4/CPU0         A9K-ISM-100(LCP)       IOS XR RUN        PWR,NSHUT,MON
0/4/CPU1         A9K-ISM-100(SE)        RECOVERY MODE
0/4/SAM0         A9K-SAM-2TB            STOPPED           PWR,NSHUT,NMON
0/4/SAM1         A9K-SAM-2TB            STOPPED           PWR,NSHUT,NMON
0/5/CPU0         A9K-8T-L               IOS XR RUN        PWR,NSHUT,MON
0/6/CPU0         A9K-8T-L               IOS XR RUN        PWR,NSHUT,MON
0/7/CPU0         A9K-SIP-700            IOS XR RUN        PWR,NSHUT,MON
0/7/0            SPA-8XOC3-POS          OK                PWR,NSHUT,MON
0/7/1            SPA-4XT3/E3            OK                PWR,NSHUT,MON
0/7/3            SPA-1XCHSTM1/OC3       OK                PWR,NSHUT,MON
```

Configuring the ISM Service-Management Interface

Step 1   Configure the ISM service-management interface by executing the **interface service-mgmt** command:

```
RP/0/RSP1/CPU0:VKG-2(config)#interface service-mgmt 0/4/0/0
RP/0/RSP1/CPU0:VKG-2(config-if)#l2transport
RP/0/RSP1/CPU0:VKG-2(config-if-l2)#service-module ipv4 address 10.20.1.11 255.255.0.0
RP/0/RSP1/CPU0:VKG-2(config-if)#service-module gateway ipv4 address 10.20.1.1
RP/0/RSP1/CPU0:VKG-2(config-if)#no shut
```

Step 2   The next step is to attach to the ISM console or SSH directly to the ISM service-management interface. Once again, from the Cisco ASR 9000 Series Aggregation Services Router console or vty session execute the following command:

```
RP/0/RSP1/CPU0:VKG-2# run attachCon 0/ISM slot number on ASR9000/CPU1 115200
```

For example, to access the Cisco ASR 9000 Series Aggregation Services Router ISM (Integrated Service Module) line card in slot 4 use the following command:

```
RP/0/RSP1/CPU0:VKG-2# run attachCon 0/4/CPU1 115200

Sat June 18 17:45:03.373 UTC

        attachCon: Starting console session to node 0/6/CPU1
        attachCon: To quit console session type 'detach'
        Current Baud 115200
        Setting Baud to 115200
```

The ISM (Integrated Service Module) line card may not be able to reach external routes unless a static route is added in the ISM (Integrated Service Module) line card.

Step 3   Add a static route by executing the **ip route add** command as shown here:

```
[root@ISM-2 ~]# ip route add 223.255.254.245/32 via 10.20.0.1
```

Note that the via must be your gateway.

Copying and Extracting the Image Files

The next step is to copy files to the Cisco ASR 9000 Series Aggregation Services Router ISM (Integrated Service Module) line card. SCP or FTP are the only supported options. The Cisco ASR 9000 Series Aggregation Services Router cannot be used as a TFTP server. For systems running Cisco IOS XR Release 4.2.1 or later, use the **download-image** command as described in .

Step 1   To copy the files using SCP, execute the following command:

```
[root@ISM-2 ~]# scp user@223.255.254.245:/<folder>/<image install kit> /root/
```

Step 2   Now that the image files have been copied down, the next step to perform is the actual install kit installation.

Step 3   Execute the **cd** command to get to the root directory:

```
[root@ISM-2 ~]#cd /root/
```

Step 4   Execute the **chmod** command to ensure you have execute privileges for the **avsm-5.3-x86_64-install-kit.sh** command file:

```
[root@ISM-2 ~]#chmod 755 avsm-5.3-x86_64-install-kit.sh
```

Step 5   Now execute the **avsm-5.3-x86_64-install-kit.sh** command file:

```
[root@ISM-2 ~]#./avsm-5.3-x86_64-install-kit.sh
```

Step 6   Execute the **cd** command to get to the **avsm_install** directory:

```
[root@ISM-2 ~]#cd avsm_install
```

Step 7   Now execute the **avsm_install.sh** command file to extract the **avsm-5.3-x86_64-full-image.iso** files:

```
[root@ISM-2 ~]#./avsm_install.sh
```

```
Extracting files into /root (extracting the ISO file may take a few minutes):
avsm_install/.
avsm_install/./avsm_install.sh
avsm_install/./backup_cfg.sh
```

```
avsm_install/./cds_upg_report.sh
avsm_install/./avsm_apiv
avsm_install/./avsm_apiv/avsm_heartbeat_compat
avsm_install/./avsm_apiv/avsm_envmon_compat
avsm_install/./avsm_apiv/apiv_sam_inventory_compat
ISO file checksum checking (may take a few minutes):
Found SHA1 checksum file: ./avsm_install/avsm-iso-full-image.sha1sum
avsm-5.3-x86_64-full-image.iso: OK
```

Reloading the ISM Line Card (CDS-TV Example Shown)

To complete the installation, you have to reload the Cisco ASR 9000 Series Aggregation Services Router ISM (Integrated Service Module) line card. This needs to be performed from the Cisco ASR 9000 Series Aggregation Services Router RSP console. To reload the ISM (Integrated Service Module) line card, either remove and then physically reinsert it or, if you haven't removed the ISM (Integrated Service Module) line card, execute the **hw-module location reload** command in admin mode to perform a soft reinsert.

Step 1   Reload the Cisco ASR 9000 Series Aggregation Services Router ISM (Integrated Service Module) line card by executing the **hw-module location reload** command in admin mode.

The syntax is **hw-module location 0/*x*/CPU0 reload** or **hw-module location 0/*x*/CPU1 reload**, where *x* is the slot number.

Here is the example output from executing the **hw-module location 0/1/CPU0 reload command:**

```
RP/0/RSP0/CPU0:VKG-2#hw-module location 0/1/CPU0 reload
WARNING: This will take the requested node out of service.
Do you wish to continue?[confirm(y/n)] y
```

Step 2   After configuring an interface to the Cisco ASR 9000 Series Aggregation Services Router ISM (Integrated Service Module) line card, for a CDS-TV reload, use the **scp** command to copy the CDS-TV-2.4.1.iso and cdsinstall software files. For example, if the remote server that you downloaded the software files to has an IP address of 172.22.97.109 and the files are stored in the CDSdownloads directory, use the following commands to copy down the files:

```
# scp -p 172.22.97.109:/CDSdownloads/CDS-TV.2.4.1.iso /
# scp -p 172.22.97.109:/CDSdownloads/cdsinstall /root
```

Step 3   Run the cdsinstall script to upgrade the ISO image to Release 2.4.1.

```
# /root
# ./cdsinstall /CDS-TV-2.4.1.iso
```

Step 4   To complete upgrading the ISO image to Release 2.4.1, you have to reload the Cisco ASR 9000 Series Aggregation Services Router ISM (Integrated Service Module) line card once again. This needs to be performed from the Cisco ASR 9000 Series Aggregation Services Router RSP console. To reload the ISM (Integrated Service Module) line card, either remove and then physically reinsert it or, if you haven't removed the ISM (Integrated Service Module) line card, execute the **hw-module location reload** command in admin mode to perform a soft reinsert.

The syntax is **hw-module location 0/*x*/CPU0 reload** or **hw-module location 0/*x*/CPU1 reload**, where *x* is the slot number.

Here is the example output from executing the **hw-module location 0/1/CPU0 reload command:**

```
RP/0/RSP0/CPU0:VKG-2#hw-module location 0/1/CPU0 reload
```

```
WARNING: This will take the requested node out of service.
Do you wish to continue?[confirm(y/n)] y
```

Installing the ISO Image File

Step 1   Run the cdsinstall script to upgrade the ISO image to Release 2.4.1.

```
# /root
# ./cdsinstall /CDS-TV-2.4.1.iso

Select Deployment Type (ctrl-c to quit):
  1) ISA
  2) RTSP/FSI
2
RTSP Selected
Mounting /CDS-TV.iso at /mnt/cdrom
Calling inst.sh for common files
Killing running processes: statsd

Starting cdsupgrade.sh
   WARNING: No existing version found on this server. Cannot backup existing files
Un-taring common-base.tgz
Fixing modprobe.conf
Loading File List
...done

Processing File List
...done

Moving modprobe.conf into place
...done

Installing kernel rpm
Installing cserver production rpm
Disabled various startup scripts in /etc/init.d
Installing busybox
warning: /home/packages/busybox-1.2.0-4.el5.i386.rpm: Header V3 DSA signature: NOKEY, key
ID 37017186
Installing kdump
warning: /home/packages/kexec-tools-1.101-194.4.el5.x86_64.rpm: Header V3 DSA signature:
NOKEY, key ID 37017186

Configuring kdump...

Starting kdump service...

No kdump initial ramdisk found.[WARNING]
Rebuilding /boot/initrd-2.6.18-53.el5kdump.img
kernel-debuginfo-2.6.18-53.el5 is not installed. You need this to use makedumpfile!
please install it and restart the kdump service
Failed to run mkdumprd
Installing logrotate
warning: /home/packages/logrotate-3.7.4-8.i386.rpm: Header V3 DSA signature: NOKEY, key ID
37017186
Installing CmdTool2

Set Write Policy to WriteBack on Adapter 0, VD 0 (target id: 0) success
```

```
Set Write Cache OK if bad BBU on Adapter 0, VD 0 (target id: 0) success

Set Disk Cache Policy to Enabled on Adapter 0, VD 0 (target id: 0) success

Starting fixperms.sh
   Loading File List
   Processing File List
Ending fixperms.sh
Calling inst.sh for rtsp
Killing running processes: statsd
Un-taring rtsp-base.tgz
Calling forprod.sh
Removing ISA-specific files
Installing RTSP-specific files (existing files backed up to .file)
mv: `/home/isa/bss/database/avsdb' and `/arroyo/db/avsdb' are the same file
mv: `/home/isa/bss/database/AVSDBUtil' and `/arroyo/db/AVSDBUtil' are the same file
mv: `/home/isa/bss/database/DATADIR' and `/arroyo/db/DATADIR' are the same file
mv: `/home/isa/bss/database/lost+found' and `/arroyo/db/lost+found' are the same file
RTSP installation complete

Starting fixperms.sh
   Loading File List
   Processing File List
Ending fixperms.sh
Unmounting /mnt/cdrom
cdsinstall completed. Please reboot the device.
```

✎ **Note**   The warning, "Failed to run," and the move messages are known, benign errors ,and can be
ignored.

Step 2   Reboot the Cisco ASR 9000 Series Aggregation Services Router ISM (Integrated Service Module) Line
Card from your terminal connection to the Cisco ASR 9000 Series Aggregation Services Router Route
Processor card.

hw-module location 0/*ISM slot number on ASR9K***/CPU0 reload**

Here is the example output from executing the **hw-module location 0/1/CPU0 reload command:**

```
RP/0/RSP0/CPU0:VKG-2#hw-module location 0/1/CPU0 reload
WARNING: This will take the requested node out of service.
Do you wish to continue?[confirm(y/n)]y

RP/0/RSP0/CPU0:Apr 13 13:21:01.329 EST: shelfmgr[357]: %PLATFORM-SHELFMGR-6-USER_RESET :
Node 0/1/CPU0 is reset due to user reload request
RP/0/RSP0/CPU0:Apr 13 13:21:01.335 EST: shelfmgr[357]:
%PLATFORM-SHELFMGR-6-NODE_STATE_CHANGE : 0/1/CPU0 A9K-ISM-100 state:IOS XR FAILURE
LC/0/1/CPU0:Apr 13 13:21:01.338 EST: vkg_sis[293]: Received SYSDB_EVENT_SET
Notification.....
LC/0/1/CPU0:Apr 13 13:21:01.338 EST: avsm_se_sm[127]: %PLATFORM-SIM_SE-5-STATE_CHANGE :
Service Engine is in shutting down state.
LC/0/1/CPU0:Apr 13 13:21:01.340 EST: ipv4_mfwd_partner[224]: Deactivating MCAST APIV ...
LC/0/1/CPU0:Apr 13 13:21:01.340 EST: l2fib[231]: Deactivating APIV module
MOD_ID_AVSM_L2FIB...
LC/0/1/CPU0:Apr 13 13:21:01.340 EST: vkg_sis[293]: Starting of SI APIV Deletion ...
RP/0/RSP0/CPU0:Apr 13 13:21:01.417 EST: invmgr[235]: %PLATFORM-INV-6-OIROUT : OIR: Node
0/1/SAM0 removed
RP/0/RSP0/CPU0:Apr 13 13:21:01.419 EST: eem_ed_oir[185]: Messge received content : Event 1
NodeId: 0x81c
RP/0/RSP0/CPU0:Apr 13 13:21:01.434 EST: invmgr[235]: %PLATFORM-INV-6-OIROUT : OIR: Node
0/1/SAM1 removed
```

```
RP/0/RSP0/CPU0:Apr 13 13:21:01.435 EST: eem_ed_oir[185]: Messge received content : Event 1
NodeId: 0x81d
LC/0/1/CPU0:Apr 13 13:21:03.003 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.003 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.004 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.004 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.005 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.005 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.005 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.005 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.006 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.006 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.007 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.007 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.007 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/3, changed state to Down
LC/0/1/CPU0:Apr 13 13:21:03.008 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/3, changed state to Down
RP/0/RSP0/CPU0:Apr 13 13:21:08.968 EST: invmgr[235]: %PLATFORM-INV-6-NODE_STATE_CHANGE :
Node: 0/1/SAM1, state: BRINGDOWN
RP/0/RSP0/CPU0:Apr 13 13:21:08.979 EST: invmgr[235]: %PLATFORM-INV-6-NODE_STATE_CHANGE :
Node: 0/1/SAM0, state: BRINGDOWN
RP/0/RSP0/CPU0:Apr 13 13:22:01.474 EST: shelfmgr[357]:
%PLATFORM-SHELFMGR-6-NODE_STATE_CHANGE : 0/1/CPU0 A9K-ISM-100 state:BRINGDOWN
RP/0/RSP0/CPU0:Apr 13 13:22:01.541 EST: invmgr[235]: %PLATFORM-INV-6-OIROUT : OIR: Node
0/1/SAM0 removed
RP/0/RSP0/CPU0:Apr 13 13:22:01.546 EST: eem_ed_oir[185]: Messge received content : Event 1
NodeId: 0x81c
RP/0/RSP0/CPU0:Apr 13 13:22:01.572 EST: invmgr[235]: %PLATFORM-INV-6-OIROUT : OIR: Node
0/1/SAM1 removed
RP/0/RSP0/CPU0:Apr 13 13:22:01.573 EST: eem_ed_oir[185]: Messge received content : Event 1
NodeId: 0x81d
RP/0/RSP0/CPU0:Apr 13 13:22:01.584 EST: invmgr[235]: %PLATFORM-INV-6-NODE_STATE_CHANGE :
Node: 0/1/CPU0, state: BRINGDOWN
RP/0/RSP0/CPU0:Apr 13 13:22:13.235 EST: shelfmgr[357]:
%PLATFORM-SHELFMGR-6-NODE_STATE_CHANGE : 0/1/CPU0 A9K-ISM-100 state:ROMMON
RP/0/RSP0/CPU0:Apr 13 13:22:44.043 EST: shelfmgr[357]:
%PLATFORM-SHELFMGR_HAL-6-BOOT_REQ_RECEIVED : Boot Request from 0/1/CPU0, RomMon Version:
1.2
RP/0/RSP0/CPU0:Apr 13 13:22:44.046 EST: shelfmgr[357]: %PLATFORM-MBIMGR-7-IMAGE_VALIDATED
: Remote location 0/1/CPU0: : MBI tftp:/disk0/asr9k-os-mbi-4.1.0.35I/lc/mbiasr9k-lc.vm
validated
RP/0/RSP0/CPU0:Apr 13 13:22:44.047 EST: shelfmgr[357]:
%PLATFORM-SHELFMGR-6-NODE_STATE_CHANGE : 0/1/CPU0 A9K-ISM-100 state:MBI-BOOTING
RP/0/RSP0/CPU0:Apr 13 13:23:35.447 EST: shelfmgr[357]:
%PLATFORM-SHELFMGR-6-NODE_STATE_CHANGE : 0/1/CPU0 A9K-ISM-100 state:MBI-RUNNING
LC/0/1/CPU0:15: init[65540]: %OS-INIT-7-MBI_STARTED : total time 9.242 seconds
LC/0/1/CPU0:Apr 13 13:23:38.912 EST: insthelper[61]: %INSTALL-INSTHELPER-7-PKG_DOWNLOAD :
MBI running; starting software download
LC/0/1/CPU0:Apr 13 13:23:53.184 EST: sysmgr[89]: %OS-SYSMGR-5-NOTICE : Card is COLD
started
```

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LC/0/1/CPU0:Apr 13 13:23:53.490 EST: init[65540]: %OS-INIT-7-INSTALL_READY : total time
28.024 seconds
LC/0/1/CPU0:Apr 13 13:23:54.820 EST: sysmgr[316]: %OS-SYSMGR-6-INFO : Backup system
manager is ready
LC/0/1/CPU0:Apr 13 13:23:55.989 EST: syslog_dev[87]: dumper_config[153]:
LC/0/1/CPU0:Apr 13 13:23:56.027 EST: syslog_dev[87]: dumper_config[153]:  The node id is
2065
LC/0/1/CPU0:Apr 13 13:23:58.631 EST: linux_maint_fpd_agent[236]: linux_maint_fpd_agent:
Registering the handlers
LC/0/1/CPU0:Apr 13 13:23:58.645 EST: linux_maint_fpd_agent[236]:
update_linux_maint_sw_version Updated the sw_ver 6
LC/0/1/CPU0:Apr 13 13:23:58.648 EST: linux_maint_fpd_agent[236]: publish_maint_fpd_info
Publishing FPD info : type 1, subtype 4, card type 16777989, module 0, instance 0, sw_ver
6, hw_ver 1
LC/0/1/CPU0:Apr 13 13:23:58.878 EST: vkg_sis[293]: Initializing APIV modules ...
LC/0/1/CPU0:Apr 13 13:23:58.890 EST: vkg_sis[293]: Registering for SysDB notifications ...
LC/0/1/CPU0:Apr 13 13:23:58.897 EST: vkg_sis[293]: Registering for SysDB SE READY
notifications ...
LC/0/1/CPU0:Apr 13 13:23:59.997 EST: fca_server[165]: bridge_asic_get_ver: msg send
problem: Invalid argument
LC/0/1/CPU0:Apr 13 13:23:59.999 EST: fca_server[165]: bridge_asic_get_ver: msg send
problem: Invalid argument
LC/0/1/CPU0:Apr 13 13:24:03.156 EST: vkg_sis[293]: Received SYSDB_EVENT_SET
Notification.....
LC/0/1/CPU0:Apr 13 13:24:03.543 EST: sysmgr[89]: %OS-SYSMGR-7-DEBUG :
sysmgr_admin_plane_check:SYSMGR_PLANE_ADMIN Notification sent.
LC/0/1/CPU0:Apr 13 13:24:04.113 EST: sync_agent[310]: %PLATFORM-FSYNC-6-UNKNOWN_BOARD_TYPE
: Frequency Synchronization feature does not recognize hardware board type 0x1000305
LC/0/1/CPU0:Apr 13 13:24:04.163 EST: sync_agent[310]: %PLATFORM-FSYNC-6-NOT_SUPPORTED :
Frequency Synchronization is not supported on this line card.
RP/0/RSP0/CPU0:Apr 13 13:24:04.464 EST: syslog_dev[93]: envmon[199]:
RP/0/RSP0/CPU0:Apr 13 13:24:04.466 EST: syslog_dev[93]: envmon[199]:
envmon_sam_sensor_cens_handler:359 mytype is not ENS_CMD_WRITE
LC/0/1/CPU0:Apr 13 13:24:06.247 EST: BM-ADJ[129]: Registering for SysDB notifications ...
LC/0/1/CPU0:Apr 13 13:24:07.585 EST: fib_mgr[167]: Initializing APIV modules ...
LC/0/1/CPU0:Apr 13 13:24:07.600 EST: fib_mgr[167]: Registering for SysDB notifications ...
LC/0/1/CPU0:Apr 13 13:24:08.350 EST: vkg_sis[293]: Received SYSDB_EVENT_SET
Notification.....
LC/0/1/CPU0:Apr 13 13:24:16.422 EST: canb_upg_agt[134]: %PLATFORM-UPGRADE_FPD-4-DOWN_REV :
cbc instance 0 is down-rev (V18.04), upgrade to (V18.05). Use the "upgrade hw-module fpd"
CLI in admin mode.
LC/0/1/CPU0:Apr 13 13:24:16.910 EST: l2fib[231]: Initializing L2 FIB APIV modules ...
LC/0/1/CPU0:Apr 13 13:24:16.937 EST: l2fib[231]:  L2fib Registering for SysDB
notifications ...
RP/0/RSP0/CPU0:Apr 13 13:24:21.806 EST: shelfmgr[357]:
%PLATFORM-SHELFMGR-6-NODE_STATE_CHANGE : 0/1/CPU0 A9K-ISM-100 state:IOS XR RUN
RP/0/RSP0/CPU0:Apr 13 13:24:21.826 EST: invmgr[235]: %PLATFORM-INV-6-NODE_STATE_CHANGE :
Node: 0/1/CPU0, state: IOS XR RUN
LC/0/1/CPU0:Apr 13 13:24:22.738 EST: ifmgr[189]: %PKT_INFRA-LINK-5-CHANGED : Interface
Service-Mgmt0/1/0/3, changed state to Administratively Down
LC/0/1/CPU0:Apr 13 13:24:22.741 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:22.741 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:22.741 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:22.741 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:22.741 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:22.741 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:22.744 EST: cfgmgr-lc[138]: %MGBL-CONFIG-6-OIR_RESTORE :
Configuration for node '0/1/0' has been restored.
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LC/0/1/CPU0:Apr 13 13:24:22.754 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/2, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:22.755 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/1, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:22.755 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/0, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:22.758 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/2, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:22.764 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/1, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:22.767 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/0, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:25.046 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/3, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:25.046 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/3, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:25.046 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:25.046 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:25.047 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:25.047 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:25.047 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:25.047 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:25.049 EST: cfgmgr-lc[138]: %MGBL-CONFIG-6-OIR_RESTORE :
Configuration for node '0/1/0' has been restored.
LC/0/1/CPU0:Apr 13 13:24:25.052 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/3, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:25.053 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/2, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:25.053 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/1, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:25.054 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/0, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:25.055 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/3, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:25.058 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/2, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:25.061 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/1, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:25.064 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/0, changed state to Up
LC/0/1/CPU0:Apr 13 13:24:26.107 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.107 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.108 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.108 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.110 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.110 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.111 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/3, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.112 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/3, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.115 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/0, changed state to Down
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LC/0/1/CPU0:Apr 13 13:24:26.116 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/0, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.117 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.118 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/1, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.119 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:26.120 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/2, changed state to Down
LC/0/1/CPU0:Apr 13 13:24:50.648 EST: vkg_sis[293]: Received SYSDB_EVENT_SET
Notification.....
LC/0/1/CPU0:Apr 13 13:25:04.333 EST: ipv4_mfwd_partner[224]: Registering for SysDB
notifications ...
LC/0/1/CPU0:Apr 13 13:25:07.458 EST: ipv4_mfwd_partner[224]: Initializing APIV modules ...
LC/0/1/CPU0:Apr 13 13:25:07.458 EST: l2fib[231]: Starting of APIV version negotiation ...
LC/0/1/CPU0:Apr 13 13:25:07.458 EST: fib_mgr[167]: Starting of APIV version negotiation
...
LC/0/1/CPU0:Apr 13 13:25:07.458 EST: BM-ADJ[129]: Starting of APIV version negotiation ...
LC/0/1/CPU0:Apr 13 13:25:07.459 EST: vkg_sis[293]: Starting of APIV version negotiation
(CREATE) ...
LC/0/1/CPU0:Apr 13 13:25:08.094 EST: inv_agent[196]: %PLATFORM-INV_AGENT-7-INFO : Sending
SIM x86 inventory info
LC/0/1/CPU0:Apr 13 13:25:09.634 EST: vkg_sis[293]: SIS APIV is up
LC/0/1/CPU0:Apr 13 13:25:10.471 EST: ipv4_mfwd_partner[224]: MCAST APIV is up
LC/0/1/CPU0:Apr 13 13:25:10.489 EST: l2fib[231]: ISM L2FIB: IPCP is up fd:50099c58,
stats_fd:0
LC/0/1/CPU0:Apr 13 13:25:11.624 EST: vkg_sis[293]: Received SYSDB_EVENT_SET
Notification.....
LC/0/1/CPU0:Apr 13 13:25:13.620 EST: fib_mgr[167]: L3 FIB, FRR, LOOKUP & MISC APIV is up
LC/0/1/CPU0:Apr 13 13:25:13.622 EST: fib_mgr[167]: Initialized FIB State Machine!!!
LC/0/1/CPU0:Apr 13 13:25:16.737 EST: vkg_sis[293]: Received SYSDB_EVENT_SET
Notification.....
LC/0/1/CPU0:Apr 13 13:25:16.737 EST: vkg_sis[293]: Received SE Operation Ready
Notification.....
LC/0/1/CPU0:Apr 13 13:25:16.740 EST: avsm_se_sm[127]: %PLATFORM-SIM_SE-5-STATE_CHANGE :
Service Engine is in ready state.
LC/0/1/CPU0:Apr 13 13:25:16.742 EST: avsm_se_sm[127]: %PLATFORM-SIM_SE-5-SW_INFO : Service
Engine heartbeat started on A9K-ISM-100
LC/0/1/CPU0:Apr 13 13:25:26.744 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/0, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.745 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/0, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.745 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/1, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.745 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/1, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.746 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/2, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.746 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Mgmt0/1/0/2, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.747 EST: ifmgr[189]: %PKT_INFRA-LINK-3-UPDOWN : Interface
Service-Engine0/1/0/3, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.747 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/0, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.750 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/0, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.758 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/1, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.760 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/1, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.763 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/2, changed state to Up
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LC/0/1/CPU0:Apr 13 13:25:26.765 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Mgmt0/1/0/2, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:26.806 EST: ifmgr[189]: %PKT_INFRA-LINEPROTO-5-UPDOWN : Line
protocol on Interface Service-Engine0/1/0/3, changed state to Up
LC/0/1/CPU0:Apr 13 13:25:29.814 EST: avsm_agent[126]: %ISM_SIA-6-INFO : Interface # 0 XAUI
link status changed to UP!!
LC/0/1/CPU0:Apr 13 13:25:29.815 EST: avsm_agent[126]: %ISM_SIA-6-INFO : Interface # 1 XAUI
link status changed to UP!!
LC/0/1/CPU0:Apr 13 13:25:29.817 EST: avsm_agent[126]: %ISM_SIA-6-INFO : Interface # 2 XAUI
link status changed to UP!!
LC/0/1/CPU0:Apr 13 13:25:29.821 EST: avsm_agent[126]: %ISM_SIA-6-INFO : Interface # 3 XAUI
link status changed to UP!!
LC/0/1/CPU0:Apr 13 13:25:29.824 EST: avsm_agent[126]: %ISM_SIA-6-INFO : Interface # 4 XAUI
link status changed to UP!!
LC/0/1/CPU0:Apr 13 13:25:29.827 EST: avsm_agent[126]: %ISM_SIA-6-INFO : Interface # 5 XAUI
link status changed to UP!!
LC/0/1/CPU0:Apr 13 13:25:29.830 EST: avsm_agent[126]: %ISM_SIA-6-INFO : Interface # 7 XAUI
link status changed to UP!!
RP/0/RSP0/CPU0:Apr 13 13:26:23.489 EST: invmgr[235]: %PLATFORM-INV-6-NODE_STATE_CHANGE :
Node: 0/1/SAM0, state: OK
RP/0/RSP0/CPU0:Apr 13 13:26:23.716 EST: invmgr[235]: %PLATFORM-INV-6-OIRIN : OIR: Node
0/1/SAM0 inserted
RP/0/RSP0/CPU0:Apr 13 13:26:23.718 EST: eem_ed_oir[185]: Messge received content : Event 0
NodeId: 0x81c
RP/0/RSP0/CPU0:Apr 13 13:26:36.684 EST: invmgr[235]: %PLATFORM-INV-6-NODE_STATE_CHANGE :
Node: 0/1/SAM1, state: OK
RP/0/RSP0/CPU0:Apr 13 13:26:36.697 EST: invmgr[235]: %PLATFORM-INV-6-OIRIN : OIR: Node
0/1/SAM1 inserted
RP/0/RSP0/CPU0:Apr 13 13:26:36.699 EST: eem_ed_oir[185]: Messge received content : Event 0
NodeId: 0x81d
RP/0/RSP0/CPU0:Apr 13 13:29:30.316 EST: invmgr[235]: %PLATFORM-INV-6-NODE_STATE_CHANGE :
Node: 0/1/SAM0, state: OK
RP/0/RSP0/CPU0:Apr 13 13:29:41.314 EST: invmgr[235]: %PLATFORM-INV-6-NODE_STATE_CHANGE :
Node: 0/1/SAM1, state: OK
```

Configuring the Service Engine Interfaces to the ISM (CDS Only)

The Cisco ASR 9000 Series Aggregation Services Router ISM (Integrated Service Module) line card now has the Release 2.4.1 TV CDS software installed.

The next step is configuring the Service Engine interfaces to the ISM (Integrated Service Module) line card using the Cisco ASR 9000 Series Aggregation Services Router IOS XR Software Command Line Interface.

Step 1 Execute the **interface Service-Engine** command as shown below. This command enters interface configuration mode to allow you to configure interfaces which emulate 10-Gigabit Ethernet interfaces which can be used to carry video streaming/cache-fill traffic.

```
!
interface Service-Engine0/4/0/0
 service-module ipv4 address 10.4.1.2 255.255.255.0
 ipv4 address 10.4.1.1 255.255.255.0
!
interface Service-Mgmt0/4/0/1
 shutdown
!
```

```
interface Service-Engine0/4/0/1
 service-module ipv4 address 10.4.2.2 255.255.255.0
 ipv4 address 10.4.2.1 255.255.255.0
!
interface Service-Mgmt0/4/0/2
 service-module ipv4 address 10.4.12.2 255.255.255.0
 ipv4 address 10.4.12.1 255.255.255.0
 shutdown
!
interface Service-Engine0/4/0/2
 service-module ipv4 address 10.4.3.2 255.255.255.0
 ipv4 address 10.4.3.1 255.255.255.0
!
interface Service-Mgmt0/4/0/3
 shutdown
!
interface Service-Engine0/4/0/3
 service-module ipv4 address 10.4.4.2 255.255.255.0
 ipv4 address 10.4.4.1 255.255.255.0
```

Running the cdsconfig Script

The next step is to initially configure the Cisco ASR 9000 Series Aggregation Services Router ISM (Integrated Service Module) line card, which requires that you run the **cdsconfig** script and answer the prompts appropriately for your deployment.

To initially configure the Cisco ASR 9000 Series Aggregation Services Router ISM (Integrated Service Module) line card, do the following:

Step 1   Log in to the Cisco ASR 9000 Series Aggregation Services Router ISM (Integrated Service Module) line card as *root*.

Step 2   Run the **cdsconfig** script. The script displays prompts with the default values in brackets. If a default value is correct, press **Enter** to accept the value; otherwise, enter the correct value and press **Enter**. Note that the following example is for adding a Cisco ASR 9000 Series Aggregation Services Router ISM (Integrated Service Module) line card into an existing deployment

```
[root@ism ~]# cdsconfig

ATTENTION!!!
If a new image is installed on this server, a reboot is required before running
cdsconfig.
If a reboot is already performed, please continue.
Otherwise, please exit and execute cdsconfig after rebooting the server

Do you want to continue ? (yes/no) [y]: y
Enter management interface [eth0]:
Please ensure an IP address and netmask are configured for
  management interface eth0:

Enter a hostname [ism]:
Backing up /etc/sysconfig/network
Writing new /etc/sysconfig/network
Backing up /etc/hosts
Writing new /etc/hosts
Skipping network restart for AVSM
Network configuration complete
Use detected platform: A9K-ISM-100 ? (yes/no) [y]: yes
```

```
Please select a device role:
    1. streamer
Choice: 1
Is this Server going to get added to a Stream Domain in a CDN Split Domain Manag
ement Environment ? (yes/no) [y]: no
Please enter a Group ID(Array ID): 6147
Please enter a server ID [3]: 1232
Enter Stream Control interface (Hit 'Enter' to skip):
Writing new configuration to /home/isa/.arroyorc

No existing replication group information found
Do you want to configure replication group members now? (yes/no) [y]:

There are currently no replication group members.
Do you want to add another replication group member? (yes/no) [y]:

Select a role for the new replication group member. Select 'exit' to exit this menu:
    1. ssv
    2. vault
    3. streamer
    4. cache
    5. controller
    6. exit
Choice: 5
Enter an IP address for new controller: 10.10.19.2

Current replication group members:
  controller    10.10.19.2
Do you want to add another replication group member? (yes/no) [n]: yes

Select a role for the new replication group member. Select 'exit' to exit this m
enu:
    1. ssv
    2. vault
    3. streamer
    4. cache
    5. controller
    6. exit
Choice: 2
Enter an IP address for new vault: 10.10.30.2

Current replication group members:
  controller    10.10.19.2
  vault         10.10.30.2
Do you want to add another replication group member? (yes/no) [n]:
Configuring ISA ecosystem
Is this node getting added to an existing deployment ? (yes/no) [y]:

Starting database sync...

./start_db: Command not found.
1 size: 4180
2 size: 3148
3 size: 2136
4 size: 11412
5 size: 4180
6 size: 3148
7 size: 17628
8 size: 5208
10 size: 60
11 size: 1108
12 size: 52
14 size: 60
```

```
15 size: 2492
16 size: 156
17 size: 3164
18 size: 144
19 size: 180
20 size: 160
21 size: 1164
22 size: 16
23 size: 4228
24 size: 164
25 size: 14800
27 size: 1108
28 size: 3508
29 size: 156
30 size: 1108
31 size: 276
32 size: 1916
33 size: 1496
34 size: 1880
35 size: 3672
36 size: 6676
37 size: 1548
38 size: 184
39 size: 1748
40 size: 1492
41 size: 212
42 size: 212
43 size: 244
44 size: 144
45 size: 280
46 size: 156
48 size: 1024
49 size: 224
50 size: 660
51 size: 340
52 size: 2132
53 size: 1816
54 size: 440
56 size: 1440
57 size: 4244
58 size: 7468
59 size: 336
60 size: 204
63 size: 5336
64 size: 204
65 size: 24
66 size: 17732
70 size: 164
71 size: 1236
72 size: 5336
74 size: 3348
75 size: 2140
76 size: 5260
77 size: 12436
78 size: 6240
79 size: 340
80 size: 11412
81 size: 228
82 size: 24
83 size: 2208
84 size: 2128
85 size: 4348
86 size: 1168
88 size: 4180
```

```
89 size: 88
90 size: 2084
91 size: 84
92 size: 1444
93 size: 512
94 size: 172
95 size: 1512
96 size: 288
97 size: 2412
98 size: 5644
99 size: 160
100 size: 84
110 size: 476
111 size: 564
112 size: 5228
113 size: 88
115 size: 40
116 size: 292
117 size: 236
120 size: 5380
121 size: 1484
122 size: 14780
125 size: 24
128 size: 1296
130 size: 2292
131 size: 400
132 size: 144
134 size: 16488
135 size: 124
136 size: 2540
137 size: 2540
138 size: 2540
139 size: 1044
140 size: 10160
141 size: 3292
145 size: 116
146 size: 108
147 size: 360
148 size: 396
150 size: 1444
151 size: 184
152 size: 192
153 size: 11412
155 size: 1572
156 size: 832
157 size: 204
158 size: 292
159 size: 468
160 size: 240
161 size: 428
162 size: 2612
165 size: 672
166 size: 2192
167 size: 592
169 size: 17732
171 size: 1168
175 size: 1208
180 size: 2724
181 size: 2396
182 size: 1120
183 size: 152
184 size: 164
185 size: 212
191 size: 628
```

```
            192 size: 6228
            195 size: 120
            200 size: 21772
            204 size: 60
            205 size: 16
            206 size: 6292
            207 size: 108
            208 size: 1140
            210 size: 2548
            211 size: 2548
            212 size: 240
            213 size: 2732
            214 size: 216
            215 size: 104
            220 size: 92
            230 size: 1288
            231 size: 1500
            250 size: 80
            266 size: 24656
            267 size: 80
            270 size: 660
            271 size: 156
            272 size: 144
            273 size: 88
            274 size: 28
            275 size: 32
            276 size: 32
trickle thread starting: tid: 4131216272
deadlock thread starting: tid: 4130163600
checkpoint thread starting: tid: 4129110928
trigger_worker thread starting: tid: 4128058256
10.10.19.2: Performing full resync for node addition with 10.10.19.2
10.10.19.2: Full Resync SUCCESS
10.10.30.2: Performing full resync for node addition with 10.10.30.2
   10.10.30.2: db_resync_content_object: still processing remote getall, 1000 co
ntents processed so far
   10.10.30.2: db_resync_content_object: still processing remote getall, 2000 co
ntents processed so far
   10.10.30.2: db_resync_content_object: still processing remote getall, 3000 co
ntents processed so far
   10.10.30.2: db_resync_content_object: still processing remote getall, 4000 co
ntents processed so far
   10.10.30.2: db_resync_content_object: still processing remote getall, 5000 co
ntents processed so far
   10.10.30.2: db_resync_content_object: still processing remote getall, 6000 co
ntents processed so far
   10.10.30.2: db_resync_content_object: still processing remote getall, 7000 co
ntents processed so far
   10.10.30.2: db_resync_content_object: still processing remote getall, 8000 co
ntents processed so far
   10.10.30.2: db_resync_content_object: Finished with 8005 new records found an
d 0 records deleted, 8005 processed in getall
10.10.30.2: Full Resync SUCCESS
serverid: 1232 servertype: 2 ipaddr: 353698051
controller archiving thread starting: tid: 4042255248
rep_mgr thread starting: tid: 4041202576 rthreads: 2
pthread created: 4131216272
pthread created: 4130163600
pthread created: 4129110928
pthread created: 4128058256
pthread created: 4127001488
pthread created: 4125948816
pthread created: 4043307920
pthread created: 4042255248
```

```
pthread created: 4041202576
pthread created: 4040149904
replication threads: 2
trigger manager thread starting: tid: 4040149904

Database sync completed.

Run svrinit to seed database? (yes/no) [n]: yes
Please enter an IP address for svrinit [21.21.1.3]:
Please enter a netmask for svrinit [255.255.255.0]:
Please enter a hostname for svrinit [ism]:
Please enter a gateway for svrinit: 21.21.1.1
21.21.1.3 (ism) ASM tables initialized!
Starting statsd
Is this an IPTV deployment with Dual CAS? (yes/no) [n]:
Writing rc.local
ISA ecosystem configuration finished
cdsconfig finished, please use CDSM to complete configuration
```

Step 3   To verify that the CDS manager (VVIM, Stream Manager, or CDSM) is operational, using your web browser, enter the IP address of your CDS manager.

For example, if the IP address of your CDSM is 192.168.0.236, you can access it by entering http://192.168.0.236 in the address or location text box of your browser program.

The System Login page is displayed (see Figure B-1).

Figure B-1   CDSM Login Page
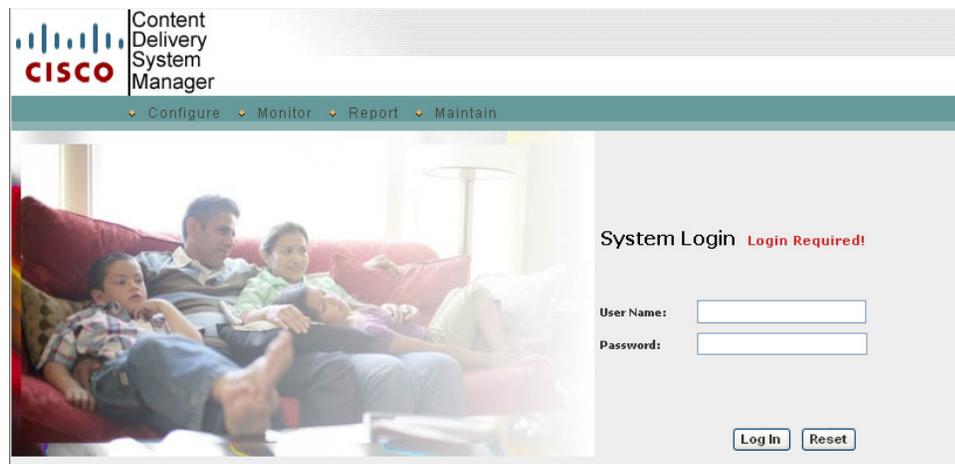
Step 4   Log in to the CDS manager GUI. Enter *admin* as the user name and *admin* as the password and click **Login**.

If you are unable to log in with the user name *admin* and the password *admin*, log in to the Cisco ASR 9000 Series Aggregation Services Router ISM (Integrated Service Module) line card Linux command line and run the **/home/stats/runonce** command, then log in to the CDS manager GUI again.

The VVIM Setup page or CDSM Setup page is displayed.

Step 5   Use the VVIM or CDSM GUI to complete the configuration.

For more information, see one of the following:

- For an ISA deployment, see the "Getting Started" chapter in the *Cisco TV CDS 2.4 ISA Software Configuration Guide*.

- For an RTSP deployment, see the "Getting Started" chapter in the *Cisco TV CDS 2.4 RTSP Software Configuration Guide*.

interface Service-Engine

To configure an interface which emulates a 10-Gigabit Ethernet interface to carry video streaming/cache-fill traffic, use the **interface Service-Engine** command in global configuration mode. To delete the **interface Service-Engine** configuration, use the **no** form of this command.

> **interface Service-Engine** *interface-path-id*

> **no interface Service-Engine** *interface-path-id*

Syntax Description	Service-Engine	The **Service-Engine** keyword signifies an interface which emulates a 10-Gigabit Ethernet interface which can be used to carry video streaming/cache-fill traffic.

	interface-path-id	• Physical interface interface-path-id. The naming notation is *rack*/*slot*/*module*/*port*, and a slash between values is required as part of the notation.
		    – *rack*—Chassis number of the rack.
		    – *slot*—Physical slot number of the line card or modular services card.
		    – *module*—Module number. A physical layer interface module (PLIM) is always 0.
		    – *port*—Physical port number of the interface.
		 For more information about the syntax for the router, use the question mark (**?**) online help function.

Defaults   No interfaces are configured

Command Modes   Global configuration (config)

Command History	Release	Modification
	Release 4.1.0	This command was introduced on the ISM line card on the Cisco ASR 9000 Series Router.

Usage Guidelines   To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

The **interface Service-Engine** command enters interface configuration mode to allow you to configure interfaces which emulate 10-Gigabit Ethernet interfaces which can be used to carry video streaming/cache-fill traffic.

The **no** form of this command applies only to virtual interfaces or to subinterfaces (that is, interfaces that have been created in global configuration mode).

Task ID	Task ID	Operations
	interface	read, write

Examples

In the following example, the **interface Service-Engine** command is given for the Service Engine interface-path-id tied to the ISM card in location 0/0/0/0, and interface configuration mode is entered for that interface:

```
RSP/0/RSP0/CPU0:router(config)# interface Service-Engine 0/0/0/0
RSP/0/RSP0/CPU0:router(config-if)# ipv4 address 10.20.1.1/30
RSP/0/RSP0/CPU0:router(config-if)# service-module ipv4 address 10.20.1.2/30
```

Service Engine interfaces are for data traffic – cache-fill traffic (from the system to the ISM) & streaming traffic (from the ISM to the system).

The service-module IPv4 address corresponds to the X86 Linux machine which provides network connectivity to the X86 Linux CDS application.

To check host reachability and network connectivity on IP networks, use the **ping** command in EXEC mode.

Related Commands

Command	Description
clear interface	Clears interface statistics or packet counters.
show interfaces	Displays statistics for all interfaces configured on the router or on a specific node.

interface Service-mgmt

To configure an interface which emulates a 100MB Ethernet interface to carry video management traffic, use the **interface Service-mgmt** command in global configuration mode. To delete the **interface Service-mgmt** configuration, use the **no** form of this command.

interface Service-mgmt *interface-path-id*

no interface Service-mgmt *interface-path-id*

Syntax Description

Service-mgmt	The **Service-mgmt** keyword signifies an interface which emulates a 100MB Ethernet interface which can be used to carry video management traffic.

interface-path-id	• Physical interface interface-path-id. The naming notation is *rack*/*slot*/*module*/*port*, and a slash between values is required as part of the notation.
	
	  – *rack*—Chassis number of the rack.
	
	  – *slot*—Physical slot number of the line card or modular services card.
	
	  – *module*—Module number. A physical layer interface module (PLIM) is always 0.
	
	  – *port*—Physical port number of the interface.
	
	For more information about the syntax for the router, use the question mark (**?**) online help function.

Defaults   No interfaces are configured

Command Modes   Global configuration (config)

Command History

Release	Modification
Release 4.1.0	This command was introduced on the ISM line card on the Cisco ASR 9000 Series Router.

Usage Guidelines   To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

The **interface Service-mgmt** command enters interface configuration mode to allow you to configure interfaces which emulate 100MB Ethernet interfaces which can be used to carry video management traffic.

The **no** form of this command applies only to virtual interfaces or to subinterfaces (that is, interfaces that have been created in global configuration mode).

Task ID	Task ID	Operations
	interface	read, write

Examples

In the following example, the **interface** command is given for the Service Management interface-path-id tied to the ISM card in location 0/0/0/0, and interface configuration mode is entered for that interface:

The Service-Mgmt interfaces are primarily used for management purposes. The traffic is between the CDS application running on the X86 node and the external CDSM station.

```
RSP/0/RSP0/CPU0:router(config)# interface Service-mgmt0/0/0/0
RSP/0/RSP0/CPU0:router(config-if)# ipv4 address 10.20.1.1/30
RSP/0/RSP0/CPU0:router(config-if)# service-module ipv4 address 10.20.1.2/30
RSP/0/RSP0/CPU0:router(config-if)# service-module gateway ipv4 address 10.20.1.3/30
RSP/0/RSP0/CPU0:router(config-if)# l2transport
```

The service-module IPv4 address corresponds to the X86 Linux machine which provides network connectivity to the X86 Linux CDS application.

```
To check host reachability and network connectivity on IP networks, use the ping command
in EXEC mode.
```

Note   The Service-Mgmt interfaces are created in Layer 3 mode by default. You need to execute the **l2transport** command to configure the Service-Mgmt interfaces to Layer 2 mode for the Service-Mgmt interfaces to function correctly.

Related Commands

Command	Description
clear interface	Clears interface statistics or packet counters.
show interfaces	Displays statistics for all interfaces configured on the router or on a specific node.

Single Hardware PID (Role Based Installation)

Cisco IOS XR Software Release 4.2.1 introduces the single hardware PID solution on the ISM (Integrated Service Module) line card. This feature provides role based installation of the following different service applications

- CDS TV
- CDS IS
- CGv6

Previously, you installed these appropriate services applications manually.

Use the following newly-introduced Cisco IOS XR Software Release 4.2.1 commands to select which service application to run (e.g. CGN):

(config)#**hw-module service** *<role>* **loc** *<ISM_node>*

(admin)# download install-image *<install-file-name>* location *<ISM_node>*

First, enter global configuration mode by executing the **config** command:

```
RP/0/RSP0/CPU0#config
```

Next, change the existing role by executing the **hw-module service *<role>* location *<ISM_node>***
command:

```
RP/0/RSP0/CPU0(config)#hw-module service <role> location <ISM_node>
```

Finally, enter the **end** or **commit** commands.

When you issue the **end** command, the system prompts you to commit changes:

```
Uncommitted changes found, commit them before exiting (yes/no/cancel)?
[cancel]:
```

Entering **yes** saves configuration changes to the running configuration file, exits the configuration
session, and returns the router to EXEC mode.

Entering **no** exits the configuration session and returns the router to EXEC mode without committing the
configuration changes.

Entering **cancel** leaves the router in the current configuration session without exiting or committing the
configuration changes.

Execute the **commit** command to save the configuration changes to the running configuration file and
remain within the configuration session.

Execute the **end** command and respond to the question with **yes**, saving your configuration changes to
the running configuration file, exiting the configuration session, and returning the router to EXEC mode

Now that you've changed the role the next step is is to install your chosen service application image.

Firstly, enter administration mode by executing the **admin** command:

```
RP/0/RSP0/CPU0#admin
```

Next, install your chosen *<install-file-name>* by executing the **download install-image
<install-file-name> location *<ISM_node>*** command:

```
RP/0/RSP0/CPU0 (admin)#download install-image <install-file-name> location <ISM_node>
```

Where the *<install-file-name>* variable contains the name of the service application image file to be
installed on the linux filesystem tied to the node named by the *<ISM_node>* variable.

Once you execute the **download install-image *<install-file-name>* location *<ISM_node>*** command
the following warning message will be displayed:

```
You are going to install new application on LC. Card will be reloaded automatically
once installation is completed. Do you want to proceed with the installation?[confirm]
```

Respond to the question with **yes.** The system begins downloading the selected image file.

■ **Single Hardware PID (Role Based Installation)**