Cisco ASR 1000 Route Processor 3 Installation and Configuration Guide

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C O N T E N T S

Preface

This preface describes the objectives and organization of this document and explains how to find additional information on related products and services. This preface contains the following sections:

Objectives

This document describes the Cisco ASR 1000 Series Route Processor 3 (Cisco ASR1000-RP3) that is supported on the Cisco ASR 1000 Series Aggregation Services Routers. This document also describes how to install and configure the Cisco ASR1000-RP3 module.

Document Revision History

The Document Revision History records changes made to this document. The table shows the Cisco IOS XE software release number and document revision number pertaining to the change, the date of the change, and a brief summary of the change.

Release No.	Date	Change Summary
Cisco IOS XE Denali 16.3.1	November, 2016	First version of the document.

Organization

This document contains the following chapters:

Chapter	Title	Description
1	Cisco ASR1000-RP3 Module Overview	Provides an introduction to the Cisco ASR1000-RP3 module. Also provides information about the characteristics of the module.
2	Preparing to Install the Cisco ASR1000-RP3 Module	Describes the required tools, equipment, and safety guidelines for installing the Cisco ASR1000-RP3 module.
3	Installing the Cisco ASR1000-RP3 Module	Describes the procedures for installing and removing the Cisco ASR1000-RP3 module from a Cisco ASR 1000 Series Aggregation Services Router.
4	Software Licensing on Cisco ASR1000-RP3 Module	Provides an high-level overview of the licensing options available for the Cisco ASR1000-RP3 module.
5	Configuring the Cisco ASR1000-RP3 Module	Describes a basic router configuration, and configuration pertaining to the Cisco ASR1000-RP3 module.
6	Upgrading the Cisco ASR1000-RP3 Module	Provides information on the In-Service Software Upgrades (ISSU) procedure for the Cisco ASR1000-RP3 module.
7	Upgrading the ROMMON	Provides information about ROMMON used in the Cisco ASR1000-RP3 module.
8	Removing and Replacing FRUs from the Cisco ASR1000-RP3 Module	Describes the procedures for replacing field-replaceable units (FRUs) from the Cisco ASR1000-RP3 module.

Related Documentation

For information about associated services and modules in Cisco ASR 1000 Series Aggregation Services Routers, see:

- Documentation Roadmap for Cisco ASR 1000 Series, Cisco IOS XE Denali 16.x.
- Cisco ASR 1009-X Router and Cisco ASR 1006-X Router Hardware Installation Guide

Document Conventions

Within the guide, the term *router* is generally used to refer to a variety of Cisco products (for example, routers, access servers, and switches). Routers, access servers, and other networking devices that support Cisco IOS software are shown interchangeably within examples. These products are used only for illustrative purposes, that is, an example that shows one product does not necessarily indicate that other products are not supported.

This documentation uses the following conventions:

Convention	Description
^ or **Ctrl**	The **^** and **Ctrl** symbols represent the Control key. For example, the key combination **^D** or **Ctrl-D** means hold down the **Control** key while you press the **D** key. Keys are indicated in capital letters, but are not case sensitive.
string	A string is a nonquoted set of characters shown in italics. For example, when setting a Simple Network Management Protocol (SNMP) *community* string to *public*, do not use quotation marks around the string. If you do, the string will include the quotation marks.

Command syntax descriptions use the following conventions:

Convention	Description
bold	Bold text indicates commands and keywords that you enter exactly as shown.
italics	Italic text indicates arguments for which you supply values.
[x]	Square brackets enclose an optional element (keyword or argument).
|	A vertical line indicates a choice within an optional or required set of keywords or arguments.
[x | y]	Square brackets enclosing keywords or arguments separated by a vertical line indicate an optional choice.
{x | y}	Braces enclosing keywords or arguments separated by a vertical line indicate a required choice.

Nested sets of square brackets or braces indicate optional or required choices within optional or required elements. For example:

Convention	Description
[x {y | z}]	Braces and a vertical line within square brackets indicate a required choice within an optional element.

Examples use the following conventions:

Convention	Description
`screen`	Examples of information displayed on the screen are set in Courier font.
`bold screen`	Examples of text that you must enter are set in Courier bold font.
< >	Angle brackets enclose text that is not printed to the screen, such as passwords.
!	An exclamation point at the beginning of a line indicates a comment line. (Exclamation points are also displayed by the Cisco IOS software for certain processes.)
[ ]	Square brackets enclose default responses to system prompts.

The following conventions are used to attract the attention of the reader:

⚠️

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

✎

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

🔍

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

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see *What's New in Cisco Product Documentation* at: http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html.

Subscribe to *What's New in Cisco Product Documentation*, which lists all new and revised Cisco technical documentation, as an RSS feed and deliver content directly to your desktop using a reader application. The RSS feeds are a free service.

Cisco ASR1000-RP3 Module Overview

This chapter contains the following sections:

Overview

The Cisco ASR 1000 Series Route Processor 3 (Cisco ASR1000-RP3) module runs the network operating system, BINOS kernel, and the IOSD (IOS daemon). The Cisco ASR1000-RP3 module is supported on the Cisco ASR 1013, Cisco ASR 1006-X, and Cisco ASR 1009-X routers.

Figure 1-1 shows the front panel of the Cisco ASR1000-RP3 module.

Figure 1-1   Cisco ASR1000-RP3 Front Panel
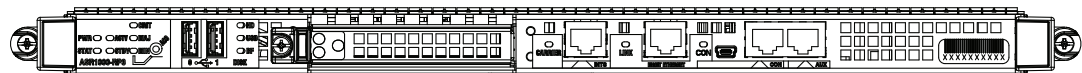
The Cisco ASR1000-RP3 module supports:

- the running of the router control plane, including network control packets, and connection setup

- the synchronization of the active and standby Cisco ASR1000-RP3 and Cisco ASR 1000 Series ESP master and standby (tasks include switchover from failing master to standby)

- code storage, management, and upgrade

- On-board failure logging (OBFL) with 2 MB of memory

- the downloading of operational code for SPA interface processors (SIPs), modular interface processors (MIPs), and Cisco ASR 1000 Series ESP over Ethernet out of band channel (EOBC), which is used for communication between the control processors on the Cisco ASR 1000 Series Routers

- command line interface (CLI), alarm, network management, logging, and statistics aggregation

- punt path processing of packets not supported by the embedded services processors

- configuration repository along with a solid-state drive (SSD) for logging system statistics, records, events, errors, and dump

- the management interfaces of the platform including Dual Asynchronous Receiver/Transmitter (DUART) that is used for the CON and AUX serial ports. The MGMT Ethernet (ENET) management ports, CLI, status indicators, BITS interface, reset switch, Audible Cutoff (ACO) button, USB ports for secure key distribution, and a mini-USB Console port to connect to a USB host (laptop)

- field-replaceable unit (FRU) with online insertion and removal (OIR)

- the chassis management including activation and initialization of the other cards, selection or switchover of active versus standby cards, image management and distribution, logging facilities, distribution of user configuration information, and alarm control

- the control signals for monitoring the health of power entry modules, shutting down the power and driving alarm relays located on the power entry modules

- redundancy

> **Note** Although the Cisco ASR1000-RP3 and Cisco ASR1000-RP2 modules can coexist in the same chassis for a short time when you are installing the Cisco ASR1000-RP3 module, you can only have one type of RP in a chassis. For detailed information on the software upgrade procedures, see Software Upgrade Process chapter of the Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide.

Understanding Redundancy

The Cisco ASR1000-RP3 module, the Cisco ASR1000 ESPs, and power supplies support redundancy. Only one RP and one ESP are considered active at a time and no load sharing is performed. However, the non-active RP or ESP is maintained in a warm standby state so that it can take over the active role as quickly as possible if necessary.

The following combination of components are supported:

- Single RP—Single or Dual ESPs

- Dual RP—Single or Dual ESPs

In a fully redundant chassis, each RP is separately connected to each FP and I/O card slot over separate point-to-point connections of the system interconnect over the midplane. The selection of the active RP is made separately from the selection of the active ESP.

Supported and Unsupported Platforms, ESPs and Line Cards

Table 1-1 lists the platforms in which the Cisco ASR1000-RP3 module is supported or unsupported, the ESPs and line cards that are supported or unsupported.

Table 1-1　　　　*Cisco ASR1000-RP3 Platform Support*

	Supported	**Unsupported**
Platforms	ASR 1006-X	ASR 1001
	ASR 1009-X	ASR 1001-X
	ASR 1013	ASR 1002
		ASR 1002-X
		ASR 1002-HX
		ASR 1004
		ASR 1006
		ASR 1001-HX
ESPs	ASR1000-ESP40	ASR1000-ESP20
	ASR1000-ESP100	ASR1000-ESP5
	ASR1000-ESP200	ASR1000-ESP10
Line Cards	ASR 1000-SIP40	ASR 1000-SIP10
	ASR 1000-MIP100	
	ASR 1000-2T+20X1GE	
	ASR 1000-6TGE	

Cisco ASR 1000 Series Route Processor Differences

The Cisco ASR 1000 RPs receive and transmit network packets through active embedded services processors. Table 1-2 describes the differences between the Cisco ASR1000-RP1, Cisco ASR1000-RP2, and Cisco ASR1000-RP3 modules.

Table 1-2　　　　*Differences Between the Cisco ASR 1000 Series RP Modules*

Feature	Cisco ASR1000-RP1	Cisco ASR1000-RP2	Cisco ASR1000-RP3
CPU	Single 1.5 GHz PowerPC	Dual 2.66 GHz Intel x86	Quad 2.2 GHz Intel
DRAM Memory	Supports 4 GB default	Supports up to 8 GB of field-replaceable memory	8 GB default; supports up to 64 GB of field-replaceable memory
Bulk Storage Hard Disk	Internal 40 GB hard-disk drive	Front-mounted 80 GB hard-disk (field-replaceable)	100 GB SSD default; 200 GB and 400 GB upgrade options (field-replaceable)
Bootflash/ NVRAM	512 MB eUSB	2 GB eUSB	8 GB eUSB

Hardware Features

The Cisco ASR1000-RP3 module provides the following enhancements compared to Cisco ASR1000-RP2 module:

- Supports up to 64 GB of memory with error detection and correction

- Provides Enhanced Serdes Interconnect (ESI) at 25 Gbps

- Contains 100 GB SSD bulk storage

- Provides 8 GB bootflash

- Comes with 8 GB of DRAM memory and can be upgraded to 16 GB, 32 GB, or 64 GB

In addition, the Cisco ASR1000-RP3 module supports the following functionalities:

- On-board Failure Logging (OBFL) with 2MB of memory

- Cisco ASR 1000 Series Router system architecture and midplane

- Gigibit Ethernet switches for Ethernet Out-of-Band Channel (EOBC) communication and boot-up of the SIPs, MIPs, and Cisco ASR 1000 Series ESP

- Runs Cisco IOS network control plane (routing protocol, connections setup)

- Cisco IOS punt packet forwarding

- Active/Standby Cisco ASR1000-RP3 module and Cisco ASR 1000 Series ESP selection

- Code storage and download operational code to Cisco ASR 1000 Series ESP and Cisco ASR 1000 SIP

- Front panel support: Console, 10/100 Management port, two USB ports, mini-USB port, CON port, and AUX port.
  The Cisco ASR 1000 Series Routers have one Gigabit Ethernet Management Ethernet interface on each RP. The purpose of this interface is to allow users to perform management tasks on the router; it is an interface that does not forward network traffic but can otherwise access the router, often through Telnet and SSH, and perform most management tasks on the router. The interface is useful before a router has begun routing, or in troubleshooting scenarios when the SPA interfaces are inactive

  Note the following aspects of the Management Ethernet interface:

  – Each RP has a Management Ethernet interface, but only the active RP has an accessible Management Ethernet interface (the standby RP can be accessed using the console port, however).

  – IPv4, IPv6, and ARP are the only routed protocols supported for the interface.

  – The interface provides a method of access to the router even if the SPA interfaces or the IOS processes are down.

- A console port that can run up to 115.2 kbps with hardware flow control. One port is used as the CONSOLE port for secure configuration and status display. The default BAUD rate for the CONSOLE port should be set at 9600 BAUD. Both console and auxiliary ports are asynchronous serial ports.

Note In Cisco IOS XE Denali 16.3.1 release, BITS T1/E1 is not supported on RP3. This support will be provided in future releases.

Model Number Location

Figure 1-2 shows the location of the model number on the Cisco ASR1000-RP3 module.

Figure 1-2   Cisco ASR1000-RP3 Model Number Location
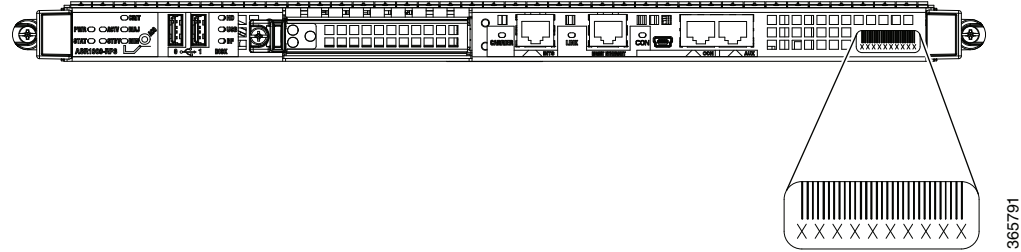
LEDs

Figure 1-3 shows the Cisco ASR1000-RP3 LEDs.

Figure 1-3   Cisco ASR1000-RP3 LEDs
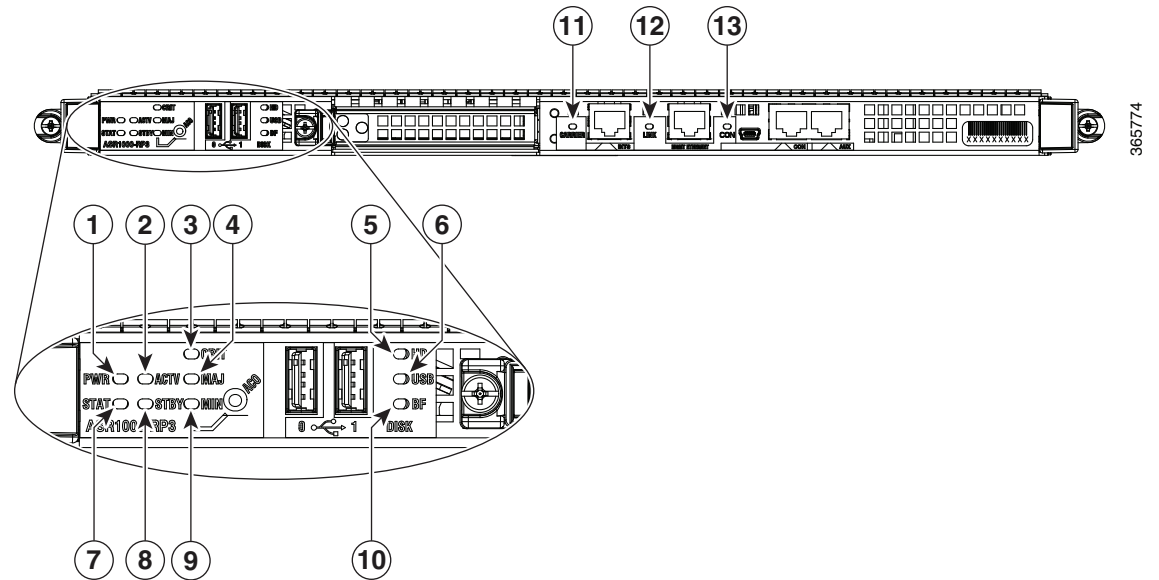
No.	LED Label	LED	Color —State	Behavior
1	PWR	Power	Solid green	All power requirements are within specification.
			Off	Router is in standby mode.
2	ACTV	Active	Green	RP is active.

No.	LED Label	LED	Color —State	Behavior
3	CRIT	Critical	Solid Red	Critical alarm indicator or during boot process.
				Example: The ambient air temperature is above 60ºC and will start shutting down in five minutes.
4	MAJ	Major	Solid Red	Major alarm indicator.
				Example: The ambient air temperature is beyond short term operating range of 55ºC. System will shut down above 60ºC.
5	HD	Internal hard drive LED	Flashing Green	Activity indicator.
			Off	No activity.
6	USB	External USB Flash LED	Flashing Green	Activity indicator.
			Off	No activity.
7	STAT	System status	Solid green	Cisco IOS software has successfully booted.
			Yellow	ROMMON has successfully loaded.
			Red, Flashing Red	System failure or during boot process.
8	STBY	Standby	Yellow	RP is the standby processor.
9	MIN	Minor	Amber	Minor alarm indicator. Ambient air temperature is beyond normal operating range of 40ºC.
				Example: If the RP software determines that an unknown card has been installed or if the card has failed, the card powers it off or sets a minor alarm.
10	BF	Internal USB bootflash LED	Flashing Green	Activity indicator.
			Off	No activity.
11	CARRIER	LED	Off	Out of service or not configured.
			Solid Green	In frame and working properly.
			Amber	Fault or loop condition exists.
12	LINK	10/100/1000 RJ-45 Interface LED	Solid Green	Link with no activity.
			Flashing Green	Link with activity.
			Off	Not connected.
13	CON	Active console indicator	Solid Green	Mini-USB console is active.
			Off	RJ45 console is active.

Management and Storage Connections

Figure 1-4 shows the Cisco ASR1000-RP3 management and storage connections.

Figure 1-4   *Cisco ASR1000-RP3 Connectors*
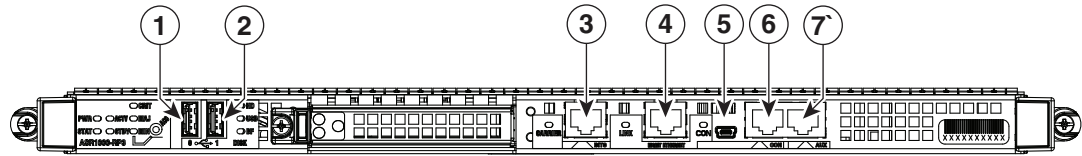
No.	Label	Type	Description
1	0	USB0 interface	Side-by-side USB connector used with memory sticks or smart cards for secure key distribution.
2	1	USB1 interface	Side-by-side USB connector used with memory sticks or smart cards for secure key distribution
3	BITS	RJ-45 connector	Indicates BITS timing reference.
4	MGMT ETHERNET	RJ-45 jack for copper Ethernet Management Port	RP has an ENET port with a RJ-45 connector to attach a management device or network for network management.
5	CON	Mini-USB console connector	Console port to connect to a USB host (laptop).
6	CON	RJ-45 for CON	Console port used to connect to a terminal.
7	AUX	RJ-45 for AUX	Auxiliary port used for remote management purposes.

Preparing to Install the Cisco ASR1000-RP3 Module

This chapter describes the general equipment, safety guidelines, and site preparation requirements for installing the Cisco ASR1000-RP3 module into the router. This chapter contains the following sections:

- Required Tools and Equipment, page 2-1
- Safety Guidelines, page 2-2

Required Tools and Equipment

You need the following tools and parts to remove and install the Cisco ASR1000-RP3 module. If you need additional equipment, contact a Cisco service representative.

- Cisco ASR1000-RP3
- Number 2 Phillips screwdriver
- Your own electrostatic discharge (ESD)-prevention equipment or ESD-preventive wrist strap or ankle strap along with instructions (supplied with your line card)
- Antistatic mat
- Antistatic container

Safety Guidelines

This section provides safety guidelines that you should follow when working with any equipment that connects to electrical power or telephone wiring.

Safety Warnings

Safety warnings appear throughout this publication in procedures that, if performed incorrectly, might harm you. A warning symbol precedes each warning statement.

Warning Definition

Warning   **IMPORTANT SAFETY INSTRUCTIONS**

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. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Waarschuwing   **BELANGRIJKE VEILIGHEIDSINSTRUCTIES**

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus   **TÄRKEITÄ TURVALLISUUSOHJEITA**

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention   **IMPORTANTES INFORMATIONS DE SÉCURITÉ**

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung   **WICHTIGE SICHERHEITSHINWEISE**

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza   **IMPORTANTI ISTRUZIONI SULLA SICUREZZA**

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI

Advarsel   **VIKTIGE SIKKERHETSINSTRUKSJONER**

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE

Aviso   **INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES

¡Advertencia!   INSTRUCCIONES IMPORTANTES DE SEGURIDAD

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES

Varning!   VIKTIGA SÄKERHETSANVISNINGAR

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR

Figyelem   FONTOS BIZTONSÁGI ELOÍRÁSOK

Ez a figyelmezeto jel veszélyre utal. Sérülésveszélyt rejto helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplo figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján keresheto meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Предупреждение   ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ

警告   重要的安全性说明

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

警告　安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

주의　중요 안전 지침

이 경고 기호는 위험을 나타냅니다. 작업자가 신체 부상을 일으킬 수 있는 위험한 환경에 있습니다. 장비에 작업을 수행하기 전에 전기 회로와 관련된 위험을 숙지하고 표준 작업 관례를 숙지하여 사고를 방지하십시오. 각 경고의 마지막 부분에 있는 경고문 번호를 참조하여 이 장치와 함께 제공되는 번역된 안전 경고문에서 해당 번역문을 찾으십시오.

이 지시 사항을 보관하십시오.

تحذير　إرشادات الأمان الهامة

يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض لإصابات. قبل بدء العمل، احذر مخاطر التعرض للصدمات الكهربائية وكن على علم بالإجراءات القياسية للحيلولة دون وقوع أي حوادث. استخدم رقم البيان الموجود في آخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز. قم بحفظ هذه الإرشادات

Upozorenje　VAŽNE SIGURNOSNE NAPOMENE

Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prouzročiti tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane uz električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. U prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju koji se nalazi uz pojedino upozorenje pronaći i njegov prijevod.

SAČUVAJTE OVE UPUTE

Upozornění　DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY

Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazům. Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených bezpečnostních upozorněních, která jsou přiložena k zařízení.

USCHOVEJTE TYTO POKYNY

Προειδοποίηση | ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ

Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τους κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνήθεις πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή.

ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ

אזהרה | **הוראות בטיחות חשובות**

סימן אזהרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד כלשהו, עליך להיות מודע לסכנות הכרוכות במעגלים חשמליים ולהכיר את הנהלים המקובלים למניעת תאונות. השתמש במספר ההוראה המסופק בסופה של כל אזהרה כד לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה

Ostrzeżenie | **WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA**

Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń.

NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ

Upozornenie | **DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY**

Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhľadajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu.

USCHOVAJTE SI TENTO NÁVOD

Electrical Equipment Guidelines

Follow these basic guidelines when working with any electrical equipment:

- Before beginning any procedures requiring access to the chassis interior, locate the emergency power off switch for the room in which you are working.

- Disconnect power and all the external cables before moving a chassis.

- Do not work alone when potentially hazardous conditions exist.

- Never assume that power has been disconnected from a circuit; always check.

- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe; carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which can occur when electronic cards or components are improperly handled, results in complete or intermittent failures. The Cisco ASR1000-RP3 modules comprise printed circuit boards that are fixed to metal carriers. Electromagnetic interference (EMI) shielding and connectors are integral components of these carriers. Although the metal carriers help to protect the boards from ESD, use a preventive antistatic strap when handling the line cards.

The following are the guidelines for preventing ESD damage:

- Always use an ESD wrist strap or ankle strap and ensure that it is touching the skin.

- Connect the equipment end of the strap to an unfinished chassis surface.

- When installing a component, use any available ejector levers or captive installation screws to properly seat the bus connectors in the backplane or midplane. These devices prevent accidental removal, provide proper grounding for the system, and help to ensure that the bus connectors are properly seated.

- When removing a component, use any available ejector levers or captive installation screws to release the bus connectors from the backplane or midplane.

- Handle the carriers using the available handles or edges only; avoid touching the printed circuit boards or connectors.

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

- Avoid contact between the printed circuit boards and clothing. The wrist strap protects only components from ESD voltages on the body; ESD voltages on clothing can still cause damage.

- Never attempt to remove the printed circuit board from the metal carrier.

⚠

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

C H A P T E R **3**

Installing the Cisco ASR1000-RP3 Module

This chapter contains the following topics:

⚠️ **Warning** **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

⚠️ **Warning** **During this procedure, wear grounding wrist straps to avoid ESD damage to any card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.** Statement 94

Installing the Cisco ASR1000-RP3 Module in the Router

The Cisco ASR1000-RP3 module can be installed in Slot R1 and Slot R0 of the Cisco ASR 1013, Cisco ASR 1006-X, and Cisco ASR 1009-X routers.

Step 1 Attach an ESD-preventive wrist strap between you and an unfinished chassis surface.

Step 2 Remove the new RP from its static shielding bag.

Step 3 Using both hands, grasp the RP by its metal carrier and orient it so that its printed circuit board components are upward.

Figure 3-1   *Cisco ASR1000-RP3 With Metal Carrier and Handles*
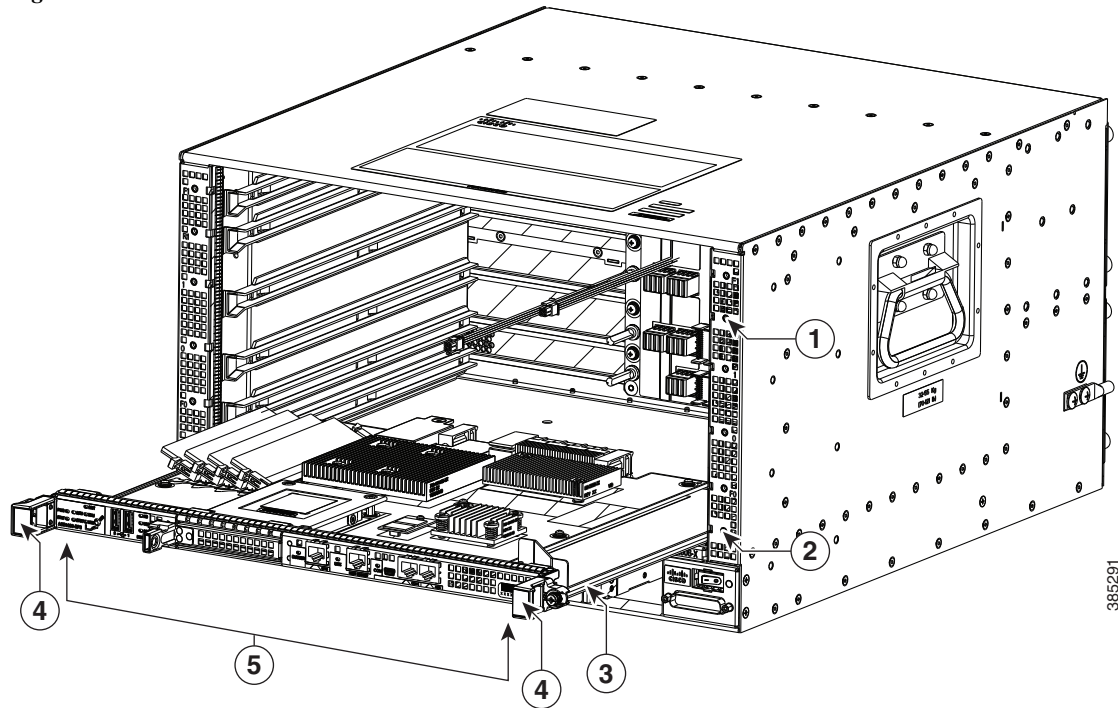
1	RP Slot R1	**2**	RP Slot R0
3	Metal Carrier	**4**	Handles
5	Cisco ASR1000-RP3		

⚠

Caution   Handle the RP by the metal carrier or handles only (see #3 and #4 in Figure 3-1); never touch the printed circuit board components or connector pins.

Step 4   Align the left and right edges of the RP printed circuit board between the RP slot guides.

Step 5   Gently slide the RP all the way into its chassis slot until you feel the connectors seat with the router midplane.

Step 6   Seat the RP in the router midplane by tightening its captive installation screws with a number 2 Phillips or a 3/16-inch flat-blade screwdriver as shown in Figure 3-2.

Figure 3-2   *Cisco ASR1000-RP3 Installed in the Chassis*
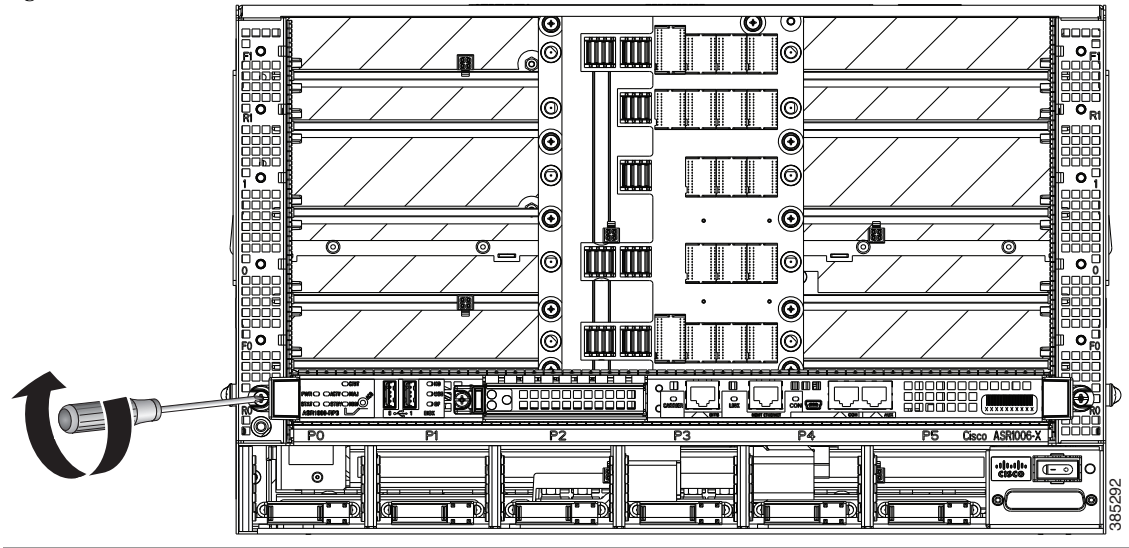
Removing the Cisco ASR1000-RP3 Module from the Router

> ✎
> **Note**   If you have two RPs in the router and you want to remove one, do not power down the router. Remove the RP and then insert a new one; high availability provides for the other RP to take on the processing tasks for the router.

Step 1   Slip on an ESD-preventive wrist strap and attach it to a chassis surface.

Step 2   If connected, remove any I/O cables from the RP.

Step 3   Using a number 2 Phillips or a 3/16-inch flat-blade screwdriver, loosen the two captive screws on the faceplate of the RP.

Step 4   Using the handles on both sides of the module, with both hands gently slide the module out of the chassis slot.

> ⚠
> **Caution**   Handle the RP by the carrier edges only; never touch the printed circuit board components or connector pins.

Figure 3-3   *Cisco ASR1000-RP3 Handles*
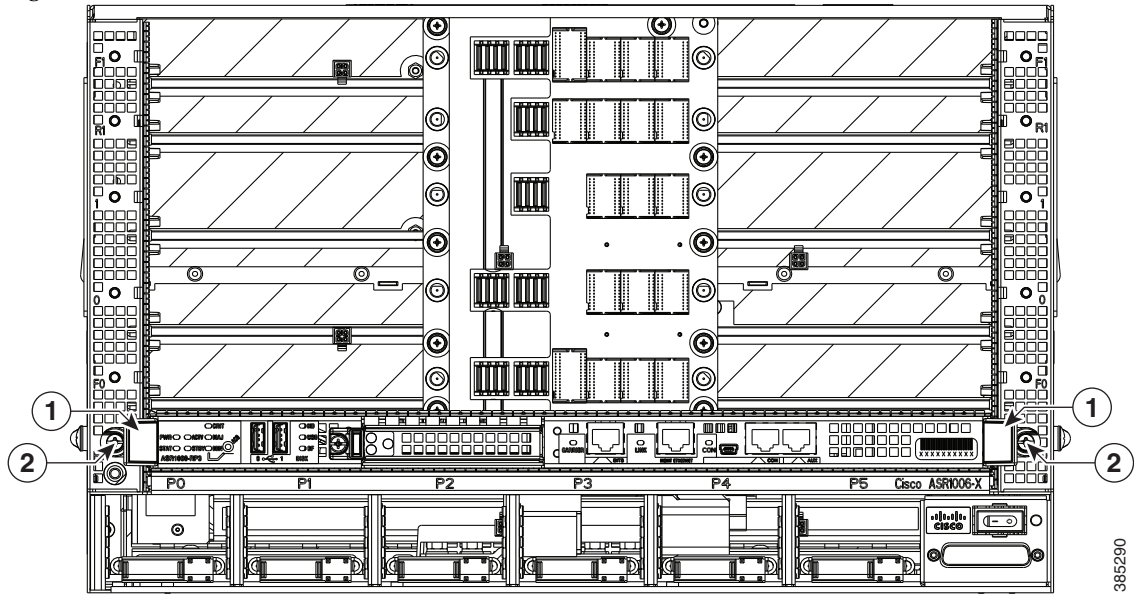
1	Handles	2	Screws

Step 5   Place the RP module on an antistatic surface with its printed circuit board components facing upward or in a static shielding bag.

Note   If you are returning the RP to the factory, immediately place it in a static shielding bag.

Software Licensing on Cisco ASR1000-RP3 Module

This chapter provides a high-level overview of the licensing options available for the Cisco ASR1000-RP3 module and information about verifying the Cisco IOS license level. The Cisco ASR1000-RP3 module supports built-in evaluation, Right To Use (RTU), and permanent licenses.

The Cisco ASR1000-RP3 module supports the following license options:

- Cisco ASR 1000 IP Base License
- Cisco ASR 1000 Advanced IP Services License (AIS)
- Cisco ASR 1000 Advanced Enterprise Services License (AES)

All the licenses supported on Cisco ASR1000-RP2 are also supported on Cisco ASR1000-RP3. The commands to install, activate and monitor the licenses are same as the ones used for other ASR 1000 platforms.

Viewing the Cisco IOS License Level

Use the **show version** command to determine the Cisco IOS license level in the router. For example:

```
Router# show version
.
.
.
License Level: adventerprise
License Type: RightToUse
Next reload license Level: adventerprise
.
.
.
```

Table 4-1   show version Command Output Description

Field Name	Description
License Level: adventerprise	Indicates the current Cisco IOS license code level.

Table 4-1   *show version Command Output Description*

Field Name	Description
License Type: RightToUse	Indicates whether you are utilizing a permanent (purchased) license, an evaluation 60-day license, or a Right-to-Use license that indicates that the purchase of a license is required.
Next reload license Level: adventerprise	Indicates the startup configuration definition that is to be used for the next reload instance.

Use the **show running-config** command or the **show startup-config** command to view the license-level information. The following example displays sample output from the **show running-config** command:

```
Router# show running-config
.
.
.
license boot level adventerprise
.
.
.
```

Table 4-2   *show running-config Command Output Description*

Field Name	Description
license boot level adventerprise	Indicates the current requested Cisco IOS license level to boot.

Viewing License Information

Use the **show license udi** command to determine the Universal Device Identifier (UDI) information of your chassis. This may be required at the time of purchasing a new license. The following example displays sample output from the **show license udi** command:

```
Router# show license udi

SlotID   PID                 SN                  UDI
-----------------------------------------------------------------------------
*        ASR1013             NWG143603HH     ASR1013:NWG143603HH
```

You can also determine the UDI information using the **show running-config** command, for example:

```
Router# show running-config
.
.
.
license udi pid ASR1013 sn NWG143603HH
.
.
.
```

Table 4-3   show running-config Command Output Description

Field Name	Description
license udi pid ASR1013 sn NWG143603HH	License identifier information (also displayed with the **show license udi** command).

Use the **show license all** command to display all the applicable licenses in both Primary License Storage and Built In License Storage.

Note   Primary License Storage stores the currently purchased and installed licenses.

The following example displays sample output from the **show license all** command:

```
Router# show license all
License Store: Primary License Storage
StoreIndex: 0   Feature: internal_service          Version: 1.0
        License Type: Evaluation
        License State: Active, Not in Use, EULA accepted
            Evaluation total period: 1  day  0  hour
            Evaluation period left: 0  minute  0  second
            Period used: 1  day  0  hour
        License Count: Non-Counted
        License Priority: Low
License Store: Built-In License Storage
StoreIndex: 0   Feature: adventerprise             Version: 1.0
        License Type: EvalRightToUse
        License State: Active, Not in Use, EULA not accepted
            Evaluation total period: 8  weeks 4  days
            Evaluation period left: 8  weeks 4  days
            Period used: 0  minute  0  second
        License Count: Non-Counted
        License Priority: None
StoreIndex: 1   Feature: advipservices             Version: 1.0
        License Type: EvalRightToUse
        License State: Active, Not in Use, EULA not accepted
            Evaluation total period: 8  weeks 4  days
            Evaluation period left: 8  weeks 4  days
            Period used: 0  minute  0  second
        License Count: Non-Counted
        License Priority: None
StoreIndex: 2   Feature: avc                        Version: 1.0
        License Type: EvalRightToUse
        License State: Active, Not in Use, EULA not accepted
            Evaluation total period: 8  weeks 4  days
            Evaluation period left: 8  weeks 4  days
            Period used: 0  minute  0  second
        License Count: Non-Counted
        License Priority: None
StoreIndex: 3   Feature: fwnat_red                  Version: 1.0
        License Type: EvalRightToUse
        License State: Active, Not in Use, EULA not accepted
            Evaluation total period: 8  weeks 4  days
            Evaluation period left: 8  weeks 4  days
            Period used: 0  minute  0  second
        License Count: Non-Counted
        License Priority: None
StoreIndex: 4   Feature: ipsec                      Version: 1.0
        License Type: EvalRightToUse
```

```
                         License State: Active, Not in Use, EULA not accepted
                             Evaluation total period: 8  weeks 4  days
                             Evaluation period left: 8  weeks 4  days
                             Period used: 0  minute  0  second
                         License Count: Non-Counted
                         License Priority: None
                StoreIndex: 5   Feature: lawful_intr                 Version: 1.0
                         License Type: EvalRightToUse
                         License State: Active, Not in Use, EULA not accepted
                             Evaluation total period: 8  weeks 4  days
                             Evaluation period left: 8  weeks 4  days
                             Period used: 0  minute  0  second
                         License Count: Non-Counted
                         License Priority: None
                StoreIndex: 6   Feature: lisp                        Version: 1.0
                         License Type: EvalRightToUse
                         License State: Active, Not in Use, EULA not accepted
                             Evaluation total period: 8  weeks 4  days
                             Evaluation period left: 8  weeks 4  days
                             Period used: 0  minute  0  second
                         License Count: Non-Counted
                         License Priority: None
                StoreIndex: 7   Feature: otv                         Version: 1.0
                         License Type: EvalRightToUse
                         License State: Active, Not in Use, EULA not accepted
                             Evaluation total period: 8  weeks 4  days
                             Evaluation period left: 8  weeks 4  days
                             Period used: 0  minute  0  second
                         License Count: Non-Counted
                         License Priority: None
                StoreIndex: 8   Feature: sw_redundancy               Version: 1.0
                         License Type: EvalRightToUse
                         License State: Active, Not in Use, EULA accepted
                             Evaluation total period: 8  weeks 4  days
                             Evaluation period left: 8  weeks 3  days
                             Period used: 15 hours 22 minutes
                         License Count: Non-Counted
                         License Priority: Low
                StoreIndex: 9 Feature: vpls                          Version: 1.0
                         License Type: EvalRightToUse
                         License State: Active, Not in Use, EULA not accepted
                             Evaluation total period: 8  weeks 4  days
                             Evaluation period left: 8  weeks 4  days
                             Period used: 0  minute  0  second
                         License Count: Non-Counted
                         License Priority: None
                StoreIndex: 10 Feature: FoundationSuiteK9            Version: 1.0
                         License Type: EvalRightToUse
                         License State: Active, Not in Use, EULA not accepted
                             Evaluation total period: 8  weeks 4  days
                             Evaluation period left: 8  weeks 4  days
                             Period used: 0  minute  0  second
                         License Count: Non-Counted
                         License Priority: None
                StoreIndex: 11 Feature: AdvUCSuiteK9                 Version: 1.0
                         License Type: EvalRightToUse
                         License State: Active, Not in Use, EULA not accepted
                             Evaluation total period: 8  weeks 4  days
                             Evaluation period left: 8  weeks 4  days
                             Period used: 0  minute  0  second
                         License Count: Non-Counted
                         License Priority: None
```

Evaluation License Features

The following are the features of the Evaluation license:

- A EULA will be presented, and must be accepted, the first time you enable any feature license.

- Port licensing is not supported on RP3.

- When the 60-Day Evaluation Period expires, the license automatically changes to an RTU license. As with all other RTU licenses, there is no functionality disruption or accessibility concerns following this transition.

- As with past license implementations, the Permanent license has higher precedence than the built-in EvalRTU license.

Configuring the Cisco ASR1000-RP3 Module

This chapter guides you through basic router configuration, which is sufficient for you to access the network. Describing complex configuration procedures are beyond the scope of this publication and can be found in the modular configuration and modular command reference publications. These are available in the Cisco IOS software configuration documentation set that corresponds to the software release installed on your Cisco hardware.

This chapter contains the following sections:

Checking Conditions Prior to System Startup

Ensure that all card slots and compartments are closed. Install blank faceplates on empty slots. Always have power supply slots filled. If you leave a power supply slot uncovered, then you risk exposure to hazardous voltages on the power pins on the midplane.

Warning **Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.** Statement 1029

Note To view the boot sequence, you must have a console connection to the Cisco ASR 1000 Series Router before it powers up.

Ensure that the following conditions are addressed before starting up the router:

- The network interface cable or the optional Fast Ethernet Management port cable is connected.
- The chassis is securely mounted and grounded.
- The power and interface cables are connected.
- Your PC with terminal emulation program (hyperTerminal or equivalent) is connected to the console port, powered up, and is configured for 9600 baud, 8 data bits, 1 stop bit, no parity, with flow control set to none.
- You have selected passwords for access control.
- Captive installation screws are tight on all removable components.
- The console terminal is turned on.
- You have determined the IP addresses for the network interfaces.
- The shared port adapter and the NIM is inserted in its slot, if applicable.
- Empty card slots are filled with card blanks. This ensures proper air flow through the chassis and electromagnetic compatibility (EMC).

Powering Up the Cisco ASR 1000 Modular Platforms

Prerequisites

Before you power on, make sure that:

- The power supply cord is plugged into the power supply inlet.
- All cables are connected.
- Your computer is powered up and connected.

You are now ready to power on the system for the first time. Follow these steps.

Step 1 Move the power switch to the ON position. Listen for the fans; you should immediately hear them in operation. Ensure that the power supply LED OK is green and the FAIL LED is not illuminated.

The front-panel indicator LEDs provide power, activity, and status information useful during bootup. For more detailed information about the LEDs, see "LEDs" section on page 1-5.

Step 2 Observe the initialization process. When the system boot is complete (the process takes a few seconds), the Cisco ASR 1000 Modular Platforms (Cisco ASR 1013, Cisco ASR 1006-X, and Cisco ASR 1009-X routers) begins to initialize.

The following is an example of what is displayed during the system boot process:

Example 5-1   Loading from ROMMON with a System Image in Bootflash

```
Initializing Hardware ...

System integrity status: 9B710000 12030000 A0A00A05


System Bootstrap, Version 16.3(2r), RELEASE SOFTWARE (fc1)
Copyright (c) 1994-2016 by cisco Systems, Inc.

Current image running: Boot ROM1
Last reset cause: LocalSoft
```

```
ASR1000-RP3 platform with 67108864 Kbytes of main memory

Warning: filesystem is not clean
File size is 0x2fa10c3c
Located asr1000rpx86-universalk9.BLD_V163_MR_THROTTLE_LATEST_20160817_000512.SSA.bin
Image size 799083580 inode num 15, bks cnt 195089 blk size 8*512
#####################################################################################
#####################################################################################
#####################################################################################
#####################################################################################
#########################
```

Performing the Initial Configuration on the Router

You can perform initial configuration on the router using the procedure described in the following sections:

- "Using the Cisco setup Command Facility" section on page 5-3
- "Using the Cisco IOS-XE CLI—Manual Configuration" section on page 5-6

Using the Cisco setup Command Facility

The **setup** command facility prompts you to enter the information that is needed to configure a router quickly. The facility takes you through an initial configuration, including LAN and WAN interfaces.

✎
Note   The **setup** command facility is entered automatically if there is no configuration on the router when it is booted into Cisco IOS-XE.

For information on modifying the configuration after you create it, see the *Cisco IOS XE Configuration Guide* and the *Cisco IOS XE Command References*.

This section explains how to configure a host name for the router, set passwords, and configure an interface to communicate with the management network.

✎
Note   If you make a mistake while using the **setup** command facility, you can exit and run the **setup** command facility again. Press **Ctrl-C**, and enter the **setup** command in privileged EXEC mode (`Router#`).

Step 1   From the Cisco IOS-XE CLI, enter the **setup** command in privileged EXEC mode:

```
Router> enable
Password: <password>
Router# setup

        --- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]:
```

The prompts in the **setup** command facility vary depending on your router model, on the installed interface modules, and on the software image. The following steps and the user entries (in bold) are shown as examples only.

Step 2   To proceed using the **setup** command facility, enter **yes**.

```
Continue with configuration dialog? [yes/no]:
```

```
At any point you may enter a question mark '?' for help.

Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.
```

Step 3   Enter **yes** to proceed with the basic management setup that configures only enough connectivity.

```
Would you like to enter basic management setup? [yes/no]: yes
```

Step 4   Enter a hostname for the router ("myrouter" in this example):

```
Configuring global parameters:
Enter host name [Router]: myrouter
```

Step 5   Enter an enable secret password. This password is encrypted (for more security) and cannot be seen when viewing the configuration.

```
The enable secret is a password used to protect access to
privileged EXEC and configuration modes. This password, after
entered, becomes encrypted in the configuration.
Enter enable secret: cisco
```

Step 6   Enter an enable password that is different from the enable secret password. This password is *not* encrypted (and is less secure) and can be seen when viewing the configuration.

```
The enable password is used when you do not specify an
enable secret password, with some older software versions, and
some boot images.
Enter enable password: cisco123
```

Step 7   Enter the virtual terminal password, which prevents unauthenticated access to the router through ports other than the console port:

```
The virtual terminal password is used to protect
access to the router over a network interface.
Enter virtual terminal password: cisco
```

Step 8   Respond to the following prompts as appropriate for your network:

```
Configure SNMP Network Management? [no]: yes
    Community string [public]:
```

A summary of the available interfaces is displayed. The interface summary includes interface numbering, which is dependent on the router model and the installed modules and interface cards.

```
Current interface summary

Interface            IP-Address      OK? Method Status               Protocol
Te0/0/0              20.1.1.1        YES NVRAM  administratively down down
Te0/0/1              21.1.1.1        YES NVRAM  administratively down down
GigabitEthernet0/0/0 11.1.1.1        YES NVRAM  down                 down
GigabitEthernet0/0/1 12.1.1.1        YES NVRAM  administratively down down
GigabitEthernet0/0/2 13.1.1.1        YES NVRAM  administratively down down
GigabitEthernet0/0/3 14.1.1.1        YES NVRAM  administratively down down
GigabitEthernet0/0/4 15.1.1.1        YES NVRAM  administratively down down
GigabitEthernet0/0/5 200.1.1.1       YES NVRAM  administratively down down
Te0/1/0              22.1.1.1        YES NVRAM  administratively down down
GigabitEthernet0     2.1.12.233      YES NVRAM  up                   up

Any interface listed with OK? value "NO" does not have a valid configuration
```

Step 9   Respond to the following prompts as appropriate for your network:

```
Configuring interface GigabitEthernet0/0/1:
```

```
Configure IP on this interface? [yes]: yes
  IP address for this interface [10.10.10.12]:
  Subnet mask for this interface [255.0.0.0] : 255.255.255.0
  Class A network is 10.0.0.0, 24 subnet bits; mask is /24
```

The following configuration command script is created:

```
hostname myrouter
enable secret 5 $1$t/Dj$yAeGKviLLZNOBX0b9eifO0
enable password cisco123
line vty 0 4 password cisco snmp-server community public !
no ip routing

!
interface GigabitEthernet0/0/0
shutdown
no ip address
!
interface GigabitEthernet0/0/1
no shutdown
ip address 10.10.10.12 255.255.255.0
!
interface GigabitEthernet0/0/2
shutdown
no ip address
!
.
.
.
end
```

Step 10 Respond to the following prompts. Select [2] to save the initial configuration.

```
[0] Go to the IOS command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration to nvram and exit.

Enter your selection [2]: 2
Building configuration...
Use the enabled mode 'configure' command to modify this configuration.

Press RETURN to get started! RETURN
```

The following user prompt is displayed:

```
myrouter>
```

Completing the Configuration

When using the Cisco **setup** command facility, and after you have provided all the information requested by the facility as described in , the final configuration appears. To complete your router configuration, follow these steps:

Step 1 The facility prompts you to save the configuration.

- If you answer no, the configuration information you entered is *not* saved, and you return to the router enable prompt (Router#). Enter **setup** to return to the System Configuration dialog box.

- If you answer yes, the configuration is saved, and you are returned to the user EXEC prompt (Router>).

```
Use this configuration? {yes/no} : yes
```

```
Building configuration...
Use the enabled mode 'configure' command to modify this configuration.



%LINK-3-UPDOWN: Interface GigabitEthernet0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1/0, changed state to up

<Additional messages omitted.>
```

Step 2   When messages stop appearing on your screen, press **Return** to get the Router> prompt.

Step 3   The Router> prompt indicates that you are now at the command-line interface (CLI) and you have just completed an initial router configuration. Note that this is not a complete configuration. At this point, you have two choices:

- Run the **setup** command facility again, and create another configuration:

  ```
  Router> enable
  Password: password
  Router# setup
  ```

- Modify the existing configuration or configure additional features by using the CLI:

  ```
  Router> enable
  Password: password
  Router# configure terminal
  Router(config)#
  ```

Using the Cisco IOS-XE CLI—Manual Configuration

This section shows you how to access the CLI to perform the initial configuration on the router.

If the system configuration message does not appear, it means a default configuration file was installed on the router prior to shipping. Follow these steps to configure the router.

Step 1   Enter **no** when the following system message appears on the router:

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

Would you like to enter the initial configuration dialog? [yes/no]: no
```

Step 2   Press **Return** and continue with the manual configuration:

Several log messages are displayed.

Step 3   Press **Return** to bring up the Router> prompt.

Step 4   Type **enable** to enter privileged EXEC mode:

```
Router> enable
Router#
```

Configuring the Router Hostname

The hostname is used in CLI prompts and default configuration filenames. If you do not configure the router hostname, the router uses the factory-assigned default hostname Router.

SUMMARY STEPS

1. **enable**

2. **configure terminal**

3. **hostname** *name*

4. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** Router> enable	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** Router# configure terminal	Enters global configuration mode.
Step 3	**hostname** *name* **Example:** Router(config)# hostname myrouter	Specifies or modifies the hostname for the network server.
Step 4	**end** **Example:** myrouter# end	(Optional) Returns to privileged EXEC mode.

Configuring the Enable and Enable Secret Passwords

To provide an additional layer of security, particularly for passwords that cross the network or are stored on a TFTP server, you can use either the **enable password** command or **enable secret** command. Both commands accomplish the same thing—they allow you to establish an encrypted password that users must enter to access privileged EXEC (enable) mode.

We recommend that you use the **enable secret** command because it uses an improved encryption algorithm.

For more information, see the "Configuring Passwords and Privileges" chapter in the *Cisco IOS Security Configuration Guide*. Also see the *Cisco IOS Password Encryption Facts* tech note and the *Improving Security on Cisco Routers* tech note.

Restrictions

If you configure the **enable secret** command, it takes precedence over the **enable password** command; the two commands cannot be in effect simultaneously.

SUMMARY STEPS

1. **enable**

2. **configure terminal**

3. **enable secret** *password*

4. **end**

5. **enable**

6. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** Router# configure terminal	Enters global configuration mode.
Step 3	**enable secret** *password* **Example:** Router(config)# enable secret *greentree*	Specifies an additional layer of security over the **enable password** command.
Step 4	**end** **Example:** Router(config)# end	Returns to privileged EXEC mode.
Step 5	**enable** **Example:** Router> enable	Enables privileged EXEC mode. Verify that your new enable or enable secret password works.
Step 6	**end** **Example:** Router(config)# end	(Optional) Returns to privileged EXEC mode.

Configuring the Console Idle Privileged EXEC Timeout

This section describes how to configure the console line's idle privileged EXEC timeout. By default, the privileged EXEC command interpreter waits 10 minutes to detect user input before timing out.

When you configure the console line, you can also set communication parameters, specify autobaud connections, and configure terminal operating parameters for the terminal that you are using. For more information on configuring the console line, see the *Cisco IOS Configuration Fundamentals and Network Management Configuration Guide*. In particular, see the "Configuring Operating Characteristics for Terminals" and "Troubleshooting and Fault Management" chapters.

SUMMARY STEPS

1. **enable**

2. **configure terminal**

3. **line console 0**

4. **exec-timeout** *minutes* [*seconds*]

5. **end**

6. **show running-config**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**line console 0** **Example:** `Router(config)# line console 0`	Configures the console line and starts the line configuration command collection mode.
Step 4	**exec-timeout** *minutes* [*seconds*] **Example:** `Router(config-line)# exec-timeout 0 0`	Sets the idle privileged EXEC timeout, which is the interval that the privileged EXEC command interpreter waits until user input is detected. The example shows how to specify no timeout. Setting the exec-timeout value to 0 will cause the router to never log out after it is logged in. This could have security implications if you leave the console without manually logging out using the **disable** command.

	Command or Action	Purpose

Step 5	`end`
	
	Example:
	`Router(config)# end`
		Returns to privileged EXEC mode.

Step 6	`show running-config`
	
	Example:
	`Router# show running-config`
		Displays the running configuration file.
		
		Verify that you have configured the idle privileged EXEC timeout correctly.

Examples

The following example shows how to set the console idle privileged EXEC timeout to 2 minutes 30 seconds:

```
line console
 exec-timeout 2 30
```

The following example shows how to set the console idle privileged EXEC timeout to 30 seconds:

```
line console
 exec-timeout 0 30
```

Gigabit Ethernet Management Interface Overview

The router provides an Ethernet management port named GigabitEthernet0.

The purpose of this interface is to allow users to perform management tasks on the router; it is an interface that should not, and often cannot, forward network traffic. It can, however, be used to access the router through Telnet and SSH to perform management tasks on the router. The interface is useful before a router has begun routing, or in troubleshooting scenarios when other forwarding interfaces are inactive.

The following aspects of the management Ethernet interface should be noted:

- The router has one management Ethernet interface named GigabitEthernet0.
- IPv4, IPv6, and ARP are the only routed protocols supported for the interface.
- The interface provides a way to access the router even if forwarding interfaces are not functional, or the Cisco IOS is down.
- The management Ethernet interface is part of its own VRF. See the *Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide* for more details.

Default Gigabit Ethernet Configuration

By default, a forwarding VRF is configured for the interface with a special group named Mgmt-intf. This cannot be changed. This isolates the traffic on the management interface away from the forwarding plane. Otherwise, the interface can be configured like other Gigabit Ethernet interfaces for most functions.

For example, the default configuration is as follows:

```
interface GigabitEthernet0
vrf forwarding Mgmt-intf
```

```
ip address 172.18.77.212 255.255.255.240
negotiation auto
```

Configuring Gigabit Ethernet Interfaces

This sections shows how to assign an IP address and interface description to an Ethernet interface on your router.

For comprehensive configuration information on Gigabit Ethernet interfaces, see the "Configuring LAN Interfaces" chapter of the *Cisco IOS Interface and Hardware Component Configuration Guide*.

For information on interface numbering, see the software configuration guide pertaining to your router.

SUMMARY STEPS

1. **enable**
2. **show ip interface brief**
3. **configure terminal**
4. **interface gigabitethernet 0**
5. **ip address** *ip-address mask*
6. **no shutdown**
7. **end**
8. **show ip interface brief**

DETAILED STEPS

	Command or Action	Purpose

Step 1	`enable`
	
	Example:
	`Router> enable`
		Enables privileged EXEC mode.
		
		Enter your password if prompted.

Step 2	`show ip interface brief`
	
	Example:
	`Router# show ip interface brief`
		Displays a brief status of the interfaces that are configured for IP and the type of Ethernet interface that is on your router.

Step 3	`configure terminal`
	
	Example:
	`Router# configure terminal`
		Enters global configuration mode.

Step 4	`interface gigabitethernet 0`
	
	Example:
	`Router(config)# interface gigabitethernet 0`
		Specifies the Ethernet interface and enters interface configuration mode.

	Command or Action	Purpose
Step 5	**ip address** *ip-address mask* **Example:** Router(config-if)# ip address 172.16.74.3 255.255.255.0	Sets a primary IP address for an interface.
Step 6	**no shutdown** **Example:** Router(config-if)# no shutdown	Enables an interface.
Step 7	**end** **Example:** Router(config)# end	Returns to privileged EXEC mode.
Step 8	**show ip interface brief** **Example:** Router# show ip interface brief	Displays a brief status of the interfaces that are configured for IP. Verify that the interfaces are up and configured correctly.

> **Note**   For comprehensive configuration information about IP routing and IP routing protocols, see the *Configuring IP Routing Protocol-Independent Feature* on Cisco.com.

Saving Your Router Configuration

This section describes how to avoid losing your configuration at the next system reload or power cycle by saving the running configuration to the startup configuration in NVRAM. The NVRAM provides 32 MB of storage on the router.

SUMMARY STEPS

1. **enable**

2. **copy running-config startup-config**

DETAILED STEPS

	Command or Action	Purpose

Step 1	`enable`
	
	Example:
	`Router> enable`
		Enables privileged EXEC mode.
		
		Enter your password if prompted.

Step 2	`copy running-config startup-config`
	
	Example:
	`Router# copy running-config startup-config`
		Saves the running configuration to the startup configuration.

> ✎
> **Note**   To aid file recovery and minimize downtime in case of file corruption, we recommend that you save backup copies of the startup configuration file and the Cisco IOS-XE software system image file on a server.

> ✎
> **Note**   To avoid losing work you have completed, be sure to save your configuration occasionally as you proceed. Use the **copy running-config startup-config** command to save the configuration to NVRAM.

Verifying the Initial Configuration

Enter the following commands in Cisco IOS-XE to verify the initial configuration on the router:

- **show version**—Displays the system hardware version, the installed software version, the names and sources of configuration files, the boot images, and the amount of installed DRAM, NVRAM, and flash memory.
- **show diag**—Lists and displays diagnostic information about the installed controllers, interface processors, and port adapters.
- **show configuration**—Helps verify if you have configured the correct hostname and password.

After you have completed and verified the initial configuration, the specific features and functions are ready to be configured. See the *Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide*.

Powering Off the Cisco ASR 1000 Modular Platforms

This section explains how to shut down the Cisco ASR 1000 Modular Platforms (Cisco ASR 1013, Cisco ASR 1006-X, and Cisco ASR 1009-X routers). We recommend that before turning off all power to the chassis, you issue the **reload** command. This ensures that the operating system cleans up all the file systems.

To remove power from the Cisco ASR 1000 Modular Platforms safely, follow this procedure:

Step 1   Slip on the ESD-preventive wrist strap included in the accessory kit.

Step 2   Enter the **reload** command.

Step 3   Confirm the **reload** command:

```
Router# reload

Proceed with reload? [confirm]
Apr 21 03:42:45.619 EDT: %SYS-5-RELOAD: Reload requested by console. Reload Reason: Reload
Command.Apr 21 03:42:59.920 R0/0: %PMAN-5-EXITACTION: Process manager is exiting: process
exit with reload chassis code
```

Step 4   After confirming the **reload** command, wait until the system bootstrap message is displayed before powering off the system:

```
System Bootstrap, Version 16.3(2r), RELEASE SOFTWARE (fc1)
Copyright (c) 1994-2016 by cisco Systems, Inc.

Current image running: Boot ROM1
Last reset cause: LocalSoft

ASR1000-RP3 platform with 67108864 Kbytes of main memory
```

Step 5   Place the Standby switch in the Standby position.

✎
Note   The fans in the power supply modules continue to run even if the Standby switch is in the Standby position.

✎
Note   After powering off the router, wait for a minimum of 30 seconds before powering it on again.

Cisco ASR1000-RP3 Alarm Monitoring

The Cisco ASR1000-RP3 faceplate displays the CRIT, MAJ, and MIN alarm indicator LEDs. An external element can be connected to a power supply using the DB-25 alarm connector on the power supply. The external element is a DC light bulb for a visual alarm and a bell for an audible alarm.

If an alarm illuminates the CRIT, MIN, or MAJ LED on the Cisco ASR 1000 Series Route Processor (RP) faceplate, and a visual or audible alarm is wired, the alarm also activates an alarm relay in the power supply DB-25 connector (on the Cisco ASR 1006 Router and Cisco ASR 1004 Router). The bell rings or the light bulb flashes and alerts site personnel that a router alarm condition exists.

✎
Note   Shielded cables must be used to connect to the DB-25 alarm connector on both the AC and DC power supplies, in order to comply with the FCC/EN55022/CISPR22 Class A emissions requirements.

The alarm signals sent to this DB-25 connector are identical in function to those sent to the system LEDs on the Cisco ASR1000-RP1, Cisco ASR1000-RP2, and Cisco ASR1000-RP3. Each alarm consists of three contact pins that are switched when an alarm becomes active, which causes a corresponding contact closure between the DB-25 connector pins. As a result, a critical, major, or minor alarm condition detected in the router can trigger a simultaneous fault indication in some of the following ways:

- System alarm LEDs—The three system alarm LEDs on the Cisco ASR1000-RP3 faceplate constitute the standard method of alarm notification in the router. These LEDs indicate router status at all times, but you must directly observe these LEDs to become aware of a router alarm condition See Cisco ASR 1000 Series Route Processor LEDs for LED descriptions.

- External alarm monitoring facility—By equipping your router with a telco-style external alarm monitoring facility, you can provide a more physical indication of router status. A visual alarm, however, can be reset only by resolving the problem that caused the alarm condition.

An external audible alarm can be reset by clearing the condition that caused the alarm or by pressing the Audible Cutoff (ACO) button on the Cisco ASR1000-RP3 module. An audible alarm can be sounded to immediately alert you to an alarm condition in the router. An audible alarm generated by the system continues to sound until you either press the ACO button to silence the alarm or clear the alarm condition itself. Pressing this button does not resolve the alarm condition.

- To clear an audible alarm, do one of the following:

  – Press the Audible Cut Off button on the route processor faceplate (see Figure 2-1: Cisco ASR1000-RP Route Processor Faceplate LEDs and Connectors)

  – Enter the clear facility-alarm command.

- To clear a visual alarm, you must resolve the alarm condition. The clear facility-alarm command does not clear an alarm LED on the RP faceplate or turn off the DC light bulb. For example, if a critical alarm LED is illuminated because an active SPA was removed without a graceful deactivation of the SPA, the only way to resolve that alarm is to replace the SPA.

Reporting Functions

The chassis manager on the forwarding engine control processor manages the local resources of the forwarding processor. The Cisco ASR 1000 Modular Platforms (Cisco ASR 1013, Cisco ASR 1006-X, and Cisco ASR 1009-X routers) display warning messages on the console if the chassis interface-monitored parameters exceed a threshold. You can also retrieve and display environmental status reports with the following commands:

- **show environment all**

- **show version**

- **show inventory**

- **show platform**

- **show platform software status control-processor**

- **show diag**

Parameters are measured and reporting functions are updated every 60 seconds. A brief description of each of these commands follows.

The **show environment all** command displays temperature, voltage, fan, and power supply information.

The following is sample output from the **show environment all** command.

Example 5-2   show environment all Command

```
Router# show environment all
Sensor List:  Environmental Monitoring
Sensor          Location        State           Reading
V1: VMA         F0              Normal          1796 mV
V1: VMB         F0              Normal          1201 mV
```

```
V1: VMC          F0              Normal          996 mV
V1: VMD          F0              Normal          1049 mV
V1: VME          F0              Normal          1049 mV
V1: VMF          F0              Normal          1098 mV
V1: 12v          F0              Normal          11879 mV
V1: VDD          F0              Normal          3286 mV
V1: GP1          F0              Normal          900 mV
V1: GP2          F0              Normal          766 mV
V2: VMA          F0              Normal          3291 mV
V2: VMB          F0              Normal          2495 mV
V2: VMC          F0              Normal          1499 mV
V2: VMD          F0              Normal          1196 mV
V2: VME          F0              Normal          1098 mV
V2: VMF          F0              Normal          996 mV
V2: 12v          F0              Normal          11835 mV
V2: VDD          F0              Normal          3291 mV
V2: GP1          F0              Normal          766 mV
V2: GP2          F0              Normal          1098 mV
Temp: Inlet      F0              Normal          23 Celsius
Temp: Pop Die    F0              Normal          40 Celsius
Temp: Left Ext   F0              Normal          33 Celsius
Temp: HKP Die    F0              Normal          44 Celsius
Temp: CPP Rear   F0              Normal          39 Celsius
Temp: Olv Die    F0              Normal          32 Celsius
Temp: Rght Ext   F0              Normal          32 Celsius
Temp: MCH Die    F0              Normal          47 Celsius
V3: VMA          F0              Normal          3291 mV
V3: VMB          F0              Normal          2490 mV
V3: VMC          F0              Normal          1499 mV
V3: VMD          F0              Normal          1000 mV
V3: 12v          F0              Normal          11865 mV
V3: VDD          F0              Normal          3291 mV
V1: VMA          F1              Normal          1796 mV
V1: VMB          F1              Normal          1196 mV
V1: VMC          F1              Normal          996 mV
V1: VMD          F1              Normal          1044 mV
V1: VME          F1              Normal          1035 mV
V1: VMF          F1              Normal          1098 mV
V1: 12v          F1              Normal          11879 mV
V1: VDD          F1              Normal          3271 mV
V1: GP1          F1              Normal          905 mV
V1: GP2          F1              Normal          766 mV
V2: VMA          F1              Normal          3295 mV
V2: VMB          F1              Normal          2495 mV
V2: VMC          F1              Normal          1499 mV
V2: VMD          F1              Normal          1201 mV
V2: VME          F1              Normal          1098 mV
V2: VMF          F1              Normal          996 mV
V2: 12v          F1              Normal          11835 mV
V2: VDD          F1              Normal          3276 mV
V2: GP1          F1              Normal          769 mV
V2: GP2          F1              Normal          1098 mV
Temp: Inlet      F1              Normal          24 Celsius
Temp: Pop Die    F1              Normal          44 Celsius
Temp: Left Ext   F1              Normal          31 Celsius
Temp: HKP Die    F1              Normal          49 Celsius
Temp: CPP Rear   F1              Normal          43 Celsius
Temp: Olv Die    F1              Normal          36 Celsius
Temp: Rght Ext   F1              Normal          32 Celsius
Temp: MCH Die    F1              Normal          50 Celsius
V3: VMA          F1              Normal          3291 mV
V3: VMB          F1              Normal          2495 mV
V3: VMC          F1              Normal          1499 mV
V3: VMD          F1              Normal          1000 mV
```

```
V3: 12v         F1              Normal          11865 mV
V3: VDD         F1              Normal          3286 mV
PEM Iout        P0              Normal          21 A
PEM Vout        P0              Normal          0 V DC
PEM Vin         P0              Normal          225 V AC
Temp: Temp1     P0              Normal          14 Celsius
Temp: Temp2     P0              Normal          26 Celsius
Temp: Temp3     P0              Normal          0 Celsius
PEM Iout        P1              Normal          22 A
PEM Vout        P1              Normal          0 V DC
PEM Vin         P1              Normal          225 V AC
Temp: Temp1     P1              Normal          14 Celsius
Temp: Temp2     P1              Normal          27 Celsius
Temp: Temp3     P1              Normal          0 Celsius
PEM Iout        P2              Normal          1 A
PEM Vout        P2              Normal          0 V DC
PEM Vin         P2              Normal          0 V AC
Temp: Temp1     P2              Normal          0 Celsius
Temp: Temp2     P2              Normal          16 Celsius
Temp: Temp3     P2              Normal          0 Celsius
PEM Iout        P3              Normal          1 A
PEM Vout        P3              Normal          0 V DC
PEM Vin         P3              Normal          0 V AC
Temp: Temp1     P3              Normal          0 Celsius
Temp: Temp2     P3              Normal          16 Celsius
Temp: Temp3     P3              Normal          0 Celsius
PEM Iout        P4              Normal          1 A
PEM Vout        P4              Normal          0 V DC
PEM Vin         P4              Normal          0 V AC
Temp: Temp1     P4              Normal          0 Celsius
Temp: Temp2     P4              Normal          16 Celsius
Temp: Temp3     P4              Normal          0 Celsius
PEM Iout        P5              Normal          1 A
PEM Vout        P5              Normal          0 V DC
PEM Vin         P5              Normal          0 V AC
Temp: Temp1     P5              Normal          0 Celsius
Temp: Temp2     P5              Normal          16 Celsius
Temp: Temp3     P5              Normal          0 Celsius
Temp1           P6              Normal          26 Celsius
Temp: FC PWM1   P6              Fan Speed 45%   24 Celsius
Temp1           P7              Normal          22 Celsius
Temp: FC PWM1   P7              Fan Speed 45%   24 Celsius
VVM 0: VX1      R0              Normal          607 mV
VVM 0: VX2      R0              Normal          1212 mV
VVM 0: VX3      R0              Normal          1207 mV
VVM 0: VX4      R0              Normal          994 mV
VVM 0: VP1      R0              Normal          3305 mV
VVM 0: VP2      R0              Normal          3312 mV
VVM 0: VP3      R0              Normal          5024 mV
VVM 0: VP4      R0              Normal          1506 mV
VVM 0: VH       R0              Normal          12003 mV
VVM 1: VX3      R0              Normal          1050 mV
VVM 1: VP1      R0              Normal          1696 mV
VVM 1: VP2      R0              Normal          1815 mV
VVM 1: VP3      R0              Normal          2511 mV
VVM 1: VP4      R0              Normal          3285 mV
VVM 1: VH       R0              Normal          12013 mV
VVM 2: VX1      R0              Normal          992 mV
VVM 2: VP1      R0              Normal          1199 mV
VVM 2: VP2      R0              Normal          1809 mV
VVM 2: VH       R0              Normal          11998 mV
Temp: CPU-IN    R0              Normal          24 Celsius
Temp: Outlet    R0              Normal          28 Celsius
Temp: Center    R0              Normal          15 Celsius
```

```
Temp: Inlet      R0                Normal          27 Celsius
Temp: DDR4 In    R0                Normal          24 Celsius
Temp: DDR4 Out   R0                Normal          20 Celsius
V1: VMA          0                 Normal          1103 mV
V1: VMB          0                 Normal          1196 mV
V1: VMC          0                 Normal          1499 mV
V1: VMD          0                 Normal          1801 mV
V1: VME          0                 Normal          2490 mV
V1: VMF          0                 Normal          3291 mV
V1: 12v          0                 Normal          11938 mV
V1: VDD          0                 Normal          3281 mV
V1: GP1          0                 Normal          749 mV
V1: GP2          0                 Normal          903 mV
V2: VMB          0                 Normal          1000 mV
V2: VME          0                 Normal          751 mV
V2: VMF          0                 Normal          751 mV
V2: 12v          0                 Normal          11923 mV
V2: VDD          0                 Normal          3286 mV
V2: GP2          0                 Normal          749 mV
Temp: Left       0                 Normal          23 Celsius
Temp: Center     0                 Normal          23 Celsius
Temp: Asic1      0                 Normal          31 Celsius
Temp: Right      0                 Normal          20 Celsius
```

The **show version** command displays the system hardware configuration, software version, and names and sources of configuration files and boot images.

The following is sample output from the **show version** command:

Example 5-3   show version Command

```
Router# show version

Cisco IOS XE Software, Version BLD_V163_MR_THROTTLE_LATEST_20160817_000512
Cisco IOS Software [Denali], ASR1000 Software (X86_64_LINUX_IOSD-UNIVERSALK9-M),
Experimental Version 16.3.20160817:001450
[v163_mr_throttle-BLD-BLD_V163_MR_THROTTLE_LATEST_20160817_000512 122]
Copyright (c) 1986-2016 by Cisco Systems, Inc.
Compiled Tue 16-Aug-16 18:16 by mcpre


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GPL code under the terms of GPL Version 2.0. For more details, see the
documentation or "License Notice" file accompanying the IOS-XE software,
or the applicable URL provided on the flyer accompanying the IOS-XE
software.


ROM: IOS-XE ROMMON

RP3 uptime is 9 minutes
Uptime for this control processor is 11 minutes
System returned to ROM by reload
System image file is
"bootflash:asr1000rpx86-universalk9.BLD_V163_MR_THROTTLE_LATEST_20160817_000512.SSA.bin"
Last reload reason: Reload Command
```

```
This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.

License Type: Default. No valid license found.
License Level: ipbase
Next reload license Level: ipbase

Cisco ASR1006-X (RP3) processor (revision RP3) with 14994684K/24590K bytes of memory.
Processor board ID FXS1829Q0LR
5 Gigabit Ethernet interfaces
3 Ten Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
67108864K bytes of physical memory.
7600127K bytes of eUSB flash at bootflash:.
97620247K bytes of SATA hard disk at harddisk:.
0K bytes of  at webui:.

Configuration register is 0x2102
```

The **show inventory** command displays an extended report that includes the product inventory listing of all the Cisco products installed in the networking device.

The following is sample output from the **show inventory** command:

Example 5-4   show inventory Command

```
Router# show inventory
NAME: "Chassis", DESCR: "Cisco ASR1006-X Chassis"
PID: ASR1006-X         , VID: V00  , SN: FXS1829Q0LR

NAME: "module 0", DESCR: "Cisco ASR1000 SPA Interface Processor 40"
PID: ASR1000-SIP40     , VID: V01  , SN: JAE160804PL

NAME: "SPA subslot 0/0", DESCR: "1-port 10 Gigabit Ethernet Shared Port Adapter XFP based"
PID: SPA-1X10GE-L-V2   , VID: V02  , SN: JAE145207F5

NAME: "SPA subslot 0/1", DESCR: "1-port 10 Gigabit Ethernet Shared Port Adapter XFP based"
PID: SPA-1X10GE-L-V2   , VID: V02  , SN: JAE1431137E

NAME: "SPA subslot 0/2", DESCR: "5-port Gigabit Ethernet Shared Port Adapter"
PID: SPA-5X1GE-V2      , VID: V02  , SN: JAE1326D4V5

NAME: "subslot 0/2 transceiver 0", DESCR: "GE T"
PID: SP7041-E          , VID: E    , SN: MTC161204FS

NAME: "SPA subslot 0/3", DESCR: "1-port 10 Gigabit Ethernet Shared Port Adapter XFP based"
PID: SPA-1X10GE-L-V2   , VID: V02  , SN: JAE13062NZM

NAME: "module R0", DESCR: "Cisco ASR1000 Route Processor 3"
```

```
PID: ASR1000-RP3        , VID: V00  , SN: JAE201902DX

NAME: "module F0", DESCR: "Cisco ASR1000 Embedded Services Processor, 40Gbps"
PID: ASR1000-ESP40     , VID: V01  , SN: JAE144909W4

NAME: "module F1", DESCR: "Cisco ASR1000 Embedded Services Processor, 40Gbps"
PID: ASR1000-ESP40     , VID: V01  , SN: JAE15270531

NAME: "Power Supply Module 0", DESCR: "Cisco 750 Watt AC power supply"
PID: ASR1000X-AC-750W  , VID: V00  , SN: ART181112ES

NAME: "Power Supply Module 1", DESCR: "Cisco 750 Watt AC power supply"
PID: ASR1000X-AC-750W  , VID: V00  , SN: ART181112DB

NAME: "Power Supply Module 2", DESCR: "Cisco 750 Watt AC power supply"
PID: ASR1000X-AC-750W  , VID: V00  , SN: ART181410EM

NAME: "Power Supply Module 3", DESCR: "Cisco 750 Watt AC power supply"
PID: ASR1000X-AC-750W  , VID: V00  , SN: ART181112BM

NAME: "Power Supply Module 4", DESCR: "Cisco 750 Watt AC power supply"
PID: ASR1000X-AC-750W  , VID: V00  , SN: ART181112CD

NAME: "Power Supply Module 5", DESCR: "Cisco 750 Watt AC power supply"
PID: ASR1000X-AC-750W  , VID: V00  , SN: ART1814103R

NAME: "Fan Tray 0", DESCR: "Cisco ASR1000X FAN Module"
PID: ASR1000X-FAN      , VID: V00  , SN: FXS182600QY

NAME: "Fan Tray 1", DESCR: "Cisco ASR1000X FAN Module"
PID: ASR1000X-FAN      , VID: V00  , SN: FXS182600NN
```

The **show platform** command displays platform information.

The following is sample output from the **show platform** command:

Example 5-5   show platform Command

```
Router# show platform

Chassis type: ASR1006-X

Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
0         ASR1000-SIP40       ok                    00:10:54
0/0       SPA-1X10GE-L-V2     ok                    00:09:12
0/1       SPA-1X10GE-L-V2     ok                    00:09:07
0/2       SPA-5X1GE-V2        ok                    00:08:57
0/3       SPA-1X10GE-L-V2     ok                    00:08:53
R0        ASR1000-RP3         ok, active            00:10:54
F0        ASR1000-ESP40       ok, active            00:10:54
F1        ASR1000-ESP40       ok, standby           00:10:54
P0        ASR1000X-AC-750W    ok                    00:09:53
P1        ASR1000X-AC-750W    ok                    00:09:51
P2        ASR1000X-AC-750W    ps, fail              00:09:52
P3        ASR1000X-AC-750W    ps, fail              00:09:52
P4        ASR1000X-AC-750W    ps, fail              00:09:51
P5        ASR1000X-AC-750W    ps, fail              00:09:51
P6        ASR1000X-FAN        ok                    00:09:47
P7        ASR1000X-FAN        ok                    00:09:46

Slot     CPLD Version       Firmware Version
```

```
---------  ------------------  ------------------------------------
0          00200800            12.2(20151201:221942) [gschnorr-rele...
R0         16081518            16.3(2r)
F0         1003190E            16.3(2r)
F1         1003190E            16.3(2r)
```

The **show platform software status control-processor** command displays the average load, memory usage, and CPU utilization levels at which the router is running. The output also specifies whether the levels of these system health parameters are within defined thresholds.

Note   The output does not display SIP-related information on a monolithic router.

The following is sample output from the **show platform software status control-processor** command:

Example 5-6   show platform software status control-processor Command

```
Router# show platform software status control-processor

RP0: online, statistics updated 1 seconds ago
Load Average: healthy
  1-Min: 0.00, status: healthy, under 8.00
  5-Min: 0.03, status: healthy, under 8.00
  15-Min: 0.07, status: healthy, under 10.00
Memory (kb): healthy
  Total: 8092776
  Used: 3491556 (43%)
  Free: 4601220 (57%)
  Committed: 3566404 (44%), status: healthy, under 95%
Per-core Statistics
CPU0: CPU Utilization (percentage of time spent)
  User:  0.00, System:  0.00, Nice:  0.00, Idle:100.00
  IRQ:  0.00, SIRQ:  0.00, IOwait:  0.00
CPU1: CPU Utilization (percentage of time spent)
  User:  1.30, System:  0.40, Nice:  0.00, Idle: 98.30
  IRQ:  0.00, SIRQ:  0.00, IOwait:  0.00
CPU2: CPU Utilization (percentage of time spent)
  User:  0.49, System:  8.89, Nice:  0.00, Idle: 90.60
  IRQ:  0.00, SIRQ:  0.00, IOwait:  0.00
CPU3: CPU Utilization (percentage of time spent)
  User:  2.00, System:  0.40, Nice:  0.00, Idle: 97.60
  IRQ:  0.00, SIRQ:  0.00, IOwait:  0.00
CPU4: CPU Utilization (percentage of time spent)
  User:  0.00, System:  0.30, Nice:  0.00, Idle: 99.69
  IRQ:  0.00, SIRQ:  0.00, IOwait:  0.00
CPU5: CPU Utilization (percentage of time spent)
  User:  0.40, System:  0.10, Nice:  0.00, Idle: 99.50
  IRQ:  0.00, SIRQ:  0.00, IOwait:  0.00
CPU6: CPU Utilization (percentage of time spent)
  User:  0.40, System:  0.40, Nice:  0.00, Idle: 99.19
  IRQ:  0.00, SIRQ:  0.00, IOwait:  0.00
CPU7: CPU Utilization (percentage of time spent)
  User:  0.80, System:  1.30, Nice:  0.00, Idle: 97.90
  IRQ:  0.00, SIRQ:  0.00, IOwait:  0.00
```

The **show diag slot R0 eeprom** command displays the configuration hardware information.

The following is sample output from the **show diag slot R0 eeprom** command:

Example 5-7   show diag slot R0 eeprom Command

```
Router# show diag slot R0 eeprom
Slot R0 EEPROM data:

        Product Identifier (PID) : ASR1000-RP3
        Version Identifier (VID) : V00
        PCB Serial Number        : JAE201902DX
        Top Assy. Part Number    : 68-5621-04
        Hardware Revision        : 0.1
        CLEI Code                : UNASSIGNED
```

Upgrading the Cisco ASR1000-RP3 Module

Upgrading the Software

The In-Service Software Upgrades (ISSU) procedure for ASR1000-RP3 is same as that for ASR1000-RP2.

For detailed information on the software upgrade procedures, see Software Upgrade Process chapter of the Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide.

Migrating from ASR1000-RP2 to ASR1000-RP3

This section describes the basic steps required for migrating from ASR1000-RP2 to ASR1000-RP3 without reloading the entire chassis in the field.

Step 1   Upgrade the RP2 based system to Cisco IOS XE Denali 16.3.1 or later (Universal images).

```
Router# show platform
Chassis type: ASR1006-X

Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
R0        ASR1000-RP2         ok, standby           00:11:48
R1        ASR1000-RP2         ok, active            00:11:48
```

Step 2   Replace the RP2 which is in Standby mode with an RP3 card.

```
Router# show platform
Chassis type: ASR1006-X

Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
R0        ASR1000-RP3         ok, standby           00:45:48
R1        ASR1000-RP2         ok, active            00:45:48
```

Step 3   Switchover from an Active RP2 to Standby RP3.

```
Router# show platform
Chassis type: ASR1006-X

Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
R0        ASR1000-RP3         ok, active            01:00:48
R1        ASR1000-RP2         ok, standby           01:00:48
```

Step 4 Replace the RP2 which is in standby mode with an RP3.

```
Router# show platform
Chassis type: ASR1006-X

Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
R0        ASR1000-RP3         ok, active            01:30:48
R1        ASR1000-RP3         ok, standby           01:30:48
```

Note
- ASR1000-RP3 to ASR1000-RP2 downgrade is not supported.

- Even though the ASR1000-RP2 and ASR1000-RP3 can co-exist in the chassis, it is only supported to enable customers to migrate the system to RP3 without requiring a reload.

    – Follow the above upgrade process during a maintenance window and replace both RP2s with RP3.

    – We do not recommend that the system runs with both RP2 and RP3 cards for a long duration.

Upgrading Complex Programmable Logic Device (CPLD)

The CPLD version for Cisco ASR1000-RP3 is 16082219. For upgrading CPLD for ASR1000-RP3, please refer to the following document:
http://www.cisco.com/c/en/us/td/docs/routers/asr1000/cpld/hw_fp_upgrade.html.

Upgrading the ROMMON

This chapter provides information about ROMMON used in the Cisco ASR1000-RP3 module. It contains the following sections:

Available ROMMON Version on the Cisco ASR1000-RP3 Module

The Cisco ASR1000-RP3 module is shipped with the ROMMON release 16.3(2r).

Upgrading the ROMMON Version

Note The minimum ROMMON version 16.3(2r) is already installed on the Cisco ASR1000-RP3 module at the time of purchase.

To upgrade the ROMMON, see the *Cisco ASR 1000 Series Routers ROMmon Upgrade Guide* at: http://www.cisco.com/c/en/us/td/docs/routers/asr1000/rommon/rommon.html.

Verifying the ROMMON Version

To verify the ROMMON version installed on the Cisco ASR1000-RP3 module, use the **show platform** command.

```
Router# show platform
...
Slot      CPLD Version        Firmware Version
--------- ------------------- --------------------------------------
R0        16080112            16.3(2r)
```

C H A P T E R

8

Removing and Replacing FRUs from the Cisco ASR1000-RP3 Module

This chapter describes procedures for removing and replacing field-replaceable units (FRUs) from the Cisco ASR1000-RP3 module. It contains the following sections:

Removing and Replacing the Internal Hard Drive

This section explains how to remove a hard drive assembly from the Cisco ASR1000-RP3 module and replace it with a new internal hard drive.

✎
Note
- The Cisco ASR1000-RP3 module contains 100 GB SSD by default; 200 GB and 400 GB field-replaceable upgrade option.
- The Cisco ASR1000-RP3 module is supported on the Cisco ASR 1006-X, Cisco ASR 1009-X, and the Cisco ASR 1013.

Removing the Internal Hard Drive

⚠
Warning
During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself. Statement 94

Before you begin, read the following important notices:

- The reason you would remove the internal hard drive is that it is failing or failed; so any data recovery may be lost.
- The form-factor internal hard drive is accessible from the front panel of the Cisco ASR1000-RP3 module and supports the online insertion and removal feature (OIR) using the following CLI commands for the standby and active RP:

- **request platform hardware filesystem harddisk: offline**—Unmounts the hard disk on the active RP.
- **request platform hardware filesystem harddisk: online**—Mounts the hard disk on the active RP. If the disk is not provisioned properly, this command will provision the disk.
- **request platform hardware filesystem stby-harddisk: offline**—Unmounts the hard disk on the standby RP.
- **request platform hardware filesystem stby-harddisk: online**—Mounts the hard disk on the standby RP. If the disk is not provisioned properly, this command will provision the disk.

- If the drive is functioning, you can back it up to a drive plugged into a USB port using the **archive tar** command.

Step 1   Run the **request platform hardware filesystem harddisk: offline** command.

Step 2   Slip on an ESD-preventive wrist strap.

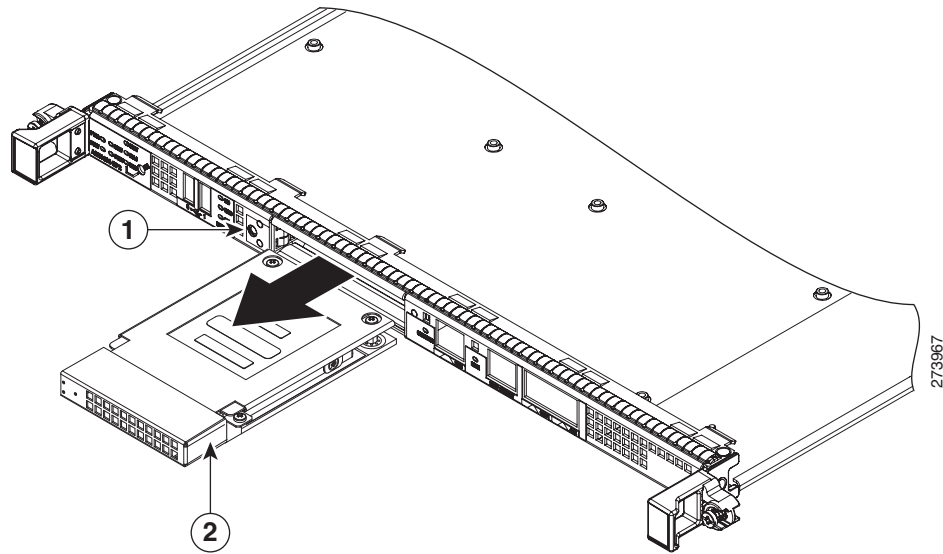**Step 3**   From the front panel of the RP module, unscrew the fastener screw.

Figure 8-1   Cisco ASR1000-RP3 Front Panel
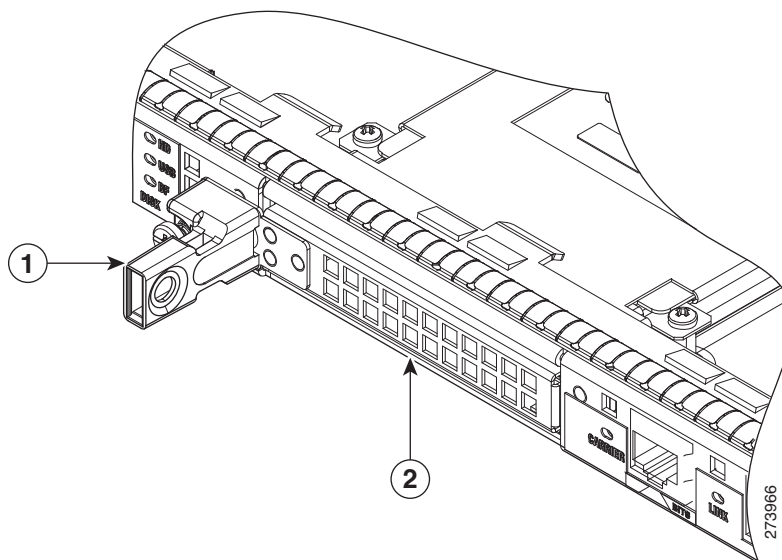
| 1 | Internal hard drive fastener screw | 2 | Internal hard drive |

Step 4   Pull out the internal hard drive.

Figure 8-2   *Cisco ASR1000-RP3 Internal Hard Drive*

1	Internal hard drive fastener screw location	2	Internal hard drive

Step 5   Place the component in an antistatic bag to return it.

Step 6   Wait until the following console message is displayed:

```
%IOSXE-0-PLATFORM: R0/0: udev: harddisk: has been removed
```

Replacing the Internal Hard Drive

Step 1   Carefully slide the internal hard drive unit into the Cisco ASR1000-RP3 faceplate slot. The component is keyed for easy insertion.

Step 2   Tighten the fastener screw on the front panel.

Step 3   Wait until the following console message is displayed:

```
%IOSXE-0-PLATFORM: R0/0: udev: harddisk: file system ready" appears.
```

If after several minutes the above message is not displayed, enter the following command:

request platform hardware filesystem harddisk: online

> **Note**   The only reason the system would not be able to automatically mount the new hard disk following a physical insertion is that the disk is not partitioned correctly.

Step 4   Verify that the disk is working by entering the following command:

dir harddisk

Removing and Replacing the DIMM Memory

The Cisco ASR1000-RP3 module comes with the DIMMs preinstalled. At the time of purchase, you choose the amount of memory you require. Use the procedures listed in this section if you choose to upgrade the memory.

Figure 8-3 shows the location of the DIMMs in a Cisco ASR1000-RP3 module.

Figure 8-3   Cisco ASR1000-RP3 DIMM Location
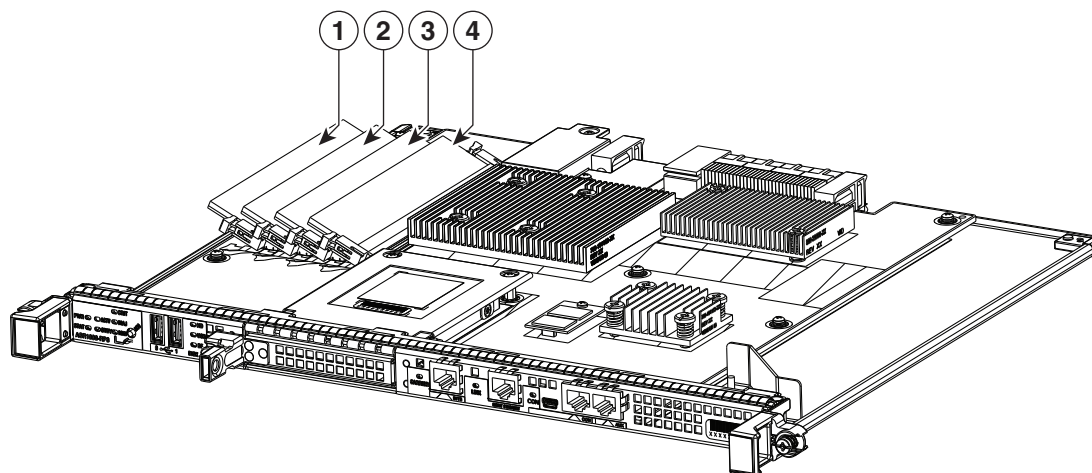
1	Ch-A DIMM0	**3**	Ch-B DIMM0
2	Ch-A DIMM1	**4**	Ch-B DIMM1

Table 8-1 provides the PID and the memory DIMM slots that are supported in the Cisco ASR1000-RP3 module.

Table 8-1   Cisco ASR1000-RP3 PID and Supported Memory DIMM Slots

Memory PID Option	**Ch-A DIMM0**	**Ch-A DIMM1**	**Ch-B DIMM0**	**Ch-B DIMM1**
M-ASR1K-RP3-8GB=	4 GB	—	4 GB	—
M-ASR1K-RP3-16GB=	8 GB	—	8 GB	—
M-ASR1K-RP3-32GB=	8 GB	8 GB	8 GB	8 GB
M-ASR1K-RP3-64GB=	16 GB	16 GB	16 GB	16 GB

Note   RP2 memory cannot be reused on RP3. For RP3 memory upgrade from 8 GB to either 16 GB or 32 GB or 64 GB, remove all existing DIMMs from the system, and install the new DIMMs pair in the system. This eliminates issues with mismatched DIMMs.

Basic Work Flow for Removing and Replacing DIMMs

The Cisco ASR 1006-X, Cisco ASR 1009-X, and Cisco ASR 1013 routers have redundant RPs. The following are the steps for removing and replacing the DIMM memory modules on these routers.

Step 1   Remove the standby RP. See Removing the Cisco ASR1000-RP3 Module from the Router, page 3-3.

Step 2   Remove the DIMM from the standby RP. See Removing the DIMMs, page 8-5.

Step 3   Insert the new DIMM memory module on the standby RP. See Replacing the DIMMs, page 8-7.

Step 4   Insert the standby RP. See Installing the Cisco ASR1000-RP3 Module in the Router, page 3-1.

Step 5   Verify the memory upgrade on the standby RP by running the following commands:

```
Router# configure terminal
Router(config-red)# redundancy
Router(config-r-mc)# main-cpu
Router(config-r-mc)# standby console enable
Router(config-r-mc)# end
Router-stby# show version

Cisco IOS Software, IOS-XE Software (PPC_LINUX_IOSD-ADVENTERPRISEK9-M), Experimental
Version 15.2(20111220:221816) [v152_2_s_xe36_throttle-tozhang-xe36_ios 114]
.
.
.
cisco ASR1006X (RP3) processor with 1689519K/6147K bytes of memory.
Processor board ID FOX1224G4VX
20 Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
4194304K bytes of physical memory.
955063K bytes of eUSB flash at bootflash:.
39004543K bytes of SATA hard disk at harddisk:.
.
.
.
```

Step 6   Use the **redundancy force-switchover** command to switch the upgraded standby RP to the active state. The RP that was in the active state moves to the standby state.

Step 7   Repeat Step 1 through Step 5 on the standby RP.

Removing the DIMMs

The Cisco ASR1000-RP3 module already comes with the DIMMs preinstalled. At the time of purchase, you choose the amount of memory you require. Use this procedure only if you want to upgrade the memory.

Before you begin:

- Use an ESD-preventive wrist strap.
- Back up data that you want to save before replacing a eUSB device.
- Make sure that the component is keyed and slotted for easier connection.

✎
Note   To ensure the DIMMs are functioning properly, all DIMMs must be replaced at the same time and must be of the same manufacturer and part number. (This is because vendors may have multiple versions of the DIMM.)

Step 1   With a wrist strap on, loosen the two captive screws on the faceplate of the RP.

Step 2   Using the handles on both sides of the module, with both hands gently slide the module out of the chassis slot.

Step 3   Place the RP on an antistatic mat or pad and ensure that you are wearing an antistatic device, such as a wrist strap.

Step 4   Position the RP so that the faceplate is toward you and the edge connector is away from you.

Step 5   Locate the DIMMs in the RP.

Figure 8-4   *Cisco ASR1000-RP3 DIMM Location*
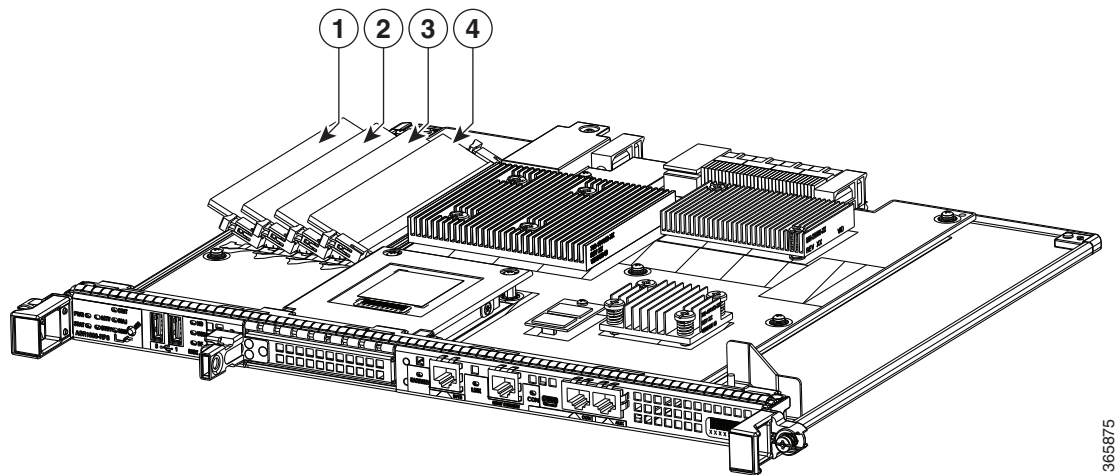
1	Ch-A DIMM0	3	Ch-B DIMM0
2	Ch-A DIMM1	4	Ch-B DIMM1

✎
Note   The DIMMs shown in Figure 8-5 and Figure 8-7 are representative and may not look exactly like the DIMMs used on the RP3; but the procedure is the same.

Step 6   For the DIMM you want to remove, pull down the levers on either side of the DIMM socket outwards to release the DIMM from the socket as shown in Figure 8-5.

Figure 8-5   DIMM Socket Release Lever to Remove the DIMM
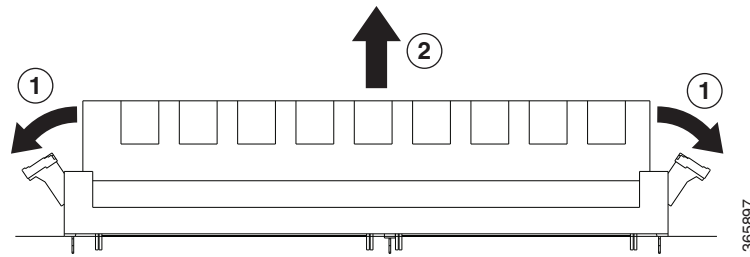
1	Pull down the levers on either side of the DIMM socket outwards	**2**	Remove the DIMM out

Step 7   When the DIMM is released from the socket, grasp each end of the DIMM with your thumb and forefinger and pull the DIMM completely out of the socket. Handle only the edges of the DIMM; avoid touching the memory module or pins and the metal traces (the metal fingers along the connector edge of the DIMM) along the socket edge.

Step 8   Place the DIMM in an antistatic bag to protect it from ESD damage.

Step 9   Repeat Step 5 through Step 8 for the remaining DIMMs if required for the upgrade.

Replacing the DIMMs

Step 1   Place the RP on an antistatic mat or pad and ensure that you are wearing an antistatic device, such as a wrist strap.

Step 2   Position the RP so that the faceplate is towards you and the edge connector is away from you.

⚠
Caution   DIMMs are sensitive components that can be shorted by mishandling; they are susceptible to ESD damage. Handle DIMMs by the edges only and avoid touching the pins.

Step 3   Remove the new DIMM from the antistatic bag.

Step 4   Hold the DIMM component-side up, with the connector edge (the metal fingers) closest to you. Hold the ends of the DIMM between your thumb and forefinger as shown in Figure 8-6.

*Figure 8-6*   *Handling the Cisco ASR1000-RP3 DIMM*

Key
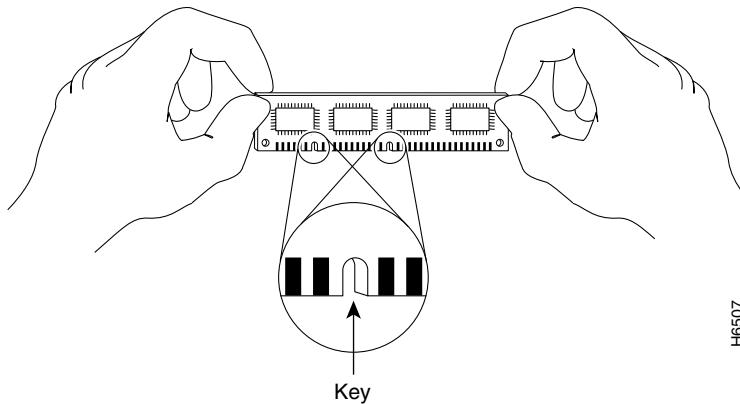
Step 5   Tilt the DIMM to approximately the same angle as the socket and insert the connector edge into the socket. Note the two notches (keys) on the connector edge of the DIMM. These keys are intended to ensure correct orientation of the DIMM in the socket.

⚠

Caution   When inserting DIMMs, use firm but not excessive pressure. If you damage a socket, you will have to return the RP to the factory for repair.

Step 6   Note the orientation of the socket key on the DIMM and the DIMM socket and gently push the DIMM into the socket until the lever is flush against the side of the DIMM socket, and the DIMM edge connector is fully inserted. If necessary, rock the DIMM gently back and forth to seat it properly. The following figure shows how to install the DIMM in the socket.

Figure 8-7   *Installing the DIMM in the Socket*
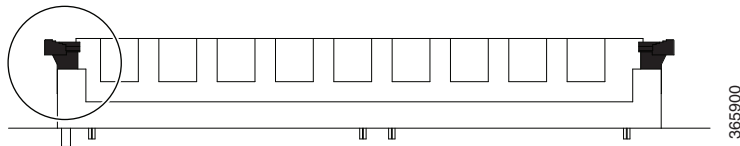
Step 7   When the DIMM is installed, check that the release lever is flush against the side of the DIMM socket. If it is not, the DIMM might not be seated properly. If the DIMM appears misaligned, carefully remove it according to the removal procedure and then reseat it in the socket. Push the DIMM firmly back into the socket until the release lever is flush against the side of the DIMM socket.

Step 8   Repeat Step 3 through Step 7 for the remaining DIMMs.

Step 9   Replace the Cisco ASR1000-RP3 module.

After you have correctly installed the Cisco ASR1000-RP3 DIMMs and reinstalled the RP, the system should reboot properly.

If the system fails to boot properly or if the console terminal displays a checksum or memory error after you have installed new DIMMs, check the following:

- Ensure that all DIMMs are installed correctly. If necessary, shut down the system and remove the RP. Check the DIMMs by looking straight down on them to inspect them at eye level. The DIMMs should all be aligned at the same angle and the same height when properly installed. If a DIMM appears to stick out or rest in the socket at a different angle from the others, remove the DIMM and reinsert it. Then replace the RP and reboot the system for another installation check.

- Make certain that all DIMMs are of the same manufacturer and part number.

Note If after several attempts the system fails to restart properly, contact a service representative for assistance. Before you call, make note of any error messages, unusual LED states, or any other indications that might help solve the problem.