



# Installing and Upgrading Software

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## Software Packaging on the Router

### Software Package Modes

The router can be booted using any of the following:

- **Consolidated**—A single software image containing a full collection of software packages. This mode provides a simplified installation and can be stored in the bootflash, a TFTP server, or a network server.
- **Sub-package**—One or more sub-images extracted from the consolidated image. This mode provides optimized memory usage and requires that you store files in the bootflash directory.



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**Note** The router supports both consolidated and sub-package mode boot.

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## Understanding Software Packages

*Table 1: Individual Sub-Packages*

Sub-Package	Purpose
RPBase	Route Switch Processor (RSP) operating system
RPControl	Control plane processes between IOS process and the rest of the platform.
RPAccess	Handles security features including Secure Socket Layer (SSL) and Secure Shell (SSH)
RPIOS	Cisco IOS kernel, which is where IOS features are stored and run. <b>Note</b> Each consolidated image has a unique RPIOS package.
FP Pkg	Controls FP daemons.
IO Pkg	Controls input/output driver daemons.
LC Base	Controls basic kernel functions including runtime, initialization scripts, and chassis control daemons.

## Provisioning Files

Provisioning files manage the boot process when the router is configured to boot in sub-packages. The provisioning file manages the bootup of each individual sub-package. Provisioning files are extracted automatically when individual sub-package files are extracted from a consolidated package. Provisioning files are not necessary for running the router using the complete consolidated package.

## File Systems on the Router

*Table 2: File Systems*

File System	Description
bootflash:	The boot flash memory file system on the active RSP.
cns:	The Cisco Networking Services file directory.
nvrn:	Router NVRAM. You can copy the startup configuration to NVRAM or from NVRAM.
stby-bootflash:	The boot flash memory file system on the standby RSP.
stby-harddisk:	The hard disk file system on the standby RSP.
stby-usb0:	The Universal Serial Bus (USB) flash drive file systems on the standby RSP. <b>Note</b> stby-usb1: is an internal port.
system:	The system memory file system, which includes the running configuration.

File System	Description
tar:	The archive file system.
tmpsys:	The temporary system files file system.
usb0:	The Universal Serial Bus (USB) flash drive file systems on the active RSP. <b>Note</b> usb1: is an internal port.

If you see a file system not listed in the above table, enter the ? help option or see the **copy** command reference for additional information on that file system.

## System Requirements

### RP Memory Recommendations

*Table 3: Memory Recommendations for the Cisco ASR 903 RSP1 Module - Consolidated Package Image*

Platform	Image Name	Software Image	Individual Sub-package Contents	DRAM Memory
ASR 903 RSP1 Module	Cisco ASR 903 Series RSP1 UNIVERSAL W/O CRYPTO	asr903rsp1-universal.version.bin	asr903rsp1-rpbase.version.pkg	2 GB (RSP1)
			asr903rsp1-rpcontrol.version.pkg	4 GB (RSP1+)
			asr903rsp1-rpaccess.version.pkg	
			asr903rsp1-rpios-universal.version.pkg	
			asr903rsp1-espbase.version.pkg	
			asr903rsp1-sipbase.version.pkg	
			asr903rsp1-sipspa.version.pkg	
			asr903rsp1-packages-universal.version.conf	
			packages.conf	

Platform	Image Name	Software Image	Individual Sub-package Contents	DRAM Memory
ASR 903 RSP1 Module	Cisco ASR 903 Series RSP1 UNIVERSAL NPE	asr903rsp1-universalk9_npe. version .bin	asr903-hw-programmables. <i>version</i> .pkg	2 GB (RSP1)
			asr903rsp1-espbase. <i>version</i> .pkg	4 GB (RSP1+)
			asr903rsp1-packages-universalk9. <i>version</i> .pkg	
			asr903rsp1-rpaccess. <i>version</i> .pkg	
			asr903rsp1-rpbase. <i>version</i> .pkg	
			asr903rsp1-rpcontrol. <i>version</i> .pkg	
			asr903rsp1-rpios-universalk9_npe. <i>version</i> .pkg	
			asr903rsp1-sipbase. <i>version</i> .pkg	
			asr903rsp1-sipspace. <i>version</i> .pkg	
			packages.conf	

Table 4: Memory Recommendations for the Cisco ASR 903 RSP2 Module - Consolidated Package Image

Platform	Image Name	Software Image	Individual Sub-package Contents
ASR 903 RSP2 Module	Cisco ASR 903 Series RSP2 UNIVERSAL W/O CRYPTO	asr900rsp2-universal. <i>version</i> .bin	asr900rsp2-rpbase. <i>version</i> .pkg
			asr900rsp2-rpcontrol. <i>version</i> .pkg
			asr900rsp2-rpaccess. <i>version</i> .pkg
			asr900rsp2-rpios-universal. <i>version</i> .pkg
			asr900rsp2-espbase. <i>version</i> .pkg
			asr900rsp2-sipbase. <i>version</i> .pkg
			asr900rsp2-sipspace. <i>version</i> .pkg
			asr900rsp2-packages-universal. <i>version</i> .conf
			packages.conf

Platform	Image Name	Software Image	Individual Sub-package Contents
ASR 903 RSP2 Module	Cisco ASR 903 Series RSP2 UNIVERSAL NPE	asr900rsp2-universalk9_npe. version .bin	asr900-hw-programmables.version .pkg
			asr900rsp2-espbase.version .pkg
			asr900rsp2-packages-universalk9.version .pkg
			asr900sp2-rpaccess.version .pkg
			asr900rsp2-rpbase.version .pkg
			asr900rsp2-rpcontrol.version .pkg
			asr900rsp2-rpios-universalk9_npe.version .pkg
			asr900rsp2-sipbase.version .pkg
			asr900rsp2-sipspa.version .pkg
			packages.conf

**Table 5: Memory Recommendations for the Cisco ASR 900 RSP3 Module - Consolidated Package Image**

Platform	Image Name	Software Image	Individual Sub-package Contents
ASR 900 RSP3 Module	Cisco ASR 900 Series RSP3 UNIVERSAL W/O CRYPTO	asr900rsp3-universal.version .bin	asr900rsp3-rpbase.version .pkg
			asr900rsp3-rpcontrol.version .pkg
			asr900rsp3-rpaccess.version .pkg
			asr900rsp3-rpios-universal.version .pkg
			asr900rsp3-espbase.version .pkg
			asr900rsp3-sipbase.version .pkg
			asr900rsp3-sipspa.version .pkg
			asr900rsp3-packages-universal.version.conf
			packages.conf

Platform	Image Name	Software Image	Individual Sub-package Contents
ASR 900 RSP3 Module	Cisco ASR 900 Series RSP3 UNIVERSAL NPE	asr900rsp3-universalk9_npe. version .bin	asr900-hw-programmables. <i>version</i> . pkg
			asr900rsp3-espbase. <i>version</i> .pkg
			asr900rsp3-packages-universalk9. <i>version</i> .pkg
			asr900rsp3-rpaccess. <i>version</i> .pkg
			asr900rsp3-rpbase. <i>version</i> .pkg
			asr900rsp3-rpcontrol. <i>version</i> .pkg
			asr900rsp3-rpios-universalk9_npe. <i>version</i> .pkg
			asr900rsp3-sipbase. <i>version</i> .pkg
			asr900rsp3-sipspa. <i>version</i> .pkg
packages.conf			

## ROMMON Version Requirements

We recommend you to upgrade the ROMMON version to 15.6(33r)S.

For more information on the ROMMON package, see [Cisco Software Download](#).

## Determining the Software Version

You can use the **show version installed** command to list the installed sub-packages on the router.

## Autogenerated Files and Directories



### Caution

Any autogenerated file in the bootflash: directory should not be deleted, renamed, moved, or altered in any way unless directed by customer support; altering these files can have unpredictable consequences for system performance.

**Table 6: Autogenerated Files**

File or Directory	Description
crashinfo files	A crashinfo file may appear in the bootflash: file system. Crashinfo files are useful for tuning and troubleshooting, but are not related to router operations: you can erase them without impacting the router's performance.

File or Directory	Description
core files	The bootflash/core directory is the storage area for .core files. <b>Warning</b> Do not erase or move the core directory.
lost+found directory	This directory is created on bootup if a system check is performed. Its appearance is completely normal and does not indicate any issues with the router.
tracelogs files	The storage area for trace files is bootflash/tracelogs. Trace files are useful for troubleshooting; you can access trace files using diagnostic mode to gather information related to the IOS failure. <b>Warning</b> Do not erase or move the tracelog directory.

## Setting the Router to Boot in Sub-Package Mode



**Note** For instructions on how to download an image file, see [Downloading an Image, on page 10](#). In the following example, the image is located in the bootflash: Image/image-name.

### Step 1 **configure terminal**

**Example:**

```
Router# configure terminal
```

Enters configuration mode.

### Step 2 **config-register**

**Example:**

```
Router(config)# config-register 0x2
```

Sets the configuration register so that the router boots using a specified image in NVRAM.

### Step 3 **exit**

**Example:**

```
Router(config)#exit
```

Exits configuration mode and returns to the EXEC command interpreter prompt.

### Step 4 **request platform software package expand file source-URL [tdestination-URL] [force] [verbose] [wipe]**

**Example:**

```
Router# request platform software package expand file
stby-bootflash:Image/asr903rsp1-adventerprisek9.base.bin
```

Expands the consolidated image file on the standby RSP.

**Note** This step applies only if your router has a redundant RSP.

**Step 5** **configure terminal**

**Example:**

```
Router# configure terminal
```

Enters configuration mode.

**Step 6** **boot system flash [flash-fs:] [partition-number:] [filename]**

**Example:**

```
Router(config)# boot system bootflash:Image/packages.conf
```

Sets the router to boot using the packages.conf file.

**Step 7** **exit**

**Example:**

```
Router(config)#exit
```

Exits configuration mode and returns to the EXEC command interpreter prompt.

**Step 8** **copy running-config startup-config**

**Example:**

```
Router# copy running-config startup-config
```

Saves the configuration.

**Step 9** **reload**

**Example:**

```
Router#reload
```

Reloads the router.

---

## ISSU Support Matrix

**Legend:**

NA: Not Applicable

NS: Not Supported



Table 7: ISSU Support Matrix

Supported ISSU Upgrade Or Downgrade Version										
Base IOS Version	16.5.1	16.5.X (X=2-3)	16.6.1	16.6.X (X=2 and later)	16.7.X (X=1 and later)	16.8.X (X=1 and later)	16.9.X (X= 1 and later)	16.11.1 (X= 1 and later)	16.12.1	17.1.1
16.5.1	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS
16.5.X (X=2,3)	NS	NA	NS	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16.6.1	NS	NS	NA	NS	NS	NS	NS	NS	Yes	NS
16.6.X (X=2 and later)	NS	Yes	NS	Yes	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1,2</sup>
16.7.X (X=1 and later)	NS	Yes	NS	Yes	Yes	Yes	Yes	Yes	Yes	Yes <sup>3</sup>
16.8.X (X=1 and later)	NS	Yes	NS	Yes <sup>3</sup>	Yes	Yes	Yes	Yes	Yes	Yes <sup>3</sup>
16.9.X (X=1 and later)	NS	Yes	NS	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16.11.X (X=1 and later)	NS	Yes	NS	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16.12.1	NS	NA	NS	Yes	Yes	Yes	Yes	Yes	NA	Yes
17.1.1	NS	NS	NS	Yes	Yes	Yes	Yes	Yes	NS	NS

<sup>1</sup> With CEM IMs the ISSU (upgrade) is not supported directly from Cisco IOS XE Release 16.6.x to 16.7.3 or 16.8.x or 16.9.x or 16.11.x, or 16.12.x release. ISSU upgrade should be done in two steps: First, upgrade from Cisco IOS XE Release 16.6.x to Cisco IOS XE Release 16.7.2. Then, upgrade from Cisco IOS XE Release 16.7.2 to the target release.

<sup>2</sup> Step ISSU (upgrade) to 17.1.1 with any of these images as intermediate image (16.9.3 and higher)

<sup>3</sup> With CEM IMs, ISSU (downgrade) is not supported from 16.8.x to 16.6.x.

## Restrictions

- The ISSU upgrade operation requires that the ROMmon version be [15.6\(33r\)S](#) or higher for all releases starting from release Cisco IOS XE 16.11.x. For Cisco IOS XE Releases 16.6.x to 16.9.x, the minimum ROMmon version must be [15.6\(20r\)S](#).
- You must enable the **port-channel max-memlink-per-pc 8** command when downgrading from Cisco IOS XE Release 16.11.x else, ISSU will fail.
- It is recommended to set the value of the interface-module-delay to 1200 seconds or more to ensure sufficient time for IM software upgrades based on the scale configuration on the IM.
  - For example, for a 5K scale, the configuration requires approximately 20 minutes to synchronize standby. In this case, the **interface-module-delay** value should be greater than 1200 seconds.

## Downloading an Image

Download the image to the same partition of the bootflash where the base image exists. For information on downloading images see, [Loading and Managing System Images Configuration Guide, Cisco IOS XE Release 3S](#).




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**Note** Ensure that you have chosen an upgrade image that is supported by your current software version.

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## Performing a Single Command Software Upgrade

A single command upgrade updates the active and standby RSPs with a single IOS command. Follow these steps to complete the one-shot upgrade.

### Preparing for Installation

Verify the chassis is booted using sub-package mode and in hot standby state, else set the router to sub-package mode. For more information, see [Setting the Router to Boot in Sub-Package Mode, on page 7](#).

- 
- Step 1** Download the new image file from Cisco.com on the chassis.
- Step 2** Open a console session to the active RSP.
- Step 3** Copy the new consolidated image file to the active image bootflash directory such that the new image file is in the same location as the existing image file.
- Note** Do not copy the packages.conf file to a new directory after expanding the package. It is required that the packages.conf file and sub package files exist in the same directory.
- Note** It is not necessary to copy the new consolidated image file to the standby RSP; the one-shot upgrade process completes this step.
- Step 4** **configure terminal**

**Example:**

```
Router# configure terminal
```

Enters configuration mode.

**Step 5**    **redundancy****Example:**

```
Router (config)# redundancy
```

```
Router (config-red)#
```

Enters redundancy configuration mode.

**Step 6**    **mode sso****Example:**

```
Router (config-red)# mode sso
```

Sets the router in SSO redundancy mode.

**Step 7**    **end****Example:**

```
Router (config)# end
```

Exits configuration mode and returns to the EXEC command prompt.

**Step 8**    Confirm that the router has reached SSO state**Example:**

```
*Jan 12 17:52:26.516: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)
```

Wait for the output before proceeding.

**Step 9**    **copy running-config startup-config****Example:**

```
Router# copy running-config startup-config
```

Saves the configuration.

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## Completing the Single Command Upgrade



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**Note** Do *not* press CTRL+C when the single command upgrade is in process. The system shall reach the command prompt only after successful completion of the upgrade.

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**Note** The Ethernet interface and TDM IM modules may reset, when firmware changes with the IOS image. The following TDM interface modules reset during the upgrade, irrespective of firmware changes with the IOS image:

- Cisco ASR 900 8 port RJ48C T1/E1 Interface Module
- Cisco ASR 900 16-Port T1/E1 Interface Module
- Cisco ASR 900 32-Port T1/E1 Interface Module
- Cisco ASR 900 Series 4-Port OC3/STM-1 or 1-Port OC12/STM-4 Module

**Step 1** (Optional) **platform issu reload interface-module sequence** *sequence of all IMs*

Reloads the interface modules in a sequence. Separate the IM numbers with a single space. If there are 16 IMs, sequence for all 16 IMs should be given, irrespective of the IMs being physically present or not. If the sequence is not configured using this command, the reload happens sequentially, by default.

**Step 2** **request platform software package install node file** *file-URL* [**interface-module-delay** *delay*]

**Example:**

```
Router# request platform software package install node file
bootflash:Image/asr903rsp1-adventerprisek9.upgrade.bin interface-module-delay 150
```

Initiates the one-shot installation procedure using the consolidated image file.

**Note** You can adjust the delay between the OIR of each IM using the **interface-module-delay** keyword. We recommend you set the **interface-module-delay** value to 150 seconds or greater in order to ensure sufficient time for IM software upgrades. Keywords other than **interface-module-delay** are not supported.

**Step 3** Wait for the router messages.

The router displays a series of STAGE/SUCCESS messages.

For sample output of a single command upgrade, see [Example: Single Command Software Upgrade, on page 28](#).

**Step 4** Wait for original active RSP to reboot.

The active RSP reboots and returns to the console prompt.

**Step 5** Switch to the new active console.

**Step 6** Wait for new active console to return to SSO state

**Example:**

```
*Jan 12 17:52:26.516: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)
```

Confirms that the router has reached SSO state; wait for this output before proceeding.

# Upgrading the ROMMON on the RSP3 Module

The router has two ROMMON regions (ROM0 and ROM1). We recommend that the upgrade is performed on both the regions.



**Caution** To avoid actions that might make your system unable to boot, read this entire section before starting the upgrade.

**Step 1** Check the RSP bootup ROMMON region (ROM0 or ROM1). The example, shows the RSP boots up from ROM0 region.

**Example:**

**Step 2** Copy the ROMMON image to the bootflash on the active and standby RSP.

**Example:**

```
copy bootflash:rsp3_rommon_156_33r_s.pkg
```

**Step 3** Use the **upgrade rom-monitor filename** *bootflash:rsp3\_rommon\_156\_33r\_s.pkg* **R0** command to upgrade the version.

**Note** R0 represents RSP in slot0 of the chassis. Step 3 upgrades the ROMMON region of the RSP that is not used (ROM1 region) as ROM 0 region is used (in this procedure) in Step 1 to boot up the RSP.

**Step 4** Upgrade the ROMMON on the Standby RSP (for High Availability) using **upgrade rom-monitor filename** *bootflash:rsp3\_rommon\_156\_33r\_s.pkg* **R1** command.

**Note** R1 represents the RSP in slot1 of the chassis. Step 4 upgrades the ROMMON region of the RSP that is not used (ROM 0 region).

**Step 5** Reload the router.

**Example:**

```
System Bootstrap, Version 15.6(20r)S, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2017 by cisco Systems, Inc.
Compiled Tue 23-May-17 07:20 by sabind
Starting Initialization of FMAN0
Loading ucode for FMAN0, size: 31424, ver: 106.04.14
fixup address:7ffff278 contentsoffixup:7ffff000
DCFG_CCSR_PORSR1(cfg_0_9 pins):22FB7F7F
RC Vendor ID[0x8241957]
PEX up stream Vendor ID[0x860910b5]
PEX down stream vendor ID [0x860910b5]
FPGA vendor ID[0x5f1137]
PCI Configuration done..
IOFPGA version[16040627]
```

```
Current image running: Boot ROM0
Last reset cause: RSP-Board
Rommon upgrade requested
Flash upgrade reset 1 in progress
.....BootPage Setting Done - Next DDR-init
```

**Example: Verifying ROMMON Upgrade for RSP3 Module**

```

System Bootstrap, Version 15.6(33r)S, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2018 by cisco Systems, Inc.
Compiled Sat 06-Oct-18 23:23 by pallavik
Starting Initialization of FMAN0
Loading ucode for FMAN0, size: 31424, ver: 106.04.14
fixup address:7ffff278 contentsoffixup:7ffff000
DCFG_CCSR_PORSR1(cfg_0_9 pins):22FB7F7F
RC Vendor ID[0x8241957]
PEX up stream Vendor ID[0x860910b5]
PEX down stream vendor ID [0x860910b5]
FPGA vendor ID[0x5f1137]
PCI Configuration done..
IOFPGA version[16040627]

```

```

Current image running: *Upgrade in progress* Boot ROM1
Last reset cause: BootRomUpgrade
Configuring zarlink...
We're coming up from a flash upgrade reset cookie
UEA platform with 3670016 Kbytes of main memory

```

```

We're coming up from a flash upgrade reset cookie
RSP3#

```

**Step 6** Reload the router again to confirm bootup from upgraded ROMMON region ROM1.

**Example:**

```

System Bootstrap, Version 15.6(33r)S, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2018 by cisco Systems, Inc.
Compiled Sat 06-Oct-18 23:23 by pallavik

```

```

Current image running: Boot ROM1

```

**Step 7** Repeat Step 3 to Step 6 to update the other region on the RSP (ROM0) region in this procedure.

**Note** We recommend that both region ROM0 andROM1 are upgraded.

**Example: Verifying ROMMON Upgrade for RSP3 Module**

Use the show platform command to verify the ROMMON upgrade.

```

Router# show platform
RSP3#show platform
Chassis type: ASR-903

```

Slot	Type	State	Insert time (ago)
0/0	A900-IMA1X	ok	00:18:41
0/1	A900-IMA2Z	ok	00:18:41
0/2	A900-IMA8S1Z	ok	00:18:40
0/3	A900-IMA8Z	ok	00:18:41
0/4	A900-IMA2F	ok	00:18:41
0/5	A900-IMA1C	ok	00:18:40
R0	A900-RSP3C-400-S	ok, active	00:20:48
R1	A900-RSP3C-400-S	ok, standby	00:20:48
F0		ok, active	00:20:48
F1		ok, standby	00:20:48
P0	A900-PWR1200-A	ok	00:19:59

P1	Unknown	N/A	never
P2	A903-FAN	ok	00:19:57
Slot	CPLD Version	Firmware Version	
R0	16040627	15.6 (33r)S	
R1	16040627	15.6 (33r)S	
F0	16040627	15.6 (33r)S	
F1	16040627	15.6 (33r)S	

## Upgrading the ROMMON on the RSP Module

The router has two ROMMON regions (ROM0 and ROM1). We recommend that the upgrade is performed on both the regions.



**Caution** To avoid actions that might make your system unable to boot, read this entire section before starting the upgrade.

**Step 1** Check the RSP bootup ROMMON region (ROM0 or ROM1). The example, shows the RSP boots up from ROM0 region.

**Example:**

```
System Bootstrap, Version 15.2(1r)S1, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2011 by cisco Systems, Inc.
Compiled Wed 07-Dec-11 07:33 by tinhuang
Current image running: Boot ROM0
```

**Step 2** Copy the ROMMON image to the bootflash on the active and standby RSP.

**Example:**

```
copy bootflash:asr903-rommon.153-1r.S1.pkg
```

**Step 3** Use the **upgrade rom-monitor filename** *bootflash:asr903-rommon.153-1r.S1.pkg* **R0** command to upgrade the version.

**Note** R0 represents RSP in slot0 of the chassis. Step 3 upgrades the ROMMON region of the RSP that is not used (ROM1 region) as ROM 0 region is used (in this procedure) in Step 1 to boot up the RSP.

**Step 4** Upgrade the ROMMON on the Standby RSP (for High Availability) using **upgrade rom-monitor filename** *bootflash:asr903-rommon.153-1r.S1.pkg* **R1** command.

**Note** R1 represents the RSP in slot1 of the chassis. Step 4 upgrades the ROMMON region of the RSP that is not used (ROM 0 region).

**Step 5** Reload the router.

**Example:**

```
System Bootstrap, Version 15.2(1r)S1, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2011 by cisco Systems, Inc.
```

**Example: Verifying ROMMON Upgrade**

```

Compiled Wed 07-Dec-11 07:33 by tinhuang
Current image running: Boot ROM0
Last reset cause: RSP-Board
UEA platform with 2097152 Kbytes of main memory
Rommon upgrade requested
Flash upgrade reset 1 in progress
.....
System Bootstrap, Version 12.2(20120514:121217) [npenumar-pegasus_rommon_02 183], DEVELOPMENT SOFTWARE
Copyright (c) 1994-2008 by cisco Systems, Inc.
Compiled Fri 15-Jun-12 11:45 by ccai
Current image running: *Upgrade in progress* Boot ROM1
Last reset cause: BootRomUpgrade
UEA platform with 2097152 Kbytes of main memory

```

**Step 6** Reload the router again to confirm bootup from upgraded ROMMON region ROM1.

**Example:**

```

System Bootstrap, Version 15.2(1r)S1, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2011 by cisco Systems, Inc.
Compiled Fri 15-Jun-12 11:45 by ccai
Current image running: Boot ROM1

```

**Step 7** Repeat Step 3 to Step 6 to update the other region on the RSP (ROM0) region in this procedure.

**Note** We recommend that both region ROM0 andROM1 are upgraded.

**Example: Verifying ROMMON Upgrade**

Use the show platform command to verify the ROMMON upgrade.

```
Router# show platform
```

```

Chassis type: ASR-903
Slot      Type              State              Insert time (ago)
-----
0/0       A900-IMA1X           ok                 04:48:07
0/1       A900-IMA1X           ok                 04:43:42
0/4       A900-IMA8T           ok                 05:18:21
0/5       A900-IMA8T           ok                 05:18:21
R0        A903-RSP1A-55       ok, active        05:23:11
R1        A903-RSP1A-55       ok, standby       05:23:11
F0                               ok, active        05:23:11
F1                               ok, standby       05:23:11
P0        A900-PWR550-D       ok                 05:20:02
P1        A900-PWR550-D       ok                 05:19:55
P2        A903-FAN            ok                 05:19:45
Slot      CPLD Version        Firmware Version
-----
R0        11102133            15.3(1r)S1
R1        11102133            15.3(1r)S1
F0        11102133            15.3(1r)S1
F1        11102133            15.3(1r)S1

```



# Verifying the Upgrade

## Example: Single Command Software Upgrade for RSP3 Module

```

Router#request platform software package install node file
bootflash:issu/asr900rsp3-universalk9_npe.16.12.01prd15.SPA.bin interface-module-delay 150
NOTE: Currently node has booted from a provisioning file
NOTE: Going to start a dual rp sub-packages node ISSU install

--- Starting disk space verification ---
Finished disk space verification

--- Starting initial file path checking ---
Copying bootflash:/issu/asr900rsp3-universalk9_npe.16.12.01prd15.SPA.bin to
stby-bootflash:/issu/asr900rsp3-universalk9_npe.16.12.01prd15.SPA.bin
Finished initial file path checking

--- Starting config-register verification ---
Finished config-register verification

--- Starting image file expansion ---
Expanding image file: bootflash:/issu/asr900rsp3-universalk9_npe.16.12.01prd15.SPA.bin

*Jul 26 08:03:51.807: %INSTALL-5-OPERATION_START_INFO: R0/0: packtool: Started expand package
bootflash:/issu/asr900rsp3-universalk9_npe.16.12.01prd15.SPA.bin
*Jul 26 08:05:42.842: %LINK-3-UPDOWN: Interface TenGigabitEthernet0/5/1, changed state to
up
*Jul 26 08:05:42.843: %IOSXE_RP_ALARM-6-INFO: cleared CRITICAL TenGigabitEthernet0/5/1:
Physical Port Link Down
*Jul 26 08:05:43.543: %LINEPROTO-5-UPDOWN: Line protocol on Interface TenGigabitEthernet0/5/1,
changed state to up
*Jul 26 08:06:12.795: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/4/6,
changed state to up
*Jul 26 08:06:14.189: %LINK-3-UPDOWN: Interface GigabitEthernet0/4/6, changed state to up
*Jul 26 08:06:14.192: %IOSXE_RP_ALARM-6-INFO: cleared CRITICAL GigabitEthernet0/4/6: Physical
Port Link Down
*Jul 26 08:06:14.210: %LINK-3-UPDOWN: Interface BDI500, changed state to up
*Jul 26 08:06:14.910: %LINEPROTO-5-UPDOWN: Line protocol on Interface BDI500, changed state
to upImage file expanded and copied
Expanding image file: stby-bootflash:/issu/asr900rsp3-universalk9_npe.16.12.01prd15.SPA.bin

*Jul 26 08:09:11.903: %INSTALL-5-OPERATION_COMPLETED_INFO: R0/0: packtool: Completed expand
package bootflash:/issu/asr900rsp3-universalk9_npe.16.12.01prd15.SPA.bin
*Jul 26 08:09:18.982: %INSTALL-5-OPERATION_START_INFO: R1/0: packtool: Started expand package
bootflash:/issu/asr900rsp3-universalk9_npe.16.12.01prd15.SPA.binImage file expanded and
copied
Finished image file expansion

STAGE 1: Installing software on standby RP
=====

*Jul 26 08:14:46.426: %INSTALL-5-OPERATION_COMPLETED_INFO: R1/0: packtool: Completed expand
package bootflash:/issu/asr900rsp3-universalk9_npe.16.12.01prd15.SPA.bin--- Starting install
local lock acquisition on R0 ---
Finished install local lock acquisition on R0

--- Starting local lock acquisition on R0 ---
Finished local lock acquisition on R0

--- Starting installation state synchronization ---

```

Finished installation state synchronization

```
*Jul 26 08:14:49.404: %INSTALL-5-OPERATION_START_INFO: R0/0: provision: Started install
package stby-bootflash:issu/*rsp3-*16.12.01prd15.SPA*.pkg--- Starting install local lock
acquisition on R1 ---
```

Finished install local lock acquisition on R1

```
--- Starting local lock acquisition on R1 ---
```

Finished local lock acquisition on R1

```
--- Starting file path checking ---
```

```
*Jul 26 08:14:55.232: %INSTALL-5-OPERATION_START_INFO: R1/0: provision: Started install
package stby-bootflash:issu/*rsp3-*16.12.01prd15.SPA*.pkgFinished file path checking
```

```
--- Starting image file verification ---
```

Checking image file names

Locating image files and validating name syntax

Found asr900rsp3-espbase.16.12.01prd15.SPA.pkg

Found asr900rsp3-rpaccess.16.12.01prd15.SPA.pkg

Found asr900rsp3-rpbase.16.12.01prd15.SPA.pkg

Found asr900rsp3-rpboot.16.12.01prd15.SPA.pkg

Found asr900rsp3-rpcontrol.16.12.01prd15.SPA.pkg

Found asr900rsp3-rpios-universalk9\_npe.16.12.01prd15.SPA.pkg

Found asr900rsp3-sipbase.16.12.01prd15.SPA.pkg

Found asr900rsp3-sipspa.16.12.01prd15.SPA.pkg

Verifying image file locations

Inspecting image file types

WARNING: In-service installation of IOSD package

WARNING: requires software redundancy on target RP

WARNING: or on-reboot parameter

WARNING: Automatically setting the on-reboot flag

WARNING: In-service installation of RP Base package

WARNING: requires software reboot of target RP

Processing image file constraints

```
Creating candidate provisioning file
Finished image file verification

--- Starting candidate package set construction ---
Verifying existing software set
Processing candidate provisioning file
Constructing working set for candidate package set
Constructing working set for running package set
Checking command output
Constructing merge of running and candidate packages
Checking if resulting candidate package set would be complete
Finished candidate package set construction

--- Starting ISSU compatibility verification ---
Verifying image type compatibility
Checking IPC compatibility for candidate software
Checking candidate package set infrastructure compatibility
Checking infrastructure compatibility with running software
Checking infrastructure compatibility with running software ... skipped
Checking package specific compatibility
Finished ISSU compatibility verification

--- Starting list of software package changes ---
Old files list:
  Removed asr900rsp3-espbase.16.11.01a.SPA.pkg
  Removed asr900rsp3-rpaccess.16.11.01a.SPA.pkg
  Removed asr900rsp3-rpbase.16.11.01a.SPA.pkg
  Removed asr900rsp3-rpboot.16.11.01a.SPA.pkg
  Removed asr900rsp3-rpcontrol.16.11.01a.SPA.pkg
  Removed asr900rsp3-rpios-universalk9_npe.16.11.01a.SPA.pkg
  Removed asr900rsp3-sipbase.16.11.01a.SPA.pkg
  Removed asr900rsp3-sipspa.16.11.01a.SPA.pkg
```

```

New files list:

  Added asr900rsp3-espbase.16.12.01prd15.SPA.pkg

  Added asr900rsp3-rpaccess.16.12.01prd15.SPA.pkg

  Added asr900rsp3-rpbase.16.12.01prd15.SPA.pkg

  Added asr900rsp3-rpboot.16.12.01prd15.SPA.pkg

  Added asr900rsp3-rpcontrol.16.12.01prd15.SPA.pkg

  Added asr900rsp3-rpios-universalk9_npe.16.12.01prd15.SPA.pkg

  Added asr900rsp3-sipbase.16.12.01prd15.SPA.pkg

  Added asr900rsp3-sipspa.16.12.01prd15.SPA.pkg

Finished list of software package changes

--- Starting commit of software changes ---

Updating provisioning rollback files

Creating pending provisioning file

Committing provisioning file

Finished commit of software changes

SUCCESS: Software provisioned.  New software will load on reboot.

*Jul 26 08:22:34.205: %INSTALL-5-OPERATION_COMPLETED_INFO: R1/0: provision: Completed install
package stby-bootflash:issu/*rsp3-*16.12.01prd15.SPA*.pkg
*Jul 26 08:22:40.703: %INSTALL-5-OPERATION_COMPLETED_INFO: R0/0: provision: Completed install
package stby-bootflash:issu/*rsp3-*16.12.01prd15.SPA*.pkgSTAGE 2: Restarting standby RP
=====
--- Starting standby reload ---
Finished standby reload

--- Starting wait for Standby RP to reach terminal redundancy state ---

*Jul 26 08:22:51.278: %IOSXE_OIR-6-OFFLINECARD: Card (rp) offline in slot R1
*Jul 26 08:22:51.294: %IOSXE_RP_ALARM-6-INFO: asserted MAJOR module R1: Boot state
*Jul 26 08:22:51.316: %IOSXE_OIR-6-OFFLINECARD: Card (fp) offline in slot F1
*Jul 26 08:22:51.371: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_NOT_PRESENT)
*Jul 26 08:22:51.371: %IOSXE_RP_ALARM-6-INFO: asserted MAJOR module R0: Secondary removed
*Jul 26 08:22:51.372: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_DOWN)
*Jul 26 08:22:51.374: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault
(PAER_REDUNDANCY_STATE_CHANGE)
*Jul 26 08:22:54.074: %RF-5-RF_RELOAD: Peer reload. Reason: EHSA standby down
*Jul 26 08:22:55.376: %IOSXE_RP_ALARM-6-INFO: cleared MAJOR module R1: Boot state
*Jul 26 08:22:55.377: %IOSXE_RP_ALARM-6-INFO: asserted MAJOR module R1: Unknown state
*Jul 26 08:22:55.437: %IOSXE_OIR-6-REMCARD: Card (rp) removed from slot R1
*Jul 26 08:22:55.438: %IOSXE_RP_ALARM-6-INFO: asserted CRITICAL slot R1: RP Removed OIR
Alarm
*Jul 26 08:22:55.438: %ALARM-3-CLEAR: cleared MAJOR module R1 Unknown state
*Jul 26 08:22:55.540: %IOSXE_OIR-6-REMCARD: Card (fp) removed from slot F1

```

```

*Jul 26 08:22:55.642: %IOSXE_OIR-6-REMCARD: Card (cc) removed from slot 1
*Jul 26 08:22:55.407: %CMRP-6-FP_HA_STATUS: R0/0: cmand: F0 redundancy state is Active with
no Standby
*Jul 26 08:22:55.412: %CMRP-6-RP_SB_RELOAD_REQ: R0/0: cmand: Reloading Standby RP: initiated
by RF reload message
*Jul 26 08:23:06.692: %IOSXE_OIR-6-INSCARD: Card (rp) inserted in slot R1
*Jul 26 08:23:06.693: %IOSXE_RP_ALARM-6-INFO: cleared CRITICAL slot R1: RP Removed OIR Alarm

*Jul 26 08:23:06.694: %IOSXE_OIR-6-INSCARD: Card (fp) inserted in slot F1
*Jul 26 08:23:06.702: %IOSXE_OIR-6-INSCARD: Card (cc) inserted in slot 1
*Jul 26 08:23:06.703: %IOSXE_RP_ALARM-6-INFO: asserted MAJOR module R1: Unknown state
*Jul 26 08:23:18.288: %IOSXE_RP_ALARM-6-INFO: cleared MAJOR module R1: Unknown state
*Jul 26 08:23:18.289: %IOSXE_RP_ALARM-6-INFO: asserted MAJOR module R1: Boot state
*Jun 7 22:58:01.164: %IOSXE-3-PLATFORM: R1/0: kernel: pci 0001:06:00.0: of_irq_parse_pci()
failed with rc=-22
*Jun 7 22:58:01.169: %IOSXE-3-PLATFORM: R1/0: kernel: pci 0001:06:00.1: of_irq_parse_pci()
failed with rc=-22
*Jun 7 22:58:01.184: %IOSXE-3-PLATFORM: R1/0: kernel: pci 0001:06:00.0: of_irq_parse_pci()
failed with rc=-22
*Jun 7 22:58:01.185: %IOSXE-3-PLATFORM: R1/0: kernel: pci 0001:06:00.0: of_irq_parse_pci()
failed with rc=-22
*Jun 7 22:58:01.185: %IOSXE-3-PLATFORM: R1/0: kernel: pci 0001:06:00.0: of_irq_parse_pci()
failed with rc=-22
*Jun 7 22:58:01.186: %IOSXE-3-PLATFORM: R1/0: kernel: pci 0001:06:00.0: of_irq_parse_pci()
failed with rc=-22
*Jun 7 22:58:01.188: %IOSXE-3-PLATFORM: R1/0: kernel: pci 0001:06:00.0: of_irq_parse_pci()
failed with rc=-22
*Jun 7 22:58:01.190: %IOSXE-3-PLATFORM: R1/0: kernel: pci 0001:06:00.0: of_irq_parse_pci()
failed with rc=-22
*Jun 7 22:58:01.191: %IOSXE-3-PLATFORM: R1/0: kernel: pci 0001:06:00.0: of_irq_parse_pci()
failed with rc=-22
*Jun 7 22:58:01.460: %IOSXE-3-PLATFORM: R1/0: kernel: pci 0001:0e:00.0: BAR 0: error
updating (high 0x00000f != 0x000000)
*Jun 7 22:58:01.508: %IOSXE-3-PLATFORM: R1/0: kernel: mdio_bus ffb4fc000: MDIO device at
address 3 is missing.
*Jun 7 22:58:01.509: %IOSXE-3-PLATFORM: R1/0: kernel: mdio_bus ffb4fc000: MDIO device at
address 4 is missing.
*Jul 26 08:29:51.405: %IOSXE_OIR-6-ONLINECARD: Card (rp) online in slot R1
*Jul 26 08:29:51.430: %IOSXE_RP_ALARM-6-INFO: cleared MAJOR module R1: Boot state
*Jul 26 08:30:01.032: %SYSHW-3-SYSHW_REG_READ: R0/0: emd: A register read operation has
failed for device: I2C_FAN_CTRL register: /sys/bus/i2c/devices/21-0020/templ_input error:
Invalid argument
*Jul 26 08:30:02.253: %IOSXE_OIR-6-ONLINECARD: Card (cc) online in slot 1
*Jul 26 08:30:02.265: %IOSXE_OIR-6-OFFLINECARD: Card (cc) offline in slot 1
*Jul 26 08:30:09.134: %IOSXE_OIR-6-ONLINECARD: Card (fp) online in slot F1
*Jul 26 08:30:33.646: %IOSXE-3-PLATFORM: R1/0: kernel: pcieport 0000:01:00.0:
of_irq_parse_pci() failed with rc=-22
*Jul 26 08:31:37.600: %IOSXE-3-PLATFORM: R1/0: uea_mgr: QDR 0 is Ready
*Jul 26 08:31:58.698: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion
(raw-event=PEER_FOUND(4))

*Jul 26 08:31:58.698: %IOSXE_RP_ALARM-6-INFO: cleared MAJOR module R0: Secondary removed
*Jul 26 08:31:58.699: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion
(raw-event=PEER_REDUNDANCY_STATE_CHANGE(5))

*Jul 26 08:32:01.578: %REDUNDANCY-3-IPC: IOS versions do not match.

*Jul 26 08:32:02.483: %HA_EM-6-LOG: Mandatory.uearp_stby_ios_mismatch_eem.tcl: AUTOMATIC
UPGRADE: CHASSIS IS NOT NCS. HENCE ABORTING AUTOMATIC UPGRADE
*Jul 26 08:32:23.494: %CMRP-6-FP_HA_STATUS: R1/0: cmand: F0 redundancy state is Active with
ready Standby
*Jul 26 08:32:23.669: %CMRP-6-FP_HA_STATUS: R0/0: cmand: F0 redundancy state is Active with
ready Standby
*Jul 26 08:32:56.373: %IOSXE_OIR-6-INSCARD: Card (cc) inserted in slot 1

```

## Example: Single Command Software Upgrade for RSP3 Module

```

*Jul 26 08:33:57.534: %ISSU-3-INCOMPATIBLE_PEER_UID: Setting image
(PPC_LINUX_IOSD-UNIVERSALK9_NPE-M), version (16.12.1prd15) on peer uid (49) as incompatible
*Jul 26 08:33:57.534: Config Sync: Bulk-sync failure due to Servicing Incompatibility.
Please check full list of mismatched commands via:
    show redundancy config-sync failures mcl

*Jul 26 08:33:57.534: Config Sync: Starting lines from MCL file:
-line aux 0
! <submode> "line"
  stopbits 1
! </submode> "line"

*Jul 26 08:33:58.540: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)Finished
wait for Standby RP to reach terminal redundancy state

STAGE 3: Installing sipspa package on local RP
=====
--- Starting install local lock acquisition on R0 ---
Finished install local lock acquisition on R0

--- Starting local lock acquisition on R0 ---
Finished local lock acquisition on R0

--- Starting installation state synchronization ---
Finished installation state synchronization

--- Starting file path checking ---

*Jul 26 08:34:03.729: %INSTALL-5-OPERATION_START_INFO: R0/0: provision: Started install
package bootflash:issu/*rsp3-sipspa*16.12.01prd15.SPA*.pkgFinished file path checking

--- Starting image file verification ---
Checking image file names
Locating image files and validating name syntax
    Found asr900rsp3-sipspa.16.12.01prd15.SPA.pkg
Verifying image file locations
Inspecting image file types
Processing image file constraints
Creating candidate provisioning file
Finished image file verification

--- Starting candidate package set construction ---
Verifying existing software set
Processing candidate provisioning file
Constructing working set for candidate package set
Constructing working set for running package set
Checking command output
Constructing merge of running and candidate packages
Checking if resulting candidate package set would be complete
Finished candidate package set construction

--- Starting ISSU compatibility verification ---
Verifying image type compatibility
Checking IPC compatibility with running software
Checking candidate package set infrastructure compatibility
Checking infrastructure compatibility with running software
Checking package specific compatibility
Finished ISSU compatibility verification

--- Starting impact testing ---
Checking operational impact of change
Finished impact testing

--- Starting list of software package changes ---

```

```
Old files list:
  Removed asr900rsp3-sipspa.16.11.01a.SPA.pkg
New files list:
  Added asr900rsp3-sipspa.16.12.01prd15.SPA.pkg
Finished list of software package changes

--- Starting commit of software changes ---
Updating provisioning rollback files
Creating pending provisioning file
Committing provisioning file
Finished commit of software changes

--- Starting analysis of software changes ---
Finished analysis of software changes

--- Starting update running software ---
Blocking peer synchronization of operating information
Creating the command set placeholder directory
  Finding latest command set
  Finding latest command shortlist lookup file
  Finding latest command shortlist file
  Assembling CLI output libraries
  Assembling CLI input libraries
  Assembling Dynamic configuration files
  Applying interim IPC and database definitions
  Replacing running software
  Replacing CLI software
  Restarting software
ISSU Sequence file found.
  Processing IM: 0/0
  ETA to Process Next IM: 160 seconds
  Processing IM: 0/1
  ETA to Process Next IM: 160 seconds
  Processing IM: 0/2
  ETA to Process Next IM: 160 seconds
  Processing IM: 0/3
  ETA to Process Next IM: 160 seconds
  Processing IM: 0/4
  ETA to Process Next IM: 160 seconds
  Processing IM: 0/5
  ETA to Process Next IM: 160 seconds
  Applying final IPC and database definitions
  Generating software version information
  Notifying running software of updates
  Unblocking peer synchronization of operating information
Cleaning temporary installation files
  Finished update running software

SUCCESS: Finished installing software.

*Jul 26 09:00:23.807: %INSTALL-5-OPERATION_COMPLETED_INFO: R0/0: provision: Completed install
package bootflash:issu/*rsp3-sipspa*16.12.01prd15.SPA*.pkgSTAGE 4: Installing software on
active RP
=====
--- Starting install local lock acquisition on R0 ---
Finished install local lock acquisition on R0

--- Starting local lock acquisition on R0 ---
Finished local lock acquisition on R0

--- Starting installation state synchronization ---
Finished installation state synchronization

--- Starting file path checking ---
```

## Example: Single Command Software Upgrade for RSP3 Module

```

*Jul 26 09:00:31.390: %INSTALL-5-OPERATION_START_INFO: R0/0: provision: Started install
package bootflash:issu/*rsp3-*16.12.01prd15.SPA*.pkgFinished file path checking

--- Starting image file verification ---
Checking image file names
Locating image files and validating name syntax
  Found asr900rsp3-espbase.16.12.01prd15.SPA.pkg
  Found asr900rsp3-rpaccess.16.12.01prd15.SPA.pkg
  Found asr900rsp3-rpbase.16.12.01prd15.SPA.pkg
  Found asr900rsp3-rpboot.16.12.01prd15.SPA.pkg
  Found asr900rsp3-rpcontrol.16.12.01prd15.SPA.pkg
  Found asr900rsp3-rpios-universalk9_npe.16.12.01prd15.SPA.pkg
  Found asr900rsp3-sipbase.16.12.01prd15.SPA.pkg
  Found asr900rsp3-sipspa.16.12.01prd15.SPA.pkg
Verifying image file locations
Inspecting image file types
  WARNING: In-service installation of IOSD package
  WARNING: requires software redundancy on target RP
  WARNING: or on-reboot parameter
  WARNING: Automatically setting the on-reboot flag
  WARNING: In-service installation of RP Base package
  WARNING: requires software reboot of target RP
Processing image file constraints
Creating candidate provisioning file
Finished image file verification

--- Starting candidate package set construction ---
Verifying existing software set
Processing candidate provisioning file
Constructing working set for candidate package set
Constructing working set for running package set
Checking command output
Constructing merge of running and candidate packages
Checking if resulting candidate package set would be complete
Finished candidate package set construction

--- Starting ISSU compatibility verification ---
Verifying image type compatibility
Checking IPC compatibility for candidate software
Checking candidate package set infrastructure compatibility
Checking infrastructure compatibility with running software
Checking infrastructure compatibility with running software ... skipped
Checking package specific compatibility
Finished ISSU compatibility verification

--- Starting list of software package changes ---
Old files list:
  Removed asr900rsp3-espbase.16.11.01a.SPA.pkg
  Removed asr900rsp3-rpaccess.16.11.01a.SPA.pkg
  Removed asr900rsp3-rpbase.16.11.01a.SPA.pkg
  Removed asr900rsp3-rpboot.16.11.01a.SPA.pkg
  Removed asr900rsp3-rpcontrol.16.11.01a.SPA.pkg
  Removed asr900rsp3-rpios-universalk9_npe.16.11.01a.SPA.pkg
  Removed asr900rsp3-sipbase.16.11.01a.SPA.pkg
New files list:
  Added asr900rsp3-espbase.16.12.01prd15.SPA.pkg
  Added asr900rsp3-rpaccess.16.12.01prd15.SPA.pkg
  Added asr900rsp3-rpbase.16.12.01prd15.SPA.pkg
  Added asr900rsp3-rpboot.16.12.01prd15.SPA.pkg
  Added asr900rsp3-rpcontrol.16.12.01prd15.SPA.pkg
  Added asr900rsp3-rpios-universalk9_npe.16.12.01prd15.SPA.pkg
  Added asr900rsp3-sipbase.16.12.01prd15.SPA.pkg
Finished list of software package changes

```



```
--- Starting commit of software changes ---
Updating provisioning rollback files
Creating pending provisioning file
Committing provisioning file
Finished commit of software changes

SUCCESS: Software provisioned.  New software will load on reboot.

*Jul 26 09:07:55.045: %INSTALL-5-OPERATION_COMPLETED_INFO: R0/0: provision: Completed install
package bootflash:issu/*rsp3-*16.12.01prd15.SPA*.pkgSTAGE 5: Restarting active RP (switchover
to stbby)
=====
--- Starting active reload ---
Finished active reload

SUCCESS: node ISSU finished successfully.
Jul 26 09:08:04.327: %PMAN-5-EXITACTION: F0/0: pvp: Process manager is exiting: process
exit with reload fru code
Jul 26 09:08:05.622: %PMAN-5-EXITACTION: R0/0: pvp: Process manage

BootPage Setting Done - Next DDR-init

System Bootstrap, Version 15.6(33r)S, RELEASE SOFTWARE (fc1)

Technical Support: http://www.cisco.com/techsupport

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Compiled Sat 06-Oct-18 23:23 by pallavik

Starting Initialization of FMAN0

Loading ucode for FMAN0, size: 31424, ver: 106.04.14

fixup address:7ffff278 contentsuffixup:7ffff000

DCFG_CCSR_PORSR1(cfg_0_9 pins):22FB7F7F

RC Vendor ID[0x8241957]

PEX up stream Vendor ID[0x860910b5]

PEX down stream vendor ID [0x860910b5]

FPGA vendor ID[0x5f1137]

PCI Configuration done..

IOFPGA version[19052734]

Current image running: Boot ROM0

Last reset cause: RSP-Board

Configuring zarlink...

C-Inlet temp 40C

ARAD-0 temp 55C

UEA platform with 3670016 Kbytes of main memory
```

```

Checking eUSB devices..
USB PHY clock valid[0x20000]
USB0:   USB EHCI 1.00
allocating the qtd buffer..
scanning bus 0 for devices... port 1 connection change
hub_port_reset: resetting port 0...
STAT_C_CONNECTION = 0 STAT_CONNECTION = 1  USB_PORT_STAT_ENABLE 1
hub_port_reset: resetting port 0...
STAT_C_CONNECTION = 0 STAT_CONNECTION = 1  USB_PORT_STAT_ENABLE 1
port 1 connection change
hub_port_reset: resetting port 0...
STAT_C_CONNECTION = 0 STAT_CONNECTION = 1  USB_PORT_STAT_ENABLE 1
hub_port_reset: resetting port 0...
STAT_C_CONNECTION = 0 STAT_CONNECTION = 1  USB_PORT_STAT_ENABLE 1
3 USB Device(s) found
USB1:   USB EHCI 1.00
scanning bus 1 for devices... 1 USB Device(s) found
    scanning usb for storage devices... 1 Storage Device(s) found
Located issu/packages.conf
Image size 8034 inode num 32464, bks cnt 2 blk size 8*512
#
Located issu/asr900rsp3-rpboot.16.12.01prd15.SPA.pkg
Image size 35163995 inode num 32461, bks cnt 8585 blk size 8*512
=====
Boot image size = 35163995 (0x2188f5b) bytes

Package header rev 3 structure detected
Calculating SHA-1 hash...done
validate_package_cs: SHA-1 hash:
    calculated 1910f63e:c01a63ee:18d0e6d1:ebf6233c:e445a270
    expected   1910f63e:c01a63ee:18d0e6d1:ebf6233c:e445a270

```

```
No suitable keys found in the key storage. 22
RSA Signed RELEASE Image Signature Verification Successful.
Image validated
Passing control to the main image..
```

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All TCP AO KDF Tests Pass  
cisco ASR-903 (RSP3\_200) processor (revision RSP3\_200) with 1948285K/6147K bytes of memory.  
Processor board ID FOX1606P060  
32768K bytes of non-volatile configuration memory.  
8388608K bytes of physical memory.  
5703875K bytes of eMMC flash at bootflash:.

```
Authentication passed
```

## Example: Single Command Software Upgrade

```
Router# request platform software package install node file bootflash:XE371_k9_0810.bin
interface-module-delay 150
```

```
NOTE: Currently node has booted from a provisioning file
NOTE: Going to start a dual rp sub-packages node ISSU install
--- Starting initial file path checking ---
Copying bootflash:XE371_k9_0810.bin to stby-bootflash:XE371_k9_0810.bin
Finished initial file path checking
--- Starting config-register verification ---
Finished config-register verification
--- Starting image file expansion ---
Expanding image file: bootflash:XE371_k9_0810.bin
Image file expanded and copied
Expanding image file: stby-bootflash:XE371_k9_0810.bin
Image file expanded and copied
Finished image file expansion
STAGE 1: Installing software on standby RP
=====
--- Starting local lock acquisition on R0 ---
Finished local lock acquisition on R0
--- Starting installation state synchronization ---
Finished installation state synchronization
--- Starting local lock acquisition on R1 ---
Finished local lock acquisition on R1
--- Starting file path checking ---
Finished file path checking
--- Starting image file verification ---
Checking image file names
Locating image files and validating name syntax
  Found asr903rsp1-espbase.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
  Found asr903rsp1-rpaccess.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
  Found asr903rsp1-rpbase.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
  Found asr903rsp1-rpcontrol.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
  Found asr903rsp1-rpios-universalk9_npe.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg

  Found asr903rsp1-sipbase.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
  Found asr903rsp1-sipspa.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
Verifying image file locations
Inspecting image file types
  WARNING: In-service installation of IOSD package
  WARNING: requires software redundancy on target RP
  WARNING: or on-reboot parameter
  WARNING: Automatically setting the on-reboot flag
  WARNING: In-service installation of RP Base package
  WARNING: requires software reboot of target RP
Processing image file constraints
Creating candidate provisioning file
Finished image file verification
--- Starting candidate package set construction ---
Verifying existing software set
Processing candidate provisioning file
Constructing working set for candidate package set
Constructing working set for running package set
Checking command output
Constructing merge of running and candidate packages
Checking if resulting candidate package set would be complete
```

```

Finished candidate package set construction
--- Starting compatibility testing ---
Determining whether candidate package set is compatible
Determining whether installation is valid
Determining whether installation is valid ... skipped
Verifying image type compatibility
Checking IPC compatibility for candidate software
Checking candidate package set infrastructure compatibility
Checking infrastructure compatibility with running software
Checking infrastructure compatibility with running software ... skipped
Checking package specific compatibility
Finished compatibility testing
--- Starting list of software package changes ---
Old files list:
  Removed asr903rspl-espbase.2012-08-12_15.26_amprajap.pkg
  Removed asr903rspl-rpaccess.2012-08-12_15.26_amprajap.pkg
  Removed asr903rspl-rpbase.2012-08-12_15.26_amprajap.pkg
  Removed asr903rspl-rpcontrol.2012-08-12_15.26_amprajap.pkg
  Removed asr903rspl-rpios-universalk9_npe.2012-08-12_15.26_amprajap.pkg
  Removed asr903rspl-sipbase.2012-08-12_15.26_amprajap.pkg
  Removed asr903rspl-sipspsa.2012-08-12_15.26_amprajap.pkg
New files list:
  Added asr903rspl-espbase.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
  Added asr903rspl-rpaccess.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
  Added asr903rspl-rpbase.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
  Added asr903rspl-rpcontrol.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
  Added asr903rspl-rpios-universalk9_npe.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
  Added asr903rspl-sipbase.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
  Added asr903rspl-sipspsa.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
Finished list of software package changes
--- Starting commit of software changes ---
Updating provisioning rollback files
Creating pending provisioning file
Committing provisioning file
Finished commit of software changes
SUCCESS: Software provisioned. New software will load on reboot.
STAGE 2: Restarting standby RP
=====
--- Starting standby reload ---
Finished standby reload
--- Starting wait for Standby RP to reach terminal redundancy state ---
Finished wait for Standby RP to reach terminal redundancy state
STAGE 3: Installing sipspsa package on local RP
=====
--- Starting local lock acquisition on R0 ---
Finished local lock acquisition on R0
--- Starting installation state synchronization ---
Finished installation state synchronization
--- Starting file path checking ---
Finished file path checking
--- Starting image file verification ---
Checking image file names
Locating image files and validating name syntax
  Found asr903rspl-sipspsa.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
Verifying image file locations
Inspecting image file types
Processing image file constraints
Creating candidate provisioning file
Finished image file verification
--- Starting candidate package set construction ---
Verifying existing software set
Processing candidate provisioning file
Constructing working set for candidate package set

```

```

Constructing working set for running package set
Checking command output
Constructing merge of running and candidate packages
Checking if resulting candidate package set would be complete
Finished candidate package set construction
--- Starting compatibility testing ---
Determining whether candidate package set is compatible
WARNING:
WARNING: Candidate software combination not found in compatibility database
WARNING:
Determining whether installation is valid
WARNING:
WARNING: Candidate software combination not found in compatibility database
WARNING:
WARNING:
WARNING: Candidate software combination not found in compatibility database
WARNING:
Software sets are identified as compatible
Verifying image type compatibility
Checking IPC compatibility with running software
Checking candidate package set infrastructure compatibility
Checking infrastructure compatibility with running software
Checking package specific compatibility
Finished compatibility testing
--- Starting impact testing ---
Checking operational impact of change
Finished impact testing
--- Starting list of software package changes ---
Old files list:
  Removed asr903rsp1-sipspa.2012-08-12_15.26_amprajap.pkg
New files list:
  Added asr903rsp1-sipspa.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
Finished list of software package changes
--- Starting commit of software changes ---
Updating provisioning rollback files
Creating pending provisioning file
Committing provisioning file
Finished commit of software changes
--- Starting analysis of software changes ---
Finished analysis of software changes
--- Starting update running software ---
Blocking peer synchronization of operating information
Creating the command set placeholder directory
  Finding latest command set
  Finding latest command shortlist lookup file
  Finding latest command shortlist file
  Assembling CLI output libraries
  Assembling CLI input libraries
  Assembling Dynamic configuration files
  Applying interim IPC and database definitions
  Replacing running software
  Replacing CLI software
  Restarting software
  Restarting IM: 0/0
Skipping IM reload for Ethernet IM
  Restarting IM: 0/1
Skipping IM reload for Ethernet IM
  Restarting IM: 0/2
Skipping IM reload for Ethernet IM
  Restarting IM: 0/3
Skipping IM reload for Ethernet IM
  Restarting IM: 0/4
Skipping IM reload for Ethernet IM
  Applying final IPC and database definitions

```

```

Generating software version information
Notifying running software of updates
Unblocking peer synchronization of operating information
Unmounting old packages
Cleaning temporary installation files
Finished update running software

SUCCESS: Finished installing software.
STAGE 4: Installing software on active RP
=====
--- Starting local lock acquisition on R0 ---
Finished local lock acquisition on R0
--- Starting installation state synchronization ---
Finished installation state synchronization
--- Starting file path checking ---
Finished file path checking
--- Starting image file verification ---
Checking image file names
Locating image files and validating name syntax
Found asr903rspl-espbase.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
Found asr903rspl-rpaccess.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
Found asr903rspl-rpbase.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
Found asr903rspl-rpcontrol.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
Found asr903rspl-rpios-universalk9_npe.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg

Found asr903rspl-sipbase.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
Found asr903rspl-sipspsa.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
Verifying image file locations
Inspecting image file types
WARNING: In-service installation of IOSD package
WARNING: requires software redundancy on target RP
WARNING: or on-reboot parameter
WARNING: Automatically setting the on-reboot flag
WARNING: In-service installation of RP Base package
WARNING: requires software reboot of target RP
Processing image file constraints
Creating candidate provisioning file
Finished image file verification
--- Starting candidate package set construction ---
Verifying existing software set
Processing candidate provisioning file
Constructing working set for candidate package set
Constructing working set for running package set
Checking command output
Constructing merge of running and candidate packages
Checking if resulting candidate package set would be complete
Finished candidate package set construction
--- Starting compatibility testing ---
Determining whether candidate package set is compatible
Determining whether installation is valid
Determining whether installation is valid ... skipped
Verifying image type compatibility
Checking IPC compatibility for candidate software
Checking candidate package set infrastructure compatibility
Checking infrastructure compatibility with running software
Checking infrastructure compatibility with running software ... skipped
Checking package specific compatibility
Finished compatibility testing
--- Starting list of software package changes ---
Old files list:
Removed asr903rspl-espbase.2012-08-12_15.26_amprajap.pkg
Removed asr903rspl-rpaccess.2012-08-12_15.26_amprajap.pkg
Removed asr903rspl-rpbase.2012-08-12_15.26_amprajap.pkg
Removed asr903rspl-rpcontrol.2012-08-12_15.26_amprajap.pkg

```

## Example: Single Command Software Upgrade

```

Removed asr903rsp1-rpios-universalk9_npe.2012-08-12_15.26_amprajap.pkg
Removed asr903rsp1-sipbase.2012-08-12_15.26_amprajap.pkg
New files list:
  Added asr903rsp1-espbase.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
  Added asr903rsp1-rpaccess.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
  Added asr903rsp1-rpbase.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
  Added asr903rsp1-rpcontrol.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
  Added asr903rsp1-rpios-universalk9_npe.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg

  Added asr903rsp1-sipbase.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
Finished list of software package changes
--- Starting commit of software changes ---
Updating provisioning rollback files
Creating pending provisioning file
Committing provisioning file
Finished commit of software changes
SUCCESS: Software provisioned. New software will load on reboot.
STAGE 5: Restarting active RP (switchover to stdby)
=====
--- Starting active reload ---
Finished active reload
SUCCESS: node ISSU finished successfully.
RUDY-1#
RUDY-1#Aug 24 07:54:41.715 R0/0: %PMAN-5-EXITACTION: Process manager is exiting: reload fru
  action requested
System Bootstrap, Version 15.3(1r)S1, RELEASE SOFTWARE (fc1)
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Compiled Tue 26-Jun-12 12:42 by ccai
Current image running: Boot ROM0UEA platform with 3670016 Kbytes of main memory
Located packages.conf
Image size 7519 inode num 38, bks cnt 2 blk size 8*512
#
Located asr903rsp1-rpbase.BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021.pkg
Image size 34216240 inode num 90631, bks cnt 8354 blk size 8*512
#####
#####
#####
#####
Boot image size = 34216240 (0x20a1930) bytes
Package header rev 0 structure detected
Calculating SHA-1 hash...done
validate_package: SHA-1 hash:
      calculated e7674970:dbc1eb86:325219c7:b3da0e0f:077e5e4d
      expected  e7674970:dbc1eb86:325219c7:b3da0e0f:077e5e4d
Image validated
%IOSXEBOOT-4-BOOT_ACTIVITY_LONG_TIME: (rp/0): load_crash_kernel took: 2 seconds, expected
max time 2 seconds
%IOSXEBOOT-4-DEBUG_CONF: (rp/0): File /bootflash/debug.conf is absent, ignoring
%IOSXEBOOT-4-BOOT_ACTIVITY_LONG_TIME: (rp/0): Chassis initialization took: 26 seconds,
expected max time 10 seconds
%IOSXEBOOT-4-BOOT_ACTIVITY_LONG_TIME: (rp/0): upgrade hw-programmable took: 2 seconds,
expected max time 2 seconds
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```



```

Experimental Version 15.2(20120810:081250)
[v152_4_s_xe37_throttle-BLD-BLD_V152_4_S_XE37_THROTTLE_LATEST_20120810_070021-ios 131]
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cisco ASR-903 (RSP1) processor with 540359K/6147K bytes of memory.
Processor board ID FOX1518POGP
32768K bytes of non-volatile configuration memory.
3670016K bytes of physical memory.
1328927K bytes of SD flash at bootflash:.
Press RETURN to get started!

```

## Additional References

### Related Documents

Related Topic	Document Title
Cisco IOS master command list	<a href="#">Cisco IOS Master Command List</a> , All Releases
Cisco IOS High Availability commands	<i>Cisco IOS High Availability Command Reference</i>

### Standards

Standard	Title
No new or modified standards are supported, and support for existing standards has not been modified.	--

**MIBs**

MIB	MIBs Link
No new or modified MIBs are supported, and support for existing MIBs has not been modified.  Cisco ASR 900 Series Aggregation Services Routers MIB Specifications Guide	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>  <a href="#">Cisco ASR 900 Series Aggregation Services Routers MIB Specifications Guide</a>

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