



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.

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.

Sub-Package	Purpose
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. Note 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.
system:	The system memory file system, which includes the running configuration.
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. Note 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 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.version.bin	asr900rsp2-rpbase.version.pkg
			asr900rsp2-rpcontrol.version.pkg
			asr900rsp2-rpaccess.version.pkg
			asr900rsp2-rpios-universal.version.pkg
			asr900rsp2-espbases.version.pkg
			asr900rsp2-sipbase.version.pkg
			asr900rsp2-sipspace.version.pkg
			asr900rsp2-packages-universal.version.conf
			packages.conf
ASR 903 RSP2 Module	Cisco ASR 903 Series RSP2 UNIVERSAL NPE	asr900rsp2-universalk9_npe.version.bin	asr900-hw-programmables.version.pkg
			asr900rsp2-espbases.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-sipspace.version.pkg
			packages.conf

Table 4: 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-sipspace.version .pkg
			asr900rsp3-packages-universal.version.conf
			packages.conf
ASR 900 RSP3 Module	Cisco ASR 900 Series RSP3 UNIVERSAL NPE	asr900rsp3-universalk9_npe.version .bin	asr900-hw-programmables.version .pkg
			asr900rsp3-espbase.version .pkg
			asr900rsp3-packages-universalk9.version .pkg
			asr900rsp3-rpaccess.version .pkg
			asr900rsp3-rpbase.version .pkg
			asr900rsp3-rpcontrol.version .pkg
			asr900rsp3-rpios-universalk9_npe.version .pkg
			asr900rsp3-sipbase.version.pkg
			asr900rsp3-sipspace.version.pkg
			packages.conf

ROMMON Version Requirements

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 5: 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.
core files	The bootflash/core directory is the storage area for .core files. Warning 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. Warning 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 7](#). In the following example, the image is located in the bootflash: Image/image-name.

Procedure

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 **configure terminal****Example:**

```
Router# configure terminal
```

Enters configuration mode.

Step 5 **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 6 **exit****Example:**

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

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

Step 7 **copy running-config startup-config****Example:**

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

Saves the configuration.

Step 8 **reload****Example:**

```
Router#reload
```

Reloads the router.

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](#).



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

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 5](#)

Procedure

- Step 1** Download the new image file from Cisco.com on the chassis.
- For more information about downloading Cisco software image, see Using Cisco IOS XE Software in [Cisco ASR 903 Router Chassis Software Configuration Guide](#).
- Step 2** Open a console session to the active RSP.
- For instructions on how to open a console session, see Console Port, Telnet, and SSH Handling in [Cisco ASR 903 Router Chassis Software Configuration Guide](#).
- 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.

## Completing the Single Command Upgrade

**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.

**Note**

The Ethernet interface modules may reset, when firmware changes with the IOS image. The TDM interface modules reset during the upgrade, irrespective of firmware changes with the IOS image.

## Procedure

- 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/asr903rspl-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 11](#).
- 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 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.

## Procedure

- 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.
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 and ROM1 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

```
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 ---
```

**Example: Single Command Software Upgrade**

```

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 asr903rsp1-espbase.2012-08-12_15.26_amprajap.pkg
 Removed asr903rsp1-rpaccess.2012-08-12_15.26_amprajap.pkg
 Removed asr903rsp1-rpbase.2012-08-12_15.26_amprajap.pkg
 Removed asr903rsp1-rpcontrol.2012-08-12_15.26_amprajap.pkg
 Removed asr903rsp1-rpios-universalk9_npe.2012-08-12_15.26_amprajap.pkg

```

```

Removed asr903rspl-sipbase.2012-08-12_15.26_amprajap.pkg
Removed asr903rspl-sipsa.2012-08-12_15.26_amprajap.pkg
New files list:
 Added asr903rspl-espbases.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-rpbases.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-sipsa.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 sipsa 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-sipsa.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

```

## Example: Single Command Software Upgrade

```

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-espbases.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-rpbases.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-sipspace.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-espbases.2012-08-12_15.26_amprajap.pkg
 Removed asr903rspl-rpaccess.2012-08-12_15.26_amprajap.pkg
 Removed asr903rspl-rpbases.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
New files list:
 Added asr903rspl-espbases.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-rpbases.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
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)
=====

```

## Example: Single Command Software Upgrade

```

--- 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)
Technical Support: http://www.cisco.com/techsupport
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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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 San Jose, California 95134-1706
Cisco IOS Software, IOS-XE Software (PPC_LINUX_IOSD-UNIVERSALK9_NPE-M),
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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 If you require further assistance please contact us by sending email to [export@cisco.com](mailto:export@cisco.com).  
 cisco ASR-903 (RSP1) processor with 540359K/6147K bytes of memory.  
 Processor board ID FOX1518P0GP  
 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.<br><br>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><br><br><a href="#">Cisco ASR 900 Series Aggregation Services Routers MIB Specifications Guide</a> |

### RFCs

| RFC                                                                                         | Title |
|---------------------------------------------------------------------------------------------|-------|
| No new or modified RFCs are supported, and support for existing RFCs has not been modified. | --    |

**Technical Assistance**

| Description                                                                                                                                                                                                                                                                                                                                                                           | Link                                                                                                              |
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| The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password. | <a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a> |