Installing and Upgrading Software

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 that are extracted from the consolidated image. This mode provides optimized memory usage and requires that you store files in the bootflash directory.

Understanding Software Packages

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

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

ROMMON Version Requirements

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

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 1: 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.

File or Directory	Description
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.

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.

ISSU Support Matrix

Legend:

NA: Not Applicable

NS: Not Supported

Table 2: 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 to 6)	16.6.X (X = 7 and later)	16.7.X (X = 1 and later)	16.8.X (X= 1)	16.9.X (X=1,2)	16.9.X (X= 3 and later)	1A.X (X = 1 and later)	1Q.X (X= 1 and later)	17.1.1	17.3.1[5]	17.4.1	17.5.1	17.6.1	17.7.1	17.8.1
16.5.1	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
16.5.X (X=2 and 3)	NS	NA	NS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NS	NS	NS	NS	NS	NS

	Supported ISSU Upgrade Or Downgrade Version																	
16.6.1	NS	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
16.6.X (X=2 to 6)	NS	Yes	NS	Yes	Yes	Yes[1]	Yes[1]	Yes[1]	Yes	Yes[1,2]	Yes	Yes[1,3]	Yes	Yes[3,1,6]	Yes[3,1]	Yes[3,1]	Yes[3,1]	Yes[3,1]
16.6.X (X=7 and later)	NS	Yes	NS	Yes	Yes	Yes[1]	Yes[1]	Yes[1]	Yes	Yes[3]	Yes	Yes[3,1]	Yes[3]	Yes[3,6]	Yes	Yes	Yes	Yes
16.7.X (X = 1 and later)	NS	Yes	NS	Yes	Yes	NA	Yes	Yes	Yes	Yes[3]	Yes	Yes[3]	Yes[3]	Yes[3,6]	Yes[3]	Yes[3]	Yes[3]	Yes[3]
16.8.X (X = 1)	NS	Yes	NS	NS	NS	Yes	NS	Yes	Yes	Yes	Yes	Yes[3]	Yes[3]	Yes[3,6]	Yes[3]	Yes[3]	Yes[3]	Yes[3]
16.9.X (X = 1-2)	NS	Yes	NS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes[3]	Yes[3]	Yes[3,6]	Yes[3]	Yes[3]	Yes[3]	Yes[3]
16.9.X (X = 3 and later)	NS	Yes	NS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes[6]	Yes	Yes	Yes	Yes
16.11.X (X = 1 and later)	NS	Yes	NS	Yes	Yes	Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes[3,4]	Yes[3,4,6]	Yes[3,4]	Yes[3,4]	Yes[3,4]	Yes[3,4]
16.12.1	Yes	Yes	NS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes[6]	Yes	Yes	Yes	Yes
17.1.1	NS	NS	NS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NS	Yes	Yes[6]	Yes	Yes	Yes	Yes
17.3.1[5]	NS	NS	NS	NS	NS	NS	NS	NS	Yes	Yes	Yes	Yes	NA	Yes[6]	Yes	Yes	Yes	Yes
17.4.1[6]	NS	NS	NS	NS	NS	NS	NS	NS	Yes	Yes	Yes	Yes	Yes[6]	NA	Yes	Yes	Yes	Yes
17.5.1	NS	NS	NS	NS	NS	NS	NS	NS	Yes	Yes	Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes

	Supported ISSU Upgrade Or Downgrade Version																	
17.6.1[7]	NS	NS	NS	NS	NS	NS	NS	NS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	Yes	Yes
17.7.1	NS	NS	NS	NS	NS	NS	NS	NS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	Yes
17.8.1	NS	NS	NS	NS	NS	NS	NS	NS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA

[1] With CEM IMs the ISSU (upgrade) is not supported directly from Cisco IOS XE Release 16.6.x to 16.7.3 or16.8.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.

[2] Step ISSU (upgrade) to 17.1.1 with any of these images as intermediate image (16.9.3 and higher)

[3] Step ISSU (upgrade) to 17.X.X with any of these images as intermediate image (16.9.3 or higher, 16.11.1 and 16.12.1)

[4] Step ISSU (upgrade) to 17.x.x with any of these images as intermediate image (16.12.3)

[5] The 17.3.1 image auto ROMMON upgrade enables the RSP for an additional reset during software upgrade if the RSP does not have the latest ROMMON version.

[6] Upgrade ISSU from 16.x.x or 17.x.x to the 17.3.1or 17.3.2 or 17.4.1 release using single-step ISSU upgrade.

[7] The 17.6.1 image auto ROMMON upgrade enables the RSP for an additional reset during software upgrade if the RSP does not have the latest ROMMON version.

> **Note**
>
> • All phase 1 interface modules undergo FPGA upgrade during the ISSU to Cisco IOS XE 17.4.1 from any earlier releases. This impacts the traffic for that IM until the FPGA is upgraded and the IM comes up after reload.
>
> • All phase 1 and phase 2 interface modules undergo FPGA upgrade during ISSU to Cisco IOS XE 17.8.1 from any earlier releases in RSP2 and RSP3. This impacts the traffic for that interface module until the FPGA is upgraded and the interface module comes up after reload.
>
> • For the phase 1 interface module nodes which are ISSU upgraded from Cisco IOS XE 17.4.1 or later release to Cisco IOS XE 17.8.1, the traffic is not impacted.
>
> Refer the following table for supported IMs:

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.

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 3.

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.

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.

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:

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 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 12.

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.

Performing Step-by-Step Upgrade

| **Note** | Ensure that the wildcard "**-*.**" is used while installing the packages on the active RSP module (Step 8). |

Step 1   Verify the chassis is booted using sub-package mode and in hot standby state, else set the router to sub-package mode, see Setting the Router to Boot in Sub-Package Mode, on page 3.

Step 2   Download the image on the chassis.

Step 3   Extract the sub-package images from the image on the active RSP using the **request platform software package expand file bootflash:Image/** command.

Step 4   Extract the sub-package image from the image on the standby RSP using the **request platform software package expand file** command.

Step 5   Upgrade all the sub-packages on the standby RSP using the **request platform software package install rp** *stdby_slot_num* **file** command.

Step 6   Reload the standby module from active RP using the **hw-module slot** *stdby_slot_num* **reload** command and wait for the standby to reach Hot standby state.

Step 7   (Optional) Reload the interface modules in a sequence using the **platform issu reload interface-module sequence** *sequence of all IMs* command.

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 8   Execute the **request platform software package install file noderp** *active_slot_num* **file slot** *active_slot_num* **bay** *im_slot_num* **force** command for each IM present in the router.

| **Note** | The interface modules present are reset during the installation. Verify that the IM state is OK before proceeding to the next interface module. |

Step 9   Upgrade all the sub-packages on the active RSP using the **request platform software package install rp** *active_slot_num* **file** command.

Step 10   Perform a switchover. Wait for the new standby RSP module to reach hot standby state.

The latest image is upgraded on the router.

Note   If you have missed the package installation on any of the IM in Step 7 and proceeded to Step 8, the packages are automatically installed for the missed IMs. The IMs may reset if the firmware changes in Step8.

Upgrading the ROMMON on the RSP Module

Table 3: Feature History

Feature Name	Release Information	Description
Secondary ROMMON Partition Auto Upgrade	Cisco IOS XE Bengaluru 17.4.1	This feature supports secondary ROMMON partition auto upgrade after a successful primary ROMMON partition is complete for NCS 4216 routers.
Secondary ROMMON Version Auto Upgrade	Cisco IOS XE Bengaluru 17.5.1	After primary ROMMON version is auto upgraded, secondary ROMMON version auto upgrade process takes place. The secondary ROMMON upgrade is only completed during the next planned manual reload of the router. This is applicable to NCS 4201/4202 routers.

Starting with Cisco IOS XE Bengaluru release, 17.6.1, the 15.6(49r)S ROMMON version filters the restricted ROMMON variables during the bootup.

Starting with Cisco IOS XE Bengaluru release, 17.5.1, secondary ROMMON partition is also auto upgraded after a successful primary ROMMON partition upgrade is complete. You can reload the router at the next planned reload to complete the secondary ROMMON upgrade.

Note   If the secondary ROMMON version is lesser than that of the primary ROMMON version, the secondary ROMMON gets auto upgraded.

For Cisco IOS XE Amsterdam Release 17.3.x, Cisco IOS XE Bengaluru Release 17.4.x, and earlier, the secondary ROMMON partition is not auto upgraded. You must manually upgrade it using the **upgrade rom-mon filename** command.

Starting with ROMMON release version 15.6(43r)S, ROMMON version is secure. Once the ROMMON version is upgraded, it cannot be downgraded to a non-secure ROMMON version.

Secure ROMMON is supported from Cisco IOS XE Amsterdam Release 17.3.1 onwards. However, it is compatible with all the releases.

Any future secure ROMMON upgrade or downgrade is only possible from Cisco IOS XE Amsterdam Release 17.3.1 onwards.

Any non-secure FPGA bundled releases moving to Cisco IOS XE Bengaluru Release 17.3.x or future releases can result in an FPGA upgrade and a ROMMON upgrade. If FPGA upgrade happens parallely with the ROMMON upgrade, you can only expect a single reload. If FPGA upgrade gets delayed and happens post ROMMON upgrade, two reloads are expected to complete both the upgrade processes. This is followed by a successful bootup of the target release image.

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

Note For Cisco IOS XE Gibraltar Release 16.9.5, Cisco IOS XE Gibraltar Release 16.12.3, Cisco IOS XE Amsterdam 17.1.x, and Cisco IOS XE Amsterdam 17.3.1, a minimum diskspace of 2 MB is required in the boot flash memory file system for a successful ROMMON auto upgrade process. For a diskspace lesser than 2 MB, ROMMON auto upgrade fails and the router reboots.

Note Routers running a ROMMON version that is lower than version 15.6(33r)S is auto upgraded to version 15.6(33r)S during a router restart. However, if a Cisco IOS XE release with ROMMON image is bundled with a version lower than the running ROMMON version, then the ROMMON is not auto downgraded.

Note Before installing the Cisco IOS XE Amsterdam 17.3.1, you *must* upgrade the ROMMON to version 15_6_43r_s or higher to avoid bootup failure. This is applicable to NCS 4202 routers.

Note Starting with Cisco IOS XE Amsterdam 17.3.1, While performing an auto upgrade of ROMMON, only primary partition is upgraded. Use the **upgrade rom-mon filename** command to upgrade the secondary partition of the ROMMON. However, the router can be reloaded during the next planned reload to complete the secondary ROMMON upgrade.

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:

Step 3 Use the **upgrade rom-monitor filename 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 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:

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

Example:

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

```
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 verfication
--- 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 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 asr903rsp1-sipbase.2012-08-12_15.26_amprajap.pkg
  Removed asr903rsp1-sipspa.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
  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
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 sipspa 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 asr903rsp1-sipspa.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 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 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)
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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           170 West Tasman Drive
           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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http://www.cisco.com/wwl/export/crypto/tool/stqrg.html
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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!
```

Fast Booting the RSP3 .bin Image

Table 4: Feature History

Feature Name	Release Information	Feature Description
Fast Booting the RSP3 .bin Image	Cisco IOS XE Amsterdam 17.3.1	A new command **platform fastboot** is introduced on the RSP3 module. When enabled on the RSP3 module that is pre-booted with .bin image, on the next reboot, the ROMMON boots up with the corresponding packages.conf image. Boot up from the packages.conf image is much faster and thus, the boot time is reduced approximately by six to eight minutes.

Effective with Cisco IOS XE Release 17.3.1, **platform fastboot** command is introduced on the RSP3 module. When enabled on the RSP3 module that is pre-booted with .bin image, on the next reboot, the ROMMON boots up with the corresponding packages.conf image. Boot up from the packages.conf image is much faster and thus, the boot time is reduced approximately by six to eight minutes.

Limitations

- ISSU is not supported.

- ROMMON version 15.6(36r)S or above must be present.

- If the autoboot image name is changed when the **platform fastboot** command is already enabled, the **platform fastboot** command gets disabled.

The following procedure explains how to enable the **platform fastboot** command.

```
Router#enable
Router#configure terminal
Router(conf)#platform fastboot
Router(conf)#end
```

Use the following command to verify that the **platform fastboot** command is enabled.

```
Router#show running-config | i fastboot
platform fastboot
```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS master command list	Cisco IOS Master Command List , All Releases
Cisco IOS High Availability commands	*Cisco IOS High Availability Command Reference*

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.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

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

Technical Assistance

Description	Link
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.	http://www.cisco.com/cisco/web/support/index.html