

Consolidated Packages and SubPackages Management

This chapter discusses how consolidated packages and software subpackages (individual and optional) are managed and are used to run the Cisco ASR 1000 Series Aggregation Services Routers. It contains the following sections:

Note This section of the document does not discuss limited downtime upgrades. For information on limited downtime upgrades, see the "Software Upgrade Processes Supported by Cisco ASR 1000 Series Routers" section on page 6-1 .

- Running the Cisco ASR 1000 Series Routers: An Overview, page 1
- Software File Management Using Command Sets, page 4
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Running the Cisco ASR 1000 Series Routers: An Overview

The Cisco ASR 1000 Series Routers can be run using a complete consolidated package or using individual subpackages.

This section covers the following topics:

Running the Cisco ASR 1000 Series Routers Using Individual and Optional SubPackages: An Overview

The Cisco ASR 1000 Series Routers can be configured to run using individual subpackages and optional subpackages.

When the router is configured to run using individual and optional subpackages:

- Each individual subpackage within a consolidated package is extracted onto the router as its own file.
- Additionally, any optional subpackages must be separately downloaded and stored in the same directory with the provisioning file and the other individual subpackages that have been extracted.
- The router then runs by accessing each file as needed for operational purposes. All individual and optional subpackage files must be stored in the same directory on the router for the router to run properly using individual subpackages.

When a Cisco ASR 1000 Series Router is configured to run using individual and optional subpackages, software image content from the RP is copied into memory on an as-needed basis only. Memory is conserved for other router processes, such as passing traffic. The router, therefore, allows for the highest peak traffic load when configured to run using individual subpackages.

When running the Cisco ASR 1000 Series Routers using individual and optional subpackages, the router must be configured to boot using the provisioning file that was included in the consolidated package with the individual subpackage files. This provisioning file must also be in the same directory as the individual and optional subpackage files. The router boots faster when configured to run using individual and optional subpackages than it does when configured to run using a consolidated package.

A Cisco ASR 1000 Series Router cannot be configured to run individual and optional subpackages stored on a TFTP or any other network server. The individual and optional subpackages along with the provisioning file must be copied onto the bootflash: file system to run the router using this method.

Running the Cisco ASR 1000 Series Routers Using a Consolidated Package: An Overview

The Cisco ASR 1000 Series Routers can also be configured to run using a consolidated package.

Note Booting the router from a consolidated package is not supported for installation of optional subpackages. For more information, see the Running the Cisco ASR 1000 Series Routers Using Individual and Optional SubPackages: An Overview, on page 1.

When the router is configured to run using a consolidated package, the entire consolidated package file is copied onto the router or accessed by the router via TFTP or another network transport method. The router runs using the consolidated package file.

When a Cisco ASR 1000 Series Router is configured to run using the consolidated package file, more memory is required to process router requests because the router has to search one larger file for every request. The peak amount of memory available for passing network traffic is therefore lower when the router is configured to run using a consolidated package.

A Cisco ASR 1000 Series Router configured to run using a consolidated package is booted by booting the consolidated package file. Because this file is large, the boot process for routers running using the consolidated package is slower than the boot process for routers running individual subpackages.

A Cisco ASR 1000 Series Router configured to run using a consolidated package does have some advantages over a Cisco ASR 1000 Series Router configured to run individual subpackages. First, a consolidated package can be booted and utilized using TFTP or another network transport method. Secondly, configuring the router to use the one consolidated package file is easier than managing several individual subpackage files. Running the router using a consolidated package may be the right method of running the router in certain networking environments.

The consolidated package should be stored on bootflash:, usb[0-1]:, or a remote file system when this method is used to run the router.

Running the Cisco ASR 1000 Series Routers: A Summary

This section summarizes the advantages and disadvantages of each method of running your Cisco ASR 1000 Series Routers.

The advantages of running your router using individual subpackages include:

- Optimizes router memory usage—When the router is booting using the individual and optional subpackage method, software image content from the Router Processor (RP) is copied into memory on an as-needed basis only, which conserves memory for other router processes. The router boots fastest and allows for the highest peak traffic load when booted using the individual subpackage boot approach.

The advantages of running your router using a consolidated package include:

- Simplified installation—Only one software file needs to be managed instead of several separate images.
- Storage—A consolidated package, unlike individual subpackages, can be used to run the router while being stored in bootflash:, on a USB Flash disk, or on a network server. A consolidated package can be booted and utilized using TFTP or another network transport method, while the individual subpackage method requires the individual subpackage files to be copied into the bootflash: file directory on the router.

Table 1: Advantages and Disadvantages of Running Individual subPackages and Consolidated Packages, on page 3 summarizes the advantages and disadvantages of the approaches.

Table 1: Advantages and Disadvantages of Running Individual subPackages and Consolidated Packages

Approach	Advantages	Disadvantages
Individual and optional subpackages **Note** This method is required if you need to install any optional subpackages for your system.	• Optimizes memory usage, allowing for faster boot times and increased traffic loads.	• Multiple software subpackages more difficult to manage. • Cannot be booted from TFTP or any other network server. If you are going to use the individual subpackage boot method, each individual subpackage file must be placed in the bootflash: directory. • Individual and optional subpackage files and the provisioning file must be stored in bootflash:.

Approach	Advantages	Disadvantages
Consolidated Package	• Easier management. Only have to manage one file instead of many files. • A consolidated package file can be stored in bootflash:, on a USB Flash disk, or on any TFTP or other network server.	• Slower boot times and lessened maximum system scalability because the larger image must be processed at all times.

Software File Management Using Command Sets

Software files can be managed on the Cisco ASR 1000 Series Routers using three distinct command sets. This section provides overviews of the following command sets:

The request platform Command Set

The **request platform software package** command is part of the larger **request platform** command set being introduced on the Cisco ASR 1000 Series Routers. For additional information on each **request platform** command and the options available with each command, see the *Cisco IOS Configuration Fundamentals Command Reference* .

The **request platform software package** command, which can be used to upgrade individual subpackages and a complete consolidated package, is used to upgrade software on the Cisco ASR 1000 Series Routers. Notably, the **request platform software package** command is the recommended way of performing an individual subpackage upgrade, and also provides the only method of no-downtime upgrades of individual subpackages on the router when the router is running individual subpackages.

The **request platform software package** command requires that the destination device or process be specified in the command line, so the commands can be used to upgrade software on both an active or a standby processor. The **request platform software package** command allows for no downtime software upgrades in many scenarios.

The basic syntax of the command is **request platform software package install rp** *rp-slot-number* **file** *file-URL*, where *rp-slot-number* is the number of the RP slot and *file-URL* is the path to the file being used to upgrade the Cisco ASR 1000 Series Router. The command has other options; see the **request platform software package** command references for information on all of the options available with this command set.

In Cisco IOS XE Release 2.4, the **request platform software package uninstall** command is introduced on the Cisco ASR 1000 Series Routers to remove provisioning of an optional subpackage from an RP. The syntax for the command follows the install form of the command: **request platform software package uninstall rp** *rp-slot-number* **type** *pkg*, where *rp-slot-number* is the number of the RP slot and *pkg* is the type of optional subpackage file to be removed.

Note For additional information on limited downtime upgrades using the **request platform software package** command set, see the "Software Upgrade Processes Supported by Cisco ASR 1000 Series Routers" section on page 6-1 .

The copy Command

The **copy** command can be used to move consolidated packages and individual subpackages onto the router, though using this command to move individual subpackage files from one storage area to another is often inefficient (in these scenarios, it is almost always preferable to move the consolidated package, then extract the subpackages, or to extract the subpackages without moving the consolidated package).

To upgrade a consolidated package on the Cisco ASR 1000 Series Routers, copy the consolidated package onto a file system, usually bootflash: or usb[0-1]: on the router, using the **copy** command as you would on most other Cisco routers. After making this copy, configure the router to boot using the consolidated package file.

To upgrade the router and reboot using individual subpackages, copy the consolidated package onto the router using the **copy** command, enter the **request platform software package expand** command to extract the individual subpackages, and configure the router to boot using subpackages. Other methods, such as copying each individual subpackage in the same consolidated package from a directory or using the **request platform software package** command to extract the subpackages onto a router directory are also usable, though copying individual subpackages is often inefficient.

See the **copy** command reference for a list of the options that are available with the **copy** command.

The issu Command Set

The **issu** command set that is available on other Cisco routers is also available on the Cisco ASR 1000 Series Routers. The **issu** command set can be used to perform both consolidated package and individual subpackage upgrades.

The **issu** command set includes the **issu** command with the **loadversion**, **runversion**, **commitversion**, and **abortversion** options. See the **issu** command references for information on all of the options available with each of these commands.

A confirm prompt is displayed when the command **issu abortversion** is issued and when the standby has not reached the terminal (hot) state.

The following example shows a confirm prompt notification:

```
The system is without a fully initialized peer and service impact will occur. Proceed with
 abort? [confirm]
```

The **issu runversion** command is optional for completing a consolidated package upgrade on the Cisco ASR 1000 Series Routers. You can enter **issu commitversion** from the active RP to complete the software upgrade, then use the **redundancy force-switchover** command to switch to the upgraded RP on this platform, if desired.

Note For additional information on limited downtime upgrades using the **issu** command set, see the "Software Upgrade Processes Supported by Cisco ASR 1000 Series Routers" section on page 6-1 .

Managing and Configuring the Router to Run Using Consolidated Packages and Individual SubPackages

This section discusses the following topics:

Quick Start Software Upgrade

The following instructions provide a quick start version of upgrading the software running the Cisco ASR 1000 Series Routers. These instructions assume you have access to the consolidated package and that the files will be stored in a bootflash: file system that is not storing any previously installed subpackages or consolidated packages and that has enough room for the file or files.

For more detailed installation examples, see the other sections of this chapter.

To upgrade the software using a quick start version, perform the following steps:

SUMMARY STEPS

1. Copy the consolidated package into bootflash: using the **copy** *URL-to-image* **bootflash:** command.
2. If you want to run the router using individual subpackages, enter the **request platform software package expand file bootflash:***image-name* command. If you want to run the router using a consolidated package, skip this step.
3. Enter the **dir bootflash:** command to verify your consolidated package or your extracted subpackages are in the directory.
4. If you are trying to run individual subpackages, use the **delete bootdisk:***image-name* to delete the consolidated package. If you want to run the router using the consolidated package, skip this step.
5. Set up the boot parameters for your boot. Set the configuration register to 0x2 by entering the **config-register 0x2102** global configuration command, and enter the **boot system flash bootflash:***image-name* (if running using the consolidated package) or **boot system flash bootflash:***provisionging-file-name* (if running using individual subpackages) global configuration command.
6. Enter **copy running-config startup-config** to save your configuration.
7. Enter the **reload** command to reload the router and finish the boot. The upgraded software should be running when the reload completes.

DETAILED STEPS

Step 1 Copy the consolidated package into bootflash: using the **copy** *URL-to-image* **bootflash:** command.

Step 2 If you want to run the router using individual subpackages, enter the **request platform software package expand file bootflash:***image-name* command. If you want to run the router using a consolidated package, skip this step.

Step 3 Enter the **dir bootflash:** command to verify your consolidated package or your extracted subpackages are in the directory.

Step 4 If you are trying to run individual subpackages, use the **delete bootdisk:***image-name* to delete the consolidated package. If you want to run the router using the consolidated package, skip this step.

Step 5 Set up the boot parameters for your boot. Set the configuration register to 0x2 by entering the **config-register 0x2102** global configuration command, and enter the **boot system flash bootflash:***image-name* (if running using the consolidated

package) or **boot system flash bootflash:***provisionging-file-name* (if running using individual subpackages) global configuration command.

Step 6 Enter **copy running-config startup-config** to save your configuration.

Step 7 Enter the **reload** command to reload the router and finish the boot. The upgraded software should be running when the reload completes.

Managing and Configuring a Router to Run Using a Consolidated Package

Note Do not use this procedure if you also need to install any optional subpackages.

This section documents the following procedures:

Managing and Configuring a Consolidated Package Using the copy Command

To upgrade a consolidated package on the Cisco ASR 1000 Series Routers using the **copy** command, copy the consolidated package into the bootflash: directory on the router using the **copy** command as you would on most other Cisco routers. After making this copy, configure the router to boot using the consolidated package file.

In the following example, the consolidated package file is copied onto the bootflash: file system from TFTP. The config-register is then set to boot using **boot system** commands, and the **boot system** commands instruct the router to boot using the consolidated package stored in the bootflash: file system. The new configuration is then saved using the **copy running-config startup-config** command, and the system is then reloaded to complete the process.

```
Router# dir bootflash:
Directory of bootflash:/
   11  drwx       16384   Dec 4 2007 04:32:46 -08:00  lost+found
86401  drwx        4096   Dec 4 2007 06:06:24 -08:00  .ssh
14401  drwx        4096   Dec 4 2007 06:06:36 -08:00  .rollback_timer
28801  drwx        4096  Mar 18 2008 17:31:17 -07:00  .prst_sync
43201  drwx        4096   Dec 4 2007 04:34:45 -08:00  .installer
   13  -rw-       45977   Apr 9 2008 16:48:46 -07:00  target_support_output.tgz.tgz
928862208 bytes total (712273920 bytes free)
Router# copy tftp bootflash:
Address or name of remote host []? 172.17.16.81
Source filename []? /auto/tftp-users/user/asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin
Destination filename [asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin]?
Accessing
tftp://172.17.16.81//auto/tftp-users/user/asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin...
Loading /auto/tftp-users/user/asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin from
172.17.16.81 (via GigabitEthernet0): !!!!!!!
[OK - 208904396 bytes]
208904396 bytes copied in 330.453 secs (632176 bytes/sec)
Router# dir bootflash:
Directory of bootflash:/
   11  drwx       16384   Dec 4 2007 04:32:46 -08:00  lost+found
86401  drwx        4096   Dec 4 2007 06:06:24 -08:00  .ssh
14401  drwx        4096   Dec 4 2007 06:06:36 -08:00  .rollback_timer
28801  drwx        4096  Mar 18 2008 17:31:17 -07:00  .prst_sync
43201  drwx        4096   Dec 4 2007 04:34:45 -08:00  .installer
   12  -rw-   208904396  May 28 2008 16:17:34 -07:00
asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin
```

```
   13  -rw-       45977   Apr 9 2008 16:48:46 -07:00  target_support_output.tgz.tgz
928862208 bytes total (503156736 bytes free)
Router# config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#boot system flash bootflash:asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin
Router(config)#config-reg 0x2102
Router(config)#exit
Router#show run | include boot
boot-start-marker
boot system flash bootflash:asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin
boot-end-marker
Router# copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
Router# reload
```

Managing and Configuring a Consolidated Package Using the request platform software package install Command

In the following example, the **request platform software package install** command is used to upgrade a consolidated package running on RP 0. The **force** option, which forces the upgrade past any prompt (such as already having the same consolidated package installed), is used in this example.

```
Router# request platform software package install rp 0 file
bootflash:asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin force

--- Starting installation state synchronization ---
Finished installation state synchronization
--- Starting file path checking ---
Finished file path checking
--- Starting image file verification ---
Checking image file names
Verifying image file locations
Locating image files and validating name syntax
Inspecting image file types
Processing image file constraints
Extracting super package content
Verifying parameters
Validating package type
Copying package files
Checking and verifying packages contained in super package
Creating candidate provisioning file

  WARNING:
  WARNING: Candidate software will be installed upon reboot
  WARNING:

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
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
Determining whether installation is valid ... skipped
Checking IPC compatibility with running software
Checking IPC compatibility with running software ... skipped
Checking candidate package set infrastructure compatibility
Checking infrastructure compatibility with running software
```

```
Checking infrastructure compatibility with running software ... skipped
Finished compatibility testing
--- 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.
```

Router# **reload**

Note A reload must be performed to finish this procedure.The Managing and Configuring a Consolidated Package Using the copy Command, on page 7 includes an example of how to configure the router to boot using the consolidated package, and then an example of what happens after the reload is performed to finish the installation.

Managing and Configuring a Router to Run Using Individual SubPackages From a Consolidated Package

To run the router using individual subpackages from a consolidated package, follow one of the following procedures:

Extracting a Consolidated Package and Booting Using the Provisioning File

To extract a consolidated package and to boot using provisioning file, perform the following steps:

SUMMARY STEPS

1. Perform one of the following tasks:
2. Configure the router to boot using the provisioning file.The sequence below provides an example that would boot the router using the provisioning file named packages.conf that was stored with the other subpackages in the bootflash: file system:

DETAILED STEPS

Step 1 Perform one of the following tasks:

- Copy the consolidated package file (or, in cases where you have every individual subpackage and a provisioning file for the subpackages available, each individual subpackage and the provisioning file) onto the bootflash: file system using the **copy** command. Make sure to copy the consolidated package into the bootflash: file system and directory where you want to store the provisioning file and the individual image subpackages. Enter the **request platform software package expand file bootflash:***url-to-Cisco-IOS-XE-imagename* command with no other option to extract the provisioning file and the individual subpackages out of the consolidated package file and into the current directory in bootflash:.
- Copy the consolidated package file onto any file system on your router, then enter the **request platform software package expand file** *file-system***:***url-to-Cisco-IOS-XE-imagename* **to bootflash:** command to extract the provisioning file and the individual image subpackages onto the bootflash: file system.

Note After performing this step, do not move any of the files. The bootup process cannot function properly unless all of the subpackages and the provisioning file are located in the same directory.Also, do not rename the subpackage files. Only the provisioning file can be renamed, and the renaming of the provisioning file, if desired, should be done at this step before the router is rebooted.

Step 2 Configure the router to boot using the provisioning file.The sequence below provides an example that would boot the router using the provisioning file named packages.conf that was stored with the other subpackages in the bootflash: file system:

Example:

```
Router(config)# no boot system
Router(config)# config-register 0x2102
Router(config)# boot system flash bootflash:packages.conf
Router(config)# exit
*May 11 01:31:04.815: %SYS-5-CONFIG_I: Configured from console by con
Router# copy running-config startup-config
Building configuration...
[OK]
Router# reload
```

What to Do Next

Extracting the SubPackages and the Provisioning File: Example 1

The following example shows how to extract the individual subpackages and the provisioning file from a consolidated package that has already been placed in the directory where you want to store the individual subpackages and the provisioning file.

Output of the directory before and after the extraction is given to confirm the files were extracted.

```
Router# dir bootflash:
Directory of bootflash:/
   11  drwx       16384   Dec 4 2007 04:32:46 -08:00  lost+found
86401  drwx        4096   Dec 4 2007 06:06:24 -08:00  .ssh
14401  drwx        4096   Dec 4 2007 06:06:36 -08:00  .rollback_timer
28801  drwx        4096  Mar 18 2008 17:31:17 -07:00  .prst_sync
43201  drwx        4096   Dec 4 2007 04:34:45 -08:00  .installer
   12  -rw-   208904396   May 9 2008 14:36:31 -07:00
asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin
   13  -rw-       45977   Apr 9 2008 16:48:46 -07:00  target_support_output.tgz.tgz
928862208 bytes total (503156736 bytes free)
Router# request platform software package expand file
bootflash:asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin
Verifying parameters
Validating package type
Copying package files
SUCCESS: Finished expanding all-in-one software package.
Router# dir bootflash:
Directory of bootflash:/
   11  drwx       16384   Dec 4 2007 04:32:46 -08:00  lost+found
86401  drwx        4096   Dec 4 2007 06:06:24 -08:00  .ssh
14401  drwx        4096   Dec 4 2007 06:06:36 -08:00  .rollback_timer
28801  drwx        4096  Mar 18 2008 17:31:17 -07:00  .prst_sync
43201  drwx        4096   Dec 4 2007 04:34:45 -08:00  .installer
   12  -rw-   208904396   May 9 2008 14:36:31 -07:00
asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin
57611  -rw-    47071436  May 22 2008 11:26:23 -07:00
asr1000rp1-espbase.02.01.00.122-33.XNA.pkg
57602  -rw-        5740  May 22 2008 11:26:22 -07:00
asr1000rp1-packages-adventerprisek9.02.01.00.122-33.XNA.conf
57612  -rw-    20334796  May 22 2008 11:26:24 -07:00
asr1000rp1-rpaccess.02.01.00.122-33.XNA.pkg
57613  -rw-    22294732  May 22 2008 11:26:24 -07:00
```

```
asr1000rp1-rpbase.02.01.00.122-33.XNA.pkg
57614  -rw-    21946572  May 22 2008 11:26:25 -07:00
asr1000rp1-rpcontrol.02.01.00.122-33.XNA.pkg
57615  -rw-    48099532  May 22 2008 11:26:26 -07:00
asr1000rp1-rpios-adventerprisek9.02.01.00.122-33.XNA.pkg
57616  -rw-    34324684  May 22 2008 11:26:27 -07:00
asr1000rp1-sipbase.02.01.00.122-33.XNA.pkg
57617  -rw-    22124748  May 22 2008 11:26:28 -07:00
asr1000rp1-sipspa.02.01.00.122-33.XNA.pkg
57603  -rw-        6256  May 22 2008 11:26:28 -07:00  packages.conf
   13  -rw-       45977   Apr 9 2008 16:48:46 -07:00  target_support_output.tgz.tgz
928862208 bytes total (286662656 bytes free)
```

Extracting the SubPackages and the Provisioning File: Example 2

The following example shows how to extract the individual subpackages and the provisioning file from a consolidated package that has already been placed on the router in a directory that will not store the individual subpackages and the provisioning file. In this particular example, the contents of a consolidated package stored in usb0: are extracted into bootflash:.

Output of the bootflash: directory before and after the extraction is given to confirm the files were extracted:

```
Router# dir usb0:
Directory of usb0:/
 1240  -rwx   208904396  May 27 2008 14:10:20 -07:00
asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin
255497216 bytes total (40190464 bytes free)
Router# dir bootflash:
Directory of bootflash:/
   11  drwx       16384  Dec 13 2004 03:45:47 -08:00  lost+found
87937  drwx        4096  Dec 13 2004 03:46:45 -08:00  .rollback_timer
14657  drwx        4096  Dec 13 2004 03:47:17 -08:00  .installer
29313  drwx        4096  Dec 13 2004 03:53:00 -08:00  .ssh
   12  -rw-    33554432  Dec 13 2004 03:53:49 -08:00  nvram_00100
58625  drwx        4096   May 7 2008 17:27:51 -07:00  .prst_sync
945377280 bytes total (695246848 bytes free)
Router# request platform software package expand file
usb0:asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin to bootflash:
Verifying parameters
Validating package type
Copying package files
SUCCESS: Finished expanding all-in-one software package.
Router# dir bootflash:
Directory of bootflash:/
   11  drwx       16384  Dec 13 2004 03:45:47 -08:00  lost+found
87937  drwx        4096  Dec 13 2004 03:46:45 -08:00  .rollback_timer
14657  drwx        4096  Dec 13 2004 03:47:17 -08:00  .installer
29313  drwx        4096  Dec 13 2004 03:53:00 -08:00  .ssh
   12  -rw-    33554432  Dec 13 2004 03:53:49 -08:00  nvram_00100
43979  -rw-    47071436  May 27 2008 14:25:01 -07:00
asr1000rp1-espbase.02.01.00.122-33.XNA.pkg
58625  drwx        4096   May 7 2008 17:27:51 -07:00  .prst_sync
43970  -rw-        5740  May 27 2008 14:25:00 -07:00
asr1000rp1-packages-adventerprisek9.02.01.00.122-33.XNA.conf
43980  -rw-    20334796  May 27 2008 14:25:01 -07:00
asr1000rp1-rpaccess.02.01.00.122-33.XNA.pkg
43981  -rw-    22294732  May 27 2008 14:25:02 -07:00
asr1000rp1-rpbase.02.01.00.122-33.XNA.pkg
43982  -rw-    21946572  May 27 2008 14:25:03 -07:00
asr1000rp1-rpcontrol.02.01.00.122-33.XNA.pkg
43983  -rw-    48099532  May 27 2008 14:25:04 -07:00
asr1000rp1-rpios-adventerprisek9.02.01.00.122-33.XNA.pkg
43984  -rw-    34324684  May 27 2008 14:25:05 -07:00
asr1000rp1-sipbase.02.01.00.122-33.XNA.pkg
43985  -rw-    22124748  May 27 2008 14:25:05 -07:00
asr1000rp1-sipspa.02.01.00.122-33.XNA.pkg
43971  -rw-        6256  May 27 2008 14:25:05 -07:00  packages.conf
945377280 bytes total (478752768 bytes free)
```

Extracting the SubPackages, Configuring the Router to Boot Using the Provisioning File, and Reloading the Router: Example 3

In the following example, the provisioning file and the individual subpackages are extracted from a consolidated package. The router is then configured to boot using the provisioning file. This example also shows the config-register being set and the running configuration being saved because these tasks must be performed for the router to reload properly. The router is then reloaded to complete the process.

```
Router# dir bootflash:
Directory of bootflash:/
   11  drwx       16384   Dec 4 2007 04:32:46 -08:00  lost+found
86401  drwx        4096   Dec 4 2007 06:06:24 -08:00  .ssh
14401  drwx        4096   Dec 4 2007 06:06:36 -08:00  .rollback_timer
28801  drwx        4096  Mar 18 2008 17:31:17 -07:00  .prst_sync
43201  drwx        4096   Dec 4 2007 04:34:45 -08:00  .installer
   12  -rw-   208904396   May 9 2008 14:36:31 -07:00
asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin
   13  -rw-       45977   Apr 9 2008 16:48:46 -07:00  target_support_output.tgz.tgz
928862208 bytes total (503156736 bytes free)
Router# request platform software package expand file
bootflash:asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin
Verifying parameters
Validating package type
Copying package files
SUCCESS: Finished expanding all-in-one software package.
Router# dir bootflash:
Directory of bootflash:/
   11  drwx       16384   Dec 4 2007 04:32:46 -08:00  lost+found
86401  drwx        4096   Dec 4 2007 06:06:24 -08:00  .ssh
14401  drwx        4096   Dec 4 2007 06:06:36 -08:00  .rollback_timer
28801  drwx        4096  Mar 18 2008 17:31:17 -07:00  .prst_sync
43201  drwx        4096   Dec 4 2007 04:34:45 -08:00  .installer
   12  -rw-   208904396   May 9 2008 14:36:31 -07:00
asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin
57611  -rw-    47071436  May 22 2008 11:26:23 -07:00
asr1000rp1-espbase.02.01.00.122-33.XNA.pkg
57602  -rw-        5740  May 22 2008 11:26:22 -07:00
asr1000rp1-packages-adventerprisek9.02.01.00.122-33.XNA.conf
57612  -rw-    20334796  May 22 2008 11:26:24 -07:00
asr1000rp1-rpaccess.02.01.00.122-33.XNA.pkg
57613  -rw-    22294732  May 22 2008 11:26:24 -07:00
asr1000rp1-rpbase.02.01.00.122-33.XNA.pkg
57614  -rw-    21946572  May 22 2008 11:26:25 -07:00
asr1000rp1-rpcontrol.02.01.00.122-33.XNA.pkg
57615  -rw-    48099532  May 22 2008 11:26:26 -07:00
asr1000rp1-rpios-adventerprisek9.02.01.00.122-33.XNA.pkg
57616  -rw-    34324684  May 22 2008 11:26:27 -07:00
asr1000rp1-sipbase.02.01.00.122-33.XNA.pkg
57617  -rw-    22124748  May 22 2008 11:26:28 -07:00
asr1000rp1-sipspa.02.01.00.122-33.XNA.pkg
57603  -rw-        6256  May 22 2008 11:26:28 -07:00  packages.conf
   13  -rw-       45977   Apr 9 2008 16:48:46 -07:00  target_support_output.tgz.tgz
928862208 bytes total (286662656 bytes free)
Router(config)# no boot system
Router(config)# config-register 0x2102
Router(config)# boot system flash bootflash:packages.conf
Router(config)# exit
Router# copy run start
Router# reload
```

Copying a Set of Individual SubPackage Files, and Booting Using a Provisioning File

To copy a set of individual subpackage files and to boot using a provisioning file, perform the following steps:



Note Although this upgrade method works, it is less efficient than other methods of upgrading the router's software.

SUMMARY STEPS

1. Copy each individual subpackage and the provisioning file into the bootflash: directory using the **copy** command. Note that this method of running the router will only work if all the individual subpackages for a release and a provisioning file are downloaded onto the router and stored in the bootflash: directory. No other file directories should be used for booting the router using individual subpackages.The files can also be moved on the router physically using a USB Flash drive.
2. Configure the router to boot using the provisioning file.

DETAILED STEPS

Step 1 Copy each individual subpackage and the provisioning file into the bootflash: directory using the **copy** command. Note that this method of running the router will only work if all the individual subpackages for a release and a provisioning file are downloaded onto the router and stored in the bootflash: directory. No other file directories should be used for booting the router using individual subpackages.The files can also be moved on the router physically using a USB Flash drive.

Step 2 Configure the router to boot using the provisioning file.
The sequence below provides an example that describes how to boot the router using the provisioning file named packages.conf that was stored with the other subpackages in the bootflash: file system. The router runs using individual subpackages once the reload is complete.

Example:

```
Router(config)# no boot system
Router(config)# config-register 0x2102
Router(config)# boot system flash bootflash:packages.conf
Router(config)# exit
*May 11 01:31:04.815: %SYS-5-CONFIG_I: Configured from console by con
Router# write memory
Building configuration...
[OK]
Router# reload
```

Managing and Configuring a Router to Run Using Optional SubPackages

To manage and configure a Cisco ASR 1000 Series Router to run using optional subpackages, perform the following tasks:

Installing an Optional SubPackage

Note If you install the Cisco WebEx Node for ASR 1000 Series SPA before the software subpackage is installed, you will receive the error message %ASR1000_RP_SPA-3-MISSING_SPA_PKG_ERR. This message will resolve once you download and install the appropriate sipspawma subpackage and then reload the router in individual subpackage mode.

To run the router using an optional subpackage, perform the following steps for each RP in the system:

SUMMARY STEPS

1. Verify that the RP is running in individual subpackage mode and was booted from a provisioning file. For more information, see the Managing and Configuring a Router to Run Using Individual SubPackages From a Consolidated Package, on page 9.
2. Verify that the version of the optional subpackage that you want to install is the same version as the software running on the active RP.
3. Download the optional subpackage that you want to install. Optional subpackages must be downloaded independently from consolidated packages for the Cisco ASR 1000 Series Routers.
4. On each RP, copy the optional subpackage to the directory where any other individual subpackages and the provisioning file is located.
5. Run the **request platform software package install rp file** command, as shown in the following example.

DETAILED STEPS

Step 1 Verify that the RP is running in individual subpackage mode and was booted from a provisioning file. For more information, see the Managing and Configuring a Router to Run Using Individual SubPackages From a Consolidated Package, on page 9.

Step 2 Verify that the version of the optional subpackage that you want to install is the same version as the software running on the active RP.

Step 3 Download the optional subpackage that you want to install. Optional subpackages must be downloaded independently from consolidated packages for the Cisco ASR 1000 Series Routers.

Step 4 On each RP, copy the optional subpackage to the directory where any other individual subpackages and the provisioning file is located.

Step 5 Run the **request platform software package install rp file** command, as shown in the following example.

Note Do not use the optional **slot** or **bay** keywords for the initial installation.

Example:

```
Router# request platform software package install rp 0 file
bootflash:asr1000rp1-sipspawmak9.BLD_V122_33_XND_ASR_RLS4_THROTTLE_LATEST_20090511_042308.pkg
--- Starting local lock acquisition on R0 --- Finished local lock acquisition on R0
--- Starting file path checking ---
Finished file path checking
--- Starting image file verification --- Checking image file names Verifying image file locations
Locating image files and validating name syntax
   Found asr1000rp1-
sipspawmak9.BLD_V122_33_XND_ASR_RLS4_THROTTLE_LATEST_20090511_042308.pkg
Inspecting image file types
Processing image file constraints
Creating candidate provisioning file
WARNING: No package of type sipspawmak9 is installed.
WARNING: Package will be installed for all SIP slots and bays.
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:
Software sets are identified as compatible 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 --- No old package files removed New files list:
   Added asr1000rp1-
sipspawmak9.BLD_V122_33_XND_ASR_RLS4_THROTTLE_LATEST_20090511_042308.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
   Applying interim IPC and database definitions
   Replacing running software
   Replacing CLI software
   Restarting software
   Restarting software: target frus filtered out ... skipped
   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.
```

Uninstalling an Optional SubPackage

In Cisco IOS XE Release 2.4, the Cisco ASR 1000 Series Routers support removal of an installed optional subpackage.

To uninstall an optional subpackage, perform the following steps:

SUMMARY STEPS

1. On each RP in the system, use the **request platform software package uninstall** command as shown in the following example:
2. Use the **show version provisioned** command to verify that the optional subpackage is no longer installed.
3. (Optional) Use the **request platform software clean** command to remove the unused packages.

DETAILED STEPS

Step 1 On each RP in the system, use the **request platform software package uninstall** command as shown in the following example:

Example:

```
Router# request platform software package uninstall rp 0 type sipspawma
--- Starting local lock acquisition on R0 --- Finished local lock acquisition on R0
--- Starting uninstall preparation ---
Validating uninstall options
Creating candidate provisioning file
Finished uninstall preparation
--- 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
Software sets are identified as compatible 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 list of software package changes --- Old files list:
   Removed asr1000rp1-
sipspawmak9.BLD_V122_33_XND_ASR_RLS4_THROTTLE_LATEST_20090511_042308.pkg
No new package files added
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
   Applying interim IPC and database definitions
   Replacing running software
   Replacing CLI software
   Restarting software
   Restarting software: target frus filtered out ... skipped
   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.
```

Step 2 Use the **show version provisioned** command to verify that the optional subpackage is no longer installed.

Step 3 (Optional) Use the **request platform software clean** command to remove the unused packages.

Troubleshooting Software Mismatch with ESP Board ASR1000-ESP10-N

The Cisco ASR 1000 ESP board ASR1000-ESP10-N enables you to install a Cisco ASR 1000 Series Aggregation Services Router without encryption features. This unrestricted product format, in which all encryption chips have been removed, can be provided in the Cisco ASR 1002, 1004, and 1006 Series Routers. This ESP must be used with the appropriate Cisco IOS XE 2.2 image that does not contain encryption software.

You cannot load Cisco IOS XE software images or subpackages which contain encryption software, onto a Cisco ASR 1000 Series Router that contains the non crypto enabled ESP board (ASR1000-ESP10-N). As

soon as the combination of an encryption-enabled Cisco IOS XE image and encryption-disabled ESP is detected—on bootup, online removal or insertion, or during an install—a message is emitted:

```
ESP[0|1] does not support strong cryptography. Chassis will reload.
```

The Route Processor (RP) then reloads the chassis and reboots continuously.

To troubleshoot this problem, follow these steps:

SUMMARY STEPS

1. Enable ROM Monitor (ROMmon) mode by entering the **reload** command.
2. Press the Break key during the first 60 seconds while the system is booting.
3. Force the system to remain in ROMmon mode, waiting for manual bootup, by entering the command: **confreg 0x0**.
4. Load the latest Cisco IOS XE package or subpackages that are compatible with the ASR1000-ESP10-N ESP board.
5. Remove the forced manual boot mode by entering the command: **confreg** *config register setting*, where *config register setting* is the default for the user system, often 0x2102.
6. Reboot the system.

DETAILED STEPS

Step 1 Enable ROM Monitor (ROMmon) mode by entering the **reload** command.

Step 2 Press the Break key during the first 60 seconds while the system is booting.

Step 3 Force the system to remain in ROMmon mode, waiting for manual bootup, by entering the command: **confreg 0x0**.

Step 4 Load the latest Cisco IOS XE package or subpackages that are compatible with the ASR1000-ESP10-N ESP board. Compatible subpackages include:

- ◦ Cisco ASR1000 Series RP1 IP BASE W/O CRYPTO
  ◦ Cisco ASR1000 Series RP1 ADVANCED IP SERVICES W/O CRYPTO
  ◦ Cisco ASR1000 Series RP1 ADVANCED ENTERPRISE SERVICES W/O CRYPTO

Step 5 Remove the forced manual boot mode by entering the command: **confreg** *config register setting*, where *config register setting* is the default for the user system, often 0x2102.

Step 6 Reboot the system.

Upgrading Individual SubPackages

One consolidated package contains seven individual subpackages. Each individual subpackage can be upgraded independently.

When using this method to upgrade subpackages, however, remember that all subpackages that are part of the same consolidated package should be used together on the Cisco ASR 1000 Series Routers. Individual subpackage upgrades are atypical on the Cisco ASR 1000 Series Routers, because it is very rare to experience

a case where a single subpackage is upgraded without upgrading all the subpackages from the consolidated package. Individual subpackage upgrades are most useful when only a single subpackage of an otherwise functioning set of subpackages requires an upgrade.

This section uses the SPA subpackage installation to illustrate an individual subpackage upgrade. Although it does not comprehensively cover every possible individual subpackage upgrade scenario, the CLI for each type of upgrade is similar.

Upgrading a SPA SubPackage

In the following example, the **request platform software package install** command is used to upgrade a SIPSPA subpackage for the SPA in bay 0 of the SIP in router slot 1. In this example, the **force** option, which forces the upgrade past any prompt (such as already having the same subpackage installed), is used.



Caution Do not run your router using subpackages from different consolidated packages.The Cisco ASR 1000 Series Router is not designed to use multiple subpackages from different consolidated packages. Running subpackages from different consolidated packages is not recommended and can cause unpredictable router behavior.Individual subpackages should only be upgraded individually if you or a Cisco customer support representative has determined that upgrading to the same subpackage that is running could have some benefit for your Cisco ASR 1000 Series Router.

```
Router# request platform software package install rp 0 file
bootflash:asr1000rp1-sipspa.02.01.00.122-33.XNA.pkg slot 1 bay 0 force
--- Starting installation state synchronization ---
Finished installation state synchronization
--- Starting file path checking ---
Finished file path checking
--- Starting image file verification ---
Checking image file names
Verifying image file locations
Locating image files and validating name syntax
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
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
Software sets are identified as compatible
Checking IPC compatibility with running software
Checking candidate package set infrastructure compatibility
Checking infrastructure compatibility with running software
Finished compatibility testing
--- Starting impact testing ---
Checking operational impact of change
Finished impact testing
--- 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
  Assembling CLI output libraries
  Assembling CLI input libraries
  Applying interim IPC and database definitions
    interim IPC and database definitions applied
      Replacing running software
      Replacing CLI software
      Restarting software
Restarting SPA CC1/0
      Applying interim IPC and database definitions
      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.
Router#
```