



# Software Packaging on the Router

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## 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.

## Upgrade IOS Image in Sub-packages Mode

To upgrade IOS image in sub-packages mode for the Cisco ASR 920 routers:

```
request platform software package expand file source-URL [to destination-URL] [force]
[verbose] [wipe]
configure terminal
config-register 0x2
boot system flash [flash-fs:] [partition-number:] [filename]
exit
copy running-configuration startup-configuration
reload
```

### Description of Commands

Command	Description
<code>config-register 0x2</code>	Use the command to boot the router using a specified image in NVRAM.

Command	Description
<b>request platform software package expand file</b> <i>source-URL</i> [to <i>destination-URL</i> ] [force] [verbose] [wipe]	Use the command to expand the consolidated image file on the router.
<b>boot system flash</b> [ <i>flash-fs:</i> ] [ <i>partition-number:</i> ] [ <i>filename</i> ]	Use the command to set the router to boot using the packages.conf file.

## Configuration Example for Upgrading IOS Image in Sub-packages Mode

The following example shows the upgrade of IOS image in sub-packages mode:

```
Router#request platform software package expand file
bootflash:asr920igp-universalk9.17.03.01.SPA.bin
Verifying parameters
Expanding superpackage bootflash:asr920igp-universalk9.17.03.01.SPA.bin
Validating package type
*Jul 16 14:41:05.881 IST: %INSTALL-5-OPERATION_START_INFO: R0/0: packtool:Started expand
package bootflash:asr920igp-universalk9.17.03.01.SPA.bin

Copying package files
WARNING: packages.conf will replace the identical file that already exists in bootflash:
SUCCESS: Finished expanding all-in-one software package.
Router#
*Jul 16 14:45:30.606 IST: %INSTALL-5-OPERATION_COMPLETED_INFO: R0/0: packtool:Completed
expand package bootflash:asr920igp-universalk9.17.03.01.SPA.bin

Router#config t
Router(config)#config-reg 0x2
Router(config)#no boot sys
Router(config)#boot system bootflash:packages.conf
Router(config)#exit
Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]

Router#reload
```

## Understanding Software Packages

**Table 1: Individual Sub-Packages**

Sub-Package	Purpose
RBase	Route Switch Processor (RSP) operating system
RPControl	Control plane processes between IOS process and the rest of the platform.
RPAccess	Handles security features including Secure Socket Layer (SSL) and Secure Shell (SSH)
RPIOS	Cisco IOS kernel, which is where IOS features are stored and run.
	<b>Note</b> Each consolidated image has a unique RPIOS package.

Sub-Package	Purpose
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 Cisco ASR 920 Series Router

The table below provides a list of file systems that can be seen on the Cisco ASR 920 Series Router.

*Table 2: File Systems*

File System	Description
bootflash:	The boot flash memory file system.
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.
bin:	The archive file system.
tmpsys:	The temporary system files file system.
usb[0-1]:	The Universal Serial Bus (USB) flash drive file systems.

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

## System Requirements

The following sections describe the system requirements for the Cisco ASR 920 Series Router software:

### Memory Recommendations

These are the recommendation for the routers for the Cisco IOS XE images and packages:

- DRAM Memory—4 GB
- Software Image—`asr920-universalk9_npe.bin`—420 MB (ASR 920-24SZ-IM)
- Software Image—`asr920-universalk9_npe.bin`—430 MB (ASR 920-12SZ-IM)

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

## 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**

<b>MIB</b>	<b>MIBs Link</b>
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: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

**RFCs**

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

**Technical Assistance**

<b>Description</b>	<b>Link</b>
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>

