



APPENDIX **B**

Configuration Examples

This appendix is designed to provide examples of how some common networking tasks can be accomplished on the Cisco ASR 1000 Series Routers. The examples in this appendix are provided for illustrative purposes only; little or no context is given with these examples. See the other chapters in this book (in particular Chapter 3, [Consolidated Packages and Sub-Package Management](#)), for more detailed explanations of the examples in this section.

When reading this section, also be aware that networking configurations are complex and can be configured many ways. The examples in this section simply show one method of accomplishing a configuration.

This appendix contains the following examples:

- [Configuring Router to Boot Consolidated Package on TFTP Server, page B-1](#)
- [Copying Consolidated Package from TFTP Server to Router, page B-5](#)
- [Configuring Router to Boot Using Consolidated Package Stored on Router, page B-6](#)
- [Extracting Sub-Packages from a Consolidated Package into the Same File System, page B-7](#)
- [Extracting Sub-Packages from a Consolidated Package into a Different File System, page B-8](#)
- [Configuring Router to Boot Using Sub-Packages, page B-9](#)
- [Backing up Configuration Files, page B-13](#)
- [Enabling Second IOS Process on Single RP Using SSO, page B-14](#)
- [ISSU—Consolidated Package Upgrade, page B-19](#)

Configuring Router to Boot Consolidated Package on TFTP Server

```
Router(config)# boot system
tftp://172.17.16.81/auto/tftp-users/user/asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin
Router(config)#config-reg 0x2102
Router(config)# exit
*May 29 21:51:11.963: %SYS-5-CONFIG_I: Configured from console by user on console
Router# show run | include boot
boot-start-marker
boot system
tftp://172.17.16.81/auto/tftp-users/user/asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin
boot-end-marker
```


Image validated

PPC/IOS XE loader version: 0.0.3
loaded at: 00800000 0CF3C004
zimage at: 00807673 009B92D6
initrd at: 009BA000 01041CC9
isord at: 01042000 0CF39800
avail ram: 00400000 00800000

Kernel load:

Uncompressing image... dst: 00000000 lim: 00400000 start: 00807673 size: 001B1C63...done.
Now booting the IOS XE kernel
%IOSXEBOOT-4-BOOT_SRC: (rp/0): Non-HD Boot
%IOSXEBOOT-4-BOOT_PARAMETER: (rp/0): Booting with custom BOOT_PARAM setting

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```
cisco ASR1006 (RP1) processor with 1772131K/6147K bytes of memory.
5 Gigabit Ethernet interfaces
2 Packet over SONET interfaces
2 Channelized T3 ports
32768K bytes of non-volatile configuration memory.
4194304K bytes of physical memory.
921599K bytes of eUSB flash at bootflash:.
39004543K bytes of SATA hard disk at harddisk:.
Duplex is configured.Remove duplex configuration before enabling auto-negotiation
```

<output removed for brevity>

User Access Verification

```
Username: user
Password:
```

```
Router>en
```

```
Password:
```

```
Router# show version
```

```
Cisco IOS Software, IOS-XE Software (PPC_LINUX_IOSD-ADVENTERPRISEK9-M), Version
12.2(33)XNA, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
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Compiled Thu 01-May-08 00:29 by mcpre
```

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ROM: IOS-XE ROMMON

```
Router uptime is 2 minutes
Uptime for this control processor is 4 minutes
System returned to ROM by reload at 14:52:01 DST Thu May 29 2008
System image file is "tftp://172.17.16.81/auto/tftp-users/user/asr1000rp1-adve"
Last reload reason: Reload command
```

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If you require further assistance please contact us by sending email to


```

13 -rw-      45977   Apr 9 2008 16:48:46 -07:00  target_support_output.tgz.tgz

928862208 bytes total (503156736 bytes free)

```

Configuring Router to Boot Using Consolidated Package Stored on Router

```

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 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 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
<output removed for brevity>
User Access Verification

Username: user
Password:

Router>en
Password:
Router#show version
Cisco IOS Software, IOS-XE Software (PPC_LINUX_IOSD-ADVENTERPRISEK9-M), Version
12.2(33)XNA, RELEASE SOFTWARE (fc1)
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```

software.

ROM: IOS-XE ROMMON

```
Router uptime is 3 minutes
Uptime for this control processor is 5 minutes
System returned to ROM by reload at 16:20:55 DST Wed May 28 2008
System image file is "bootflash:asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin"
Last reload reason: Reload command
```

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If you require further assistance please contact us by sending email to export@cisco.com.

```
cisco ASR1006 (RP1) processor with 1772131K/6147K bytes of memory.
5 Gigabit Ethernet interfaces
8 Serial interfaces
8 Channelized T1 ports
2 Packet over SONET interfaces
2 Channelized T3 ports
32768K bytes of non-volatile configuration memory.
4194304K bytes of physical memory.
921599K bytes of eUSB flash at bootflash:.
39004543K bytes of SATA hard disk at harddisk:.
```

Configuration register is 0x2102

Extracting Sub-Packages from a Consolidated Package into the Same File System

The asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin consolidated package file is in bootflash, but no sub-packages are in the directory.

```
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.
```

After entering the **request platform software package expand file bootflash:asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin** command, noting that the **to** option is not used, the sub-packages are extracted from the consolidated package into bootflash:

```
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 Sub-Packages from a Consolidated Package into a Different File System

The asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin consolidated package file is in usb0:

```
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)
```

No sub-packages are in the bootflash: directory.

```
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.
```

After the **request platform software package expand file usb0:asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin to bootflash:** command is entered, the sub-packages are now in the bootflash: directory.

```
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)
```

Configuring Router to Boot Using Sub-Packages

Enter the **dir bootflash:** command to confirm all sub-packages and the provisioning file are in the same file system:

```
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# show running-config | include boot
```

```
boot-start-marker
```

```
boot-end-marker
```

```
Router# configure terminal
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

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

```
Router(config)# config-reg 0x2102
```

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

```
Router# config t
```

```
*May 29 22:47:57.433: %SYS-5-CONFIG_I: Configured from console by user
```

```
Router# show running-config | include boot
```

```
boot-start-marker
```

```
boot system bootflash:packages.conf
```

```
boot-end-marker
```

```
Router# copy run start
```

```
Destination filename [startup-config]?
```

```
Building configuration...
```

```
[OK]
```

```
Router# reload
```

```
Proceed with reload? [confirm]
```

```
*May 29 22:51:54.194: %SYS-5-RELOAD: Reload requested by user on console. Reload Reason:
Reload command.
```

```
System Bootstrap, Version 12.2(33r)XN2, RELEASE SOFTWARE (fc1)
```

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

```
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```

```
Current image running: Boot ROM0
```

```
Last reset cause: LocalSoft
```

```
ASR1000-RP1 platform with 4194303 Kbytes of main memory
```

```

Located packages.conf
Image size 6256 inode num 57603, bks cnt 2 blk size 8*512
#
Located asr1000rp1-rpbase.02.01.00.122-33.XNA.pkg
Image size 22294732 inode num 57606, bks cnt 5444 blk size 8*512
#####
#####
#####
Boot image size = 22294732 (0x15430cc) bytes

Using midplane macaddr
Package header rev 0 structure detected
Calculating SHA-1 hash...done
validate_package: SHA-1 hash:
    calculated 4ad33773:e1cb7492:db502416:4ad586f2:7c4d9701
    expected   4ad33773:e1cb7492:db502416:4ad586f2:7c4d9701
Image validated

PPC/IOS XE loader version: 0.0.3
loaded at:      00800000 01D45004
zimage at:     00807673 009B92D6
initrd at:     009BA000 01041CC9
isord at:      01042000 01D42800
avail ram:     00400000 00800000

Kernel load:
Uncompressing image... dst: 00000000 lim: 00400000 start: 00807673 size: 001B1C63...done.
Now booting the IOS XE kernel
%IOSXEBOOT-4-BOOT_SRC: (rp/0): Non-HD Boot
%IOSXEBOOT-4-BOOT_PARAMETER: (rp/0): Booting with custom BOOT_PARAM setting

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Compiled Thu 01-May-08 00:29 by mcpre
Image text-base: 0x10064AF0, data-base: 0x137E0958

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GPL code under the terms of GPL Version 2.0. For more details, see the
documentation or "License Notice" file accompanying the IOS-XE software,
or the applicable URL provided on the flyer accompanying the IOS-XE

```

software.

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```
cisco ASR1006 (RP1) processor with 1776227K/6147K bytes of memory.
5 Gigabit Ethernet interfaces
2 Packet over SONET interfaces
2 Channelized T3 ports
32768K bytes of non-volatile configuration memory.
4194304K bytes of physical memory.
921599K bytes of eUSB flash at bootflash:.
39004543K bytes of SATA hard disk at harddisk:.
Duplex is configured.Remove duplex configuration before enabling auto-negotiation
```

```
Press RETURN to get started!
<some output removed for brevity?
User Access Verification
```

```
Username: user
Password:
```

```
Router> enable
Password:
```

```
Router# show version
Cisco IOS Software, IOS-XE Software (PPC_LINUX_IOSD-ADVENTERPRISEK9-M), Version
12.2(33)XNA, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
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Compiled Thu 01-May-08 00:29 by mcpre
```

```
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documentation or "License Notice" file accompanying the IOS-XE software,
or the applicable URL provided on the flyer accompanying the IOS-XE
software.
```

```
ROM: IOS-XE ROMMON
```

```
Router uptime is 1 minute
Uptime for this control processor is 3 minutes
```

```
System returned to ROM by reload at 15:51:54 DST Thu May 29 2008
System image file is "bootflash:packages.conf"
Last reload reason: Reload command
```

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```
cisco ASR1006 (RP1) processor with 1776227K/6147K bytes of memory.
5 Gigabit Ethernet interfaces
8 Serial interfaces
8 Channelized T1 ports
2 Packet over SONET interfaces
2 Channelized T3 ports
32768K bytes of non-volatile configuration memory.
4194304K bytes of physical memory.
921599K bytes of eUSB flash at bootflash:.
39004543K bytes of SATA hard disk at harddisk:.
```

```
Configuration register is 0x2102
```

Backing up Configuration Files

This section provides the following examples:

- [Copying Startup Configuration File to Bootflash, page B-13](#)
- [Copying Startup Configuration File to USB Flash Disk, page B-14](#)
- [Copying Startup Configuration File to a TFTP Server, page B-14](#)

Copying Startup Configuration File to Bootflash

```
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   May 29 2008 16:31:41 -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
```

```
Router# copy nvram:startup-config bootflash:
Destination filename [startup-config]?
```

```

3517 bytes copied in 0.647 secs (5436 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  May 29 2008 16:31:41 -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-adventerprise9.02.01.00.122-33.XNA.bin
  13  -rw-           7516   Jul 2 2008 15:01:39 -07:00  startup-config

```

Copying Startup Configuration File to USB Flash Disk

```

Router# dir usb0:
Directory of usb0:/

43261  -rwx    208904396  May 27 2008 14:10:20 -07:00
asr1000rp1-adventerprise9.02.01.00.122-33.XNA.bin

255497216 bytes total (40190464 bytes free)

Router# copy nvram:startup-config usb0:
Destination filename [startup-config]?

3172 bytes copied in 0.214 secs (14822 bytes/sec)

Router# dir usb0:
Directory of usb0:/

43261  -rwx    208904396  May 27 2008 14:10:20 -07:00
asr1000rp1-adventerprise9.02.01.00.122-33.XNA.bin
43262  -rwx           3172   Jul 2 2008 15:40:45 -07:00  startup-config

255497216 bytes total (40186880 bytes free)

```

Copying Startup Configuration File to a TFTP Server

```

Router# copy bootflash:startup-config tftp:
Address or name of remote host []? 172.17.16.81
Destination filename [pe24_asr-1002-config]? /auto/tftp-users/user/startup-config
!!
3517 bytes copied in 0.122 secs (28828 bytes/sec)

```

Enabling Second IOS Process on Single RP Using SSO

The **show platform** command output does not indicate a second IOS process is active:

```

Router# show platform
Chassis type: ASR1004

Slot      Type              State              Insert time (ago)
-----

```

```

0          ASR1000-SIP10      ok          00:04:39
0/0       SPA-5X1GE-V2       ok          00:03:23
0/1       SPA-2XT3/E3        ok          00:03:18
R0        ASR1000-RP1        ok, active  00:04:39
F0        ASR1000-ESP10      ok, active  00:04:39
P0        ASR1004-PWR-AC     ok          00:03:52
P1        ASR1004-PWR-AC     ok          00:03:52

```

```

Slot      CPLD Version      Firmware Version
-----
0         07091401          12.2(33r)XN2
R0        07062111          12.2(33r)XN2
F0        07051680          12.2(33r)XN2

```

The **show redundancy states** command output shows that the redundancy state is non-redundant:

```

Router# show redundancy states
      my state = 13 -ACTIVE
      peer state = 1  -DISABLED
      Mode = Simplex
      Unit ID = 48

Redundancy Mode (Operational) = Non-redundant
Redundancy Mode (Configured) = Non-redundant
Redundancy State                = Non Redundant
      Maintenance Mode = Disabled
      Manual Swact = disabled (system is simplex (no peer unit))
      Communications = Down      Reason: Simplex mode

      client count = 66
      client_notification_TMR = 30000 milliseconds
      RF debug mask = 0x0

```

SSO is configured:

```

Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# redundancy
Router(config-red)# mode sso
*May 27 19:43:43.539: %CMRP-6-DUAL_IOS_REBOOT_REQUIRED: R0/0: cmand: Configuration must
be saved and the chassis must be rebooted for IOS redundancy changes to take effect
Router(config-red)# exit
Router(config)# exit
Router#show
*May 27 19:44:04.173: %SYS-5-CONFIG_I: Configured from console by user on console

```

The **show redundancy states** command output now indicates that SSO is configured but not operational:

```

Router# show redundancy states
      my state = 13 -ACTIVE
      peer state = 1  -DISABLED
      Mode = Simplex
      Unit ID = 48

Redundancy Mode (Operational) = Non-redundant
Redundancy Mode (Configured) = sso
Redundancy State                = Non Redundant
      Maintenance Mode = Disabled
      Manual Swact = disabled (system is simplex (no peer unit))
      Communications = Down      Reason: Simplex mode

      client count = 66
      client_notification_TMR = 30000 milliseconds
      RF debug mask = 0x0

```

The **show platform** command output continues to show a second IOS process is still not running:

```
Router# show platform
Chassis type: ASR1004

Slot          Type                State                Insert time (ago)
-----
0             ASR1000-SIP10       ok                   00:05:53
  0/0         SPA-5X1GE-V2        ok                   00:04:37
  0/1         SPA-2XT3/E3         ok                   00:04:32
R0            ASR1000-RP1         ok, active           00:05:53
F0            ASR1000-ESP10       ok, active           00:05:53
P0            ASR1004-PWR-AC      ok                   00:05:06
P1            ASR1004-PWR-AC      ok                   00:05:06

Slot          CPLD Version        Firmware Version
-----
0             07091401            12.2(33r)XN2
R0            07062111            12.2(33r)XN2
F0            07051680            12.2(33r)XN2
```

```
Router# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

The router needs to be reloaded after saving the running configuration to make SSO the operational redundancy mode.

```
Router# reload
Proceed with reload? [confirm]

*May 27 19:45:16.917: %SYS-5-RELOAD: Reload requested by user on console. Reload Reason:
Reload command.

System Bootstrap, Version 12.2(33r)XN2, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2008 by cisco Systems, Inc.

Current image running: Boot ROM1
Last reset cause: LocalSoft

ASR1000-RP1 platform with 4194303 Kbytes of main memory

Located packages.conf
Image size 6256 inode num 43971, bks cnt 2 blk size 8*512
#
Located asr1000rp1-rpbase.02.01.00.122-33.XNA.pkg
Image size 22294732 inode num 43974, bks cnt 5444 blk size 8*512
#####
#####
#####
Boot image size = 22294732 (0x15430cc) bytes

Using midplane macaddr
Package header rev 0 structure detected
Calculating SHA-1 hash...done
validate_package: SHA-1 hash:
      calculated 4ad33773:e1cb7492:db502416:4ad586f2:7c4d9701
      expected   4ad33773:e1cb7492:db502416:4ad586f2:7c4d9701
Image validated
```

```
PPC/IOS XE loader version: 0.0.3
loaded at:      00800000 01D45004
zimage at:     00807673 009B92D6
initrd at:     009BA000 01041CC9
isord at:      01042000 01D42800
avail ram:     00400000 00800000
```

Kernel load:

```
Uncompressing image... dst: 00000000 lim: 00400000 start: 00807673 size: 001B1C63...done.
Now booting the IOS XE kernel
%IOSXEBOOT-4-BOOT_SRC: (rp/0): Non-HD Boot
%IOSXEBOOT-4-BOOT_PARAMETER: (rp/0): Booting with custom BOOT_PARAM setting
```

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170 West Tasman Drive
San Jose, California 95134-1706

Cisco IOS Software, IOS-XE Software (PPC_LINUX_IOSD-ADVENTERPRISEK9-M), Version 12.2(33)XNA, RELEASE SOFTWARE (fc1)
Technical Support: <http://www.cisco.com/techsupport>
Copyright (c) 1986-2008 by Cisco Systems, Inc.
Compiled Thu 01-May-08 00:29 by mcpre
Image text-base: 0x10064AF0, data-base: 0x137E0958

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```
export@cisco.com.
```

```
cisco ASR1004 (RP1) processor with 752227K/6147K bytes of memory.
5 Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
4194304K bytes of physical memory.
937983K bytes of eUSB flash at bootflash:.
39004543K bytes of SATA hard disk at harddisk:.
253424K bytes of USB flash at usb0:.
```

```
Press RETURN to get started!
```

```
<some output omitted for brevity>
```

```
User Access Verification
```

```
Username: user
```

```
Password:
```

```
Router> enable
```

```
Password:
```

The **show platform** command output now indicates a second IOS process is active on RP 0.

```
Router# show platform
```

```
Chassis type: ASR1004
```

Slot	Type	State	Insert time (ago)
0	ASR1000-SIP10	ok	00:29:34
0/0	SPA-5X1GE-V2	ok	00:28:13
0/1	SPA-2XT3/E3	ok	00:28:18
R0	ASR1000-RP1	ok	00:29:34
R0/0		ok, active	00:29:34
R0/1		ok, standby	00:27:49
F0	ASR1000-ESP10	ok, active	00:29:34
P0	ASR1004-PWR-AC	ok	00:28:47
P1	ASR1004-PWR-AC	ok	00:28:47

Slot	CPLD Version	Firmware Version
0	07091401	12.2(33r)XN2
R0	07062111	12.2(33r)XN2
F0	07051680	12.2(33r)XN2

The **show redundancy states** command shows SSO as the operational redundancy mode.

```
Router# show redundancy states
```

```
my state = 13 -ACTIVE
peer state = 8 -STANDBY HOT
Mode = Duplex
Unit ID = 48
```

```
Redundancy Mode (Operational) = sso
Redundancy Mode (Configured) = sso
Redundancy State = sso
Maintenance Mode = Disabled
Manual Swact = enabled
Communications = Up
```

```
client count = 66
client_notification_TMR = 30000 milliseconds
RF debug mask = 0x0
```

ISSU—Consolidated Package Upgrade

In the following example, ISSU is used to upgrade two RPs in the same Cisco ASR 1000 Series Router to consolidated packages. The RPs are being upgraded from Cisco IOS XE Release 2.1.0, which uses Cisco IOS Release 12.2(33)XNA, to Cisco IOS XE Release 2.1.1, which uses Cisco IOS Release 12.2(33)XNA1.

The example starts with the user logged into RP 0, the active RP.

```
Router# show version
Cisco IOS Software, IOS-XE Software (PPC_LINUX_IOSD-ADVENTERPRISEK9-M), Version
12.2(33)XNA, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2008 by Cisco Systems, Inc.
Compiled Thu 01-May-08 00:29 by mcpre
```

```
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documentation or "License Notice" file accompanying the IOS-XE software,
or the applicable URL provided on the flyer accompanying the IOS-XE
software.
```

```
ROM: IOS-XE ROMMON
```

```
Router uptime is 2 weeks, 2 hours, 54 minutes
Uptime for this control processor is 1 hour, 7 minutes
System returned to ROM by reload at 15:24:15 DST Mon Jul 21 2008
System image file is "bootflash:asr1000rpl-adventerprisek9.02.01.00.122-33.XNA.bin"
Last reload reason: redundancy force-switchover
```

```
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to comply with U.S. and local laws, return this product immediately.
```

```
A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html
```

```
If you require further assistance please contact us by sending email to
export@cisco.com.
```

```
cisco ASR1006 (RP1) processor with 1772131K/6147K bytes of memory.
8 FastEthernet interfaces
5 Gigabit Ethernet interfaces
```



```
Router# copy bootflash:asr1000rp1-adventerprisek9.02.01.01.122-33.XNA1.bin stby-bootflash:
Destination filename [asr1000rp1-adventerprisek9.02.01.01.122-33.XNA1.bin]?
Copy in progress...CCCCCCCC
<output removed for brevity>
209227980 bytes copied in 434.790 secs (481216 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  Jul 21 2008 15:29:25 -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
  15  -rw-          7516  Jul 2 2008 15:01:39 -07:00  startup-config
  13  -rw-          45977  Apr 9 2008 16:48:46 -07:00  target_support_output.tgz.tgz
  16  -rw-    209227980  Jul 17 2008 16:06:58 -07:00
asr1000rp1-adventerprisek9.02.01.01.122-33.XNA1.bin
```

```
928862208 bytes total (76644352 bytes free)
```

```
Router# dir stby-bootflash:
Directory of stby-bootflash:/
```

```

  11  drwx          16384  Dec 13 2004 03:45:47 -08:00  lost+found
87937  drwx          4096  Jul 17 2008 16:43:34 -07:00  .rollback_timer
14657  drwx          4096  Jul 17 2008 16:43:34 -07:00  .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
  13  -rw-    208904396  Jun 5 2008 20:12:53 -07:00
asr1000rp1-adventerprisek9.02.01.00.122-33.XNA.bin
58625  drwx          4096  Jul 21 2008 15:32:59 -07:00  .prst_sync
  14  -rw-    209227980  Jul 17 2008 16:16:07 -07:00
asr1000rp1-adventerprisek9.02.01.01.122-33.XNA1.bin
```

```
945377280 bytes total (276652032 bytes free)
```

```
Router# issu loadversion rp 1 file
```

```
stby-bootflash:asr1000rp1-adventerprisek9.02.01.01.122-33.XNA1.bin
```

```
--- Starting installation state synchronization ---
```

```
Finished installation state synchronization
```

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

```
Finished file path checking
```

```
--- Starting system installation readiness checking ---
```

```
Finished system installation readiness checking
```

```
--- Starting installation changes ---
```

```
Setting up image to boot on next reset
```

```
Starting automatic rollback timer
```

```
Finished installation changes
```

```
SUCCESS: Software will now load.
```

```
Router#
```

```
*Jul 21 23:34:27.206: %ASR1000_OIR-6-OFFLINECARD: Card (rp) offline in slot R1
```

```
*Jul 21 23:34:27.271: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault
```

```
(PEER_NOT_PRESENT)
```

```
*Jul 21 23:34:27.271: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_DOWN)
```

```
*Jul 21 23:34:27.271: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault
```

```
(PEER_REDUNDANCY_STATE_CHANGE)
```

```
*Jul 21 23:37:05.528: %ASR1000_OIR-6-ONLINECARD: Card (rp) online in slot R1
*Jul 21 23:37:25.480: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby
insertion (raw-event=PEER_FOUND(4))

*Jul 21 23:37:25.480: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby
insertion (raw-event=PEER_REDUNDANCY_STATE_CHANGE(5))
Finished installation state synchronization

*Jul 21 23:37:26.349: %REDUNDANCY-3-IPC: IOS versions do not match.
*Jul 21 23:38:47.172: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEEDED: Bulk Sync succeeded
*Jul 21 23:38:47.173: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)
```

```
Router# issu runversion
--- Starting installation state synchronization ---
Finished installation state synchronization
```

```
Initiating active RP failover
SUCCESS: Standby RP will now become active
```

```
Router#
```

```
System Bootstrap, Version 12.2(33r)XN2, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2008 by cisco Systems, Inc.
```

```
<additional output removed for brevity>
```

```
*Jul 21 23:43:31.970: %SYS-5-RESTART: System restarted --
Cisco IOS Software, IOS-XE Software (PPC_LINUX_IOSD-ADVENTERPRISEK9-M), Version
12.2(33)XNA, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2008 by Cisco Systems, Inc.
Compiled Thu 01-May-08 00:29 by mcpre
*Jul 21 23:43:31.978: %SSH-5-ENABLED: SSH 1.99 has been enabled
*Jul 21 23:43:35.196: Relay: standby progression done
*Jul 21 23:43:35.197: %PLATFORM-6-RF_PROG_SUCCESS: RF state STANDBY HOT
```

At this point of the process, the user has to log onto RP1, which started the upgrade as the standby RP but is the active RP after the switchover.

The following commands are entered from RP1:

```
Router# issu acceptversion
Cancelling rollback timer
SUCCESS: Rollback timer cancelled
```

```
Router# issu commitversion
--- Starting installation changes ---
Cancelling rollback timer
Saving image changes
Finished installation changes
```

```
Building configuration...
[OK]
```

```
SUCCESS: version committed: bootflash:asr1000rp1-adventerprisek9.02.01.01.122-33.XNA1.bin
```

```
Router# show version
Cisco IOS Software, IOS-XE Software (PPC_LINUX_IOSD-ADVENTERPRISEK9-M), Version
12.2(33)XNA1, RELEASE SOFTWARE (fc1)
```

Technical Support: <http://www.cisco.com/techsupport>
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ROM: IOS-XE ROMMON

```
Router uptime is 2 weeks, 3 hours, 8 minutes
Uptime for this control processor is 11 minutes
System returned to ROM by reload at 15:29:24 DST Mon Jul 21 2008
System image file is "bootflash:asr1000rp1-adventerprisek9.02.01.01.122-33.XNA1.bin"
Last reload reason: EHSa standby down
```

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<http://www.cisco.com/wwl/export/crypto/tool/stqrg.html>

If you require further assistance please contact us by sending email to export@cisco.com.

```
cisco ASR1006 (RP1) processor with 1772046K/6147K bytes of memory.
8 FastEthernet interfaces
5 Gigabit Ethernet interfaces
8 Serial interfaces
8 Channelized T1 ports
2 Packet over SONET interfaces
2 Channelized T3 ports
32768K bytes of non-volatile configuration memory.
4194304K bytes of physical memory.
937983K bytes of eUSB flash at bootflash:.
39004543K bytes of SATA hard disk at harddisk:.
253424K bytes of USB flash at usb0:.
```

Configuration register is 0x2102

```
Router# show running-config | include boot
boot-start-marker
boot system bootflash:asr1000rp1-adventerprisek9.02.01.01.122-33.XNA1.bin
boot system bootflash:asr1000rp1-adventerprisek9.02.01.00.122-33.XNA1.bin
boot-end-marker
Router#
```

At this point of the procedure, the upgrade of RP1 is complete.

The following procedure uses the same steps to upgrade RP0. The user is still on RP1 when this process begins.

```
Router# show platform
Chassis type: ASR1006
```

Slot	Type	State	Insert time (ago)
0	ASR1000-SIP10	ok	00:16:10
0/0	SPA-5X1GE-V2	ok	00:10:50
0/1	SPA-8X1FE-TX-V2	ok	00:10:46
0/2	SPA-2XCT3/DS0	ok	00:10:42
1	ASR1000-SIP10	ok	00:16:10
1/0	SPA-2XOC3-POS	ok	00:10:49
1/1	SPA-8XCHT1/E1	ok	00:10:45
1/2	SPA-2XT3/E3	ok	00:10:41
R0	ASR1000-RP1	ok, standby	00:16:10
R1	ASR1000-RP1	ok, active	00:16:10
F0	ASR1000-ESP10	ok, standby	00:16:10
F1	ASR1000-ESP10	ok, active	00:16:10
P0	ASR1006-PWR-AC	ok	00:15:07
P1	ASR1006-FAN	ok	00:15:07

Slot	CPLD Version	Firmware Version
0	06120701	12.2(33r)XN2
1	06120701	12.2(33r)XN2
R0	07082312	12.2(33r)XN2
R1	07062111	12.2(33r)XN2
F0	07051680	12.2(33r)XN2
F1	07051680	12.2(33r)XN2

```
Router# issu loadversion rp 0 file
stby-bootflash:asr1000rp1-adventerprisek9.02.01.01.122-33.XNA1.bin
```

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

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

```
--- Starting system installation readiness checking ---
Finished system installation readiness checking
```

```
--- Starting installation changes ---
Setting up image to boot on next reset
Starting automatic rollback timer
Finished installation changes
```

```
SUCCESS: Software will now load.
```

```
Router#
*Jul 21 23:53:41.218: %ASR1000_OIR-6-OFFLINECARD: Card (rp) offline in slot R0
*Jul 21 23:53:41.256: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault
(PEER_NOT_PRESENT)
*Jul 21 23:53:41.256: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_DOWN)
*Jul 21 23:53:41.256: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault
(PEER_REDUNDANCY_STATE_CHANGE)
*Jul 21 23:53:42.423: %IP-4-DUPADDR: Duplicate address 172.29.52.155 on GigabitEthernet0,
sourced by 001a.3046.e3ff
*Jul 21 23:56:19.885: %ASR1000_OIR-6-ONLINECARD: Card (rp) online in slot R0
```

```
*Jul 21 23:56:39.324: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby
insertion (raw-event=PEER_FOUND(4))
```

```
*Jul 21 23:56:39.324: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby
insertion (raw-event=PEER_REDUNDANCY_STATE_CHANGE(5))
```

```
*Jul 21 23:58:03.660: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeeded
```

```
*Jul 21 23:58:03.661: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)
```

```
Router# issu runversion
```

```
--- Starting installation state synchronization ---
```

```
Finished installation state synchronization
```

```
Initiating active RP failover
```

```
SUCCESS: Standby RP will now become active
```

```
Router#
```

```
System Bootstrap, Version 12.2(33r)XN2, RELEASE SOFTWARE (fc1)
```

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

```
Copyright (c) 2008 by cisco Systems, Inc.
```

```
<Output removed for brevity>
```

After the switchover, the user must log onto RP0.

The remaining commands are all entered from RP0:

```
Router# issu acceptversion
```

```
Cancelling rollback timer
```

```
SUCCESS: Rollback timer cancelled
```

```
Router# issu commitversion
```

```
*Jul 22 00:10:45.488: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeeded
```

```
*Jul 22 00:10:45.489: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)
```

```
--- Starting installation changes ---
```

```
Cancelling rollback timer
```

```
Saving image changes
```

```
Finished installation changes
```

```
Building configuration...
```

```
[OK]
```

```
SUCCESS: version committed: bootflash:asr1000rp1-adventerprisek9.02.01.01.122-33.XNA1.bin
```

```
Router# show version
```

```
Cisco IOS Software, IOS-XE Software (PPC_LINUX_IOSD-ADVENTERPRISEK9-M), Version
```

```
12.2(33)XNA1, RELEASE SOFTWARE (fc1)
```

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

```
Copyright (c) 1986-2008 by Cisco Systems, Inc.
```

```
Compiled Tue 08-Jul-08 14:40 by mcpre
```

Cisco IOS-XE software, Copyright (c) 1986-2008 by Cisco Systems, Inc.

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ROM: IOS-XE ROMMON

```
Router uptime is 2 weeks, 3 hours, 33 minutes
Uptime for this control processor is 16 minutes
System returned to ROM by reload at 15:24:15 DST Mon Jul 21 2008
System image file is "bootflash:asr1000rp1-adventerprisek9.02.01.01.122-33.XNA1.bin"
Last reload reason: EHSA standby down
```

This product contains cryptographic features and is subject to United States and local country laws governing import, export, transfer and use. Delivery of Cisco cryptographic products does not imply third-party authority to import, export, distribute or use encryption. Importers, exporters, distributors and users are responsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
<http://www.cisco.com/wwl/export/crypto/tool/stqrg.html>

If you require further assistance please contact us by sending email to export@cisco.com.

```
cisco ASR1006 (RP1) processor with 1772046K/6147K bytes of memory.
8 FastEthernet interfaces
5 Gigabit Ethernet interfaces
8 Serial interfaces
8 Channelized T1 ports
2 Packet over SONET interfaces
2 Channelized T3 ports
32768K bytes of non-volatile configuration memory.
4194304K bytes of physical memory.
921599K bytes of eUSB flash at bootflash:.
39004543K bytes of SATA hard disk at harddisk:.
```

Configuration register is 0x2102

```
Router# show running-config | include boot
boot-start-marker
boot system bootflash:asr1000rp1-adventerprisek9.02.01.01.122-33.XNA1.bin
boot system bootflash:asr1000rp1-adventerprisek9.02.01.00.122-33.XNA1.bin
boot-end-marker
Router#
```