

# Boot Commands

This module describes the commands used to boot or reset Cisco IOS XR software.

For more information about ROM Monitor (ROMMON) and boot tasks, see *ROM Monitor Configuration Guide for Cisco ASR 9000 Routers* or *Cisco ASR 9000 Series Aggregation Services Router Getting Started Guide*.


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# config-register

To define the configuration register boot value, use the **config-register** command in the appropriate mode.

**config-register** {*value* | **boot-mode** {**exec-mode** | **rom-monitor**} | **console-baud** *baud-rate* | **console-break-key** {**disable** | **enable**} | **password-recovery** {**disable** | **enable**}} [**location** {*node-id* | **all**}]

## Syntax Description

| | |
|---|---|
| *value* | Hexadecimal or decimal value that represents the 16-bit configuration register value to be used the next time the router is reloaded. Range is from 0x0 to 0xFFFF (0 to 65535 in decimal).<br>For information about common configuration register settings, see Table 1: Common Configuration Register Settings, on page 3. |
| **boot-mode** | Specifies what to do when the system is rebooted. |
| **exec-mode** | Specifies to load the Cisco IOS XR software and enter EXEC mode on next system reboot. |
| **rom-monitor** | Specifies to enter ROM Monitor mode on next system reboot. |
| **console-baud** *baud-rate* | Specifies the console baud rate. |
| **console-break-key** {**disable** \| **enable**} | Specifies to disable or enable the console break key on the next system reboot. |
| **password-recovery** {**disable** \| **enable**} | Specifies to enable or disable the password recovery mode on the next reboot. |
| **location** {*node-id* \| **all**} | (Optional) Specifies the RSP node for which to define the configuration register boot value. The **all** keyword specifies all RSP nodes. |

## Command Default

By default, the configuration register value is 0x102 after a Turboboot.

## Command Modes

Administration EXEC

EXEC mode

## Command History

| Release | Modification |
|---|---|
| Release 3.7.2 | This command was introduced. |

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The *configuration register setting* is a 16-bit, user-configurable value that determines how the router switch processor (RSP) functions during initialization. The configuration register can cause the RSP to boot normally from the default configuration, or to enter ROMMON mode during a reload. Configuration register settings can also be used to perform tasks such as password recovery.

The **config-register** command is entered in administration EXEC mode, on the designated shelf controller (DSC) of the system. The DSC is the primary RSP of the owner secure domain router (owner SDR).

When you have two RPs (Primary RP0 and Standby RP1) and the config-registers of the two are different, you must manually set the config-register in RP1 equal to RP0 in order for RP1 to synchronize with the configurations on RP0.

Use the **show variables boot** command in the EXEC mode to see status of the config-register in both the RPs.

Use the **config-register***x***location***x* command in the Admin mode to change the config-register in either of the RPs.

When setting the configuration register value for the **config-register** command, note the following conditions:

- If both the primary and standby DSC are up and running when the configuration register value is set, the configuration register value applies to both the primary and standby DSC.
- By contrast, if only the primary DSC is up and running when the configuration register value is set and the standby DSC is introduced into the router at a later time, the router does *not* attempt to synchronize the configuration register value for the standby RSP to that of the active RSP; in this situation, the configuration register setting applied to the standby DSC is determined by the configuration register value set in ROMMON mode.

This table describes the most commonly used configuration register settings.

***Table 1: Common Configuration Register Settings***

| Value | Description |
|---|---|
| 0x0 | RSP enters ROMMON mode (rommon B1>) on the next system boot. |
| 0x2 | RSP loads the Cisco IOS XR software and default configuration on the next system boot. After logging in, the user can access EXEC mode. |
| 0x102 | Router loads the Cisco IOS XR software with the console Break key disabled on the next system boot.<br>Both 0x102 and 0x2102 specify the same functionality, as bit 13 in 0x2102 is not significant for Cisco IOS XR software. |
| 0x40 | Router enters the password recovery mode on the next system boot. |

If you use the various keywords to set the configuration settings, note that the hexadecimal value is updated in an additive or subtractive manner to represent the keyword used. For example, if the current configuration setting is 0x102 and you use the **config-register** command with the **password-recovery enable** keywords, the value is updated to 0x142.

## Task ID

| Task ID | Operations |
|---|---|
| root-lr | read, write |

The following example shows how to set the configuration register on the DSC to 0x2. Setting the configuration registration to 0x2 causes the router to boot the Cisco IOS XR software and enter EXEC mode during a router reload.

```
RP/0/RSP0/CPU0:router(admin)# config-register boot-mode exec-mode

Sun May 31 12:10:36.037 PST Successfully set config-register to
0x2 on node 0/RSP0/CPU0
```

### Related Topics

reload, on page 10
show variables boot, on page 26
show version

# mirror

To configure disk mirroring on a node, use the **mirror** command in global configuration mode. To disable disk mirroring, use the **no** form of this command.

**mirror location** [**preconfigure**] *node-id primary-device***:***secondary-device***:**
**no mirror location**

## Syntax Description

| | |
|---|---|
| **location** *node-id* | Specifies the node of the RP. It can be a node that is not yet installed if the **preconfigure** keyword is used. The *node-id* argument is entered in the *rack*/*slot*/*module* notation. |
| **preconfigure** | (Optional) Enables you to specify a node that is not yet installed. |
| *primary-device* **:** | Specifies the primary boot device used to store installation packages and configuration files. Supported devices are:<br>• **disk0:**<br>• **disk1:** (if installed)<br>• **compactflash:** (if installed) |
| *secondary-device* **:** | Storage device on the same RP as the *primary-device*, to where critical data is replicated. Supported devices are the same as for *primary-device* **:**, but *secondary-device* **:** must be different than the *primary-device* **:**. |

## Command Default

None

## Command Modes

Global configuration

## Command History

## Command History

| Release | Modification |
|---|---|
| Release 3.7.2 | This command was introduced. |

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **mirror** command replicates all critical data contained in the primary partition of the primary boot device, onto a second storage device on the same RSP. Therefore, if the primary boot device fails, applications continue to be serviced transparently by the secondary device, without having to switch control to a standby RSP.

Before the **mirror** command can be used, the secondary storage device must be partitioned using the **format** command. If the primary boot device is not partitioned, once mirroring is enabled and all data on the primary boot device is replicated to the secondary device, the primary boot device is partitioned automatically. This guarantees that only critical data on the primary boot device is mirrored to the secondary device. Noncritical

data, such as logging data, should not be mirrored and should, therefore, be saved to the secondary partition on the storage device.

To temporarily suspend disk mirroring without changing the configuration, use the **mirror pause** command in EXEC mode.

## Task ID

| Task ID | Operations |
|---|---|
| root-lr | read, write |

The following example shows how to configure disk mirroring from the primary boot device (disk0:) to the secondary storage device (disk1:):

```
RP/0/RSP0/CPU0:router(config)# mirror location 0/rp0/cpu0 disk0: disk1:
```

### Related Topics

format
mirror pause, on page 7
mirror resume, on page 8

# mirror pause

To temporarily pause disk mirroring on a node, use the **mirror pause** command in EXEC or administration EXEC mode.

**mirror pause** [**location** {*node-id* | **all**}]

**Syntax Description**

| | |
|---|---|
| **location** {*node-id* \| **all**} | (Optional) Specifies the node of the RSP. The *node-id* argument is entered in the *rack/slot/module* notation. The **all** keyword specifies all RSP nodes. |

**Command Default**

If no node is specified, disk mirroring is paused on the active RSP.

**Command Modes**

EXEC

Administration EXEC

**Command History**

| Release | Modification |
|---|---|
| Release 3.7.2 | This command was introduced. |

**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **mirror pause** command temporarily pauses the mirroring of the primary boot device. This command is primarily useful during an installation operation to prevent significant performance degradation on single CPU boards. The **mirror pause** command does not change the configured state of mirroring, but rather causes the mirroring to be suspended until the **mirror resume** command is used.

The **mirror pause** command has no affect if the **mirror** configuration command is not enabled.

**Task ID**

| Task ID | Operations |
|---|---|
| root-lr | read, write |

The following example shows how to pause disk mirroring on the active RSP:

```
RP/0/RSP0/CPU0:router# mirror pause
```

**Related Topics**

mirror, on page 5
mirror resume, on page 8

# mirror resume

To resume disk mirroring on a node after it has been temporarily stopped, use the **mirror resume** command in EXEC or administration EXEC mode.

**mirror resume** [**location** {*node-id* | **all**}]

## Syntax Description

| | |
|---|---|
| **location** {*node-id* \| **all**} | (Optional) Specifies the node of the RSP. The *node-id* argument is entered in the *rack*/*slot*/*module* notation. The **all** keyword specifies all RSP nodes. |

## Command Modes

EXEC

Administration EXEC

## Command History

| Release | Modification |
|---|---|
| Release 3.7.2 | This command was introduced. |

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **mirror resume** command resumes the mirroring of the primary boot device after it has been temporarily paused with the **mirror pause** command.

The **mirror resume** command has no affect if the **mirror** configuration command is not enabled and the **mirror pause** command has not been used.

## Task ID

| Task ID | Operations |
|---|---|
| root-lr | read, write |

The following example shows how to resume disk mirroring on the active RSP:

```
RP/0/RSP0/CPU0:router# mirror resume
```

### Related Topics

mirror, on page 5
mirror pause, on page 7

# mirror verify

To verify disk synchronization for disk mirroring on a node, use the **mirror verify** command in EXEC or administration EXEC mode.

**mirror verify** [**location** *node-id*]

## Syntax Description

| | |
|---|---|
| **location** *node-id* | (Optional) Specifies the node of the RSP. The *node-id* argument is entered in the *rack/slot/module* notation. |

## Command Default

If no node is specified, the verification is done on the active RSP.

## Command Modes

EXEC

Administration EXEC

## Command History

| Release | Modification |
|---|---|
| Release 3.7.2 | This command was introduced. |

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **mirror verify** command verifies the synchronization consistency between the primary and secondary media devices being used in mirroring. The command verifies that the full contents are identical between the mirrored devices and reports any inconsistencies found.

## Task ID

| Task ID | Operations |
|---|---|
| root-lr | read, write |

The following example shows how to verify the disk mirroring on the active RSP:

```
RP/0/RSP0/CPU0:router# mirror verify


  Mirror Verify Information for 0/RSP0/CPU0.
  ==========================================================
  Primary device and secondary device are fully synchronized.
```

### Related Topics

mirror, on page 5

# reload

**reload**

**Syntax Description** This command has no keywords or arguments.

**Command Default** No default behavior or values

**Command Modes** EXEC

**Command History**

| Releases | Modifications |
|---|---|
| Release 3.7.2 | This command was introduced. |

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **reload** command to cause the RSP to reload the Cisco IOS XR software according to the configuration register setting (for example, 0x0 to enter ROMMON mode and 0x2 to reload the RSP to EXEC mode). If a standby RSP is in the ready redundancy state, the **reload** command also causes the router to fail over to the standby RSP. Use the **show redundancy** command in EXEC mode to display the status of the standby RSP.

When the **reload** command is used and a switchover occurs, the running (active) software configuration is automatically maintained during switchover.



**Caution** If a standby RSP is not installed or is not in the ready state, then the router experiences a loss of service while the active RSP is reloading Cisco IOS XR software. To view the status of the standby RSP, issue the **show redundancy** command in EXEC mode.

If you use the **reload** command and there is no available standby node, you are prompted to continue with the reload:

When a router reloads using **reload**, if the line card experiences a timeout waiting for the sysdb configuration replay, the system will notify the user once to reload the line card. This reload allows the sysdb configuration to come up properly after the line card restarts.

```
RP/0/RSP0/CPU0:router# reload

Standby card not present or not Ready for failover. Proceed?[confirm]y
```

**Task ID**

| Task ID | Operations |
|---|---|
| root-lr | execute |

The following example shows how to reload the active RSP. If a standby RSP is in the ready state, then the router fails over to the standby RSP. If the standby RSP is not installed or is not in the ready state, then the router enters ROMMON mode and routing operations stop.

```
RP/0/RSP0/CPU0:router# reload

  Updating Commit Database.  Please wait...[OK]
  Proceed with reload? [confirm] y

  PCI0 device[7]: Vendor ID 0x10ee
  PCI0 device[7]: Device ID 0x300e
  PCI1 device[7]: Device ID 0x1100
  PCI1 device[7]: Vendor ID 0x1013
  PCI1 device[8]: Device ID 0x649
  PCI1 device[8]: Vendor ID 0x1095
  PCI1 device[9]: Device ID 0x5618
  PCI1 device[9]: Vendor ID 0x14e4
  PCI1 device[10]: Device ID 0x5618
  PCI1 device[10]: Vendor ID 0x14e4
  System Bootstrap, Version 1.15(20040120:002852) ,
  Copyright (c) 1994-2004 by cisco Systems, Inc.
  Board type is 0x100000 (1048576)
  Enabling watchdog
  Broadcom 5618 #0 Found on PCI
  Broadcom 5618 #1 Found on PCI
  No. of BCM 56xx switches found 2 .
  BCM Switch #0 initialisation complete.
  BCM Switch #1 initialisation complete
  G4(7450-SMP-GT64260_A) platform with 2048 Mb of main memory

  rommon B1 >
```

## Related Topics

reload (administration EXEC), on page 12
show redundancy
config-register, on page 2

# reload (administration EXEC)

To reload a node or all nodes on a single chassis or multishelf system, use the **reload** command in the appropriate mode.

**reload** [**location** {*node-id* | **all**} | **rack** *rack-number*]

## Syntax Description

| | |
|---|---|
| **location** {*node-id* \| **all**} | (Optional) Specifies the node to reload. The *node-id* argument is entered in the *rack/slot/module* notation. The **all** keyword specifies all RP nodes. |
| **rack** | Reloads all the nodes on a specified chassis. |
| *rack-number* | Rack number of the line card chassis or fabric chassis. |

## Command Default

None

## Command Modes

Administration EXEC

## Command History

| Release | Modification |
|---|---|
| Release 3.7.2 | This command was introduced. |

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

**Note** Before reloading nodes on the router, we recommend using the **cfs check** command to check the sanity of the configuration file system and attempt to recover from internal inconsistencies.

To reload a specific node on the router, specify the **reload** command with the **location** *node-id* keyword and argument. The *node-id* is expressed in the *rack/slot/module* notation.

## Task ID

| Task ID | Operations |
|---|---|
| root-system | execute |

The following example shows how to reload all nodes on the router:

```
RP/0/RSP0/CPU0:router(admin)# reload location all

Graceful reload of all nodes not supported
Assuming 'force'
Operation may result in file corruptions or loss of config. Proceed [Y/N]? y
```

**Note** To ensure the sanity of the configuration file system, enter the **cfs check** command on the router.

**Related Topics**

cfs check
reload, on page 10
show redundancy
config-register, on page 2

# show epm trace boot

To display execution path monitoring traces, use the **show epm trace boot** command in

administration EXEC

mode.

**show epm trace boot** [**hexdump**] [**last** *n*] [**reverse**] [**stats**] [**tailf**] [**unique**][**verbose**] [**wrapping**][**file** *filename* **original**] [**location** {*node-id* | **all**}]

## Syntax Description

| | |
|---|---|
| **hexdump** | (Optional) Displays traces in hexadecimal format. |
| **last** *n* | (Optional) Displays the last *n* number of traces only. |
| **reverse** | (Optional) Displays the most recent traces first. |
| **stats** | (Optional) Displays execution path statistics. |
| **tailf** | (Optional) Displays new traces as they are added. |
| **unique** | (Optional) Displays unique entries only, along with the count of the number of times this entry appears. |
| **verbose** | (Optional) Displays additional internal debugging information. |
| **wrapping** | (Optional) Displays wrapping entries. |
| **file** *filename* **original** | (Optional) Specifies the filename of the file to display. You can specify up to four trace files. |
| **location** {*node-id* \| **all**} | (Optional) Specifies the node of the RSP. The *node-id* argument is entered in the *rack/slot/module* notation. You can specify up to four nodes. The **all** keyword specifies all RSP nodes. |

## Command Default

None

## Command Modes

Administration EXEC

## Command History

| Release | Modification |
|---|---|
| Release 3.7.2 | This command was introduced. |

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show epm trace boot** command provides a simple way of tracking and time-stamping critical events to clearly understand their temporal relationship to one another and the amount of time spent performing critical operations.

## Task ID

| Task ID | Operations |
|---|---|
| basic services | read |

The following example shows sample output from the **show epm trace boot** command:

```
RP/0/RSP0/CPU0:router(admin)# show epm trace boot

Mon Jun  1 03:16:36.946 PST
22 wrapping entries (1024 possible, 0 filtered, 22 total)
Oct  8 07:54:49.610 epm/boot 0/RSP0/CPU0 t1  @ 00:00:06 - [init] process-start
Oct  8 07:55:25.710 epm/boot 0/RSP0/CPU0 t1  @ 00:00:42 - [insthelper] process-start
Oct  8 07:57:08.992 epm/boot 0/RSP0/CPU0 t1  @ 00:02:25 - [sysmgr] process-start
Oct  8 07:57:09.785 epm/boot 0/RSP0/CPU0 t7  @ 00:02:26 - [sysmgr] start-level: start
Oct  8 07:57:10.722 epm/boot 0/RSP0/CPU0 t1  @ 00:02:27 - [sw_dwnld_svr] process-start
Oct  8 07:57:12.482 epm/boot 0/RSP0/CPU0 t11 @ 00:02:29 - [sysmgr] start-level: admin
Oct  8 07:57:13.385 epm/boot 0/RSP0/CPU0 t1  @ 00:02:30 - [instdir] process-start
Oct  8 07:57:19.638 epm/boot 0/RSP0/CPU0 t1  @ 00:02:36 - [instdir_lr] process-start
Oct  8 07:58:07.045 epm/boot 0/RSP0/CPU0 t9  @ 00:03:23 - [sysmgr] admin-plane-up
Oct  8 07:58:52.057 epm/boot 0/RSP0/CPU0 t4  @ 00:04:08 - [cfgmgr-rp] admin-config-start
Oct  8 07:58:59.973 epm/boot 0/RSP0/CPU0 t4  @ 00:04:16 - [cfgmgr-rp] admin-config-done
Oct  8 07:59:00.079 epm/boot 0/RSP0/CPU0 t9  @ 00:04:16 - [sysmgr] start-level: infra
Oct  8 07:59:00.615 epm/boot 0/RSP0/CPU0 t1  @ 00:04:17 - [devc-conaux] exec-available
Oct  8 07:59:02.288 epm/boot 0/RSP0/CPU0 t4  @ 00:04:18 - [cfgmgr-rp] admin-plane-mount-done
Oct  8 07:59:08.157 epm/boot 0/RSP0/CPU0 t6  @ 00:04:24 - [instdir] ready-for-requests
Oct  8 07:59:15.999 epm/boot 0/RSP0/CPU0 t6  @ 00:04:32 - [sysmgr] start-level: active
Oct  8 07:59:32.300 epm/boot 0/RSP0/CPU0 t13 @ 00:04:48 - [sysmgr] start-level: final
Oct  8 07:59:38.143 epm/boot 0/RSP0/CPU0 t9  @ 00:04:54 - [sysmgr] lr-plane-up
Oct  8 07:59:38.189 epm/boot 0/RSP0/CPU0 t4  @ 00:04:54 - [cfgmgr-rp] lr-config-start
Oct  8 07:59:49.898 epm/boot 0/RSP0/CPU0 t4  @ 00:05:06 - [cfgmgr-rp] lr-config-done
Oct  8 07:59:50.259 epm/boot 0/RSP0/CPU0 t4  @ 00:05:06 - [cfgmgr-rp]
bulk-interface-config-start
Oct  8 07:59:50.351 epm/boot 0/RSP0/CPU0 t7  @ 00:05:06 - [cfgmgr-rp] node-config-done
```

In this sample output, the time stamp following the @ sign is the elapsed time in the format hh:mm:ss since the execution phase started (for example, since node start, in the case of a boot).

# show mirror

To display disk mirroring information, use the **show mirror** command in EXEC or administration EXEC mode.

**show mirror** [**location** {*node-id* | **all**}]

**Syntax Description**

| | |
|---|---|
| **location** {*node-id* \| **all**} | (Optional) Specifies the node of the RSP for which to display the mirroring information. The *node-id* argument is entered in the *rack/slot/module* notation. The **all** keyword specifies all RSP nodes. |

**Command Default**

No default behavior or values

**Command Modes**

EXEC

Administration EXEC

**Command History**

| Release | Modification |
|---|---|
| Release 3.7.2 | This command was introduced. |

**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

**Task ID**

| Task ID | Operations |
|---|---|
| filesystem | read |

The following is sample output from the **show mirror** command:

```
RP/0/RSP0/CPU0:router# show mirror


  Mirror Information for 0/RSP0/CPU0.
  ===========================================================
   Mirroring Enabled
     Configured Primary:         disk0:
     Configured Secondary:       disk1:

   Current Mirroring State:      Syncing Files
     Current Physical Primary:   disk1:
     Current Physical Secondary: disk0:

   Mirroring Logical Device:     disk0:

   Physical Device     State       Flags
  -----------------------------------------------------------
    disk0:           Available     Enabled Formatted
    disk1:           Available     Enabled Formatted
    compactflash:    Not Present
```

```
  disk0a:          Available     Formatted
  disk1a:          Available     Formatted
  compactflasha:   Not Present

Mirroring Rommon Variable
 BOOT_DEV_SEQ_CONF = disk0:;disk1:
 BOOT_DEV_SEQ_OPER = disk1:
 MIRROR_ENABLE = Y
```

***Table 2: show mirror Field Descriptions***

| Field | Description |
|---|---|
| Mirroring Enabled | Indicates whether mirroring is enabled or disabled. |
| Configured Primary | If mirroring is enabled, the configured primary disk for mirroring. |
| Configured Secondary | If mirroring is enabled, the configured secondary disk for mirroring. |
| Current Mirroring State | Current status of mirroring. Possible values are as follows:<br>Syncing files—Files are being synchronized between the primary and secondary disks.<br>Not Configured—Mirroring is not configured.<br>Mirroring Paused—In this state, no mirroring is being done to the secondary device and the disk redundancy has been removed. The values of the BOOT_DEV_SEQ_OPER and MIRROR_ENABLE variables reflect this.<br>Redundant—The primary and secondary disks are totally in synchronization. Any read or write failure on the primary device results in disk redundancy switchover such that all operations are performed on the secondary device. |
| Current Physical Primary | Current primary disk. |
| Current Physical Secondary | Current secondary disk. |
| Mirroring Logical Device | Device name used by the mirroring process to intercept all application requests to that named device before passing them through to one of the mirrored physical devices. |
| Physical Device | Physical disk in router. |
| State | Status of the disk. Possible values are as follows:<br>Available—Disk exists in router and is available.<br>Not present—Disk does not exist in router. Partitioning of disks is available only after the disk has been formatted with the **partition** keyword. |
| Flags | Enabled—Disk mirroring has been enabled on this device and the device is part of the mirroring process.<br>Repaired—During the boot, some minor inconsistencies were discovered on the disk and were repaired to make the file system consistent.<br>Formatted—Disk was formatted before mirroring was enabled. |

| Field | Description |
|---|---|
| BOOT_DEV_SEQ_CONF= | ROM Monitor environmental variable for the boot disk sequence. This variable is is set when mirroring is enabled through the **mirror** configuration command. The devices in this ROMMON variable declare the primary and the secondary devices of the mirroring process. The first device is the primary device and the second device is the secondary device in the mirroring process.<br>**Note**<br>This variable is also shared by the disk backup feature. This variable can also be set or unset using the system boot-sequence command of the disk backup feature. But the use of system boot-sequence and system backup commands is blocked, if mirroring is enabled. |
| BOOT_DEV_SEQ_OPER= | ROM Monitor environmental variable that reflects the state of the disk redundancy status. When mirroring is enabled and the state is redundant, this variable is set to the primary device followed by the secondary device. When mirroring is not in the redundancy state, then this variable is updated to contain only the primary device. |
| MIRROR_ENABLE | ROM Monitor environmental variable whose value reflects the mirroring status. If it is set to Y, then mirroring is enabled. If it is set to P, then mirroring is paused. If empty, mirroring is not enabled. |

### Related Topics

mirror, on page 5
mirror verify, on page 9

# show reboot

To display reboot information for a node, use the **show reboot** command in

EXEC or administration EXEC

mode.

**show reboot** {**history** | [**reverse**] | {**first** | **last**} {**crashinfo** | **syslog** | **trace**} | **graceful**} **location** *node-id*

## Syntax Description

| | |
|---|---|
| **first** | (Optional) Displays information about the first ungraceful reboot. |
| **last** | (Optional) Displays information about the last ungraceful reboot. |
| **crashinfo** | Displays crash information for an ungraceful reboot. |
| **syslog** | Displays the syslogs related to an ungraceful reboot. |
| **trace** | Displays trace information for an ungraceful reboot. |
| **graceful** | Displays information about the last graceful reboot. |
| **history** | Displays the reboot history of a specific node. |
| **reverse** | (Optional) Displays the reboot history information in reverse chronological order.<br>**Note**<br>Starting from Cisco IOS XR Release 24.3.1, the **reverse** keyword is deprecated and will not be supported in future releases. |
| **location** *node-id* | Specifies which node to reload. The *node-id* argument is expressed in the *rack/slot/module* notation. |

## Command Default

None

## Command Modes

EXEC

Administration EXEC

## Command History

| Release | Modification |
|---|---|
| Release 3.7.2 | This command was introduced. |
| Release 24.3.1 | The **reverse** keyword is deprecated and will not be supported in future releases. Hence the **show reboot history reverse location** command is also not supported. |

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **history** keyword for the **show reboot** command displays all reboot causes stored for previous node resets.

Crash information ( **crashinfo** ), syslog, and kernel dumper ltrace ( **trace** ) can be displayed for the first or last reboot if it is an ungraceful reboot.

## Task ID

| Task ID | Operations |
|---|---|
| system | read |

This example shows sample output from the **show reboot** command with the **history** keyword:

The following example shows sample output from the **show reboot** command with the **first crashinfo** keywords:

```
RP/0/RSP0/CPU0:router# show reboot first crashinfo location 0/rp0/cpu0

Crashinfo Timestamp: Thu Jul 19 20:32:57 2007

20070719 20:32:57

Crash Reason: Cause code 0x21000010 Cause: Missed deadline,
  client: sc-reddrv-main, timeout: 5 Process: wd-critical-mon
Traceback: fc1941a0 fc194290 48200738 482013cc 48201c04 fc1d4fb0 Timezone UTC0

Exception at 0xfc1944c8 signal 5 c=1 f=3

Active process(s):
pkg/bin/wd-critical-mon Thread ID 1 on cpu 0
pkg/bin/l3test Thread ID 0 on cpu 1

       REGISTER INFO
      r0        r1        r2        r3
R0   01000000  4817e8c0  4820e208  000000de
       r4        r5        r6        r7
R4   fc1b4856  7fffffff  4817e738  fc1b4856
       r8        r9       r10       r11
R8   00000000  602cf522  00000000  00000000
      r12       r13       r14       r15
R12  602cf51c  4820e1a0  00000000  00000000
      r16       r17       r18       r19
R16  00000000  00000000  00000000  00000000
      r20       r21       r22       r23
R20  00000000  00000000  48200000  48200000
      r24       r25       r26       r27
R24  48200000  48200000  48200000  48200000
      r28       r29       r30       r31
R28  00000028  00000001  21000010  6029b000
        cnt        lr       msr        pc
R32  00000000  fc194290  0002d932  fc1944c8
        cnd       xer
R36  44000094  20000006

                SUPERVISOR REGISTERS
```

```
                    Memory Management Registers

                    Instruction BAT Registers
                     Index #                Value
                    IBAT0U #             0x1ffe
                    IBAT0L #               0x12
                    IBAT1U #                  0
                    IBAT1L #                  0
                    IBAT2U #          0x30000ffe
                    IBAT2L #          0xf0000032
                    IBAT3U #          0xfffc0003
                    IBAT3L #             0x40011

                    Data BAT Registers
                     Index #                Value
                    DBAT0U #             0x1ffe
                    DBAT0L #               0x12
                    DBAT1U #                  0
                    DBAT1L #          0x10000012
                    DBAT2U #          0x30000ffe
                    DBAT2L #          0xf000006a
                    DBAT3U #          0xfffc0003
                    DBAT3L #             0x40011

                    Segment Registers
                     Index #              SR-Value
                         0 #                     0
                         1 #                     0
                         2 #                     0
                         3 #                     0
                         4 #                     0
                         5 #                     0
                         6 #                     0
                         7 #                     0
                         8 #                     0
                         9 #                     0
                        10 #                     0
                        11 #                     0
                        12 #                     0
                        13 #                     0
                        14 #                     0
                        15 #                     0

                    Exception Handling Registers
          Data Addr Reg #                 DSISR
            0x602cf440 #          0x42000000
         SPRG0 #      SPRG1 #      SPRG2 #      SPRG3
         0x1 # 0x21000010 # 0x6029b000 #        0
       SaveNRestore SRR0 #    SaveNRestore SRR1
            0xfc1944c4 #             0x2d932

    Miscellaneous Registers
        Processor Id Reg #                  0
                    HID0 #          0x8410c0bc
                    HID1 #          0x9001ac80

                    MSSCR0 #             0x88000
                    MSSSR0 #                   0

     STACK TRACE
    #0 0xfc194290
    #1 0x48200738
    #2 0x482013cc
    #3 0x48201c04
```

```
#4 0xfc1d4fb0
```

### Related Topics

reload, on page 10

# show system backup

To display the system backup details and history, use the **show system backup** command in EXEC or administration EXEC mode.

**show system backup** [*target-device*] [**details** | **diff**] [**verify**] **location** {*node-id* | **all**}

## Syntax Description

| | |
|---|---|
| *target-device* | (Optional) Displays the backup details and history for the specified device. The supported devices are:<br>• **disk0:**<br>• **disk1:** (if installed)<br>• **compactflash:** (if installed) |
| **details** | (Optional) Lists the software packages and configurations stored on the specified backup device. |
| **diff** | (Optional) Displays the differences between the software packages and configuration files on the backup device with the packages and configuration files on the current boot device. |
| **verify** | (Optional) Verifies the software packages and configuration files stored on the specified backup device. |
| **location** {*node-id* \| **all**} | (Optional) Specifies the node of the RP for which to display information. The *node-id* argument is entered in the *rack/slot/module* notation. The **all** keyword specifies all RSP nodes. |

## Command Default

Enter the **show system backup** command without keywords or arguments to display the date, time, and status of the last backup for the current designated shelf controller (DSC). This command also displays the configured primary and secondary boot devices.

## Command Modes

EXEC

Administration EXEC

## Command History

| Release | Modification |
|---|---|
| Release 3.7.2 | This command was introduced. |

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **show system backup** command to display details of the current system backup on a local storage device. The command displays information about the backup performed for the active RP to which you are logged in, including the date, time, and status of the last backup.

- Use the *target-device* argument to display backup information for a specified device on a RSP node.

- Use the **details** keyword to list information about the software packages and configuration files stored on the backup device.
- Use the **diff** keyword to display the differences between the software and configurations on the backup device and the software and configurations on the currently active boot disk.
- Use the **location** *node-id* keyword and argument to display information for a backup on a specific node. Use the **location all** keywords to display information for backups on all nodes in the system.

### Various Command Modes

- The **show system backup** command can be entered in either EXEC mode or administration EXEC mode.

### Task ID

| Task ID | Operations |
|---|---|
| root-lr | execute |

In the following example, the **show system backup** command displays the status of the last system backup:

```
RP/0/RSP0/CPU0:router# admin
RP/0/RSP0/CPU0:router(admin)# show system backup

  System Backup information for node0_0_CPU0 on disk1:
  ====================================================
  Last Backup Successful
  Backup started at Sat Jun 24 12:22:10 2006
   ended at Sat Jun 24 12:42:11 2006
  Verify started at Sat Jun 24 12:42:12 2006
   ended at Sat Jun 24 12:48:47 2006
  BOOT_DEV_SEQ_CONF=disk0:;disk1:
  BOOT_DEV_SEQ_OPER=disk0:;disk1:
```

In the following example, the **show system backup** command is entered with the **details** keyword to display additional information about the configuration and software package files stored on the backup device. Because this command is entered in administration EXEC mode, the backup information for both the administration and SDR configurations is displayed.

```
RP/0/RSP0/CPU0:router(admin)# show system backup details

  System Backup information for node0_0_CPU0 on disk1:
  ====================================================
  Last Backup Successful
  Backup started at Sat Jun 24 12:22:10 2006
   ended at Sat Jun 24 12:42:11 2006
  Verify started at Sat Jun 24 12:42:12 2006
   ended at Sat Jun 24 12:48:47 2006
  BOOT_DEV_SEQ_CONF=disk0:;disk1:
  BOOT_DEV_SEQ_OPER=disk0:;disk1:
  Admin configuration last commit record on disk1:
    Device          Commitid    Time Stamp
    disk1:          2000000010  23:07:59 UTC Fri Jun 09 2006

  SDR configuration last commit record on disk1:
```

```
  Device          Commitid    Time Stamp
  disk1:          1000000030  11:56:43 UTC Thu Jun 22 2006

Active software packages on disk1:
371_372_Image_upgrade3.pdf
comp-asr9k-mini.vm-3.7.2
comp-asr9k-mini.pie-3.7.2
asr9k-diags-p.pie-3.7.2
asr9k-fpd.pie-3.7.2
asr9k-mcast-p.pie-3.7.2
asr9k-mgbl-p.pie-3.7.2
asr9k-mpls-p.pie-3.7.2
asr9k-k9sec-p.pie-3.7.2 [this item is only in the 3DES tar file]
No Inactive software packages on disk1:
```

***Table 3: show system backup Field Descriptions***

| Field | Description |
|---|---|
| BOOT_DEV_SEQ_CONF= | ROM Monitor environmental variable for the boot disk sequence. This variable is defined by the **system boot-sequence** command. The first disk is the primary device; the second disk is the backup (secondary) device. The value listed in the secondary device is also used as the default backup target device for the **system backup** command. |
| BOOT_DEV_SEQ_OPER= | ROM Monitor environmental variable for the boot disks currently in use by the system. |

## Related Topics

system backup, on page 30
system boot-sequence, on page 34

# show variables boot

To display the configuration register setting and boot file setting for the route switch processors (RSPs) in the system, use the **show variables boot** command in administration

EXEC

mode.

**show variables boot** [**location** {**all***node-id*}]

**Syntax Description**

| | |
|---|---|
| **location**{*node-id* \| **all**} | (Optional) Specifies the node to reload. The *node-id* argument is expressed in the *rack/slot/module* notation. Use the **all** keyword to indicate all nodes. |

**Command Default**

No default behavior or values

**Command Modes**

Administration EXEC

**Command History**

| Release | Modification |
|---|---|
| Release 3.7.2 | This command was introduced. |

**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **show variables boot** command to display system boot variables for the router. This command displays the configuration register setting and boot file setting for the RSPs in the system. Use the **location** *node-id* keyword and argument to display the configuration register setting for a specific card.

The configuration register setting is set with the **config-register** command. The boot variable is set in ROM Monitor mode. For more information about ROM Monitor mode, see *ROM Monitor Configuration Guide for Cisco ASR 9000 Routers*.

**Task ID**

| Task ID | Operations |
|---|---|
| root-lr | read |

This example shows sample output from the **show variables boot** command:

```
RP/0/RSP0/CPU0:router# show variables boot

Mon Jun  1 05:21:56.791 PST
BOOT variable = disk0:asr9k-os-mbi-3.9.0.11I/mbiasr9k-rp.vm,1;
CONFREG variable = 0x102
```

### Related Topics

show variables system, on page 28
show version
config-register, on page 2

# show variables system

To display internal system environmental variables set on the router, use the **show variables system** command in

EXEC

mode.

**show variables system**

## Syntax Description

This command has no keywords or arguments.

## Command Default

None

## Command Modes

EXEC

## Command History

| Release | Modification |
|---|---|
| Release 3.7.2 | This command was introduced. |

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **show variables system** command to display system environmental variables for the router.

To display the configuration register setting, use the **show variables boot** command in administration EXEC mode.

## Task ID

| Task ID | Operations |
|---|---|
| basic-services | read |

This example illustrates sample output from the **show variables system** command. The output is meant to be interpreted by Cisco personnel.

```
RP/0/RSP0/CPU0:router# show variables system

  TERM=vt220
  GDB_PDEBUG=-P1
  TERM=vt100
  DIR_PREFIX=.
  LOADPATH=/pkg
  LD_LIBRARY_PATH=/pkg/lib
  PATH=/pkg/bin
  BFM_CONFIG_PATH=/pkg/bfm/config
  BGP_PATH=/pkg/bgp
  CONFIGS_PATH=/pkg/configs
  CRAFT_PATH=/pkg/cwi
  CTF_PATH=/pkg/ctf
  DM_RULES_PATH=/pkg/dm/rules
  ETC_PATH=/pkg/etc
```

```
FPD_PATH=/pkg/fpd
IM_RULES_PATH=/pkg/rules
INIT_STARTUP_PATH=/pkg/init.d
INSTHELPER_PATH=/pkg/other
MAN_PATH=/pkg/man
MIB_LIBRARY_PATH=/pkg/lib/mib
MIB_PATH=/pkg/mib
NETIO_SCRIPT_PATH=/pkg/script
PARSER_PATH=/pkg/parser
PARTITIONS_PATH=/pkg/partitions
QOS_PATH=/pkg/qos
SCHEMA_PATH=/pkg/schema
STARTUP_PATH=/pkg/startup
TCL_LIBRARY=/pkg/lib/tcl
UCODE_PATH=/pkg/gsr/ucode
UCODE_ROOT_PATH=/pkg/ucode
VCM_RULES_PATH=/pkg/vcmrules
JOB_ID=0
INSTANCE_ID=1
SYSMGR_TUPLE=
SYSMGR_NODE=node0_RSP0_CPU0
EXIT_STATUS=0
SYSMGR_RESTART_REASON=0
AAA_USER=labuser
EXEC_PID=18280619
TASKID_MAP_SIZE=72
HOME=/disk0:/usr
TMPDIR=/disk0:/var/tmp
PWD=/disk0:/usr
```

## Related Topics

show variables boot, on page 26
show version
config-register, on page 2

# system backup

To back up the system software and configurations to a backup disk, use the **system backup** command in EXEC or administration EXEC mode.

**system backup** [*target-device*] [**format**] [**synchronous** | **asynchronous**] [**location** {*node-id* | **all**}]

## Syntax Description

| | |
|---|---|
| *target-device* | (Optional) Specifies the storage device used for the system backup. If a target device is not specified, then the secondary device defined with the **system boot-sequence** command is used. If a target device is not specified with either command, then the **system backup** command returns an error.<br>• The target device cannot be the current boot device.<br>• The target device must be large enough to store the current software set and configuration.<br>• The supported storage devices are:<br>  • **disk0:**<br>  • **disk1:** (if installed)<br>  • **compactflash:** (if installed) |
| **format** | (Optional) Formats a target disk that already contains a system backup.<br>By default, the **system backup** command formats the target disk if that target disk does not contain a previous system backup. If the target disk already contains a backup, then the disk is not formatted again. The **format** keyword forces a format of the target device even if it contains a previous system backup. |
| **synchronous** | (Optional) Performs the command in synchronous mode. This mode allows the installation process to finish before the prompt is returned. This is the default mode. |
| **asynchronous** | (Optional) Performs the command in asynchronous mode. In asynchronous mode, the command runs in the background, and the EXEC prompt is returned as soon as possible. |

| | |
|---|---|
| **location** {*node-id* \| **all**} | (Optional) Specifies an alternative node location for the backup target disk, such as the standby DSC.<br><br>By default, the backup files are copied to the target device in the current DSC. Use the **location** *node-id* keyword and argument to specify an alternative node for the backup files, such as the standby DSC.<br><br>The *node-id* argument is expressed in the *rack*/*slot*/*module* notation.<br><br>Use the **all** keyword to back up the software and configuration files to all RSPs in the system. Each RP must contain a disk in the specified target device location, such as disk1:. |

## Command Default

The operation is performed in synchronous mode.

The backup files are copied to the secondary device defined with the **system boot-sequence** command.

The backup files are copied to the target device on the current designated shelf controller (DSC).

## Command Modes

EXEC

Administration EXEC

## Command History

| Release | Modification |
|---|---|
| Release 3.7.2 | This command was introduced. |

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

**Note** The **system backup** command does not make any changes to bootflash content.

### Target Device for the Backup

Use the **system boot-sequence** command with the *target-device* argument to specify the local storage device for backup software and configuration files. The *target-device* argument is optional and applies only to the current backup operation.

- If a target storage device is not specified, then the files are backed up to the secondary storage device defined with the **system boot-sequence** command.
- If a target device is not specified with either the **system backup** command or the **system boot-sequence** command, then the backup operation is not allowed.

The *target-device* can be any local storage device except the current boot device, and must be large enough to store the current software set and configuration. Supported storage devices are:

- **disk0:**
- **disk1:** (if installed)

- **compactflash:** (if installed)

### Location Node of the Target Device

By default, the backup is created on the specified target device of the active DSC where the command is executed.

- To specify an alternate node for the system backup, such as the standby DSC, use the **system backup** command with the **location** *node-id* keyword and argument.
- To perform the backup on all installed route switch processors (RSPs), use the **system backup** command with the **location all** keywords in EXEC mode.



**Note** Each RSP impacted by the **system backup** command must contain the specified target device. For example, if the **system backup** command is executed for disk1: on all RSPs in the system, then a flash disk must be installed in disk1: of each RSP.

### Various Command Modes

- Use the **system backup** command in administration EXEC mode to back up the administration plane configuration.
- Use the **system backup** command in the EXEC mode of an SDR to back up the software and configurations for a specific SDR.

### Commit and Installation Operations Not Allowed During Backup

- Configuration changes are not allowed during the backup process. Any attempts to commit configuration changes are rejected until the backup operation is complete.
- The backup process cannot be performed during an installation operation. If an installation operation is performed while a backup is in process, the backup operation terminates.

### Displaying the Current Backup Information

Enter the **show system backup** command to display information about the current backup files. If no backup exists, an error message is displayed.

**Task ID**

| Task ID | Operations |
|---|---|
| root-lr | read, write |

The following example shows how to back up the software and configuration files on a router.

- The **system backup** command is run in administration EXEC mode, which backs up both the administration and SDR configurations.

- The target device is defined as disk1:.
- The disk is formatted because this is the first backup on the device.

```
RP/0/RSP0/CPU0:router# admin
RP/0/RSP0/CPU0:router(admin)# system backup disk1:

  Info:  node0_0_CPU0: formatting target device
  Info:  node0_0_CPU0: copying admin configuration
  Info:  node0_0_CPU0: copying SDR configuration
  Info:  node0_0_CPU0: copying installed software
  Info:  node0_0_CPU0: backup complete.
  Info:  node0_0_CPU0: verifying admin configuration
  Info:  node0_0_CPU0: verifying installed software
  Info:  node0_0_CPU0: verify complete.
  Info:  node0_0_CPU0: command succeeded.
```

## Related Topics

show system backup, on page 23
system boot-sequence, on page 34

# system boot-sequence

To define the order of local storage devices used to boot a router, use the **system boot-sequence** command in EXEC or administration EXEC mode.

**system boot-sequence** {*primary-device* [*secondary-device*] | **disable**} [**location** {*node-id* | **all**}]

## Syntax Description

| | |
|---|---|
| *primary-device* | Default device where software packages are installed and run. This device is also the default location for router configurations. The value of the *primary-device* argument is normally **disk0:**. |
| *secondary-device* | (Optional) Secondary (backup) boot device, used by the **system backup** command to back up system software and configurations. Supported storage devices are:<br>• **disk0:**<br>• **disk1:** (if installed)<br>• **compactflash:** (if installed)<br>**Note**<br>The value of the *secondary-device* argument must be different from the value of the *primary-device* argument. |
| **disable** | Temporarily disables the automatic recovery mechanism. |
| **location** {*node-id* | **all**} | (Optional) Specifies the node of the RSP for which to define the boot sequence. The *node-id* argument is expressed in the *rack/slot/module* notation. The **all** keyword specifies all RSP nodes. |

## Command Default

The primary device is **disk0:**. The (optional) secondary boot device is not defined.

## Command Modes

EXEC

Administration EXEC

## Command History

| Release | Modification |
|---|---|
| Release 3.7.2 | This command was introduced. |

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **system boot-sequence** command to define the local storage devices used to boot a router. You can define two devices with this command.

- The value of the *primary-device* argument defines the default device where software packages are installed and run. This device is also the default location for router configurations.

- The value of the *secondary-device* argument defines the device used by the **system backup** command to back up system software and configurations. This field is optional.
- The secondary device can also be temporarily defined when the **system backup** command is executed with the *target-device* argument. Use the **system boot-sequence** command with the *secondary-device* argument to permanently define the secondary (backup) device.



**Note** The primary and secondary device definitions remain in effect until the **system boot-sequence** command is entered again.

**General Guidelines**

- The value of the *secondary-device* argument must be different from the value of the *primary-device* argument.
- We recommend disk0: as the primary boot device in the boot sequence, and disk1: as the secondary boot device.
- The boot device specified with the **system boot-sequence** command must be installed in the card or the command is rejected.

**Command Mode Options**

- Use the **system boot-sequence** command in administration EXEC mode to define the boot sequence for the system.
- Use the **system boot-sequence** command in EXEC mode to define the boot sequence for a specific SDR.

**Location Node**

- Use the **location** *node-id* keyword and argument to define the boot sequence for a specific route switch processor (RSP).
- Use the **location all** keywords to define the boot sequence for all RSPs in the router.

**Disabling Automatic Recovery**

Use the **system boot-sequence** command with the **disable** keyword to disable the automatic recovery.

**Displaying the Current Boot Sequence Settings**

Enter the **show system backup** command to display the currently configured boot sequence devices.

**Task ID**

| Task ID | Operations |
|---|---|
| root-lr | read, write |

The following example shows how to define the primary and secondary boot device for the active RSP (DSC). In this example, the default location for software and configurations is disk0:. The location for backups of software and configurations is disk1:.

```
RP/0/RSP0/CPU0:router# admin
RP/0/RSP0/CPU0:router(admin)# system boot-sequence disk0: disk1:

  Info:  node0_0_CPU0: command succeeded.
```

### Related Topics

show system backup, on page 23
system backup, on page 30