



Configuring Disk Mirroring

This module describes the process to configure disk mirroring in Cisco IOS XR software.

For complete descriptions of the commands listed in this module, see [Related Documents, on page 10](#). To locate documentation for other commands that might appear in the course of performing a configuration task, search online in *Cisco ASR 9000 Series Aggregation Services Router Commands Master List*.

Table 1: Feature History for Disk Mirroring for Cisco IOS XR Software

| Release | Modification |
|---------------|--------------------------------|
| Release 3.7.2 | Disk mirroring was introduced. |
| Release 3.9.0 | No modification. |

This module contains the following topics:

- [Disk Mirroring Prerequisites, on page 1](#)
- [Information About Disk Mirroring, on page 2](#)
- [How to Enable Disk Mirroring, on page 3](#)
- [Configuration Examples for Enabling Disk Mirroring, on page 8](#)
- [Additional References, on page 9](#)

Disk Mirroring Prerequisites

Before enabling disk mirroring, the following conditions must be met:

- You must be in a user group associated with a task group that includes the proper task IDs. The command reference guides include the task IDs required for each command. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
- The secondary storage device specified for the mirroring must be installed in the same node as the primary boot device. The supported storage devices are disk0: and disk1:.
- The secondary storage device must be the same size or larger than the designated primary storage device.
- The secondary storage device must be partitioned.



Note The primary partition on the secondary storage device must be large enough to contain all data on the primary boot device. This can be an issue if the primary boot device has not yet been partitioned. For example, in the situation where both the primary boot device and the secondary storage device are 1 GB in size, the primary boot device contains 950 MB of data, and the secondary storage device is already partitioned to 800 MB in the primary partition and 200 MB in the secondary partition. In such a case, the 950 MB of data from the primary boot device does not fit on the secondary storage device because of the partition. Such a configuration is rejected and an error is displayed. You need to replace the secondary storage device with a higher capacity device. For information about disk partition sizes, see *Related Topics*.



Note Although compactflash: can be used as the secondary device on a Performance Route Processor (PRP-2), there is an issue with the ROM Monitor not being able to boot the minimum boot image (MBI) from the secondary device if the device is not disk0: or disk1:. In such a situation, you would need to go into ROMMON mode and boot the PRP-2 manually using the MBI on the compactflash:.

Related Topics

[Information About Disk Mirroring](#), on page 2

Information About Disk Mirroring

The route switch processor (RSP) card has a primary storage device that is used to store installation packages and configuration files. This primary storage device is referred to as the *primary boot device* and is essential for booting the RSP and its normal operation.

Disk mirroring replicates the critical data on the primary boot device onto another storage device on the same RSP, henceforth referred to as the secondary device. If the primary boot device fails, applications continue to be serviced transparently by the secondary device, thereby avoiding a switchover to the standby RSP. The failed primary storage device can be replaced or repaired without disruption of service.

Disk mirroring should only mirror critical data on the primary boot device onto a secondary storage device and not any noncritical data such as logging data. To separate critical data from noncritical data, the disk devices need to be partitioned. Disk0: is partitioned to disk0: and disk0a:; disk1: is partitioned to disk1: and disk1a:. Disk0: and disk1: are used for critical data, whereas disk0a: and disk1a: are used for logging data and other noncritical data. Before you can configure disk mirroring on the RSP, you must have partitioned the secondary storage device. The sizes of disk partitions are related to the total disk size, and are provided in [Table 2: Size of Disk Partitions in Relation to Size of Disk](#), on page 2.

Table 2: Size of Disk Partitions in Relation to Size of Disk

| Size of Disk | Primary Partition Percentage | Secondary Partition Percentage |
|------------------|------------------------------|--------------------------------|
| less than 900 MB | Partitioning not supported | Partitioning not supported |
| 900 MB to 1.5 GB | 80% | 20% |
| 1.5 GB to 3 GB | 60% | 40% |
| more than 3 GB | 50% | 50% |

How to Enable Disk Mirroring

The tasks in this section describe how to enable and manage disk mirroring.

Enabling Disk Mirroring

Complete the following instructions to enable disk mirroring. After disk mirroring is configured, if there is a fault on the primary boot drive or it cannot be accessed for any reason, control is automatically transferred to the secondary storage device.

SUMMARY STEPS

1. **format** *secondary-device* **partition** [**location** *node-id*]
2. Remove any noncritical data from the primary boot device.
3. **configure**
4. **mirror** **location** *node-id* *Primary-device* *Secondary-device*
5. Use the **commit** or **end** command.
6. **show mirror** [**location** *node-id*]
7. **mirror verify** **location** *node-id*

DETAILED STEPS

| | Command or Action | Purpose |
|--------|--|--|
| Step 1 | format <i>secondary-device</i> partition [location <i>node-id</i>] Example: RP/0/RSP0/CPU0:router# format disk1: partition | Partitions the secondary storage device into two partitions. <ul style="list-style-type: none"> • If the device is already partitioned, you do not need to perform this step. |
| Step 2 | Remove any noncritical data from the primary boot device. | The primary boot device should contain installation packages and configuration files only. Log files can be copied to the “a” partition of the secondary device, for example disk1a: . |
| Step 3 | configure Example: RP/0/RSP0/CPU0:router# configure | Enters global configuration mode. |
| Step 4 | mirror location <i>node-id</i> <i>Primary-device</i> <i>Secondary-device</i> Example: RP/0/RSP0/CPU0:router(config)# mirror location 0/ rsp0/cpu0 disk0:disk1: | Enables disk mirroring of the <i>primary-device</i> to the <i>secondary-device</i> . If the primary boot device is not partitioned, the following occurs: <ul style="list-style-type: none"> • The contents of the primary device are replicated to the secondary device |

| | Command or Action | Purpose |
|---------------|---|---|
| | | <ul style="list-style-type: none"> Control of the mirroring server switches to the secondary storage device. The primary device is partitioned. Data is replicated back to the primary boot device. |
| Step 5 | Use the commit or end command. | <p>commit —Saves the configuration changes and remains within the configuration session.</p> <p>end —Prompts user to take one of these actions:</p> <ul style="list-style-type: none"> Yes — Saves configuration changes and exits the configuration session. No —Exits the configuration session without committing the configuration changes. Cancel —Remains in the configuration session, without committing the configuration changes. |
| Step 6 | <p>show mirror [location <i>node-id</i>]</p> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router# show mirror location 0/ rsp0/cpu0</pre> | Displays disk mirroring information for an RSP node. It also provides the status of the synchronization between the primary and secondary devices. |
| Step 7 | <p>mirror verify location <i>node-id</i></p> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router# mirror verify location 0/ rsp0/cpu0</pre> | Verifies disk synchronization for disk mirroring on an RSP node. |

Replacing the Secondary Mirroring Device

Follow this procedure if you need to replace the secondary boot device used in the disk mirroring process.

SUMMARY STEPS

- show mirror** [**location** *node-id*]
- mirror pause** [**location** *node-id*]
- show mirror** [**location** *node-id*]
- unmount** *secondary-device* [**location** *node-id*]
- Remove the device and insert a new device.
- format** *secondary-device* **partition** [**location** *node-id*]
- show media** [**location** *node-id*]
- mirror resume** [**location** *node-id*]
- show mirror** [**location** *node-id*]

DETAILED STEPS

| | Command or Action | Purpose |
|---------------|---|--|
| Step 1 | show mirror [location <i>node-id</i>] Example: RP/0/RSP0/CPU0:router# show mirror | Verifies that mirroring is active. In the output, the <i>Current Mirroring State</i> should be redundant. |
| Step 2 | mirror pause [location <i>node-id</i>] Example: RP/0/RSP0/CPU0:router# mirror pause | Temporarily pauses disk mirroring. |
| Step 3 | show mirror [location <i>node-id</i>] Example: RP/0/RSP0/CPU0:router# show mirror | Verifies that mirroring has paused. In the output, the <i>Current Mirroring State</i> should be paused. |
| Step 4 | unmount secondary-device [location <i>node-id</i>] Example: RP/0/RSP0/CPU0:router# unmount disk1: | Unmounts the secondary device. |
| Step 5 | Remove the device and insert a new device. | |
| Step 6 | format secondary-device partition [location <i>node-id</i>] Example: RP/0/RSP0/CPU0:router# format disk1: partition | Formats the device. |
| Step 7 | show media [location <i>node-id</i>] Example: RP/0/RSP0/CPU0:router# show media | Verifies that the device is formatted. The output should display the device that you formatted. |
| Step 8 | mirror resume [location <i>node-id</i>] Example: RP/0/RSP0/CPU0:router# mirror resume | Resumes mirroring. |
| Step 9 | show mirror [location <i>node-id</i>] Example: RP/0/RSP0/CPU0:router# show mirror | Verifies that mirroring has restarted. In the output, the <i>Current Mirroring State</i> should be Syncing. It can take 15 to 30 minutes for the mirroring process to complete. The exact time depends on the number of packages or files on the boot device. When the mirroring is complete, the <i>Current Mirroring State</i> should be Redundant. |

Replacing the Primary Mirroring Device

In the event that your primary boot disk is defective and you need to replace it while disk mirroring is enabled, perform this task.

SUMMARY STEPS

1. **show mirror** [location *node-id*]
2. **configure**
3. **mirror location** *node-id* *Primary-device* *Secondary-device*
4. Use the **commit** or **end** command.
5. **show mirror** [location *node-id*]
6. **mirror pause** [location *node-id*]
7. **show mirror**
8. **unmount** *secondary-device* [location *node-id*]
9. Remove the device and insert a new device.
10. **show media** [location *node-id*]
11. (Optional) **format** *secondary-device* **partition** [location *node-id*]
12. **mirror resume** [location *node-id*]
13. **show mirror** [location *node-id*]
14. **configure**
15. **mirror location** *node-id* *Primary-device* *Secondary-device*
16. **show mirror** [location *node-id*]

DETAILED STEPS

| | Command or Action | Purpose |
|---------------|--|---|
| Step 1 | show mirror [location <i>node-id</i>] Example: RP/0/RSP0/CPU0:router# show mirror | Verifies that mirroring is in the redundant state. In the output, the <i>Current Mirroring State</i> should be redundant. If mirroring is not in the redundant state, you cannot proceed with the procedure. You must wait until mirroring is in the redundant state. |
| Step 2 | configure Example: RP/0/RSP0/CPU0:router# configure | Enters global configuration mode. |
| Step 3 | mirror location <i>node-id</i> <i>Primary-device</i> <i>Secondary-device</i> Example: RP/0/RSP0/CPU0:router(config)# mirror location 0/ RSP0 /CPU0 disk1:disk0: | Swaps the device roles such that the primary mirroring device now becomes the secondary device and the secondary mirroring device becomes the primary device. |

| | Command or Action | Purpose |
|---------|---|---|
| Step 4 | Use the commit or end command. | <p>commit —Saves the configuration changes and remains within the configuration session.</p> <p>end —Prompts user to take one of these actions:</p> <ul style="list-style-type: none"> • Yes — Saves configuration changes and exits the configuration session. • No —Exits the configuration session without committing the configuration changes. • Cancel —Remains in the configuration session, without committing the configuration changes. |
| Step 5 | <p>show mirror [location node-id]</p> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router# show mirror</pre> | Verifies that the primary device is now the secondary device and vice versa. In the output, if disk0: was the primary disk that you want to replace, it should now be listed as the secondary device. |
| Step 6 | <p>mirror pause [location node-id]</p> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router# mirror pause</pre> | Temporarily pauses disk mirroring. |
| Step 7 | <p>show mirror</p> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router# show mirror</pre> | Verifies that mirroring has paused. In the output, the <i>Current Mirroring State</i> should be paused. |
| Step 8 | <p>unmount secondary-device [location node-id]</p> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router# unmount disk1:</pre> | Unmounts the secondary device which is the device that you want to replace. Initially, this was the primary device. |
| Step 9 | Remove the device and insert a new device. | |
| Step 10 | <p>show media [location node-id]</p> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router# show media</pre> | Verifies that the new disk is partitioned. You should see that the new device is mounted. If the new device is not partitioned, format the device as indicated in the next step. |
| Step 11 | <p>(Optional) format secondary-device partition [location node-id]</p> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router# format disk1: partition</pre> | Formats the device. You only need to perform this step if the new device is not partitioned. |
| Step 12 | <p>mirror resume [location node-id]</p> <p>Example:</p> | Resumes mirroring. |

| | Command or Action | Purpose |
|----------------|--|--|
| | RP/0/RSP0/CPU0:router# mirror resume | |
| Step 13 | show mirror [location node-id] Example: RP/0/RSP0/CPU0:router# show mirror | Verifies that mirroring has restarted. In the output, the <i>Current Mirroring State</i> should be Syncing. It can take 15 to 30 minutes for the mirroring process to complete. The exact time depends on the number of packages or files on the boot device. When the mirroring is complete, the <i>Current Mirroring State</i> should be Redundant. |
| Step 14 | configure Example: RP/0/RSP0/CPU0:router# configure | Enters global configuration mode. |
| Step 15 | mirror location node-id Primary-device Secondary-device Example: RP/0/RSP0/CPU0:router (config)# mirror location 0/ RSP0 /CPU0 disk0:disk1: | Swaps the device roles back so that the newly inserted device becomes the primary device. |
| Step 16 | show mirror [location node-id] Example: RP/0/RSP0/CPU0:router# show mirror | Verifies that the new device is now the primary device. |

Configuration Examples for Enabling Disk Mirroring

Enabling Disk Mirroring: Example

In the following example, disk mirroring is enabled on a router:

```
format disk1: partition
```

```
This operation will destroy all data on "disk1:" and partition device.  
Continue? [confirm] y
```

```
Device partition disk1: is now formatted and is available for use.
```

```
configure  
  mirror location 0/0/cpu0 disk0:disk1:  
  commit
```


show mirror Command Output: Example

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

Tue Dec  7 13:02:26.520 PST

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

Current Mirroring State:  Redundant
  Current Physical Primary: disk0:
  Current Physical Secondary: disk1:

Mirroring Logical Device:  disk0:
Mirroring Logical Device2: disk1:

Physical Device      State      Flags
-----
disk0:               Available  Enabled
disk1:               Available  Enabled
compactflash:       Available
(compactflash)      Available
disk0a:              Available
disk1a:              Available
compactflasha:      Not Present
harddisk:            Available

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

mirror verify Command Output: Example

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

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

Additional References

The following sections provide references related to disk mirroring configuration.

Related Documents

| Related Topic | Document Title |
|--|--|
| Initial system bootup and configuration information for a router using the Cisco IOS XR software | <i>Cisco ASR 9000 Series Aggregation Services Router Getting Started Guide</i> |
| Information about user groups and task IDs | <i>Configuring AAA Services on the Cisco ASR 9000 Series Router</i> module of <i>System Security Configuration Guide for Cisco ASR 9000 Series Routers</i> |
| Cisco IOS XR command master list | <i>Cisco ASR 9000 Series Aggregation Services Router Commands Master List</i> |
| Cisco IOS XR boot commands | <i>Boot Commands on the Cisco ASR 9000 Series Router</i> module of <i>System Management Command Reference for Cisco ASR 9000 Series Routers</i> |

Standards

| Standards | Title |
|---|-------|
| No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature. | — |

MIBs

| MIBs | MIBs Link |
|------|--|
| — | To locate and download MIBs using Cisco IOS XR software, use the Cisco MIB Locator found at the following URL and choose a platform under the Cisco Access Products menu: http://cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml |

RFCs

| RFCs | Title |
|---|-------|
| No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature. | — |

Technical Assistance

| Description | Link |
|---|---|
| The Cisco Technical Support website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content. | http://www.cisco.com/cisco/web/support/index.html |