



# Perform Disaster Recovery

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This chapter covers details on performing disaster recovery using hard disk recovery partition and USB boot process.

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## Disaster Recovery by Using a Hard Disk Partition

### How Disaster Recovery Using a Hard Disk Recovery Partition Works

This new method of disaster recovery introduced from Cisco IOS XR Release 5.2.5 onwards helps overcome operational delays that may occur when a router is in a non-responding state.

Typically, when the router is in a non-responsive state, the administrator has to physically access the router and then take corrective action. Inability to quickly access the router can lead to delays in recovering the router and subsequently cause extended downtime in router operations. To overcome this constraint, this new method of disaster recovery can be performed remotely.

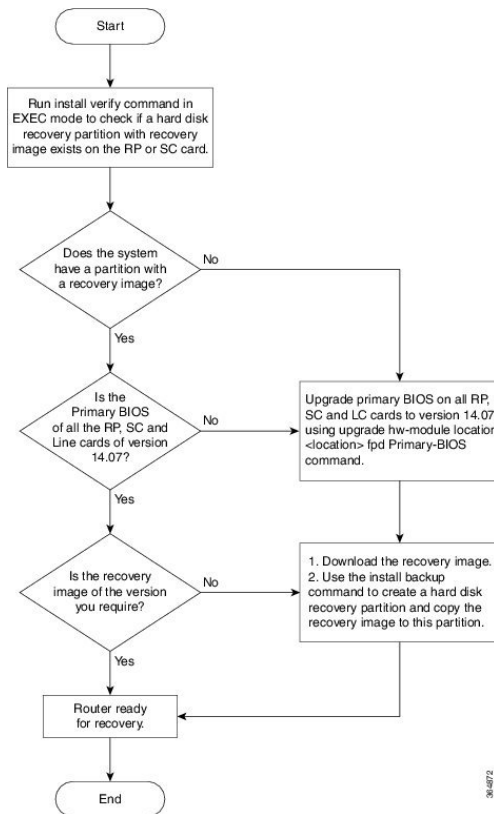
In this method of disaster recovery, while the router is in operational state, a recovery image is copied to a hard disk recovery partition in the RP (route processor) and SC (shelf controller) card. The administrator remotely accesses this recovery image to restore a router.

When the system is in a state of disaster, recovery can be performed only if the following conditions are met:

- The primary BIOS on all RP or SC cards is of version 14.07.
- A hard disk recovery partition already exists on a RP and SC card hard disk with the desired recovery image content.

The following figure illustrates the process of getting a system ready for recovery.

Figure 1: Preparing the System for Disaster Recovery

**Note**

- To perform disaster recovery in a production environment, it is important that the recovery image be of a release no earlier than Cisco IOS XR Release 5.2.5. The disaster recovery feature is not supported on a release earlier than Cisco IOS XR Release 5.2.5.
- If you upgrade the system to a version higher than R5.2.5, but if the recovery image in the hard disk recovery partition is of Cisco IOS XR Release 5.2.5, the router can still be recovered using this recovery image. After recovery you can upgrade the system to the latest version of software.
- If the system already has a hard disk recovery partition and there is a need to perform disaster recovery using either USB boot or PXE boot, ensure that the image is no earlier than Cisco IOS XR Release 5.2.5 version 37I.

Performing disaster recovery by using a hard disk partition involves the following:

## Preparing the Router for Disaster Recovery

Preparing the router for disaster recovery involves copying the recovery image to a hard disk recovery partition when the router is in a fully functional state. To prepare a router for disaster recovery, execute the following steps:

### Before you begin

- Download the compressed recovery image from software download page at [cisco.com](https://www.cisco.com) to the hard disk of the router. The filename for the compressed boot file is in this format: ncs6k-dr-boot.tar-*release\_number*. For example, ncs6k-dr-boot.tar-5.2.5
- Ensure that the version of primary BIOS on all the RP and SC cards is of version 14.07. If the primary BIOS is of a lower version, use the **upgrade hw-module location location fpd Primary-BIOS** command.
- If you are performing disaster recovery in a multi-chassis environment ensure that there is control ethernet connectivity between the chassis before you boot an RP or SC card from the hard disk recovery partition.

### SUMMARY STEPS

1. **install verify packages location *node-id***
2. **show install log *install-id***
3. **install backup *node-id* location *destination***

### DETAILED STEPS

#### Step 1 **install verify packages location *node-id***

Use this command to verify if a partition with a recovery image exists.

##### Example:

```
sysadmin-vm:0_RP0# install verify packages location 0/RP0
```

```
Install operation 30 (install verify) started by user 'root' will continue asynchronously.
replied.check show install log 30 for detailed log.
Install operation completed successfully.
```

#### Step 2 **show install log *install-id***

Verify the contents of the log to determine whether creation of hard disk partition is successful.

##### Example:

```
sysadmin-vm:0_RP0#show install log 30
```

If a hard disk partition already exists, similar output is displayed:

```
sysadmin-vm:0_RP1# show install log 30
Thu Mar 17 01:54:36.776 UTC
log 30
  Mar 17 01:42:00 Admin install operation 30 started by user 'root'
Mar 17 01:42:00 install verify packages location 0/RP1
Mar 17 01:42:26 Disaster Recovery Partition found
./system_image.iso 833636352
MD5: bb73f05528286c87b6b1209754ac9e64 ./system_image.iso
./EFI/Recovery/grub.cfg 516
MD5: 525ce5b5b65701c3942afefd3d4a3249 ./EFI/Recovery/grub.cfg
./EFI/Recovery/grub.efi 887836
MD5: 4abf58ec0fd23255d42e1548aae2e3e ./EFI/Recovery/grub.efi
Mar 17 01:42:26 Node 0/RP1 completed verification successfully

Mar 17 01:42:26 Install operation 30 completed successfully.
Mar 17 01:42:26 Ending 'install verify' operation 30
```

If a hard disk partition does not exist, similar output is displayed:

```

sysadmin-vm:0_RP1# show install log 30
Thu Mar 17 01:54:36.776 UTC
log 30
  Mar 17 01:42:00 Admin install operation 30 started by user 'root'
Mar 17 01:42:00 install verify packages location 0/RP1
Mar 17 01:42:26 Disaster Recovery Partition Not found
./system_image.iso 833636352
MD5: bb73f05528286c87b6b1209754ac9e64 ./system_image.iso
./EFI/Recovery/grub.cfg 516
MD5: 525ce5b5b65701c3942afefd3d4a3249 ./EFI/Recovery/grub.cfg
./EFI/Recovery/grub.efi 887836
MD5: 4abf58ec0fd23255d42e1548aeae2e3e ./EFI/Recovery/grub.efi
Mar 17 01:42:26 Node 0/RP1 completed verification successfully

Mar 17 01:42:26 Install operation 30 completed successfully.
Mar 17 01:42:26 Ending 'install verify' operation 30.

```

### Step 3 **install backup** *node-id location destination*

Creates a hard disk partition and copies the recovery image to the hard disk of the RP and SC card. If a partition already exists, the recovery image is updated.

#### Example:

```

sysadmin-vm:0_RP0#install backup /harddisk:/ncs6k-dr-boot.tar-<release-version>.zip location 0/RP1
The harddisk and /misc/scratch/core on 0/RP1 may need to be erased to perform this operation
Do you want to proceed [yes/no]:

```

#### Yes

```

Install operation 9 (install backup) started by user 'root' will continue asynchronously.
Install operation 9 completed successfully.

```

After the operation is completed, use the **show install log** command to verify the details of the operation.

#### Example:

The following example shows the contents of the log file after **install backup** command is executed.

```

sysadmin-vm:0_RP1# show install log 9
Thu Mar 17 01:55:24.939 UTC
log 9
  Mar 14 18:10:46 Admin install operation 9 started by user 'root'
Mar 14 18:10:46 install backup /harddisk:/ncs6k-dr-boot.tar-<release-version>.SIT_IMAGE location
0/RP0
Mar 14 18:13:07 all nodes responded,phase 1 done
Mar 14 18:13:07 Install operation 9 completed successfully.
Mar 14 18:13:07 Ending 'install backup' operation 9

```

---

### What to do next

After the router is prepared for disaster recovery, you can recover the router by the recovery image stored in the hard disk recovery partition. For details on recovering the router when it is in a non-responding state, see [Recovering a Router, on page 4](#)

## Recovering a Router

If the router is in a non-responding state, it can be restored by using a recovery image that is stored in the hard disk recovery partition of the router. Sometimes, even if the router is in a non-responding state, the

command-line interface will respond and can be used to execute commands to recover the router. Determine the state of the command-line interface and execute the steps based on the requirement.

The router can be recovered using the following method:

### Recovering a Router Using Boot Manager

Use this method of recovery if the router is in a non-responding state and the command line interface is not functional.

#### Before you begin

Ensure that you have prepared the router for disaster recovery by using the information in [Preparing the Router for Disaster Recovery, on page 2](#)

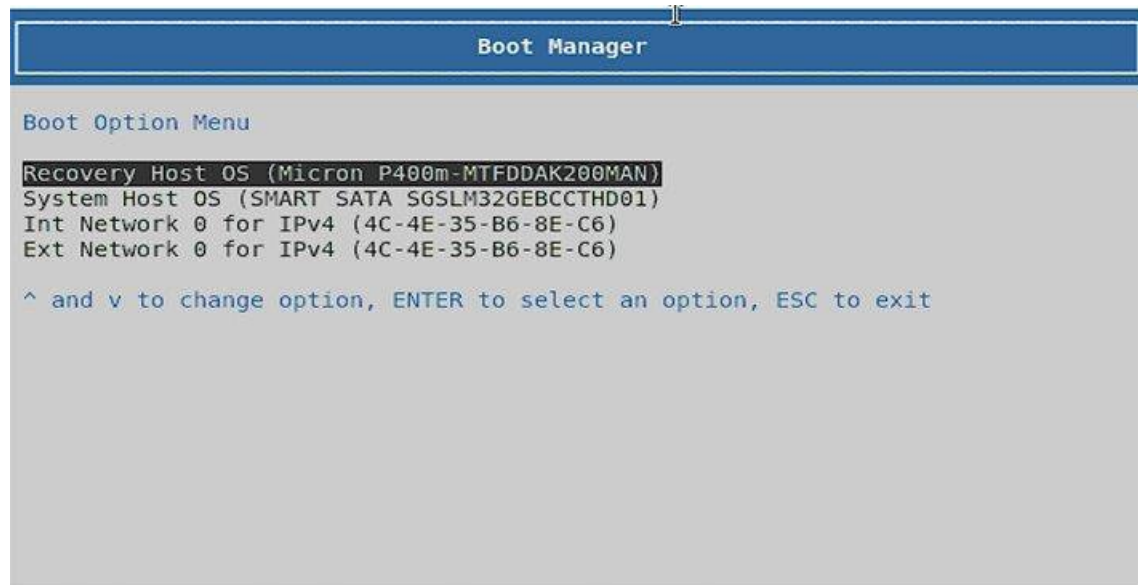
#### Step 1

Power cycle the router.

This results in the entire router rebooting inclusive of all the cards.

#### Step 2

Press F12 to go to the Boot Manager and select **Recovery Host OS**



The router is recovered by using the recovery image in the hard disk recovery partition.

## Create a Bootable USB Drive

The bootable USB drive is used to re-image the router for the purpose of system upgrade or for booting the router in case of boot failure. The bootable USB drive can be created in two ways:

### Create a Bootable USB Drive Using Compressed Boot File

This task is applicable to Cisco IOS XR Software Release 5.0.1.

A bootable USB drive is created by copying a compressed boot file into a USB drive. The USB drive becomes bootable after the contents of the compressed file are extracted.

This task can be completed using Windows, Linux, or MAC operating systems available on your local machine. The exact operation to be performed for each generic step outlined here depends on the operating system in use.

### Before you begin

- Have access to a USB drive with a storage capacity that is between 2GB (min) and 32 GB (max). USB 2.0 and USB 3.0 are supported.
- Copy the compressed boot file from the software download page at [cisco.com](http://cisco.com) to your local machine. The file name for the compressed boot file is in the format `ncs6k-usb-boot-<release_number>.zip`. For example, `ncs6k-usb-boot-5.0.1.zip`.

## SUMMARY STEPS

1. Connect the USB drive to your local machine and format it with FAT32 file system.
2. Copy the compressed boot file to the USB drive.
3. Verify that the copy operation is successful. To verify, compare the file size at source and destination. Additionally, verify the MD5 checksum value.
4. Extract the content of the compressed boot file by unzipping it inside the USB drive. This converts the USB drive to a bootable drive.

## DETAILED STEPS

- 
- Step 1** Connect the USB drive to your local machine and format it with FAT32 file system.
- Step 2** Copy the compressed boot file to the USB drive.
- Step 3** Verify that the copy operation is successful. To verify, compare the file size at source and destination. Additionally, verify the MD5 checksum value.
- Step 4** Extract the content of the compressed boot file by unzipping it inside the USB drive. This converts the USB drive to a bootable drive.

**Note** The content of the zipped file ("EFI" and "boot" directories) should be extracted directly into root of the USB drive. If the unzipping application places the extracted files in a new folder, move the "EFI" and "boot" directories to root of the USB drive.

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### What to do next

Use the bootable USB drive to boot the router or upgrade its image. See:

- [Boot the Router Using USB, on page 9](#)
- [Perform System Upgrade Using USB, on page 14](#)

## Create Bootable USB Drive Using Shell Script

To create the bootable USB drive using shell script, you need an ISO image file and the shell script that creates the boot device. The shell script is already available on the router. Create the bootable USB drive as a preemptive measure when the router is operational. If the router is already unusable, create the bootable USB drive on another active router.



**Note** The contents of the USB drive is erased during the process of creating the bootable drive.

### Before you begin

- Have access to a USB drive with a storage capacity that is between 2GB (min) and 32 GB (max). USB 2.0 and USB 3.0 are supported.
- The ISO image must be present on a network server.

### SUMMARY STEPS

1. **copy** *ftp:source* **harddisk:destination**
2. **dir** */harddisk:*
3. **dir** */usr/bin/usb\*.sh*
4. Connect the USB drive.
5. **run**
6. **tail** */var/log/messages*
7. **cd** *directory path*
8. *<shell\_script\_file\_name> <location\_of\_iso\_image> <mount\_location\_of\_USB\_device>*

### DETAILED STEPS

**Step 1** **copy** *ftp:source* **harddisk:destination**

**Example:**

```
RP/0/RP0/CPU0:router# copy ftp://223.255.254.254/image/ncs6k-mini-x.iso harddisk\:/ncs6k-mini-x.iso
```

Copy the ISO image from a network server to the router hard disk.

**Step 2** **dir** */harddisk:*

**Example:**

```
RP/0/RP0/CPU0:router#dir /harddisk:
```

Verify that the image is copied. The result of this command displays the ISO file name.

```
Directory of /harddisk:/
```

```
  12 -rw-r--r--  1  7864320 Jun 27 20:30 ncs6k-mini-x.iso
```

**Step 3** **dir** */usr/bin/usb\*.sh*

**Example:**

```
RP/0/RP0/CPU0:router# dir /usr/bin/usb*.sh
```

Verify that the shell script is available on the router. The *usb-install.sh* script must be present in the command output.

```
Directory of /usr/bin/usb*.sh
```

```
430 -rwx----- 1 8456 Jun 20 23:30 /usr/bin/usb-install.sh
```

**Step 4** Connect the USB drive.

The USB drive must be connected to the USB port on the RP to which the *iso* image has been copied. The USB port is shown in this figure.

**Step 5** **run**

**Example:**

```
RP/0/RP0/CPU0:router# run
```

Enters the XR VM Linux shell. The router prompt changes to:

```
[xr-vm_node0_RP0_CPU0:/]$
```

**Step 6** **tail /var/log/messages**

**Example:**

```
[xr-vm_node0_RP0_CPU0:/]$ tail /var/log/messages
```

Identifies the device name to which the USB drive is been mapped. The USB drive is auto-discoverable on the XR VM shell.

```
...
...
Aug 16 18:56:07 xr-vm kernel: virtio-pci 0000:c0:08.0: setting latency timer to 64
Aug 16 18:56:07 xr-vm kernel: virtio-pci 0000:c0:08.0: irq 93 for MSI/MSI-X
Aug 16 18:56:07 xr-vm kernel: virtio-pci 0000:c0:08.0: irq 94 for MSI/MSI-X
Aug 16 18:56:07 xr-vm kernel: vde: vdel
```

In this example, we identify from the last entry that the USB is mapped as "vde".

**Step 7** **cd directory path**

**Example:**

```
[xr-vm_node0_RP0_CPU0:/]$ cd /usr/bin
```

Access the directory where the shell script is present.

**Step 8** **<shell\_script\_file\_name> <location\_of\_iso\_image> <mount\_location\_of\_USB\_device>**

**Example:**

```
[xr-vm_node0_RP0_CPU0:/usr/bin]$ ./usb-install.sh /harddisk:/ncs6k-mini-x.iso /dev/vde/
```

Runs the script to create the bootable USB drive. After the process is complete, this message is displayed:

```
USB stick set up for EFI boot!
```

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### What to do next

Use the bootable USB drive to boot the router or upgrade its image. See:



- [Boot the Router Using USB, on page 9](#)
- [Perform System Upgrade Using USB, on page 14](#)

## Boot the Router Using USB

The router can be booted using an external bootable USB drive. This might be required when the router is unable to boot from the installed image. A boot failure may happen when the image gets corrupted. During the USB boot, process the router gets re-imaged with the version available on the USB drive.

The default boot sequence is USB disk, Sata disk, and PXE boot. But from Cisco IOS XR Release 5.2.4 and later, the boot sequence is changed to Sata disk, USB disk and PXE boot.



**Note** During the USB boot process, the router is completely re-imaged with the ISO image version present in the bootable USB drive. All existing configurations are deleted because the disk 0 content is erased. No optional packages are installed during the upgrade process; they need to be installed after the upgrade is complete.

### Before you begin

Create a bootable USB drive.

**Step 1** Connect the USB drive to an RP.

The USB port on the RP is shown in this figure.

**Step 2** Connect to the console.

If it is not already connected, connect a terminal to the System Admin console port of the RP. If two RPs are installed on the router, connect to the System Admin console port of both RPs. Start the terminal emulation program on your workstation.

**Step 3** Power on the router.

**Step 4** Press F12 on the console of the RP to which the USB is not connected. This action displays the boot menu and pauses the boot process. The RP on which the USB is connected should boot normally.

Only the RP having the USB should boot. The booting of other RP is paused.

**Step 5** Select the USB drive to boot from USB.

According to the default boot sequence, the Sata disk is the first boot source and the USB drive is the second boot source. During the boot process, the OS image is installed on the router so that in future the router boots without the USB.

**Step 6** Press **Enter** to get the host prompt.

**Step 7** Login to the host using *root* and *lab* as username and password respectively.

### Example:

```
host login: root
Password:
```

If there is no space in the RP, a prompt to either cancel the installation, or to continue with formatting the disk is displayed.

The prompt changes to:

```
[Install image, reboot required host:~]$
```

**Step 8** Run the **reboot** command.

**Example:**

```
[Install image, reboot required host:~]$ reboot
```

The RP reboots with the new image. After the booting is completed, specify the root-system username and password.

**Step 9** Access the System Admin EXEC mode and reload the RP for which the boot process was paused in Step 4.

**Example:**

```
sysadmin-vm:0_RP0#hw-module location 0/RP1 reload
```

The shut down RP is reloaded and gets synchronized with the other RP running the new image.

**What to do next**

- After the booting process is complete, specify the root username and password.
- Install the required optional packages.

## Boot the Multi-chassis Router using USB

A multi-chassis router can be booted using an external bootable USB drive when the router is unable to boot from the installed image. A boot failure can happen when the image is corrupt. During the USB boot process, the router is re-imaged with the version available on the USB drive.

The router image can also be upgraded on multi-chassis configuration using an external bootable USB drive. This is required when the router has to be re-imaged, but the ISO image cannot be accessed over the network because of non-availability of network connectivity.

**Before you begin**

Create a bootable USB drive. See [Create Bootable USB Drive Using Shell Script, on page 7](#).

**Step 1** Power off the Line card chassis (LCC) and the Fabric card chassis (FCC).

**Step 2** Remove the standby Route processors (RPs) from the LCC.

The initial USB boot recovery procedure must be performed with only the primary RP. The secondary RPs must be removed from both the LCCs.

**Step 3** Remove the standby Shelf controllers (SCs) from the FCC.

The initial USB boot recovery procedure must be performed only with the primary SC. The secondary SCs must be removed from the FCCs.

**Step 4** Follow the USB boot procedure on LCC0 that is similar to booting a single chassis.

- a) Connect the bootable USB drive to an RP.

- b) Connect to the console.

If it is not already connected, connect a terminal to the XR VM console port of the RP. If two RPs are installed on the router, connect to the XR VM console port of both RPs. Start the terminal emulation program on your workstation.

- c) Power on the router.  
d) RP automatically boots from the USB.

According to the default boot sequence, the USB drive is the first source to boot the router. The router automatically boots from the USB device connected to it. During the boot process, the OS image is installed on the router. This helps to boot the router without the USB in future.

```
Cisco BIOS version : <version>
BIOS Build Date : MM/DD/YYYY by
System Memory Speed : 1600 MHz
Processor Type : Intel(R) Xeon(R) CPU E5-2448L @ 1.80GHz

Press F12 to goto Boot Manager..

Booting EFI USB Device (KingstonDataTraveler G3)..

GNU GRUB version 2.00
Press F2 to goto grub Menu..
Booting from USB..
Loading Kernel..
Loading initrd..
?[ 6.660104] i8042.c: No controller found.
Starting udev: [ OK ]
Setting hostname host: [ OK ]
Checking filesystems:[ OK ]
Remounting root filesystem in read-write mode: [ OK ]
Entering non-interactive startup
Bringing up loopback interface: [ OK ]
Starting system logger: [ OK ]
Starting kernel logger: [ OK ]
Starting kdump:[ OK ]
Starting system message bus: [ OK ]
Starting smartd: [ OK ]
Generating SSH1 RSA host key: [ OK ]
Generating SSH2 RSA host key: [ OK ]
Generating SSH2 DSA host key: [ OK ]
Starting sshd: [ OK ]
Starting xinetd: [ OK ]
Fri Aug 22 18:05:29 UTC 2014: Running in Data LV support model
/etc/rc3.d/S60xrnginstall: line 135: SIMULATION: readonly variable
Fri Aug 22 18:05:29 UTC 2014: Prepping System with calvados.iso
Fri Aug 22 18:05:29 UTC 2014: Installer will install image on sda
Fri Aug 22 18:05:29 UTC 2014: Running in LVM support model
Fri Aug 22 18:05:31 UTC 2014: Partition creation on /dev/sda took 1 seconds
Fri Aug 22 18:05:31 UTC 2014: File system creation on /dev/sda1 took 0 seconds
```

- e) Remove the USB drive.

After the initial boot sequences are completed, a message is displayed: `Running install image: Please reboot the system.` Remove the USB drive.

**Note** The USB drive should not be left connected on the router during regular operation. If the router reloads when the USB drive is connected, all existing configurations are deleted as the router is re-imaged.

- f) Press Enter to get the host prompt.  
g) Login to the host using `root` and `lab` as username and password respectively.

**Example:**

```

host login: root Password:
The prompt changes to:
[Install image, reboot required host:~]$

```

- h) Run the reboot command.

**Example:**

```
[Install image, reboot required host:~]$ reboot
```

The RP reboots with the new image. After the booting is completed, specify "**root**" and "**system**" as username and password respectively.

- i) Enter username and password when the router prompts for the same.

**Example:**

```
!!!!!!!!!!!!!!!!!!!!!! NO root-system username is configured. Need to configure root-system
username. !!!!!!!!!!!!!!!!!!!!!!!
```

```
--- Administrative User Dialog ---
```

```

Enter root-system username:
% Entry must not be null.

Enter root-system username: root
Enter secret:
Use the 'configure' command to modify this configuration.
User Access Verification

Username: root
Password:

```

- j) Confirm that the router has the new image on RP.

**Example:**

```

sysadmin-vm:0_RP0# show version
Fri Aug 22 18:45:34.794 UTC

Cisco IOS XR Admin Software, Version <release-version>
Copyright (c) 2013-2014 by Cisco Systems, Inc.

Build Information:
  Built By      :
  Built On     : Tue Aug 19 00:50:48 PDT 2014
  Build Host   : iox-lnx-003
  Workspace    : /<path>
  Version      : <release-version>
  Location     : /opt/cisco/calvados/packages/

BIOS Version   : 13.8

System uptime is 28 minutes.

```

## Step 5 Configure LCC0 with **chassis serial configuration** and **fabric plane configuration**.

**Example:**

```

sysadmin-vm:0_RP0(config)# chassis serial FLM17326A2J
sysadmin-vm:0_RP0(config-serial-FLM17326A2J)# rack 1
sysadmin-vm:0_RP0(config-serial-FLM17326A2J)# !
sysadmin-vm:0_RP0(config-serial-FLM17326A2J)# chassis serial FLM17326A2K
sysadmin-vm:0_RP0(config-serial-FLM17326A2K)# rack 0
sysadmin-vm:0_RP0(config-serial-FLM17326A2K)# !

```

```

sysadmin-vm:0_RP0(config-serial-FLM17326A2K)# chassis serial FMP17210228
sysadmin-vm:0_RP0(config-serial-FMP17210228)# rack F0
sysadmin-vm:0_RP0(config-serial-FMP17210228)# !
sysadmin-vm:0_RP0(config-serial-FMP17210228)# chassis serial FMP17380420
sysadmin-vm:0_RP0(config-serial-FMP17380420)# rack F1
sysadmin-vm:0_RP0(config-serial-FMP17380420)# !
sysadmin-vm:0_RP0(config-serial-FMP17380420)#
Mon Aug 25 22:27:49.594 UTC
Uncommitted changes found, commit them? [yes/no/CANCEL] yes

sysadmin-vm:0_RP0# conf t
Mon Aug 25 22:47:38.999 UTC
Entering configuration mode terminal
sysadmin-vm:0_RP0 (config)# controller fabric plane 0
sysadmin-vm:0_RP0 (config-plane-0)# no shutdown
sysadmin-vm:0_RP0(config-plane-0)# instance 0
sysadmin-vm:0_RP0(config-instance-0)# location F0/FC6
sysadmin-vm:0_RP0(config-instance-0)# !
sysadmin-vm:0_RP0 (config-instance-0)# !
sysadmin-vm:0_RP0(config-instance-0)# controller fabric plane 1
sysadmin-vm:0_RP0(config-plane-1)# no shutdown
Mon Aug 25 22:47:45.944 UTC
sysadmin-vm:0_RP0(config-plane-1)# instance 0
sysadmin-vm:0_RP0(config-instance-0)# location F1/FC6
sysadmin-vm:0_RP0(config-instance-0)# !
sysadmin-vm:0_RP0(config-instance-0)# !
sysadmin-vm:0_RP0(config-instance-0)# controller fabric plane 2
sysadmin-vm:0_RP0(config-plane-2)# no shutdown
Mon Aug 25 22:47:45.958 UTC
sysadmin-vm:0_RP0(config-plane-2)# instance 0
sysadmin-vm:0_RP0(config-instance-0)# location F0/FC7
sysadmin-vm:0_RP0(config-instance-0)# !
sysadmin-vm:0_RP0(config-instance-0)# !
sysadmin-vm:0_RP0(config-instance-0)# controller fabric plane 3
sysadmin-vm:0_RP0(config-plane-3)# no shutdown
Mon Aug 25 22:47:45.974 UTC
sysadmin-vm:0_RP0(config-plane-3)# instance 0
sysadmin-vm:0_RP0(config-instance-0)# location F1/FC7
sysadmin-vm:0_RP0(config-instance-0)# !
sysadmin-vm:0_RP0(config-instance-0)# !
sysadmin-vm:0_RP0(config-instance-0)# controller fabric plane 4
sysadmin-vm:0_RP0(config-plane-4)# no shutdown
Mon Aug 25 22:47:45.983 UTC
sysadmin-vm:0_RP0(config-plane-4)# instance 0
sysadmin-vm:0_RP0(config-instance-0)# location F0/FC8
sysadmin-vm:0_RP0(config-instance-0)# !
sysadmin-vm:0_RP0(config-instance-0)# !
sysadmin-vm:0_RP0(config-instance-0)# controller fabric plane 5
sysadmin-vm:0_RP0(config-plane-5)# no shutdown
Mon Aug 25 22:47:45.993 UTC
sysadmin-vm:0_RP0(config-plane-5)# instance 0
sysadmin-vm:0_RP0(config-instance-0)# location F1/FC8
sysadmin-vm:0_RP0(config-instance-0)# !
sysadmin-vm:0_RP0(config-instance-0)# !
Mon Aug 25 22:47:55.321 UTC
Uncommitted changes found, commit them? [yes/no/CANCEL] yes

```

- Step 6** Power off the LCC0 chassis.
- Step 7** Follow Steps 4 to 6 for LCC1, FCC0 and FCC1.
- Step 8** Power up all the chassis at the same time. The system boots with the new image.

**Note** After the router is reboots, all primary RPs have the new image.

```

sysadmin-vm:0_RP0# show install active
Fri Aug 22 21:43:09.700 UTC
Node 1/RP0 [RP]
  Active Packages: 1
    ncs6k-sysadmin-<release-version> version=<release-version> [Boot image]

Node 0/RP0 [RP]
  Active Packages: 1
    ncs6k-sysadmin-<release-version> version=<release-version> [Boot image]

Node F0/SC0 [SC]
  Active Packages: 1
    ncs6k-sysadmin-<release-version> version=<release-version> [Boot image]

Node F1/SC0 [SC]
  Active Packages: 1
    ncs6k-sysadmin-<release-version> version=<release-version> [Boot image]

Node 1/1 [LC]
  Active Packages: 1
    ncs6k-sysadmin-<release-version> version=<release-version> [Boot image]

Node 0/3 [LC]
  Active Packages: 1
    ncs6k-sysadmin-<release-version> version=<release-version> [Boot image]

```

```

sysadmin-vm:1_RP0# show chassis
Thu Aug 21 19:42:41.599 UTC
Serial Num   Rack Num   Rack Type   Rack State   Data Plane   Ctrl Plane
-----
FMP12180264  0          LCC         UP           NCONN        CONN
FMP12180281  1          LCC         UP           NCONN        CONN
FMP12240401  F1         FCC         UP           NCONN        CONN
FMP17400526  F0         FCC         UP           NCONN        CONN

```

**Step 9** Insert secondary RPs in both LCCs.

**Step 10** Insert secondary SC cards in both FCCs.

**Note** On inserting the secondary SC cards on each FCC, the SC card triggers an internal PXE boot and starts with the new image.

**Step 11** Verify that the router has the new image on all RPs, SCs, and LCs.

## Perform System Upgrade Using USB

The router image can be upgraded using an external bootable USB drive. This may be required when the router is to be re-imaged, but the ISO image cannot be accessed over the network. It may happen when the network connectivity is unavailable.



**Note** During an upgrade, all existing configurations are deleted because the disk 0 content is erased.

### Before you begin

- Create a bootable USB drive.
- Ensure that the router BIOS version is 9.10, or higher.
  - Verify the BIOS version using the **show fpd package** command in the System Admin EXEC mode.
  - Verify the actual state of all field-programmable gate array (FPGA) of the system and whether it requires an upgrade or not using the **show hw-module fpd** command in System Admin EXEC mode.
  - If required, upgrade the BIOS using the **upgrade hw-module location all fpd BIOS\FPD** command in the System Admin EXEC mode.

---

#### Step 1 **hw-module location *node-id* shutdown**

**Example:**

```
sysadmin-vm:0_RP0#hw-module location 0/RP1 shutdown
```

Shut down one RP. In this example, the RP1 is shut down. During the system upgrade, only one RP should be operational.

#### Step 2 Connect the USB drive.

The USB drive must be connected to the USB port on the operational RP.

#### Step 3 **hw-module location *node-id* reload**

**Example:**

```
sysadmin-vm:0_RP0#hw-module location 0/RP0 reload
```

Reload the RP on which the USB is connected. As the RP reloads, it boots from the USB drive and gets re-imaged.

#### Step 4 Remove the USB drive.

After the initial boot sequences are complete, this message is displayed:

```
Running install image: Please reboot the system
```

On receiving this message, remove the USB drive.

**Note** The USB drive should not be left connected on the router during regular operation. If the router reloads when the USB drive is connected, all existing configurations are deleted as the router gets re-imaged.

#### Step 5 Press **Enter** to get the host prompt.

#### Step 6 Login to the host using *root* and *lab* as username and password respectively.

**Example:**

```
host login: root  
Password:
```

The prompt changes to:

```
[Install image, reboot required host:~]$
```

#### Step 7 Run the **reboot** command.

**Example:**

```
[Install image, reboot required host:~]$ reboot
```

The RP reboots with the new image. After the booting is completed, specify the root-system username and password.

**Step 8** Access the System Admin EXEC mode and reload the RP that was shut down in Step 1.

**Example:**

```
sysadmin-vm:0_RP0#hw-module location 0/RP1 reload
```

The shut down RP is reloaded and gets synchronized with the other RP running the new image.

---

**What to do next**

- Run the **show version** command in the XR EXEC mode to verify that the new image version is successfully installed.
- Install the required optional packages.