Upgrading the Programmable Hardware Devices in the Cisco cBR

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Overview of Firmware Images and Packages

With the Cisco cBR Series Routers, the Cisco IOS-XE image comes with the bundled firmware images and packages. In case of a firmware incompatibility, an error message is displayed notifying that an upgrade to a compatible firmware is required.

You can view the current firmware images and packages on your router, using the methods outlined in the following sections.

Displaying Current and Minimum Required FPD Image Versions

To display the current version of FPD images on the FRUs installed on your router, use the `show hw-module [slot/subslot | all] fpd` command, where `slot` is the slot number where the FRU is installed, and `subslot` is the number of the FRU subslot where a target FRU is located. Entering the all keyword shows information for hardware in all router slots.

The following examples show the output when using this `show` command. The output display in this example shows that FPD versions on the FRUs in the system meet the minimum requirements:

```
Router# show hw-module all fpd
--- ---------------------- ------- ------------------ ----------- --------------
H/W Field Programmable Current Min. Required Slot Card Type Ver. Device: "ID-Name" Version Version
--- ---------------------- ------- ------------------ ----------- --------------
0/1 CBR-RF-PROT-PIC 0.0 35-CBR STEALTHSTAR 7.14 7.13
--- ---------------------- ------- ------------------ ----------- --------------
```
This example shows the output when using the `slot/subslot` argument to identify a particular FRU:

```
Router# show hw-module subslot 0/1 fpd
```

The output display in this example shows that the FRU in subslot 0/1 is disabled because one of the programmable devices does not meet the minimum version requirements.

```
Router# show hw-module all fpd
```

NOTES:
- FPD images that are required to be upgraded are indicated with a '*' character in the "Minimal Required Version" field.

### Displaying Information About the Default FPD Image Package

You can use the `show upgrade fpd package default` command to find out which FRUs are supported with your current Cisco IOS-XE release and which FPD image package you need for an upgrade.

```
Router# show upgrade fpd package default
```

This Cisco IOS software image requires the following default FPD Image Package for the automatic upgrade of FPD images (the package is available from Cisco.com and is accessible from the Cisco Software Center page where this IOS software image can be downloaded):

```
Version: 15.5(3)S
```
Package Filename: cbr-fpd-bundle.pkg

List of card type supported in this package:

<table>
<thead>
<tr>
<th>No.</th>
<th>Card Type</th>
<th>HW Ver.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>RF Switch</td>
<td>PIC 0.0</td>
</tr>
<tr>
<td>2)</td>
<td>RF Switch</td>
<td>PIC 0.0</td>
</tr>
<tr>
<td>3)</td>
<td>8x10GE Supervisor</td>
<td>PIC 0.0</td>
</tr>
</tbody>
</table>

**Displaying All Firmware on the Router**

Use the `show platform diag` command to view all firmware available on the router.

```plaintext
Router#show platform diag
Chassis type: CBR-8-CCAP-CHASS
Pic: 0/1, CBR-RF-PROT-PIC
Internal state : inserted
Physical insert detect time : 00:03:27 (00:15:07 ago)
Firmware version: 0000070E
Slot: 2, CBR-CCAP-LC-40G
Running state : ok
Internal state : online
Internal operational state : ok
Physical insert detect time : 00:01:41 (00:16:53 ago)
Software declared up time : 00:05:04 (00:13:30 ago)
CPLD version : 0000001C
Rommon version : 2011.03.12
Basestar version : 00110002
Raider version : 01010006
Caprica version : 00000017
PSOC 0 version : v3.0
PSOC 1 version : v3.0
Pic: 2/1, CBR-RF-PROT-PIC
Internal state : inserted
Physical insert detect time : 00:03:28 (00:15:06 ago)
Firmware version: 00000500
Slot: 3, CBR-CCAP-LC-40G
Running state : ok
Internal state : online
Internal operational state : ok
Physical insert detect time : 00:01:41 (00:16:53 ago)
Software declared up time : 00:05:03 (00:13:31 ago)
CPLD version : 0000001C
Rommon version : 2011.03.12
Basestar version : 00110002
Raider version : 01010006
Caprica version : 00000017
PSOC 0 version : v3.0
PSOC 1 version : v3.0
Pic: 3/1, CBR-RF-PIC
Internal state : inserted
Physical insert detect time : 00:03:29 (00:15:05 ago)
Firmware version: 00000602
Slot: 6, CBR-CCAP-LC-40G
Running state : ok
Internal state : online
Internal operational state : ok
Physical insert detect time : 00:01:41 (00:16:53 ago)
Software declared up time : 00:05:02 (00:13:31 ago)
```
Cortina PHY version: 201402061607
SUP PSOC 0 version: v4.0.8
SUP PSOC 1 version: v4.0.8
SUP PSOC 2 version: v4.0.9_IVY
SUP PSOC 3 version: v4.0.6
SUP-DC PSOC 0 version: N/A
SUP-DC PSOC 1 version: N/A
SUP-PIC PSOC 0 version: V2.0.5
SUP-PIC PSOC 1 version: V2.0.5

Slot: R1, CBR-CCAP-SUP-160G
Running state: ok, standby
Internal state: online
Internal operational state: ok
Software declared up time: 00:01:47 (00:16:47 ago)

Slot: F1, CBR-CCAP-SUP-160G
Running state: ok, standby
Internal state: online
Internal operational state: ok
Software declared up time: 00:05:07 (00:13:26 ago)
Packet ready signal time: 00:05:28 (00:13:05 ago)

Slot: 5, CBR-CCAP-SUP-160G
Running state: ok
Internal state: online
Internal operational state: ok
Software declared up time: 00:05:12 (00:13:22 ago)

Pic: 5/1, CBR-SUP-8X10G-PIC
Internal state: inserted
Physical insert detect time: 00:03:32 (00:15:02 ago)

Slot: P0, PWR-3KW-AC-V2
State: ok
Physical insert detect time: 00:03:27 (00:15:07 ago)

Slot: P1, PWR-3KW-AC-V2
State: ok
Physical insert detect time: 00:03:27 (00:15:07 ago)

Slot: P2, PWR-3KW-AC-V2
State: ok
Physical insert detect time: 00:03:27 (00:15:07 ago)

Slot: P3, Unknown
State: ps, fail
Physical insert detect time: 00:00:00 (never ago)

Slot: P4, Unknown
State: ps, fail
Physical insert detect time: 00:00:00 (never ago)

Slot: P5, Unknown
State: ps, fail
Physical insert detect time: 00:00:00 (never ago)

Slot: P10, CBR-FAN-ASSEMBLY
State: ok
Physical insert detect time: 00:03:37 (00:14:57 ago)
Firmware version: CBR-FAN FW 1.4

Slot: P11, CBR-FAN-ASSEMBLY
State: ok
Physical insert detect time: 00:03:37 (00:14:56 ago)
Firmware version: CBR-FAN FW 1.4

Slot: P12, CBR-FAN-ASSEMBLY
State: ok
Physical insert detect time: 00:03:37 (00:14:57 ago)
Firmware version: CBR-FAN FW 1.4
Programmable Hardware Devices in the Cisco cBR

The Cisco cBR-8 Series router has programmable hardware devices that are run by firmware that require upgrades to deploy new features and functions. The following are the two types of programmable hardware devices on the Cisco cBR-8.

- **Field-Programmable Devices (FPD)**—The components on the Supervisor card, the RF Through PIC, the RF Protect PIC, and the Supervisor PIC are examples of FPDs.

- **HW-Programmable Devices**—The ROM Monitor, the Fan Programmable System-on-Chip (PSoC), the line card firmware, the line card PSoC and the Supervisor complex programmable logic device (CPLD) are examples of the HW-Programmable devices.

Bundled FPGA Images Upgrades

Two methods may be used to upgrade the Cisco IOS-XE software image, as outlined in the following sections.

Upgrading Your Cisco IOS-XE Release and FPD Image

To upgrade your Cisco IOS-XE release and your FPD image, do the following steps:

**Step 1**
Download the package for the Cisco IOS-XE release that you are upgrading to. The package contains both the Cisco IOS-XE image and the FPD image.

**Step 2**
Boot the new version of Cisco IOS-XE. When the new version of Cisco IOS-XE boots, search for the bundled FPD image. The FPD images will be updated automatically as part of the Cisco IOS-XE boot process.

**Step 3**
When the router has booted, verify the upgrade was successful by entering the `show hw-module all fpd` command. The time for updating the FPGA can be read in the log messages. The following is a sample for the log message:

```
#show hw-module all fpd
----- ---------------------- ------ ------------------ ----------- -------------
H/W  Field Programmable Current Min. Required Slot Card Type Ver. Device: "ID-Name" Version
Version
----- ---------------------- ------ ------------------ ----------- -------------
3/1  CBR-RF-PIC  0.0 34-CBR RFSW PIC 7.35 7.35
4/1  CBR-SUP-8X10G-PIC  2.4 36-CBR SUP PIC 0.130 0.130
5/1  CBR-SUP-8X10G-PIC  3.0 36-CBR SUP PIC 0.130 0.130
```
Upgrading Only Your Cisco IOS-XE Release and Retaining Your Current FPD Image

You may choose to upgrade your Cisco IOS-XE release with or without retaining your current FPD image.

Note
You may choose to upgrade your Cisco IOS-XE image and retain your current FPD image, although this is not recommended.

Step 1
Use the `no upgrade fpd auto` command to disable the bundled FPD image.

Note
The automatic upgrade feature is disabled once you enter the `no upgrade fpd auto` command.

Step 2
Save the configuration before loading the new image.

Step 3
Load the new image.

Note
If your current FPD image is not compatible with the new image, the FRUs do not come online.

Field-Programmable Device Upgrades

If you retained the current FPD images and only upgraded the Cisco IOS-XE software image, then use the procedures described in this section to upgrade the FPD images.

These instructions are not always feasible for operating network environments. If these methods of upgrade are not suitable for your situation, see other sections of this document for other methods of upgrading FPDs.

Upgrading FPD Images in a Production System

Adding a FRU to a production system presents the possibility that the FRU may contain versions of FPD images that are incompatible with the Cisco IOS-XE release currently running the router. In addition, the FPD upgrade operation can be a very CPU-intensive operation and therefore the upgrade operation may take more time when it is performed on a production system. The performance impact will vary depending on various factors, including network traffic load, the type of processing engine used, type of FRU, and the type of service configured.

For these reasons, we recommend that one of the following alternatives be used to perform the FPD upgrade on a production system if possible:
Verifying System Compatibility First

If a spare system is not available to perform an upgrade, you can check for system compatibility by disabling the automatic upgrade feature before inserting the FRU.

- If the FPD images on the FRU are compatible with the system, you will only need to re-enable the automatic upgrade feature (the automatic upgrade feature can be re-enabled using the `upgrade fpd auto` command).

- If the FPD images on the FRU are not compatible with the system, the FRU is disabled but will not impact system performance by attempting to perform an automatic upgrade.

Use the following procedure to check the FPD images on the FRU for system compatibility:

**Step 1** Disable the automatic upgrade feature using the `no upgrade fpd auto` global configuration command.

**Step 2** Insert the FRU into the system.
If the FPD images are compatible, the FRU will operate successfully after bootup.
If the FPD images are not compatible, the FRU is disabled. At this point we recommend that you wait for a scheduled maintenance when the system is offline to manually perform the FPD upgrade as described in the Manually Upgrading FRU FPD Images section.

**Step 3** Re-enable the automatic upgrade feature using the `upgrade fpd auto` global configuration command.

Using a Nonproduction System to Upgrade the Cisco cBR Series Converged Broadband Routers FPD Image

Use the following procedure to perform an upgrade on a spare system:

**Before You Begin**

- The spare system is running the same version of the Cisco IOS-XE software release that the target production system is running.

- The automatic upgrade feature is enabled on the spare system. (The automatic upgrade feature is enabled by default. It can also be enabled using the `upgrade fpd auto` command).

**Step 1** Insert the FRU into the spare system.
If an upgrade is required, the system will perform the necessary FPD image updates so that when this FRU is inserted to the target production system it will not trigger an FPD upgrade operation there.

**Step 2** Verify the upgrade was successful by entering the `show hw-module all fpd` command.

**Step 3** Remove the FRU from the spare system after the upgrade.

**Step 4** Insert the FRU into the target production system.
Optional FPD Procedures

This section provides information for optional FPD-related functions. None of the topics discussed in this section are necessary for completing FPD upgrades, but may be useful in some FPD-related scenarios. It covers the following topics:

Manually Upgrading FRU FPD Images

To manually upgrade the current FPD version on a FRU, use the following command:

Router# upgrade hw-module subslot [slot/subslot] fpd bundle [reload]

In this example, slot is the slot where the FRU is installed, subslot is the subslot number where the FRU is located, fpd indicates the type of upgrade required, bundle selects the bundled FPD package, and reload specifies that the FRU is automatically reloaded after the upgrade. Note that subslot slot/subslot is used to specify a FRU FPD upgrade. The FRU will automatically be reloaded to complete the FPD upgrade.

Caution

An image upgrade can require a long period of time to complete depending on the FRU.

Upgrading Multiple FPD Images

A single piece of hardware can contain multiple FPD images. The Cisco cBR Series Routers can upgrade up to three FPD images simultaneously. However, only one FPD upgrade per router slot can occur at a time, so all FPD images on all FRUs in a single slot will have to wait for another FPD upgrade to finish.

Note

Some FPD images require the FRU to reload to complete. The FPD upgrade process will perform this step automatically, so users do not have to intervene. However, the other FPDs in the hardware of the specified slot will have to wait for this reload to complete before their upgrade process begins.

Note

With a manual upgrade, you must include the reload option to cause the FRU to reload automatically.

During an automatic upgrade, the Cisco cBR Series Routers will upgrade as many FPDs as possible at a time. No user intervention is possible or necessary. The upgrade process will not stop until all FPD images have been updated.

During manual upgrades, it is important to note that users can only specify upgrades for a single piece of hardware each time the upgrade hw-module subslot [slot/subslot] command is entered. The maximum of three simultaneous upgrades applies to manual upgrades as well. If you individually specify multiple manual FPD upgrades, only three FPDs can be upgraded simultaneously and that can only occur when the hardware is in different router slots. The FPD upgrade process will stop when all FPDs for the specified hardware have been upgraded.
Verifying the FPD Image Upgrade Progress

You can use the `show upgrade fpd progress` command to view a snapshot of the upgrade progress while an FPD image upgrade is in progress. The following example shows the type of information this command displays:

```
Router# show upgrade fpd progress
FPD Image Upgrade Progress Table:
4/1 CBR-SUP-8X10G-PIC 36-CBR SUP PIC 00:10:00 00:00:06 Updating...
0/1 CBR-RF-PROT-PIC 35-CBR STEALTHSTAR --:--:-- --:--:-- Waiting...
```

Troubleshooting Problems with FPD Image Upgrades

This section contains information to help troubleshoot problems that can occur during the upgrade process. It contains the following topics:

**Power Failure or Removal of a FRU During an FPD Image Upgrade**

These instructions should only be used if a previous upgrade attempt has failed due to an external factor such as a power failure or a FRU removal.

If the FPD upgrade operation is interrupted by a power failure or the removal of a FRU, it could corrupt the FPD image. This corruption of the FPD image file makes the FRU unusable by the router and the system will display an error message.

The `show hw-module all fpd` command can be used to verify that the FRU is using a corrupted FPD image.

```
Router# show hw-module all fpd
```

```
H/W Field Programmable Current Min. Required
Slot Card Type Ver. Device: "ID-Name" Version Version
---- ---------------------- ------ ------------------ ----------- --------------
0/1 CBR-RF-PROT-PIC 0.0 35-CBR STEALTHSTAR 7.14 7.13
---- ---------------------- ------ ------------------ ----------- --------------
2/1 CBR-RF-PROT-PIC 3.0 35-CBR STEALTHSTAR 5.0 7.13 *
---- ---------------------- ------ ------------------ ----------- --------------
3/1 CBR-RF-PIC 3.0 34-CBR RFSW PIC 5.0 7.35 *
---- ---------------------- ------ ------------------ ----------- --------------
4/1 CBR-SUP-8X10G-PIC 2.4 36-CBR SUP PIC 0.130 0.130
---- ---------------------- ------ ------------------ ----------- --------------
5/1 CBR-SUP-8X10G-PIC 3.0 36-CBR SUP PIC 0.130 0.130
---- ---------------------- ------ ------------------ ----------- --------------
6/1 CBR-RF-PROT-PIC 3.0 34-CBR RFSW PIC 5.0 7.35 *
```

**Performing an FPD Recovery Upgrade**

The recovery upgrade procedure can only be performed on a FRU that has been powered off by the system after it has failed all of the retries attempted to initialize the FRU.
Because a recovery upgrade is done at a more conservative speed, it may take more than the estimated upgrade time.

Other factors can cause the system to ask “Do you want to perform the recovery upgrade operation?” Only answer y to this question if you have attempted an FPD upgrade that has failed due to a power failure or a FRU removal. If you are prompted for this question without having previously had a failed upgrade attempt for one of the aforementioned reasons, contact Cisco Technical Support.

Perform the manual FPD image upgrade method using the `upgrade hw-module subslot` command to recover from a corrupted image after the FRU has been powered off by the system.

**HW-Programmable Device Upgrades**

This section provides information for the HW-Programmable device upgrades.

Effective from Cisco IOS-XE Release 3.16.1S, an all-in-one firmware package is introduced for HW-Programmable device upgrades. Packages such as PSoC, Line Card Daggs, UBoot Images and viper are bundled together into the all-one-one package and released along with Cisco IOS-XE Release 3.16.1S.

The all-in-one package is applicable only for Cisco IOS-XE Release 3.16.1S.

**Upgrading ROMMON**

The Cisco cBR boots up with the ROM monitor (ROMMON). ROMMON upgrades are released periodically. When a ROMMON upgrade image is released, use the procedure outlined in this section to upgrade the ROMMON in the Cisco cBR.

Use the `showmon` command to display the current image running of ROMMON.

```
rommon > showmon
Current image running (0/1): Boot ROM0
```

There are two Boot ROMs that need to be upgraded, Boot ROM0 which is the running Boot ROM on the active SUP and Boot ROM1 which is the Boot ROM1 on the standby SUP not running currently. This procedure upgrades both the Boot ROMs. During the upgrade process, the Boot ROM1 is upgraded first to ensure a reliable backup copy in case the upgrade procedure fails.

During the upgrade process, the IOS sets the ROMMON upgrade flag. At the end of the upgrade procedure, the router is reloaded. After reload, it is important to ensure that the same IOS-XE image (that is on the active SUP) is loaded. There are two possible scenarios:

1. AUTOBOOT is set for the IOS-XE image that should be loaded. In this case, the router reload process will automatically load the same IOS-XE image.
### Upgrading ROMMON

1. **Step 1**
   Boot the image to IOS prompt.

2. **Step 2**
   Download the ROMMON package from Cisco.com and copy it to bootflash or harddisk.

3. **Step 3**
   Run the following command in IOS prompt:
   ```
   Router# upgrade rom-monitor filename bootflash:[package name] r0
   ```
   The IOS upgrades ROMMON and sets ROMMON Upgrade Flag.

4. **Step 4**
   Run the following command if you have a standby supervisor:
   ```
   Router# upgrade rom-monitor filename bootflash:[package name] r1
   ```
   This example shows the output that is displayed after the `upgrade rom-monitor` command is used.

5. **Step 5**
   Reload the Supervisor cards after the upgrade is complete.
   **Note**
   Do not power cycle the router. Power cycling the chassis may corrupt the ROMMON image.

6. **Step 6**
   Rommon > b bootflash:<imagename>
   Reload the Cisco IOS-XE software to reset the ROMMON upgrade flag.
   **Note**
   This step is used in case AUTOBOOT is not set for the Cisco IOS-XE software image that should be loaded when the router is reloaded.
Upgrading the Programmable Hardware Devices in the Cisco cBR

Upgrading Uboot

This example shows the **bootflash** command with the image name of the Cisco IOS-XE Release 3.16.0S software image.

```
Rommon > b bootflash:cbrsup-universalk9.03.15.00.S.155-2.S-std.SPA.bin
```

**Upgrading Uboot**

This section provides the procedure to upgrade the Uboot in Cisco cBR-8 router.

**Step 1**
Copy the firmware package file to the hard disk of the Cisco cBR-8 router.

```
copy ftp://location/firmware-name harddisk:
```

**Step 2**
Upgrade the Uboot using the following command:

```
upgrade hw-programmable cable slot-id rommon pkg_name firmware-name
```

Example:

```
upgrade hw-programmable cable 3 rommon pkg_name 
/harddisk/cbrsub-rp-hw-programmable-firmware.156-1.r.S1-std.02.SPA.pkg
```

```
UBOOT:
FILE : /tmp/fpd/mount/uboot.bin.SPA
VERSION : U-Boot 2011.03.13
BYTES : 1441792
Upgrade Field Region: SUCCESS!
```

**Step 3**
Reboot the line card after the upgrade command output is displayed using the following command:

```
hw-module slot slot-id reload
```

Upgrading the Line Card Daggit Firmware

The RF line card is run by the Daggit firmware. To upgrade the Daggit firmware, use the procedure outlined in this section.

**Step 1**
Copy the line card firmware package to harddisk.

```
copy tftp:xxx harddisk:
```

**Step 2**
Run the following pre-upgrade commands on the SUP IOS:

```
upgrade hw-programmable cable active_SUP daggit pre-upgrade slot LC_slot_
```

Example:

```
Router# upgrade hw-programmable cable R0 daggit pre-upgrade slot 3
```

**Step 3**
Upgrade the line card firmware using the SUP IOS command.
**Note**  Do not reboot the line card until the upgrade is complete. Upgrade takes approximately 15 minutes.

**upgrade hw-programmable cable**  
*LC_slot_# daggit pkg_name firmware_pkg_location_path*  

Example (Cisco IOS-XE Release 3.16.1S):

Router# upgrade hw-programmable cable 3 daggit pkg_name /harddisk/cbrsup-rp-hw-programmable-firmware.155-3.r.S3-ext.03.SPA.pkg

Initialize GPIO pins......

  Lattice Semiconductor Corp.


  For Daisy Chain of All In-System Programmable Devices

**FREQUENCY 25000000 HZ;**

**NOTE:** Daggits upgrade will take 15 mins!

**Do Not Reboot Line Card!**

Example (Cisco IOS-XE Release 3.16.0S):

Router# upgrade hw-programmable cable 3 daggit pkg_name /harddisk/cbrsup-rp-hw-programmable-firmware.155-3.r.S3-ext.03.SPA.pkg

Initialize GPIO pins......

  Lattice Semiconductor Corp.


  For Daisy Chain of All In-System Programmable Devices

**FREQUENCY 25000000 HZ;**

**NOTE:** Daggits upgrade will take 15 mins!

**Do Not Reboot Line Card!**

**Step 4**

After the upgrade is complete (takes approximately 15 minutes), the line card moves to **unknown** state. Check the status of the line card using the **show platform** command. When the line card is in **unknown** state, run the following command to recover the line card:

**upgrade hw-programmable cable**  
*active_SUP daggit lc-recovery slot LC_slot_*

Example:

Router# upgrade hw-programmable cable R0 daggit lc-recovery slot 3

**Note**  This takes approximately 10 minutes.
Step 5

The line card moves from **booting** to **active** state. Check the status of the line card using the **show platform** command. When the line card is in **active** state, run the following command to verify the upgrade:

```
upgrade hw-programmable cable   active_SUP  daggit post-active slot  LC_slot_#
```

Example:

```
Router# upgrade hw-programmable cable R0 daggit post-active slot 3
```

Verify the output to check if it shows the latest version and if the image can be upgraded or is the golden image. If the version is not what you expected and you are running golden image, the upgrade process did not complete. Start your upgrade again from step 1 and make sure you do not reboot the line card until the upgrade is complete.

---

### Upgrading Both the Line Card Daggit Firmware and the UBoot Image

This section outlines the procedure for upgrading the line card Daggit firmware and the UBoot image.

**Note**

The UBoot image is not released in Cisco IOS-XE Release 3.16.0S. This procedure cannot be used while upgrading the firmware for Cisco IOS-XE Release 3.16.0S.

---

**Step 1**

Copy the firmware package to harddisk.

```
copy tftp:xxx harddisk:
```

**Step 2**

Run the following pre-upgrade commands on the SUP IOS:

```
upgrade hw-programmable cable   active_SUP  daggit pre-upgrade slot  LC_slot_#
```

Example:

```
Router# upgrade hw-programmable cable R0 daggit pre-upgrade slot 3
```

**Step 3**

Upgrade both the line card firmware and the uboot image using the following command:

```
Router#upgrade hw-programmable cable 2 pkg_name
/harddisk/cbrsup-rp-hw-programmable-firmware.155-3.r.S3-ext.03.SPA.pkg
```

**UBOOT:**

```
FILE       : /tmp/fpd/mount/uboot.bin.SPA
VERSION    : U-Boot 2011.03.9
BYTES      : 1441792
Upgrade Field Region: SUCCESS!
```

**Daggits:**

```
Initialize GPIO pins......
```

Lattice Semiconductor Corp.

For Daisy Chain of All In-System Programmable Devices

FREQUENCY 25000000 HZ;
Feature row programming
+-------+
| PASS! |
+-------+

Programming Daggits CPLD image...
FREQUENCY 25000000 HZ;

NOTE: Daggits upgrade will take 15 mins!
Do Not Reboot Line Card!

Step 4

After the upgrade is complete (takes approximately 15 minutes), the line card moves to unknown state. Check the status of the line card using the show platform command. When the line card is in unknown state, run the following command to recover the line card:

upgrade hw-programmable cable active_SUP daggit lc-recovery slot LC_slot_

Example:

Router# upgrade hw-programmable cable R0 daggit lc-recovery slot 3

Note: This takes approximately 10 minutes.

Step 5

The line card moves from booting to active state. Check the status of the line card using the show platform command. When the line card is in active state, run the following command to verify the upgrade:

upgrade hw-programmable cable active_SUP daggit post-active slot LC_slot_

Example:

Router# upgrade hw-programmable cable R0 daggit post-active slot 3

Verify the output to check if it shows the latest version and if the image is upgradable or golden.

If the version is not what you expected and you are running golden image, the upgrade process did not complete. Start your upgrade again from step 1 and make sure you do not reboot the line card until the upgrade is complete.

Use the show platform diag command to verify the internal state and firmware version of the line card.
Upgrading the Line Card PSoC Image in the Cisco cBR (Cisco IOS-XE Release 3.16.1S and later releases)

This section provides the procedure to upgrade the line card PSoC (LC PSoC) for Cisco IOS-XE Release 3.16.1S.

**Step 1** Copy the firmware package to harddisk.

```
copy tftp:xxx harddisk:
```

**Step 2** Run the following upgrade command:

```
upgrade hw-programmable cable LC_slot_# psoc pkg_name firmware_pkg_location_path
```

Example:

```
Router#upgrade hw-programmable cable 8 psoc pkg_name /harddisk/
cbrsup-rp-hw-programmable-firmware.155-3.r.S3-ext.04.SPA.pkg
```

The following message is displayed, indicating that the upgrade has successfully completed this step.

```
PSOC pre-upgrading ready, the card will reload twice to finish the PSOC updating. It will take 20 mins in total.
```

**Step 3** The line card reloads automatically. When the upgrade is completed, the following message is displayed.

```
002456: Sep 8 11:26:58.828 CST: %CMCC-3-FRU_HWPRG_UPG_PSOC_SUCCESS:CLC8: cmcc: Hardware programmable PSoCs on Line card in slot 8 were successfully programmed. The card will reload to make new firmware work.
```

**Step 4** The line card reloads automatically once again. After the line card reloads, wait for it to come online.

---

**What to Do Next**

Use the `show platform hardware slot slot psoc psoc id version` command to check the firmware version for each of the two PSoCs on each RF line card.

```
Router#show platform hardware slot 1 psoc 0 version
```

```
Load for five secs: 29%/6%; one minute: 30%; five minutes: 31%
Time source is NTP, 10:20:17.662 PORTUGAL-Summer Tue Aug 4 2015
PSOC Version

<table>
<thead>
<tr>
<th>version name</th>
<th>version value</th>
</tr>
</thead>
<tbody>
<tr>
<td>psoc_address</td>
<td>50-0063</td>
</tr>
<tr>
<td>reg_pmbus_revision</td>
<td>22</td>
</tr>
<tr>
<td>reg_mfr_id</td>
<td>Cypress Semicon</td>
</tr>
<tr>
<td>reg_mfr_model</td>
<td>039 Power Spvr</td>
</tr>
<tr>
<td>reg_mfr_revision</td>
<td>Version 2.0</td>
</tr>
<tr>
<td>reg_mfr_location</td>
<td>Seattle, WA</td>
</tr>
<tr>
<td>reg_mfr_date</td>
<td>2013-09-04</td>
</tr>
<tr>
<td>reg_mfr_serial</td>
<td>v3.0</td>
</tr>
</tbody>
</table>
```

Router#
Upgrading the Line Card PSoC Image in the Cisco cBR (Cisco IOS-XE Release 3.16.0S)

This section provides the procedure to upgrade the line card PSoC (LC PSoC).

**Step 1**
Copy the firmware package to harddisk.

```
copy tftp:xxx harddisk:
```

**Step 2**
Run the following upgrade command:

```
upgrade hw-programmable cable LC_slot_# psoc pkg_name firmware_pkg_location_path
```

Example:

```
Router#upgrade hw-programmable cable 7 psoc pkg_name /harddisk/cbrsup-rp-hw-programmable-firmware.155-3.r.S3-ext.04.SPA.pkg
```

The following message is displayed, indicating that the upgrade has successfully completed this step.

```
PSOC pre-upgrading ready, please power-cycle the board to finish the PSOC updating.
```

Example:

```
The following message is displayed, indicating that the upgrade has successfully completed this step.

PSOC pre-upgrading ready, please power-cycle the board to finish the PSOC updating.
```

**Step 3**
Power-cycle the Cisco cBR chassis or perform an OIR of the RF line card.

**Note** Perform the OIR of the RF line card physically, by removing the RF line card from the slot and inserting it back into the slot.

```
Aug 4 09:02:59.836: %IOSXE_OIR-6-OFFLINECARD: Card (cc) offline in slot 1
Aug 4 09:02:59.839: %CABLE_CLC-5-LOGGER_LC_REMOVED: Carrier Card 1 removed
Aug 4 09:02:59.844: %BIPC-6-SESSION_DOWN: IPCCL Session to CLC1 is DOWN
Aug 4 09:02:59.937: %IOSXE_OIR-6-REMCARD: Card (cc) removed from slot 1
Aug 4 09:02:59.938: %CABLE_CLC-5-LOGGER_LC_REMOVED: Carrier Card 1 removed
LAB1_CBR8_DEMO#  
Aug 4 09:03:15.622: %IOSXE_OIR-6-INSCARD: Card (cc) inserted in slot 1
```

**Step 4**
The RF line card reboots after the chassis power-cycle or the RF line card OIR is completed. The LC PSoC upgrade process continues after the RF line card reboots.

**Note** After the RF line card reboots, the LC PSoC upgrade process takes approximately 15 minutes to complete. Do not perform any operation on the RF line card while the upgrade process is running.

When the upgrade process is completed, the following sample message is displayed, indicating that the upgrade was successful.

```
Aug 4 09:06:31.571: %IOSXE_OIR-6-ONLINECARD: Card (cc) online in slot 1
Router# success
```
Aug 4 09:11:45.764: %CMCC-3-FRU_HWPRG_UPG_PSOC_SUCCESS: CLC1: cmcc: Hardware programmable PSOCs on Line card in slot 1 were successfully programmed. Please power-cycle or OIR the card to make them work.

Step 5

Power cycle the Cisco cBR chassis or perform an OIR of the RF line card again. The PSOC 0 and PSOC 1 versions are indicated in the display that appears after the chassis power-cycle or the RF line card OIR is complete and the RF line card reboots. This example shows the sample messages displayed after the RF line card reboots:

Aug 4 09:16:18.124: %IOSXE_OIR-6-ONLINECARD: Card (cc) online in slot 1
LAB1_CBR8_DEMO# success
LAB1_CBR8_DEMO# Aug 4 09:16:29.021: %BIPC-6-SESSION_UP: IPCCL Session to CLC1 is UP
LAB1_CBR8_DEMO# sh plat diag
Load for five secs: 1%/0%; one minute: 5%; five minutes: 3%
Time source is NTP, 10:20:17.662 PORTUGAL-Summer Tue Aug 4 2015

Chassis type: CBR-8-CCAP-CHASS
Slot: 0, CBR-CCAP-LC-40G
Running state : ok
Internal state : online
Internal operational state : ok
Physical insert detect time : 15:37:00 (00:59:22 ago)
Software declared up time : 15:40:20 (00:56:01 ago)
CPLD version : 00000021
Rommon version : 2011.03.12
Basestar version : 00110004
Raider version : 01010008
Caprica version : 00000020
PSOC 0 version : v4.6
PSOC 1 version : v4.6

Pic: 0/1, CBR-RF-PROT-PIC
Internal state : inserted
Physical insert detect time : 00:03:22 (16:32:59 ago)
Firmware version: : 0000071E

Slot: 1, CBR-CCAP-LC-40G
Running state : ok
Internal state : online
Internal operational state : ok
Physical insert detect time : 16:29:06 (00:07:15 ago)
Software declared up time : 16:32:23 (00:03:59 ago)
CPLD version : 00000021
Rommon version : 2011.03.12
Basestar version : 00110004
Raider version : 01010008
Caprica version : 00000020
PSOC 0 version : v4.6
PSOC 1 version : v4.6

Pic: 1/1, CBR-RF-PIC
What to Do Next

Use the `show platform hardware slot slot psoc psoc id version` command to check the firmware version for each of the two PSoCs on each RF line card.

```
Router#show platform hardware slot 1 psoc 0 version
```

Load for five secs: 29%/6%; one minute: 30%; five minutes: 31%
Time source is NTP, 10:20:17.662 PORTUGAL-Summer Tue Aug 4 2015
PSOC Version

<table>
<thead>
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<tr>
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<td>2013-09-04</td>
</tr>
<tr>
<td>reg_mfr_serial</td>
<td>v3.0</td>
</tr>
</tbody>
</table>

Router#

Upgrading the Fan PSoC Image in the Cisco cBR

This section provides the procedure to upgrade the fan module PSoC.

Before You Begin

You could identify the fan module hardware using the `show platform hardware slot slot psoc 0 version` command. The `reg_ic_device_rev` field shows the fan module firmware version.

---

**Step 1**

Copy the firmware package to harddisk.

```
copy tftp:xxx harddisk:
```

**Step 2**

Run the following upgrade command on the SUP IOS:
For Cisco IOS-XE Release 3.16.1S:

```
upgrade hw-programmable cable active_SUP fan pkg_name firmware_pkg_location_path
```

Example:

```
Router#upgrade hw-programmable cable R0 fan pkg_name /harddisk/cbrsup-rp-hw-programmable-firmware.155-3.r.S3-ext.05.SPA.pkg
```

For Cisco IOS-XE Release 3.16.0S:
This command is specific to Cisco IOS-XE Release 3.16.0S alone. Using this command to upgrade the Fan PSoC firmware on Cisco IOS-XE Release 3.16.1S may cause unexpected results.

Caution
For upgrading Cisco IOS-XE Release 3.16.0S, do not use the firmware package `cbrsup-rp-hw-programmable-firmware.155-3.r.S3-ext.05.SPA.pkg` released for Cisco IOS-XE Release 3.16.1S. Use the firmware package `cbrsup-rp-hw-programmable-firmware.155-3.r.S3-ext.02.SPA.pkg` for upgrading Cisco IOS-XE Release 3.16.

**upgrade hw-programmable cable** active_SUP psoc pkg_name firmware_pkg_location_path

Example:

```
Router#upgrade hw-programmable cable R0 psoc pkg_name /harddisk/cbrsup-rp-hw-programmable-firmware.155-3.r.S3-ext.02.SPA.pkg
```

It takes approximately 15 minutes to upgrade the fan module PSoC for all the fan modules.

**Note**
Do not power-cycle or reload the router while the upgrade process is running.

When the upgrade is complete, the messages that indicate that the hardware programmable PSoC on each fan module in each fan bay is upgraded successfully, are displayed.

---

**What to Do Next**

**Note**
The following procedures are applicable only for Cisco IOS-XE Release 3.16.0S and not for Cisco IOS-XE Release 3.16.1S.

Perform one of the following two procedures:

- OIR the Fan modules one by one. Do not remove the fan module fully from the chassis. Pull the fan modules out until the back connector is disconnected fully, then re-insert the fan module.
- Power cycle the Cisco cBR chassis.

Use the `show platform hardware slot Psoc 0 version` command to check the firmware version for each slot and each of the two PSoCs on each fan module.

---

**Upgrading Supervisor CPLD Firmware in the Cisco cBR**

This section provides the procedure to upgrade the Supervisor CPLD firmware. The upgrade to Supervisor CPLD firmware version 16012711 is optional. Compared to the version 15091511, the version 16012711 provides SEU support. The customers can decide if they need to upgrade to the new Supervisor CPLD version at their own discretion.

**Before You Begin**

Before upgrading the Supervisor CPLD firmware, make sure the following requirements are met:

- Download Supervisor CPLD firmware from [http://www.cisco.com](http://www.cisco.com)
- System running IOS-XE image: 3.16.0, 3.16.1, 3.16 engineering specials, and later releases
- Console connections and login to both Supervisor cards
- Run the following command to verify Supervisor CPLD firmware version on the cBR-8:

<table>
<thead>
<tr>
<th>Command</th>
<th>Current Version</th>
<th>Upgrade Version</th>
<th>Package Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>show platform</td>
<td>15091511</td>
<td>16012711</td>
<td>cbrsup-rp-programmable-firmware.156-2.r.SP-ext.01.SPA.pkg</td>
</tr>
<tr>
<td>show platform</td>
<td>14121111</td>
<td>15091511</td>
<td>cbrsup-rp-hw-programmable-firmware.155-3.r.S3-ext.05.SPA.pkg</td>
</tr>
</tbody>
</table>

**Step 1**  
Copy the new firmware package to the cBR-8 using FTP.

```
copy filename bootflash:  
copy filename stby-bootflash:  
```

**Step 2**  
Verify the firmware package against the known md5 hash.

```
verify /md5 bootflash:filename  
```

**Step 3**  
Log into active SUP0 using console connection.

**Step 4**  
Check if there is any previous failed SUP0 and SUP1 CPLD or other firmware attempt and delete if any.

```
dir bootflash:already_in_progress_file  
delete bootflash:already_in_progress_file  
dir stby-bootflash:already_in_progress_file  
delete stby-bootflash:already_in_progress_file  
```

**Step 5**  
Run the following command to upgrade Viper firmware on SUP0 (R0) and SUP1 (R1):

```
upgrade hw-programmable cable R0 viper pkg_name filename  
upgrade hw-programmable cable R1 viper pkg_name filename  
```
Example:

Router# upgrade hw-programmable cable R0 viper pkg_name /bootflash/cbrsup-rp-programmable-firmware.156-2.r.SP-ext.01.SPA.pkg
Router# upgrade hw-programmable cable R1 viper pkg_name /bootflash/cbrsup-rp-programmable-firmware.156-2.r.SP-ext.01.SPA.pkg

It takes about 10 minutes to upgrade. You should see the following messages when upgrade finished:

Upgrade successfully. Please make sure Rommon version is matched. Please power cycle the chassis to let the new firmware take effect

**Caution** Disregard the power cycle instruction for now. Do not power cycle the chassis at this time.

**Step 6**

To mitigate the known modem registration rate issue, the following configuration commands needs to be added.

```
Router# configure terminal
Router(config)# platform punt-policer 24 50
Router(config)# platform punt-policer 24 50 high
Router(config)# platform punt-policer 105 300
Router(config)# platform punt-policer 100 100
Router(config)# platform punt-sbrl wan punt-cause 10 rate 4
Router(config)# platform punt-sbrl wan punt-cause 11 rate 4
Router(config)# platform punt-sbrl wan punt-cause 24 rate 4
Router(config)# platform punt-sbrl subscriber rate 16
Router(config)# interface bundle x
Router(config)# hold-queue 1024 in
Router(config)# hold-queue 1024 out
Router(config)# end
Router(config)# write memory
Router# configure terminal
```

**Step 7**

Copy the system startup-config to bootflash: and stby-bootflash: as a precaution.

```
copy startup-config bootflash:filename
```

```
copy startup-config stby-bootflash:filename
```

**Step 8**

Set the config register to 0, so both SUPs will boot in ROMMON mode after reset.

```
Router# configure terminal
Router(config)# config-register 0x0
Router(config)# end
Router# write memory
```

**Step 9**

Check console connectivity on both SUP0 and SUP1. Then reload cBR-8.

```
Router# reload
```

**Step 10**

Confirm both SUP0 and SUP1 are in ROMMON mode, and check bootflash on both SUPs.

```
Router# dir bootflash:
```

**Step 11**

Power cycle the cBR-8. Wait for both SUP0 and SUP1 to load into ROMMON mode. You will see the new CPLD version has been loaded on both SUPs from both console connections.

```
rommon 1 >
```

Initializing Hardware ...

?
Upgrading Docsis 3.0 downstream module and Docsis 3.1 downstream module (Cisco IOS-XE Release 3.18.0S and earlier releases)

This section provides the procedure to upgrade the Docsis 3.0 downstream and Docsis 3.1 downstream (DSPHY) module installed in Cisco cBR-8 router for Cisco IOS-XE Release 3.18.0S and earlier releases.
Before You Begin

Before upgrading the module, make sure the following requirements are met:

- Verify the IOS-XE image file against the known file md5 hash using `verify /md5 image-file-name` command.
- Access to TSV, both console connections, all passwords including enable, and logging sessions for both supervisor cards.
- Insert a USB drive into the supervisor front USB port just behind the small cover. Verify that the system can read the drive directory `usb0:`. Backup the configuration to USB drive before upgrade using `copy running-config usb0: name.txt` command.
- Check if the redundancy is enabled using `show redundancy` command.
- Perform standard pre-checks (total modems online, any 911 calls, etc). See verification section for `show` commands to verify system health before upgrade.

---

**Step 1**

Change the boot variable to point to desired IOS-XE image.

```
boot system bootflash:image-file-name
no boot system
end
write memory
```

**Step 2**

Verify that the bootvar has changed to point to the new image.

```
show bootvar
```

**Step 3**

To mitigate the known modem registration rate issue, the following configuration commands needs to be added.

```
configure terminal
no platform punt-policer 105 300
platform punt-policer 24 10
platform punt-policer 24 10 high
platform punt-policer 100 10
ipv6 access-list dhcp_up
permit ipv6 any host FF02::1:2 sequence 10
exit
ip access-list extended dhcp_v4_up
10 permit ip host 0.0.0.0 host 255.255.255.255
exit
class-map match-all dhcp_drop
match access-group name dhcp_up
class-map match-all dhcp_drop_v4
match access-group name dhcp_v4_up
policy-map copp_policy
class dhcp_drop
police rate 100 pps conform-action transmit exceed-action drop
class dhcp_drop_v4
```
police rate 100 pps conform-action transmit exceed-action drop
interface bundle 10
hold-queue 1024 in
hold-queue 1024 out
end
write memory

Step 4  Copy the system startup-config to bootflash: and stby-bootflash: as a precaution.

```
copy startup-config bootflash: filename
```

```
copy startup-config stby-bootflash: filename
```

Step 5  Check console connectivity on both SUP0 and SUP1. Then reload cBR-8.

```
Router# reload
```

Step 6  Once the system is up, check if it is running the new version of IOS-XE using `show redundancy` command. You will find following information in the command output if the new IOS-XE image is running:

```
Image Version = Cisco IOS Software, cBR Software (X86_64_LINUX_IOSD-UNIVERSALK9-M), cbrsup-universalk9.03.16.01.S.155-3.S1-ext.SPA.bin
```

Note  The command output depends on the IOS-XE version.

Step 7  If the chassis has DSPHY modules on the line cards, the firmware of each line card will automatically upgrade. You need to watch the logs for a suggested line card reload.
If you find following content in the output of the `show log | include DSPHY` command, it means an upgrade is taking place.

```
router: CLC9: cdman: DSPHY downloading gemini 0 FW done, total packets 514
```
If you find following content in the output of the `show log | include reload` command, it means an upgrade is complete.

```
router: CLC0: cdman: Suggest reload the line card for new FW to take effect using CLI:
```

Note  No upgrade is occurring means router image upgrade is complete.

Step 8  Disable line card redundancy for line card reloads.

```
configure terminal
redundancy
mode sso
linecard-group 0 internal-switch
no member slot 0 secondary
end
```

Step 9  Verify that there is no line card redundancy using `show run | begin redundancy` command. The following information will not appear in the command output:

```
member slot 0 secondary
```

Step 10  At this point you need to reload each line card and wait for the modems to come back online. Reload one card at a time, allow approximate 5 minutes between each line card reload. This helps to stagger the modem recovery and will be faster than reloading all the line cards at once.

```
hw-module slot 0 reload
hw-module slot 1 reload
hw-module slot 2 reload
hw-module slot 3 reload
hw-module slot 4 reload
hw-module slot 5 reload
```
hw-module slot 6 reload
hw-module slot 7 reload
hw-module slot 8 reload
hw-module slot 9 reload

Step 11 Check to see if all DSPHY modules are upgraded.

show cable card 0/0 ds-phy display | include version
show cable card 1/0 ds-phy display | include version
show cable card 2/0 ds-phy display | include version
show cable card 3/0 ds-phy display | include version
show cable card 6/0 ds-phy display | include version
show cable card 7/0 ds-phy display | include version
show cable card 8/0 ds-phy display | include version
show cable card 9/0 ds-phy display | include version

Step 12 Check for DSPHY module detection status, repeat for each line card slot:

show cable card 0/0 ds-phy display | include detected
show cable card 1/0 ds-phy display | include detected
show cable card 2/0 ds-phy display | include detected
show cable card 3/0 ds-phy display | include detected
show cable card 6/0 ds-phy display | include detected
show cable card 7/0 ds-phy display | include detected
show cable card 8/0 ds-phy display | include detected
show cable card 9/0 ds-phy display | include detected

Step 13 Check for keepalive (KA) counts sent and received to match closely, repeat for each line card slot:

show cable card 0/0 ds-phy display | include KA MicoAPSeSet
show cable card 1/0 ds-phy display | include KA MicoAPSeSet
show cable card 2/0 ds-phy display | include KA MicoAPSeSet
show cable card 3/0 ds-phy display | include KA MicoAPSeSet
show cable card 6/0 ds-phy display | include KA MicoAPSeSet
show cable card 7/0 ds-phy display | include KA MicoAPSeSet
show cable card 8/0 ds-phy display | include KA MicoAPSeSet
show cable card 9/0 ds-phy display | include KA MicoAPSeSet

Step 14 Re-enable the line card redundancy.

configure terminal
redundancy
mode sso
linecard-group 0 internal-switch
member slot 0 secondary
end
write memory

Step 15 Verify if the redundancy has been re-enabled using show run | begin redundancy command. You can find following information in the command output:

member slot 0 secondary

What to Do Next

Perform verification test to determine if the upgrade is successful, include:
• Check facility alarms using `show facility-alarm status` command.

**Note**
Some deployments use 5 power supplies which are sufficient, but will show a major alarm which can be ignored.

• Check the status of the power supplies using `show environment power` command.

• Check PS status using `show platform hardware slot P<0-5> mcu status` command.

• Complete trace routes to known good off-network IP address using the source address of customer CPE blocks to verify routing is working.

• Check logs for error messages using `show log` command.

These `show` commands may be useful in the verification test:

• `show redundancy`
• `show platform`
• `show platform diag`
• `show environment`
• `show redundancy linecard all`
• `show isis neighbors`
• `show ip route rip`
• `show ip mroute`
• `show cops servers`
• `show cable modem voice`
• `show cable calls`
• `show cable metering verbose`
• `show version`
• `show cable licenses all`
• `show inventory`

### Upgrading Docsis 3.0 downstream module and Docsis 3.1 downstream module (Cisco IOS-XE Release 3.18.1S and later releases)

This section provides the procedure to upgrade the Docsis 3.0 downstream and Docsis 3.1 downstream (DSPHY) module installed in Cisco cBR-8 router for Cisco IOS-XE Release 3.18.1S and later releases.

From Cisco IOS-XE Release 3.18.1S, DSPHY module firmware upgrade will be changed from IOS bundled auto-upgrade to external programmable upgrades via manual FPD upgrade, it is mandatory to upgrade Docsis 3.1 downstream module to the latest FPD (cbrsup-rp-programmable-firmware.156-2.r.S1-ext.01.SPA.pkg) while moving to Cisco IOS-XE Release 3.18.1S image.
This upgrade procedure is only applicable to Cisco IOS-XE Release 3.18.1S and later releases, upgrading from any release earlier, the FPD auto option is not supported. With the auto option, the firmwares that need upgrade can be determined by the system automatically and upgraded all at once, the whole process is more user-friendly and faster.

Before You Begin
Before upgrading the module, make sure the following requirements are met:
• Cisco cBR-8 router is running the IOS-XE release 3.18.1S and later releases.
• Check the module firmware version to determine if the upgrade is needed.

For non-LCHA enabled Chassis

Note: There is service impact during upgrade.

Step 1
Copy the new DSPHY module firmware package to the hard disk of the cBR-8.

`copy package name harddisk:`

Step 2
Verify the new DSPHY module firmware package against the known md5 hash.

`verify /md5 harddisk:package name`

Step 3
Upgrade the DSPHY module firmware using the command below.

`upgrade hw-programmable cable slot number dsphy auto pkg-name package name`

Example:

```
Router# upgrade hw-programmable cable 7 dsphy auto pkg-name
/harddisk/cbrsup-rp-programmable-firmware.156-2.r.S1-ext.01.SPA.pkg
```

Step 4
Reload the linecard when you see the "reload" instruction in the console CLI output for the new firmware to take effect, service will be impacted during the linecard reload.

```
*Mar  9 07:34:27.211: %IOSXE-5-PLATFORM: CLC7: cdman: Suggest reload the line card for new FW to
take effect using CLI: hw slot <slot-id> reload
```

`Router# hw-module slot 7 reload`

Step 5
After the linecard is online after the reload, check DSPHY module version to confirm the new firmware has taken effect.

`Router# show cable card 7/0 ds-phy display | i ver`

```
img info: section 2, running ver 30016 (micro)
img info: section 2, running ver 44147 (fpga)
```
For LCHA enabled Chassis

**Step 1**  Copy the new DSPHY module firmware package to the hard disk of the cBR-8.

```bash
copy package name harddisk:
```

**Step 2**  Verify the new DSPHY module firmware package against the known md5 hash.

```bash
verify /md5 harddisk:package name
```

**Step 3**  Upgrade the protect linecard 0 when it is in stand-by hot state using the command below.

```bash
upgrade hw-programmable cable 0 dsphy auto pkg-name package name
```

**Example:**

```
Router# upgrade hw-programmable cable 0 dsphy auto pkg-name
/harddisk/cbrsup-rp-programmable-firmware.156-2.r.S1-ext.01.SPA.pkg
```

**Step 4**  Reload the linecard when you see the "reload" instruction in the console CLI output for the new firmware to take effect.

```
*Mar 9 07:34:27.211: %IOSXE-5-PLATFORM: CLC0: cdman: Suggest reload the line card for new FW to take effect using CLI: hw slot <slot-id> reload
```

```
Router# hw-module slot 0 reload
```

**Step 5**  Wait until the protect linecard 0 becomes stand-by warm state, check DSPHY module version to confirm the new firmware has taken effect.

```
Router# show cable card 0/0 ds-phy display | i ver
```

```
img info: section 2, running ver 30016 (micro)
img info: section 2, running ver 44147 (fpga)
```

**Step 6**  Upgrade the first working linecard using the command below.

```bash
upgrade hw-programmable cable slot number dsphy auto pkg-name package name
```

**Example:**

```
Router# upgrade hw-programmable cable 1 dsphy auto pkg-name
/harddisk/cbrsup-rp-programmable-firmware.156-2.r.S1-ext.01.SPA.pkg
```

**Step 7**  Reload the linecard when you see the "reload" instruction in the console CLI output for the new firmware to take effect.

```
*Mar 9 07:34:27.211: %IOSXE-5-PLATFORM: CLC1: cdman: Suggest reload the line card for new FW to take effect using CLI: hw slot <slot-id> reload
```

```
Router# hw-module slot 1 reload
```

**Step 8**  When the linecard reload command is executed, a linecard switchover will be triggered for service protection. When the original working linecard is back online after the reload, perform linecard revertback.

**Step 9**  Check DSPHY module version to confirm the new firmware has taken effect on the first working linecard.

```
Router# show cable card 1/0 ds-phy display | i ver
```

```
img info: section 2, running ver 30016 (micro)
img info: section 2, running ver 44147 (fpga)
```

**Step 10**  Wait until the protect linecard 0 goes to standby-hot state, perform step 6 to 9 on the other working linecards one by one.
Upgrading Docsis 3.0 downstream module and Docsis 3.1 downstream module CPLD Firmware (Cisco IOS-XE Release 3.18.1S and later releases)

**Step 1**
Copy the Docsis 3.0 downstream and Docsis 3.1 downstream (DSPHY) module CPLD firmware package to hard disk of the cBR-8.

```markdown
copy bootflash:cbrsup-rp-programmable-firmware.xxx.pkg harddisk:rp-prog.pkg
```

**Step 2**
Upgrade the DSPHY CPLD firmware using SUP IOS command, for each applicable slot.

```markdown
upgrade hw-programmable cable slot number dsphy cpld pkg-name package name
```

Example:

```markdown
Router# upgrade hw-programmable cable 3 dsphy cpld pkg-name /harddisk/rp-prog.pkg
```

Wait for DSPHY CPLD firmware upgrade to complete.

```markdown
*Jan 1 09:08:22.830 EDT: %IOSXE-5-PLATFORM: CLC3: cdman: DSPHY manual downloading gemini 0 PSOC or CPLD FW, 0 packets done
*Jan 1 09:08:28.671 EDT: %IOSXE-5-PLATFORM: CLC3: cdman: DSPHY manual downloading gemini 0 CPLD FW, 1000 packets done
*Jan 1 09:08:33.381 EDT: %IOSXE-5-PLATFORM: CLC3: cdman: DSPHY manual downloading gemini 0 CPLD FW, 2000 packets done
*Jan 1 09:08:38.117 EDT: %IOSXE-5-PLATFORM: CLC3: cdman: DSPHY manual downloading gemini 0 CPLD FW, 3000 packets done
*Jan 1 09:08:42.822 EDT: %IOSXE-5-PLATFORM: CLC3: cdman: DSPHY manual downloading gemini 0 CPLD FW, 4000 packets done
*Jan 1 09:08:43.036 EDT: %IOSXE-5-PLATFORM: CLC3: cdman: DSPHY downloading gemini 0 FW done, total packets 4035
*Jan 1 09:08:43.036 EDT: %IOSXE-5-PLATFORM: CLC3: cdman: Suggest reload the line card for new FW to take effect using CLI: hw slot <slot-id> reload
```

**Step 3**
After the upgrade is complete, reload the line card.

```markdown
hw slot slot number reload
```

Example:

```markdown
Router# hw slot 3 reload
Proceed with reload of module? [confirm]
```

Wait for the line card to return to State ok.

```markdown
Router# show platform
Chassis type: CBR-8
Slot  Type  State  Insert time (ago)
-------  ------  -------  ---------------
3  CBR-CCAP-LC-40G  ok  00:08:49
```

**Step 4**
Verify if the DSPHY CPLD firmware has been upgraded.

```markdown
show cable card slot/0 ds-phy display
```

Example:
Verify the cpld version details using the following command:

```
Router# show cable card 3/0 ds-phy display
Internal GCP Status of module or AppCore 0:
  . . .
cpld ver 7, sector(1 base) 1, psoc ver 40004, sector(1 base) 1
  . . .
Internal GCP Status of module or AppCore 1:
  . . .
cpld ver 7, sector(1 base) 0, psoc ver 40004, sector(1 base) 0
  . . .
```

Upgrading Docsis 3.0 downstream module and Docsis 3.1 downstream module PSoC Firmware (Cisco IOS-XE Release 3.18.1S and later releases)

**Step 1**
Copy the Docsis 3.0 downstream and Docsis 3.1 downstream (DSPHY) module PSoC firmware package to hard disk of the cBR-8.

```
copy bootflash:cbrsup-rp-programmable-firmware.xxx.pkg harddisk:rp-prog.pkg
```

**Step 2**
Upgrade the DSPHY PSoC firmware using SUP IOS command, for each applicable slot.

```
upgrade hw-programmable cable slot number dsphy psoc pkg-name package name
```

Example:

```
Router# upgrade hw-programmable cable 3 dsphy psoc pkg-name /harddisk/rp-prog.pkg
```

Wait for DSPHY PSoC firmware upgrade to complete.

```
*Jan 1 09:24:21.026 EDT: %IOSXE-5-PLATFORM: CLC3: cdman: gemini psoc img ID 1, starting to download, is GeminiII ? 0
*Jan 1 09:24:21.046 EDT: %IOSXE-5-PLATFORM: CLC3: cdman: DSPHY manual downloading gemini 0 PSOC or CPLD FW, 0 packets done
*Jan 1 09:25:19.861 EDT: %IOSXE-5-PLATFORM: CLC3: cdman: DSPHY downloading gemini 0 FW done, total packets 430
*Jan 1 09:25:19.861 EDT: %IOSXE-5-PLATFORM: CLC3: cdman: Suggest reload the line card for new FW to take effect using CLI: hw slot <slot-id> reload
```

**Step 3**
After the upgrade is complete, reload the line card.

```
hw slot slot number reload
```

Example:

```
Router# hw slot 3 reload
Proceed with reload of module? [confirm]
```

Wait for the line card to return to State ok.
Example:

Router# **show platform**
Chassis type: CBR-8-CCAP-CHASS
Slot  Type          State Insert time (ago)
---------- ------------- ---------------------
3     CBR-CCAP-LC-40G  ok          00:34:19

**Step 4** Verify if the DSPHY PSoC firmware has been upgraded.

**show cable card slot/0 ds-phy display**
Example:
Verify the psoc version details using the following command:

Router# **show cable card 3/0 ds-phy display**
Internal GCP Status of module or AppCore 0:
... cpld ver 7, sector(1 base) 1, psoc ver 40004, sector(1 base) 1
... Internal GCP Status of module or AppCore 1:
... cpld ver 7, sector(1 base) 0, psoc ver 40004, sector(1 base) 0
...

---

**Upgrading Docsis 3.0 downstream module and Docsis 3.1 downstream module FPGA Firmware (Cisco IOS-XE Release 3.18.1S and later releases)**

This section provides the procedure to upgrade the DSPHY FPGA firmware.

---

**Step 1** Copy the new Docsis 3.0 downstream and Docsis 3.1 downstream (DSPHY) FPGA firmware package to the harddisk of the cBR-8.

**copy package name harddisk:**

**Step 2** Verify the new DSPHY FPGA firmware package against the known md5 hash.

**verify /md5 harddisk:package name**

**Step 3** Upgrade the DSPHY FPGA firmware using the command below.

**upgrade hw-programmable cable slot number dsphy fpga pkg-name package name**

Example:

Router# **upgrade hw-programmable cable 3 dsphy fpga pkg-name /harddisk/rp-prog.pkg**

Please wait - firmware download may take up to 5 minutes to complete.

**Note** When there is LCHA configured, protect card needs to be upgraded while it is in standby mode.
In the example, slot 6 is upgraded. If there are more CBR-CCAP-LC-40G mother boards, all slots need to be upgraded, which can be done in parallel.

Wait for DSPHY FPGA firmware upgrade to complete. The downloading progress is recorded in syslog. Use below command to monitor:

```
Router# show log | include download
```

*Jan 14 05:43:30.719 EDT: %IOSXE-5-PLATFORM: CLC6: cdman: DSPHY manual downloading gemini 1 Apollo FW, 0 out of 28K packets done
*Jan 14 05:43:59.700 EDT: %IOSXE-5-PLATFORM: CLC6: cdman: DSPHY manual downloading gemini 0 Apollo FW, 0 out of 28K packets done
*Jan 14 05:47:13.435 EDT: %IOSXE-5-PLATFORM: CLC6: cdman: DSPHY downloading gemini 1 FW done, total packets 27381
*Jan 14 05:47:39.137 EDT: %IOSXE-5-PLATFORM: CLC6: cdman: DSPHY downloading gemini 0 FW done, total packets 27381

**Step 4**

After the upgrade is complete, reload the line card.

```
hw-module slot slot number reload
```

Example:
```
Router# hw-module slot 3 reload
Proceed with reload of module? [confirm]
```

Wait for the line card to return to State ok.

Example:

```
Router# show platform
```

<table>
<thead>
<tr>
<th>Slot</th>
<th>Type</th>
<th>State</th>
<th>Insert time (ago)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>CBR-CCAP-LC-40G</td>
<td>ok</td>
<td>19:28:07</td>
</tr>
<tr>
<td>3/1</td>
<td>CBR-RF-PROT-PIC</td>
<td>ok</td>
<td>19:25:14</td>
</tr>
<tr>
<td>6</td>
<td>CBR-CCAP-LC-40G</td>
<td>ok</td>
<td>19:28:07</td>
</tr>
<tr>
<td>6/1</td>
<td>CBR-RF-PIC</td>
<td>ok</td>
<td>19:25:13</td>
</tr>
</tbody>
</table>

**Note** After DSPHY FPGA firmware upgrade, line card must be reloaded before perform another firmware upgrade on the same slot.

**Step 5**

Verify if the DSPHY FPGA firmware has been upgraded.

```
show cable card slot/0 ds-phy display | include apollo
```

Example:
```
Router# show cable card 6/0 ds-phy display | include apollo
```

micro ver 30014, sector(1 base) 2, apollo ver 44141, sector(0 base) 1
micro ver 30014, sector(1 base) 3, apollo ver 44141, sector(0 base) 2

**Note** Make sure DSPHY FPGA firmware version matches the one released in the package.
Upgrading Docsis 3.0 downstream module and Docsis 3.1 downstream module Micro Firmware (Cisco IOS-XE Release 3.18.1S and later releases)

This section provides the procedure to upgrade the DSPHY Micro firmware.

**Step 1**
Copy the new Docsis 3.0 downstream and Docsis 3.1 downstream (DSPHY) Micro firmware package to the harddisk of the cBR-8.

`copy package name harddisk:`

**Step 2**
Verify the new DSPHY Micro firmware package against the known md5 hash.

`verify /md5 harddisk:package name`

**Step 3**
Upgrade the DSPHY Micro firmware using the command below.

`upgrade hw-programmable cable slot number dsphy micro pkg-name package name`

Example:

```
Router# upgrade hw-programmable cable 3 dsphy micro pkg-name /harddisk/rp-prog.pkg
```

Please wait - firmware download may take up to 5 minutes to complete.

Note: Following output will be seen if console logging is turned on

```
*Mar 9 07:45:26.093: %IOSXE-5-PLATFORM: CLC7: cdman: DSPHY manual downloading gemini 1 micro FW, 0 out of 514 packets done
*Mar 9 07:45:26.761: %IOSXE-5-PLATFORM: CLC7: cdman: DSPHY manual downloading gemini 0 micro FW, 0 out of 514 packets done
*Mar 9 07:45:28.780: %IOSXE-5-PLATFORM: CLC7: cdman: DSPHY downloading gemini 1 micro FW, 300 out of 514 packets done
*Mar 9 07:45:29.609: %IOSXE-5-PLATFORM: CLC7: cdman: DSPHY downloading gemini 0 micro FW, 300 out of 514 packets done
*Mar 9 07:45:32.071: %IOSXE-5-PLATFORM: CLC7: cdman: DSPHY downloading gemini 1 FW done, total packets 514
*Mar 9 07:45:32.953: %IOSXE-5-PLATFORM: CLC7: cdman: DSPHY downloading gemini 0 FW done, total packets 514
*Mar 9 07:45:32.953: %IOSXE-5-PLATFORM: CLC7: cdman: Suggest reload the line card for new FW to take effect using CLI: hw slot <slot-id> reload
```

**Note**
When there is LCHA configured, protect card needs to be upgraded while it is in standby mode.

Wait for DSPHY Micro firmware upgrade to complete.

**Step 4**
After the upgrade is complete, reload the line card.

`hw-module slot slot number reload`

Example:

```
Router# hw-module slot 3 reload
Proceed with reload of module? [confirm]
Wait for the line card to return to State ok.
```
Example:

Router# show platform

Load for five secs: 3%/0%; one minute: 3%; five minutes: 4%
Time source is NTP, 02:22:27.191 CST Thu Jun 30 2016

Chassis type: CBR-8-CCAP-CHAAS

<table>
<thead>
<tr>
<th>Slot</th>
<th>Type</th>
<th>State</th>
<th>Insert time (ago)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>CBR-CCAP-LC-40G</td>
<td>ok</td>
<td>00:12:50</td>
</tr>
<tr>
<td>0/1</td>
<td>CBR-RF-PROT-PIC</td>
<td>ok</td>
<td>00:09:17</td>
</tr>
<tr>
<td>1</td>
<td>CBR-CCAP-LC-40G</td>
<td>ok</td>
<td>00:12:50</td>
</tr>
<tr>
<td>1/1</td>
<td>CBR-RF-PIC</td>
<td>ok</td>
<td>00:09:17</td>
</tr>
<tr>
<td>SUP0</td>
<td>CBR-CCAP-SUP-160G</td>
<td>inserted</td>
<td>00:12:50</td>
</tr>
<tr>
<td></td>
<td>R0</td>
<td>ok, active</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F0</td>
<td>ok, active</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>ok, active</td>
<td></td>
</tr>
<tr>
<td>4/1</td>
<td>CBR-SUP-8X10G-PIC</td>
<td>ok</td>
<td>00:10:16</td>
</tr>
<tr>
<td>SUP1</td>
<td>inserted</td>
<td></td>
<td>00:12:50</td>
</tr>
<tr>
<td></td>
<td>R1</td>
<td>unknown</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F1</td>
<td>unknown</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>unknown</td>
<td></td>
</tr>
<tr>
<td>P0</td>
<td>CBR-AC-PS</td>
<td>ok</td>
<td>00:10:57</td>
</tr>
<tr>
<td>P1</td>
<td>CBR-AC-PS</td>
<td>ok</td>
<td>00:10:57</td>
</tr>
<tr>
<td>P2</td>
<td>Unknown</td>
<td>N/A</td>
<td>never</td>
</tr>
<tr>
<td>P3</td>
<td>Unknown</td>
<td>N/A</td>
<td>never</td>
</tr>
<tr>
<td>P4</td>
<td>Unknown</td>
<td>N/A</td>
<td>never</td>
</tr>
<tr>
<td>P5</td>
<td>Unknown</td>
<td>N/A</td>
<td>never</td>
</tr>
<tr>
<td>P10</td>
<td>CBR-FAN-ASSEMBLY</td>
<td>ok</td>
<td>00:10:46</td>
</tr>
<tr>
<td>P11</td>
<td>CBR-FAN-ASSEMBLY</td>
<td>ok</td>
<td>00:10:46</td>
</tr>
<tr>
<td>P12</td>
<td>CBR-FAN-ASSEMBLY</td>
<td>ok</td>
<td>00:10:47</td>
</tr>
<tr>
<td>P13</td>
<td>CBR-FAN-ASSEMBLY</td>
<td>ok</td>
<td>00:10:46</td>
</tr>
<tr>
<td>P14</td>
<td>CBR-FAN-ASSEMBLY</td>
<td>ok</td>
<td>00:10:46</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Slot</th>
<th>CPLD Version</th>
<th>Rommon Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>00000021</td>
<td>2011.03.16</td>
</tr>
<tr>
<td>1</td>
<td>00000021</td>
<td>2011.03.12</td>
</tr>
<tr>
<td>SUP0</td>
<td>15091511</td>
<td>15.6(2r)S</td>
</tr>
<tr>
<td>SUP1</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Note** After DSPHY Micro firmware upgrade, line card must be reloaded before perform another upgrade.

**Step 5**

Verify if the DSPHY Micro firmware has been upgraded.

`show cable card slot/0 ds-phy display | include micro`

Example:

Router# show cable card 3/0 ds-phy display | include micro

```
img info: section 2, running ver 30012, bundled 1000c G2 2000c G2-D31 30012(micro)
```
Verifying the Firmware Versions after the Upgrade

Verify the firmware version of the programmable hardware devices after the upgrade is completed successfully.

Table 1: Firmware Versions

<table>
<thead>
<tr>
<th>Command</th>
<th>Firmware</th>
<th>Correct Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco IOS-XE Release 3.16.0S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>show platform</td>
<td>ROMMON</td>
<td>15.5(2r)S1</td>
</tr>
<tr>
<td>show platform diag</td>
<td>Fan PSoC</td>
<td>CBR-FAN FW 1.6</td>
</tr>
<tr>
<td>show platform diag</td>
<td>LC PSoC</td>
<td>v4.6</td>
</tr>
<tr>
<td>show platform</td>
<td>LC Daggits/CPLD</td>
<td>00000021</td>
</tr>
<tr>
<td>show platform</td>
<td>SUP CPLD (Viper)</td>
<td>15091511</td>
</tr>
<tr>
<td>Cisco IOS-XE Release 3.18.0SP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>show platform</td>
<td>SUP CPLD (Viper)</td>
<td>16012711</td>
</tr>
<tr>
<td>show platform</td>
<td>Docsis 3.1 downstream module Micro</td>
<td>3.13</td>
</tr>
<tr>
<td>show platform</td>
<td>Docsis 3.1 downstream module FPGA</td>
<td>4.4141</td>
</tr>
</tbody>
</table>
Verifying the Firmware Versions after the Upgrade