Upgrading the Cisco cBR-8 Router System to Cisco IOS XE Gibraltar 16.12.1w

This section contains the upgrade procedures for the Cisco cBR-8 Router System.

If you are using telnet to access the device, make sure the value of line vty transport is correct and save the configuration.

```
Router# show run | begin line vty
line vty 0 4
 exec-timeout 0 0
 privilege level 15
 password 7 104D081B094410055F
 exec prompt timestamp
 transport input all
line vty 5 98
 exec-timeout 0 0
 privilege level 15
 password 7 02050D480809
 transport input all
line vty 99
 transport input all
!
```

The following table encompasses all versions that customers are required to update to support Cisco IOS XE Gibraltar 16.12.1w. All other firmware versions are either not upgradable by the customer, or not required to be upgraded for Cisco IOS XE Gibraltar 16.12.1w support. Use the commands in the tables to verify the firmware versions.

Table 1: Firmware Versions

Internal Name	Component Name	Required Minimum Version	Command
Supervisor CPLD	CBR-CCAP-SUP-160G CPLD	16052011/19071712	**show platform**
	CBR-CCAP-SUP-250G CPLD	170724E0/190717E1	**show platform**

Supervisor ROMMON	CBR-CCAP-SUP-160G Rommon and CBR-CCAP-SUP-250G Rommon	16.7(6r)S	**show platform**
Line Card CPLD	CBR-CCAP-LC-40G CPLD	00000026	**show platform diag**
Docsis 3.1 downstream module Micro	CBR-CCAP-LC-40G Gemin2 Micro	3.1A	**show platform diag**
Docsis 3.1 downstream module FPGA	CBR-CCAP-LC-40G Gemini2 Apollo	4.484F	**show platform diag**
DPIC Uboot and FPGA	CBR-DPIC-8X10G Firmware	00010001	**show platform diag**
DPIC 100G Uboot and FPGA	CBR-DPIC-2X100G Firmware	00020005	**show platform diag**

Note If the user wants to upgrade Supervisor CPLD to version 19071712 and 190717E1, the chassis must be running with Cisco IOS XE Gibraltar 16.12.1w or later releases.

Note Cisco recommends that operators upgrade their On-Premise SSM Satellite software versions to v7.x or later releases, to ensure the compatibility with cBR-8.

Verify max-carrier value

Currently in Remote PHY system, max-carrier value can be configured in the downstream controller profile as well as in RPD configuration for Cisco Remote PHY Shelf 300/600/7200. This may lead to inconsistent max-carrier value configurations.

Starting from Cisco IOS XE Gibraltar 16.10.1f, max-carrier value configured in the **cable rpd** mode is removed and RPD will use the max-carrier value configured in the **controller-profile** mode for the power calculation.

Before upgrading to Cisco IOS XE Gibraltar 16.10.1f or later releases, verify if the max-carrier values configured in the RPD shelf configuration and downstream controller profile(s) associated to RPD downstream port are the same. If they are different, update the cBR-8 configuration prior to upgrade.

Below is an example of correct configuration before upgrade.

```
cable downstream controller-profile 1
 max-carrier 128
 max-ofdm-spectrum 384000000
 rf-chan 0 3
  type DOCSIS
  qam-profile 1
  frequency 381000000
  rf-output NORMAL
  docsis-channel-id 1

cable downstream controller-profile 2
 max-carrier 158
 max-ofdm-spectrum 384000000
 rf-chan 158
  docsis-channel-id 159
  ofdm channel-profile 20 start-frequency 579000000 width 48000000 plc 600000000


cable rpd test
 identifier 0001.0001.0001
 type shelf
 rpd-ds 0 max-carrier 128
 rpd-ds 0 base-power 33
 rpd-ds 1 max-carrier 158
 rpd-ds 1 base-power 25
 core-interface Te9/1/0
  rpd-ds 0 downstream-cable 9/0/3 profile 1
  rpd-ds 0 downstream-cable 9/0/4 profile 2
  rpd-us 0 upstream-cable 9/0/3 profile 1
 r-dti 1
 rpd-event profile 0
 rpd-55d1-us-event profile 0
```

Note   It is highly recommended to follow this example to check and update configuration if necessary because max-carrier value is used to compute the base power. Otherwise, after upgrade the expected base power value can be different which may affect cable modem coming online.

Note   If you upgrade from a version lower than Cisco IOS XE Fuji 16.9.1, base power range may be changed on the port with OFDM channel configured. So be aware of the potential base power change before and after the upgrade.

Upgrading from Cisco IOS XE 16.x to Cisco IOS XE Gibraltar 16.12.1w

Note   If you are upgrading from Cisco IOS XE Everest 16.6.x and Cisco IOS XE Fuji 16.7.x to Cisco IOS XE Gibraltar 16.12.1w,perform the following steps to upgrade SUP ROMMON manually. Otherwise, proceed with the IOS upgrade.

1. Download hardware programmable devices upgrade package file **cbrsup-programmable_firmware.16.12.01w.SPA.pkg** from the following Cisco.com Software Center URL: https://software.cisco.com/download/type.html?mdfid=286283913&flowid=73842

2. Copy the package file to harddisk:.

   ```
   copy <location>/cbrsup-programmable_firmware.16.12.01w.SPA.pkg harddisk:
   ```

3. Verify the hardware programmable devices upgrade package against the md5 hash as provided in the Cisco.com Software center.

   ```
   verify /md5 harddisk:cbrsup-programmable_firmware.16.12.01w.SPA.pkg
   ```

4. Upgrade SUP ROMMON.

   ```
   Router#Upgrade rom-mon file harddisk:cbrsup-programmable_firmware.16.12.01w.SPA.pkg r0
   Wait for the following output on the console:
   ROMMON upgrade complete.
   To make the new ROMMON permanent, you must restart the RP

   Router#Upgrade rom-mon file harddisk:cbrsup-programmable_firmware.16.12.01w.SPA.pkg r1
   Wait for the following output on the console:
   ROMMON upgrade complete.
   To make the new ROMMON permanent, you must restart the RP
   ```

Note To save time, we can combine reloading the SUP with the ISSU process.

Upgrading with ISSU

Before you begin

Note **If you are upgrading from Cisco IOS XE Everest 16.7.x to Cisco IOS XE Gibraltar 16.12.1w, contact Cisco TAC for special procedures.**

Note Due to the new SUP250 WAN FPGA firmware included in the Cisco IOS XE Gibraltar 16.12.1w package, it is recommended to upgrade the cBR-8 system following the steps in Upgrading using reload, otherwise the new SUP250 WAN FPGA firmware will not take effect.

Note If you are upgrading from Cisco IOS XE Everest 16.6.x to Cisco IOS XE Gibraltar 16.12.1w, complete pre-upgrade steps 1 to 4 before proceed.

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

• The cBR-8 has two SUPs setup.

```
Router# show redundancy | include Location|state
              Active Location = slot 4
         Current Software state = ACTIVE
       Uptime in current state = 2 days, 21 hours, 37 minutes
             Standby Location = slot 5
         Current Software state = STANDBY HOT
       Uptime in current state = 2 days, 21 hours, 30 minutes
```

• Standby SUP must be in hot standby.

```
Router# show redundancy | include Location|state
              Active Location = slot 4
         Current Software state = ACTIVE
       Uptime in current state = 2 days, 21 hours, 37 minutes
             Standby Location = slot 5
         Current Software state = STANDBY HOT
       Uptime in current state = 2 days, 21 hours, 30 minutes
```

• Line card redundancy is in stable state with state Active and Stdby warm.

```
Router# show redundancy linecard all
Load for five secs: 14%/1%; one minute: 8%; five minutes: 8%
Time source is NTP, 15:23:26.697 PST Thu Jan 17 2019
```

Slot	Subslot	LC Group	My State	Peer State	Peer Slot	Peer Subslot	Role	Mode
1	-	0	Active	Stdby Warm	0	-	Active	Primary
2	-	0	Active	Stdby Warm	0	-	Active	Primary
3	-	0	Active	Stdby Warm	0	-	Active	Primary
6	-	0	Active	Stdby Warm	0	-	Active	Primary
0	-	0	-	-	Multiple	None	Standby	Secondary

• Auto-boot is enabled.

```
Router# show bootvar
Load for five secs: 14%/0%; one minute: 14%; five minutes: 10%
Time source is NTP, 15:46:59.837 PST Thu Jan 17 2019

BOOT variable = bootflash:IOSXE/packages.conf,12;
CONFIG_FILE variable =
BOOTLDR variable does not exist
Configuration register is 0x2

Standby BOOT variable = bootflash:IOSXE/packages.conf,12;
Standby CONFIG_FILE variable =
Standby BOOTLDR variable does not exist
Standby Configuration register is 0x2
```

• Both SUPs are in the sub-package mode, running the same image from the same path.

```
Router# show bootvar
Load for five secs: 14%/0%; one minute: 14%; five minutes: 10%
Time source is NTP, 15:46:59.837 PST Thu Jan 17 2019

BOOT variable = bootflash:IOSXE/packages.conf,12;
CONFIG_FILE variable =
BOOTLDR variable does not exist
Configuration register is 0x2
```

```
Standby BOOT variable = bootflash:IOSXE/packages.conf,12;
Standby CONFIG_FILE variable =
Standby BOOTLDR variable does not exist
Standby Configuration register is 0x2
```

- Target consolidated image cbrsup-universalk9.16.12.01w.SPA.bin is copied to active SUP in the same directory of the packages.conf file that the system is booted up with.

- Download two files from the following Cisco.com Software Center URL:

  https://software.cisco.com/download/type.html?mdfid=286283913&flowid=73842

  - IOS XE Software Version 16.12.1w: **cbrsup-universalk9.16.12.01w.SPA.bin**

  - IOS XE Hardware Programmable Devices Version 16.12.1w:
    cbrsup-programmable_firmware.16.12.01w.SPA.pkg

- The free space on boot device on both SUPs must be greater than 1.8 GB.

```
Router# dir bootflash: | include bytes total

7804653568 bytes total (1311854592 bytes free)
```

Note Do not power cycle the cBR-8 router during the firmware upgrade process. Power cycling the chassis may corrupt the ROMMON/Uboot image.

Step 1 Copy Cisco IOS XE Gibraltar 16.12.1w package to bootflash:.

`copy <location>/cbrsup-universalk9.16.12.01w.SPA.bin bootflash:<sub-pkg-dir>/`

Step 2 Verify Cisco IOS XE Gibraltar 16.12.1w package against the md5 hash as provided in the Cisco.com Software center.

`verify /md5 bootflash:<sub-pkg-dir>/cbrsup-universalk9.16.12.01w.SPA.bin`

Step 3 Copy the hardware programmable devices upgrade package to harddisk: if the file has not been copied already.

`copy <location>/cbrsup-programmable_firmware.16.12.01w.SPA.pkg harddisk:`

Step 4 Verify the hardware programmable devices upgrade package against the md5 hash as provided in the Cisco.com Software center.

`verify /md5 harddisk:cbrsup-programmable_firmware.16.12.01w.SPA.pkg`

Step 5 Check system status prior to upgrade. Save the information to compare against the system status after upgrade. For the commands to use to check the status, see the **show** commands at the end of this section.

Step 6 Check line card CPLD version via **show platform**. If it is not the latest version 00000026, upgrade line card CPLD following the sub steps below. Otherwise skip this step.

a) 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 0
Daggits pre-upgrade successful
```

b) Upgrade the line card CPLD 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:

```
Router# upgrade hw-programmable cable 0 daggit pkg_name
/harddisk/cbrsup-programmable_firmware.16.12.01w.SPA.pkg
```

c) 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 0
```

d) The line card moves from **booting** to **active** state. Check the version of the line card using the **show platform** command to make sure version is changed to 00000026.

Example:

```
cBR8#show platform
......
Slot      CPLD Version        Rommon Version
--------- ------------------- -------------------------------------

0         00000026            2011.03.18
…
```

e) 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 0
SUCCESS: Daggit_ver-37 : Booted from upgradable Image-1
```

Step 7   Upgrade Docsis 3.1 downstream modules in all slots.

> **Note**   Do not upgrade if they already have the correct FPGA/Micro firmware version as shown in Table 1: Firmware Versions, on page 1, otherwise the line card will be in unknown state.

```
Upgrade hw-programmable cable <slot> dsphy all
pkg_name/harddisk/cbrsup-programmable_firmware.16.12.01w.SPA.pkg
```

Step 8   Wait for the system log message asking the user to reload the line card that was upgraded.

```
001860: Jun 15 19:05:05.904 PDT: %IOSXE-5-PLATFORM: CLC0: cdman: Suggest reload the line card for
new FW to take effect using CLI: hw slot <slot-id> reload
```

Step 9   Perform ISSU.

```
request platform software package install node file bootflash:cbrsup-universalk9.16.12.01w.SPA.bin
```

Step 10   To monitor the ISSU progress, use the command below.

```
request platform software package install node attach
```

Step 11   Use these CLI to check status after ISSU.

```
show version
show version r0 running
show version r1 running
show version r0 provisioned
show version r1 provisioned
```

> **Note**   If both Docsis 3.1 OFDM channels and downstream load balancing are configured, then Docsis 3.1 CMs will come up in a Docsis 3.0 bonding group after ISSU from Cisco IOS XE Everest 16.6.x. The workaround procedure is:
>
> **a.**   Admin shut all OFDM channels. This can be done from a script, or from cut and paste of the CLI. There is no need to have a delay between successive shuts. For example:
>
> ```
> configure terminal
>     controller Integrated-Cable 2/0/0
>         rf-chan 158
>             shut
> ```
>
> **b.**   Wait for 30 seconds.
>
> **c.**   Admin perform no-shut on all OFDM channels. This may be done from a script, or from cut and paste of the CLI. There is no need to have a delay between successive no-shuts. For example:
>
> ```
> configure terminal
>     controller Integrated-Cable 2/0/0
>         rf-chan 158
>             no shut
> ```
>
> **d.**   Reset all Docsis 31 CMs. For example:
>
> ```
> clear cable modem d31-capable reset
> ```

What to do next

Perform verification test to determine if the upgrade is successful, include:

- Verify the router is running the new IOS-XE release using **show version** command.

- Check facility alarms using **show facility-alarm status** command.

- 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 ospf neighbor**

- **show ip route rip**

- **show ip mroute**

- **show cops servers**

- **show cable modem voice**

- **show cable calls**

- **show cable metering verbose**

- **show cable licenses all**

- **show inventory**

Upgrading using reload

Before you begin

Note   If you are upgrading from Cisco IOS XE Everest 16.6.x and Cisco IOS XE Fuji 16.7.x to Cisco IOS XE Gibraltar 16.12.1w, complete pre-upgrade steps 1 to 4 before proceed.

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

- Download two files from the following Cisco.com Software Center URL:

  https://software.cisco.com/download/type.html?mdfid=286283913&flowid=73842

  - IOS XE Software Version 16.12.1w: **cbrsup-universalk9.16.12.01w.SPA.bin**

  - IOS XE Hardware Programmable Devices Version 16.12.1w:
    cbrsup-programmable_firmware.16.12.01w.SPA.pkg

Step 1 Copy Cisco IOS XE Gibraltar 16.12.1w package to bootflash: and stby-bootflash:.

```
copy <location>/cbrsup-universalk9.16.12.01w.SPA.bin bootflash:
copy <location>/cbrsup-universalk9.16.12.01w.SPA.bin stby-bootflash:
```

Step 2 Verify Cisco IOS XE Gibraltar 16.12.1w package against the md5 hash as provided in the Cisco.com Software center.

```
verify /md5 bootflash:cbrsup-universalk9.16.12.01w.SPA.bin
verify /md5 stby-bootflash:cbrsup-universalk9.16.12.01w.SPA.bin
```

Step 3 Copy the hardware programmable devices upgrade package to harddisk:.

```
copy <location>/cbrsup-programmable_firmware.16.12.01w.SPA.pkg harddisk:
```

Step 4 Verify the hardware programmable devices upgrade package against the md5 hash as provided in the Cisco.com Software center.

```
verify /md5 harddisk:cbrsup-programmable_firmware.16.12.01w.SPA.pkg
```

Step 5 Configure the chassis to boot the system with Cisco IOS XE Gibraltar 16.12.1w image.

```
Configure terminal
no boot system
boot system bootflash:cbrsup-universalk9.16.12.01w.SPA.bin
config-register 0x2
end
write mem
```

Step 6 If you are upgrading from Cisco IOS XE Everest 16.6.x and Cisco IOS XE Fuji 16.7.x, and both SUP ROMMON versions are not 16.7(6r)S, upgrade SUP ROMMON.

```
Router#Upgrade rom-mon file harddisk:cbrsup-programmable_firmware.16.12.01w.SPA.pkg r0
Wait for the following output on the console:
ROMMON upgrade complete.
To make the new ROMMON permanent, you must restart the RP

Router#Upgrade rom-mon file harddisk:cbrsup-programmable_firmware.16.12.01w.SPA.pkg r1
Wait for the following output on the console:
ROMMON upgrade complete.
```

```
To make the new ROMMON permanent, you must restart the RP
```

Step 7 Check line card CPLD version via **show platform**. If it is not the latest version 00000026, upgrade line card CPLD following the sub steps below. Otherwise skip this step.

a) 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 0
Daggits pre-upgrade successful
```

b) Upgrade the line card CPLD 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:

```
Router# upgrade hw-programmable cable 0 daggit pkg_name
/harddisk/cbrsup-programmable_firmware.16.12.01w.SPA.pkg
```

c) 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 0
```

d) The line card moves from **booting** to **active** state. Check the version of the line card using the **show platform** command to make sure version is changed to 00000026.

Example:

```
cBR8#show platform
......
Slot      CPLD Version        Rommon Version
--------- ------------------ -------------------------------------
0         00000026            2011.03.18
...
```

e) 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 0
```

```
       SUCCESS: Daggit_ver-37 : Booted from upgradable Image-1
```

Step 8   Upgrade Docsis 3.1 downstream modules in all slots.

> **Note**   Do not upgrade if they already have the correct FPGA/Micro firmware version as shown in Table 1: Firmware Versions, on page 1, otherwise the line card will be in unknown state.

```
Upgrade hw-programmable cable <slot> dsphy all
pkg_name/harddisk/cbrsup-programmable_firmware.16.12.01w.SPA.pkg
```

Step 9   Wait for the system log message asking the user to reload the line card that was upgraded.

```
001860: Jun 15 19:05:05.904 PDT: %IOSXE-5-PLATFORM: CLC0: cdman: Suggest reload the line card for
new FW to take effect using CLI: hw slot <slot-id> reload
```

Step 10   Reload the system.

```
Router#reload
```

Step 11   If the system is running with SUP250, perform **no shut** on 100G interface after the system comes up for the first time.

What to do next

Perform verification test to determine if the upgrade is successful, include:

- Verify the router is running the new IOS-XE release using **show version** command.

- Check facility alarms using **show facility-alarm status** command.

- 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 ospf neighbor**

- **show ip route rip**

- **show ip mroute**
- **show cops servers**
- **show cable modem voice**
- **show cable calls**
- **show cable metering verbose**
- **show cable licenses all**
- **show inventory**

Upgrading Supervisor CPLD Firmware

Note When upgrading SUP0, run the CLI with the R0 setting while controlling SUP0. And when upgrading SUP1, run the CLI with the R1 setting.

Note This guide assumes SUP0 is in active state and SUP1 is in standby hot state at the beginning.

Perform step 1 to 4 using console connection of active SUP0:

Before you begin

Note If the supervisor SO CPLD version is lower than 1511_1401 (SUP 160) or 15111401 (SUP 250), the supervisor SIO CPLD version is lower than 1511_1301 (SUP 160) or 15111301 (SUP 250), physically power cycle the chassis when upgrading the supervisor FPGA.

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

- Cisco cBR-8 router is running with Cisco IOS XE Gibraltar 16.12.1w or later releases.
- 2 supervisors are running in the Cisco cBR-8 router and the redundancy is enabled.
- Download the file from the following Cisco.com Software Center URL:

  https://software.cisco.com/download/type.html?mdfid=286283913&flowid=73842

    - IOS XE Hardware Programmable Devices Version 16.12.1w:
      cbrsup-programmable_firmware.16.12.01w.SPA.pkg

- Console access for both supervisors are required.
- Copy the new firmware package to the cBR-8 using FTP.

```
copy ftp://<location>/cbrsup-programmable_firmware.16.12.01w.SPA.pkg bootflash:
```

```
copy ftp://<location>/cbrsup-programmable_firmware.16.12.01w.SPA.pkg stby-bootflash:
```

Step 1 Set the config register to 0.

```
configure terminal
config-register 0x0
end
write memory
```

Step 2 Run the following command to prepare for R0 upgrade.

```
upgrade hw-programmable cable R0 viper pkg_name
/bootflash/cbrsup-programmable_firmware.16.12.01w.SPA.pkg
```

On SUP 250, you will see one of the following outputs:

- It takes 10~20 minutes to upgrade. Console would hung. Please don't do any operation during the
  upgrade.
  You are upgrading Viper firmware using bootflash/cbrsup-programmable_firmware.16.12.01w.SPA.pkg
   image on SUP0, SUP0 is active.
  Upgrade from assigned pkg file bootflash/cbrsup-programmable_firmware.16.12.01w.SPA.pkg
  Using viper firmware /tmp/viper/mount/supve_viper_fpga_psirt.bin
  Size of Viper Upgrade image: 16777216 bytes
  No.of parts: 65536
  Upgrading golden image...
  65536+0 records in
  65536+0 records out
  16777216 bytes (17 MB, 16 MiB) copied, 688.873 s, 24.4 kB/s
  Upgrading primary image...
  65536+0 records in
  65536+0 records out
  16777216 bytes (17 MB, 16 MiB) copied, 675.19 s, 24.8 kB/s
  Viper upgrade clean up 0
  Upgrade successfully. Please make sure Rommon version is matched.
  Please power cycle the chassis to let the new firmware take effect

- It takes 10~20 minutes to upgrade. Console would hung. Please don't do any operation during the
  upgrade.
  You are upgrading Viper firmware using bootflash/cbrsup-programmable_firmware.16.12.01w.SPA.pkg
   image on SUP0, SUP0 is active.
  Upgrade from assigned pkg file bootflash/cbrsup-programmable_firmware.16.12.01w.SPA.pkg
  The golden viper is not compatible with assigned firmware
  /tmp/viper/mount/supve_viper_fpga_psirt.bin, no upgrade will be performed
  Viper upgrade clean up 2

  Note This output means the SUP already has the latest version it can support, skip the rest of the steps.

On SUP 160, you will see one of the following outputs:

- It takes about 10 minutes to upgrade. Console would hung. Please don't do any operation during
  the upgrade.
  You are upgrading Viper firmware using bootflash/cbrsup-programmable_firmware.16.12.01w.SPA.pkg
   image
  Upgrade from assigned pkg file /bootflash/cbrsup-programmable_firmware.16.12.01w.SPA.pkg
  Using viper firmware /tmp/viper/mount/viper_fpga.bin
  Size of Viper Upgrade image: 16777216 bytes
  No.of parts: 65536

```
65536+0 records in
65536+0 records out
Viper upgrade clean up 0
Upgrade successfully. Please make sure Rommon version is matched.
Please power cycle the chassis to let the new firmware take effect
```

- It takes 10~20 minutes to upgrade. Console would hung. Please don't do any operation during the upgrade.

```
You are upgrading Viper firmware using harddisk/cbrsup-programmable_firmware.16.12.01w.SPA.pkg
 image on SUP0, SUP0 is active.
Upgrade from assigned pkg file harddisk/cbrsup-programmable_firmware.16.12.01w.SPA.pkg
The golden viper is not compatible with assigned firmware
/tmp/viper/mount/supve_viper_fpga_psirt.bin, no upgrade will be performed
Viper upgrade clean up 2
```

Note   This output means the SUP already has the latest version it can support, skip the rest of the steps.

Note   Do not power cycle the chassis in this step.

Step 3   Run the following command to prepare for R1 upgrade.

```
upgrade hw-programmable cable R1 viper pkg_name
/bootflash/cbrsup-programmable_firmware.16.12.01w.SPA.pkg
```

You will see the similar output as the one in Step 2.

Note   Do not power cycle the chassis in this step.

Step 4   If the supervisor SO CPLD version is 15111401 and the supervisor SIO CPLD version is 15111301 on both supervisors, follow step 5 - 11 to do the upgrade. Otherwise proceed to step 12.

```
Router#show platform diag
Load for five secs: 6%/1%; one minute: 7%; five minutes: 8%
Time source is NTP, 16:05:43.546 PST Thu Feb 8 2018
Chassis type: CBR-8-CCAP-CHASS
<SNIP>
Slot: SUP0, CBR-CCAP-SUP-160G
        Physical insert detect time : 00:01:58 (1d03h ago)
        CPLD version              : 16052011
        ViperSO CPLD version      : 15111401
        ViperSIO CPLD version     : 15111301
        Rommon version            : 16.7(1r)S
        Blackbird version         : 00000112
        Raptor ESI version        : 0001003b
        Raptor MAC version        : 00010031
        SUP-PIC CPLD version      : 14071504
        SUP-DC CPLD version       : 14072207
        DTI Client FPGA version   : 00000005
        DTI Firmware version      : 00000A03
        Cortina PHY version       : 201402061607
        SUP PSOC 0 version        : v4.0.9
        SUP PSOC 1 version        : v4.0.8
        SUP PSOC 2 version        : v4.1.0_IVB
        SUP PSOC 3 version        : v4.0.6
        SUP-DC PSOC 0 version     : v4.0.8
        SUP-DC PSOC 1 version     : v4.0.5
        SUP-PIC PSOC 0 version    : V2.0.6
        SUP-PIC PSOC 1 version    : V2.0.6
<SNIP>
```

```
Slot: SUP1, CBR-CCAP-SUP-160G
        Physical insert detect time : 00:02:26 (1d03h ago)
        CPLD version                : 16052011
        ViperSO CPLD version        : 15111401
        ViperSIO CPLD version       : 15111301
        Rommon version              : 16.7(1r)S
        Blackbird version           : 00000112
        Raptor ESI version          : 0001003b
        Raptor MAC version          : 00010031
        SUP-PIC CPLD version        : 14071504
        SUP-DC CPLD version         : 14072207
        DTI Client FPGA version     : 00000005
        DTI Firmware version        : 00000A03
        Cortina PHY version         : 201402061607
        SUP PSOC 0 version          : v4.0.9
        SUP PSOC 1 version          : v4.0.8
        SUP PSOC 2 version          : v4.1.0_IVB
        SUP PSOC 3 version          : v4.0.6
        SUP-DC PSOC 0 version       : v4.0.9
        SUP-DC PSOC 1 version       : v4.0.5
        SUP-PIC PSOC 0 version      : V3.0.0
        SUP-PIC PSOC 1 version      : V3.0.0
<SNIP>
```

Step 5   Set SUP0 to ROMMON using the following command.

```
redundancy force-switchover
```

Perform the following steps 6 to 7 using console connection of current active SUP1.

Step 6   Power cycle the SUP0 to set it to ROMMON.

```
test platform hardware slot R0 oir power-cycle
```

This command will reset and re-initialize the ROMMON. The new version of the supervisor CPLD will now take effect. Verify if it matches the following new version.

SUP 160 new version: 0x19071712

SUP 250 new version: 0x190717E1

Step 7   Boot SUP0 into IOS XE using SUP0 console connection.

```
dir bootflash:
boot bootflash:cbrsup-universalk9.16.12.01w.SPA.bin
```

Wait utill SUP0 is in standby hot.

Step 8   Set SUP1 to ROMMON using the following command.

```
redundancy force-switchover
```

Perform the following steps 9 to 11 using console connection of current active SUP0.

Step 9   Power cycle the SUP1 to set it to ROMMON.

```
test platform hardware slot R1 oir power-cycle
```

This command will reset and re-initialize the ROMMON. The new version of the supervisor CPLD will now take effect. Verify if it matches the following new version.

SUP 160 new version: 0x19071712

SUP 250 new version: 0x190717E1

Step 10   Boot SUP1 into IOS XE using SUP1 console connection.

```
dir bootflash:
boot bootflash:cbrsup-universalk9.16.12.01w.SPA.bin
```

Wait utill SUP1 is in standby hot.

Step 11   Wait for the chassis to become SSO and settled down. Then go to step 16. If you skipped step 5 to 10, perform step 12 to 15.

Note   You need physical access to the chassis to power cycle the chassis.

Step 12   Reload the system by issuing **reload** command on the active SUP.

```
Router#reload
```

Step 13   Power cycle both supervisors.

Step 14   Verify if the new version matches the following on both SUPs.

SUP 160 new version: 0x19071712

SUP 250 new version: 0x190717E1

Step 15   Boot both SUP0 and SUP1 into IOS XE using SUP0 and SUP1 console.

```
dir bootflash:
boot bootflash:cbrsup-universalk9.16.12.01w.SPA.bin
```

Wait till SUP0 become standby hot.

Step 16   Once the system is up and running, perform the following checks.

• Set config register to normal boot.

```
configure terminal
config-register 0x2102
end
write memory
```

• Execute **show redundancy** command to ensure both SUPs are listed, one is active and the other is standby hot.

• Execute **show proc CPU sorted | ex 0.00** command.

• Execute **show platform diag** command.

Installing DPIC 100G Card

This chapter serves as a guideline to install a new DPIC 100G card (PID: cBR-DPIC-2X100G) in cBR-8. DPIC 100G must be working with cBR CCAP second generation Remote PHY linecard (G2 RPHY LC for short. PID: CBR-CCAP-LC-G2-R), it supports 2 working modes: 100G + 100G (link redundancy) and 4x10G + 4x10G (both active-active and link redundancy). DPIC 100G and G2 RPHY LC work with existing SUP-60G/SUP-160G/SUP-250G and is supported from Cisco IOS XE Gibraltar 16.12.1.

PIC card type	Ports on card	SFP/QSFP
DPIC-100G	2x100G	QSFP-100G-xx/QSFP-40G-xx/ QSFP-4X10G-xx
DPIC-40G	2x4x10G	SFP-10G-xx

LCHA is supported only for G2 RPHY LC + DPIC 100G with same DPIC working mode, 2x100G protects 2x100G mode, 2x4x10G protects 2x4x10G mode. Mixed mode redundancy is not supported. G2 RPHY LCHA follows the original rules.

Note Install cBR CCAP Remote PHY linecard (RPHY LC for short. PID: CBR-CCAP-LC-40G-R) continuously from top to bottom (slot 0, 1, 2, …) and install G2 RPHY LC continuously from bottom to top (slot 9, 8, 7, …). An exception is that protect linecard needs to be G2 RPHY LC installed in slot 0.

DPIC-100G 2x100G configuration note:

1. If you are using DPIC-100G 2x100G mode, please replace TenGigE interface with HundredGigE interface in RPD configuration:

```
cable rpd node_313
 identifier badb.ad13.419a
 type shelf
 core-interface Hu1/1/8
 principal
 rpd-ds 0 downstream-cable 1/0/19 profile 32
 rpd-us 0 upstream-cable 1/0/38 profile 37
 rpd-us 1 upstream-cable 1/0/39 profile 38
r-dti 6
rpd-event profile 0
rpd-55d1-us-event profile 0
```

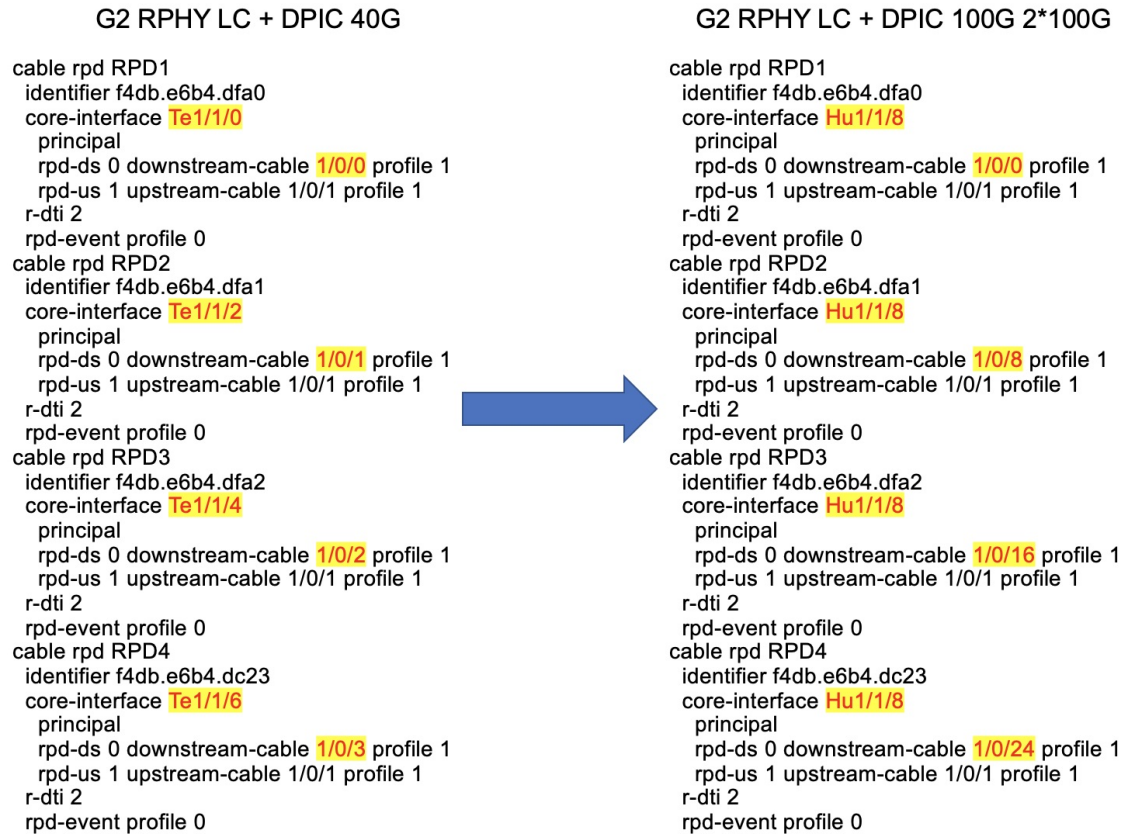2. Balance downstream controllers to different groups if you want to make full utility of the bandwidth.

For G2 RPHY LC supporting DPIC-100G 2x100G mode, 32 downstream controllers are divided into 4 XFI groups, each XFI group supports 9Gbps data bandwidth at most. The bandwidth restriction is inherited from DPIC 40G design.

Downstream controller group	XFI group
0 - 7	0
8 - 15	1
16 - 23	2

Downstream controller group	XFI group
24 - 31	3

Below is an example of the configuration comparation between G2 RPHY LC + DPIC 40G and G2 RPHY LC + DPIC 100G 2*100G mode.

G2 RPHY LC + DPIC 40G

```
cable rpd RPD1
  identifier f4db.e6b4.dfa0
  core-interface Te1/1/0
    principal
    rpd-ds 0 downstream-cable 1/0/0 profile 1
    rpd-us 1 upstream-cable 1/0/1 profile 1
  r-dti 2
  rpd-event profile 0
cable rpd RPD2
  identifier f4db.e6b4.dfa1
  core-interface Te1/1/2
    principal
    rpd-ds 0 downstream-cable 1/0/1 profile 1
    rpd-us 1 upstream-cable 1/0/1 profile 1
  r-dti 2
  rpd-event profile 0
cable rpd RPD3
  identifier f4db.e6b4.dfa2
  core-interface Te1/1/4
    principal
    rpd-ds 0 downstream-cable 1/0/2 profile 1
    rpd-us 1 upstream-cable 1/0/1 profile 1
  r-dti 2
  rpd-event profile 0
cable rpd RPD4
  identifier f4db.e6b4.dc23
  core-interface Te1/1/6
    principal
    rpd-ds 0 downstream-cable 1/0/3 profile 1
    rpd-us 1 upstream-cable 1/0/1 profile 1
  r-dti 2
  rpd-event profile 0
```

G2 RPHY LC + DPIC 100G 2*100G

```
cable rpd RPD1
  identifier f4db.e6b4.dfa0
  core-interface Hu1/1/8
    principal
    rpd-ds 0 downstream-cable 1/0/0 profile 1
    rpd-us 1 upstream-cable 1/0/1 profile 1
  r-dti 2
  rpd-event profile 0
cable rpd RPD2
  identifier f4db.e6b4.dfa1
  core-interface Hu1/1/8
    principal
    rpd-ds 0 downstream-cable 1/0/8 profile 1
    rpd-us 1 upstream-cable 1/0/1 profile 1
  r-dti 2
  rpd-event profile 0
cable rpd RPD3
  identifier f4db.e6b4.dfa2
  core-interface Hu1/1/8
    principal
    rpd-ds 0 downstream-cable 1/0/16 profile 1
    rpd-us 1 upstream-cable 1/0/1 profile 1
  r-dti 2
  rpd-event profile 0
cable rpd RPD4
  identifier f4db.e6b4.dc23
  core-interface Hu1/1/8
    principal
    rpd-ds 0 downstream-cable 1/0/24 profile 1
    rpd-us 1 upstream-cable 1/0/1 profile 1
  r-dti 2
  rpd-event profile 0
```

Pre-steps

This section contains pre-steps before installing DPIC 100G card.

1. Copy Cisco IOS XE Gibraltar 16.12.1 package to bootflash: and stby-bootflash:.

```
copy <location>/cbrsup-universalk9.16.12.01.SPA.bin bootflash:
copy <location>/cbrsup-universalk9.16.12.01.SPA.bin stby-bootflash:
```

2. Verify Cisco IOS XE Gibraltar 16.12.1 package against the md5 hash as provided in the Cisco.com Software center.

```
verify /md5 bootflash:cbrsup-universalk9.16.12.01.SPA.bin
verify /md5 stby-bootflash:cbrsup-universalk9.16.12.01.SPA.bin
```

3. Copy the special firmware programming package to harddisk: and stby-harddisk:.

```
copy <location>/cbrsup-programmable_firmware.16.12.01.SPA.pkg harddisk:
copy <location>/cbrsup-programmable_firmware.16.12.01.SPA.pkg
stby-harddisk:
```

4. Verify the special firmware programming package against the md5 hash as provided in the Cisco.com Software center.

```
verify /md5 harddisk:cbrsup-programmable_firmware.16.12.01.SPA.pkg
verify /md5 stby-harddisk:cbrsup-programmable_firmware.16.12.01.SPA.pkg
```

5. Check SUP ROMMON version with **show platform** command.

```
Slot      CPLD Version        Rommon Version
--------- ------------------- -------------------------------------
SUP0      170724E0            16.7(2r)S
SUP1      170724E0            16.7(2r)S
```

If the ROMMON version is lower than 16.7(4r)S, upgrade it following the sub steps below. Otherwise skip to the next step.

a. Upgrade SUP ROMMON.

```
Router#Upgrade rom-mon file harddisk:cbrsup-programmable_firmware.16.12.01.SPA.pkg
r0
Wait for the following output on the console:
ROMMON upgrade complete.
To make the new ROMMON permanent, you must restart the RP

Router#Upgrade rom-mon file harddisk:cbrsup-programmable_firmware.16.12.01.SPA.pkg
r1
Wait for the following output on the console:
ROMMON upgrade complete.
To make the new ROMMON permanent, you must restart the RP
```

b. Reload SUP, do not power cycle the system during the upgrade.

c. Verify if the ROMMON version is upgraded to 16.7(4r)s after boot up.

6. Copy RPD image to tftp/http server. Upgrade RPD image via SSD command on SUP.

```
cable rpd slot x ssd 3.0.0.52 http xxx.sign.SSA
```

Check all RPD upgrade successfully after RPD boot up via command **show cable rpd verison**.

Note   After upgrade, RPD may not be able to go online due to compatibility issue with current cBR image. Ignore this issue and continue upgrade.

Note	After upgrade to IOS XE 16.12.1, the command **rpd-ds** *index* **max-carrier** *value* under RPD configuration mode is not supported anymore on cBR-8 (max-carrier can be configured under DS profile configuration mode). And the power value for **rpd-ds** *index* **base-power** *value* may be changed.

Replace RPHY LC/G2 RPHY LC/DPIC 40G with G2 RPHY LC/DPIC 100G (2x4x10G mode)

Step 1 Copy the current configuration to a server and edit it manually. Replace the following highlighted part with "CBR-CCAP-LC-G2-R r-phy DPIC-G2-10GE"

Existing configuration:

```
card 0/0 cBR-CCAP-LC-40G r-phy
card 1/0 cBR-CCAP-LC-40G r-phy
card 2/0 cBR-CCAP-LC-40G r-phy
card 3/0 cBR-CCAP-LC-40G r-phy
card 4/1 sup-pic-2x100g-8x10g
card 5/1 sup-pic-2x100g-8x10g
card 6/0 cBR-CCAP-LC-40G r-phy
card 7/0 cBR-CCAP-LC-40G r-phy
card 8/0 cBR-CCAP-LC-40G r-phy
card 9/0 cBR-CCAP-LC-40G r-phy
```

New configuration:

```
card 0/0 CBR-CCAP-LC-G2-R r-phy DPIC-G2-10GE
card 1/0 CBR-CCAP-LC-G2-R r-phy DPIC-G2-10GE
card 2/0 CBR-CCAP-LC-G2-R r-phy DPIC-G2-10GE
card 3/0 CBR-CCAP-LC-G2-R r-phy DPIC-G2-10GE
card 4/1 sup-pic-2x100g-8x10g
card 5/1 sup-pic-2x100g-8x10g
card 6/0 CBR-CCAP-LC-G2-R r-phy DPIC-G2-10GE
card 7/0 CBR-CCAP-LC-G2-R r-phy DPIC-G2-10GE
card 8/0 CBR-CCAP-LC-G2-R r-phy DPIC-G2-10GE
card 9/0 CBR-CCAP-LC-G2-R r-phy DPIC-G2-10GE
```

Step 2 Copy the modified configuration file to harddisk:.

Note	G2 RPHY LC only supports US sharing ratio 1:4. If there is configuration for 1:8, switch it to 1:4 or remove it.

Step 3 Copy the modified configuration file to startup-config.

Step 4 Modify config-register 0x0, reload chassis and enter ROMMON.

Step 5 Power off the chassis.

Step 6 Loosen the hook screw on RPHY LC/G2 RPHY LC/DPIC 40G and pull out the card from chassis.

Step 7 Insert the G2 RPHY LC/DPIC 100G into chassis and tighten the hook screw.

Step 8 Insert QSFP-40G-xx or QSFP-4X10G-xx with breakout cables (MPO-4LC Duplex) into DPIC 100G interfaces.

Step 9 Connect original fibers to breakout cable with butt joint. Port mapping: the first port is mapped to TenGiga 0, 2, 4, 6, the second port is mapped to TenGiga 1, 3, 5, 7.

Note   DPIC 100G board silk print has wrong port number shown on board. The right ports number are as follows.
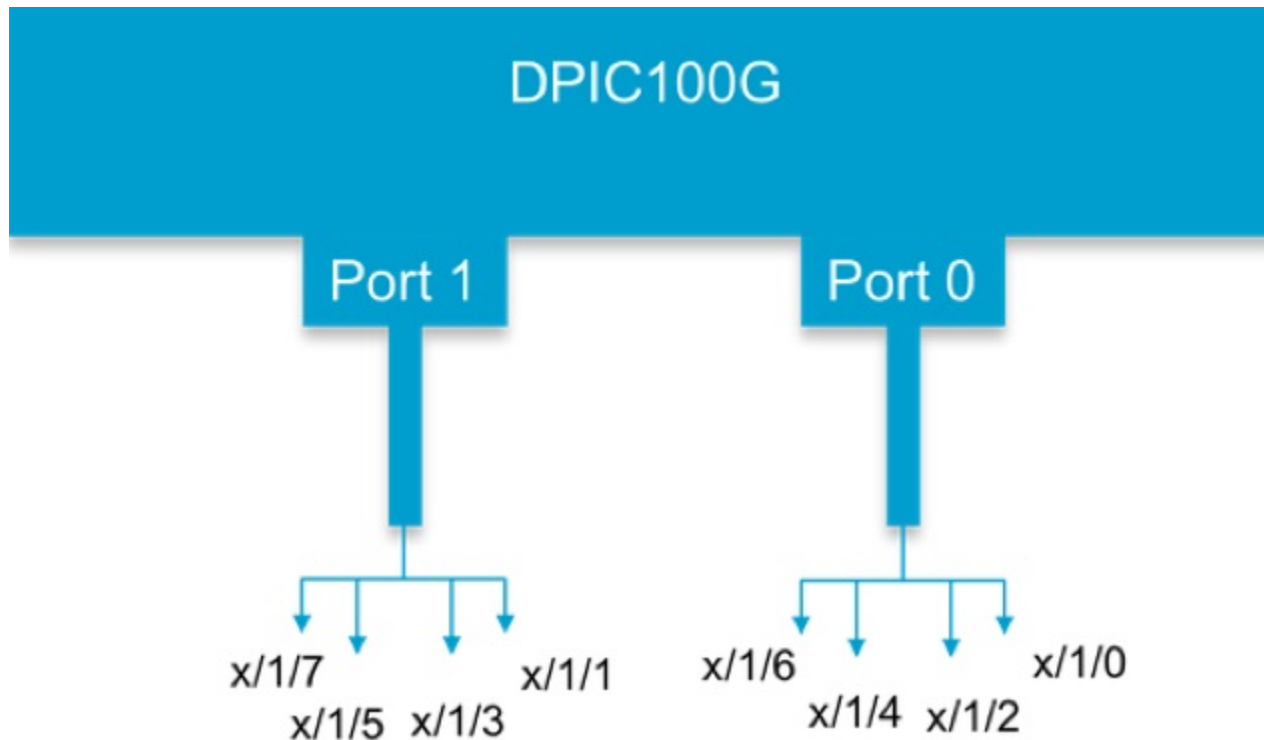
Step 10   Power on chassis and enter ROMMON.

Step 11   Boot up cBR-8 with IOS image.

Step 12   After the system enters IOS mode, verify the status of G2 RPHY LC/DPIC 100G with **show platform** command.

```
Slot        Type                State                 Insert time (ago)
---------   ------------------  --------------------  -----------------
0           CBR-CCAP-LC-G2-R    ok                    01:55:41
0/1         CBR-DPIC-2X100G     ok                    01:44:33
1           CBR-CCAP-LC-G2-R    ok                    01:55:41
1/1         CBR-DPIC-2X100G     ok                    01:44:32
2           CBR-CCAP-LC-G2-R    ok                    01:55:41
2/1         CBR-DPIC-2X100G     ok                    01:44:33
3           CBR-CCAP-LC-G2-R    ok                    01:55:41
3/1         CBR-DPIC-2X100G     ok                    01:44:32
6           CBR-CCAP-LC-G2-R    ok                    01:55:41
6/1         CBR-DPIC-2X100G     ok                    01:44:32
7           CBR-CCAP-LC-G2-R    ok                    01:55:41
7/1         CBR-DPIC-2X100G     ok                    01:44:32
8           CBR-CCAP-LC-G2-R    ok                    01:55:41
8/1         CBR-DPIC-2X100G     ok                    01:44:32
9           CBR-CCAP-LC-G2-R    ok                    01:55:41
9/1         CBR-DPIC-2X100G     ok                    01:44:32
```

Step 13   Verify if all RPDs and CMs are coming online with **show cable rpd** and **show cable modem** commands.

Step 14   (optional) Expand DS/US channels to 1024/256 by modifying cable controller profiles.

Step 15   Modify config-register = 0x2102 according customer requirement.

Step 16   Save configure to harddisk:.

Step 17   Check the system health and service.

- **show version**

- **show platform**

- **show platform diag**

- **show environment**

- **show cable modem summary total**

- **show processes cpu sorted**

- **show logging**

Replace RPHY LC/G2 RPHY LC/DPIC 40G with G2 RPHY LC/DPIC 100G (2x100G mode) via No Card Command

For this Scenario, all original configuration for RPHY LC/G2 RPHY LC + DPIC 40G card can not be applied to new G2 RPHY LC + DPIC 100G mode. Please plug-out RPHY LC/G2 RPHY LC and removed all card configuration on this slot. Then config this slot.

Step 1   Boot up chassis with IOS image. Remove linecard to be removed from redundancy group if any.

Step 2   Shutdown all mac domain interfaces for the linecard to be removed. Cisco IOS XE Gibraltar 16.12.1 has 32 MD per linecard.

Example:

```
Router(config)#interface Cable 1/0/0
Router(config-if)#shutdown
```

Step 3   Shutdown all DPIC interfaces for this linecard if any.

Example:

```
Router(config)#interface tenGigabitEthernet 1/1/0
Router(config-if)#shutdown
```

Step 4   Shutdown the linecard to be removed.

Example:

```
Router(config)#hw-module slot 1 shutdown
Router(config)#hw-module subslot 1/1 shutdown
```

Step 5   Delete slot configuration.

Example:

```
Router(config)#no card 1/0 cBR-CCAP-LC-40G r-phy
```

or

```
Router(config)#no card 1/0 CBR-CCAP-LC-G2-R r-phy
```

Step 6   Pull out linecard and corresponding DPIC.

Step 7   Configure 2x100G mode for DPIC 100G card before inserting DPIC 100G card.

Example:

```
Router(config)#card 1/0 CBR-CCAP-LC-G2-R r-phy DPIC-G2-100GE
```

Step 8   Enable the linecard.

Example:

```
Router(config)#no hw-module slot 1 shutdown
Router(config)#no hw-module subslot 1/1 shutdown
```

Step 9   Insert DPIC 100G into the slot and tighten the hook screw.

Step 10   Insert G2 RPHY LC into the slot and tighten the hook screw.

Step 11   Connect QSPF and fiber to chassis and make sure network configuration is working for 1588 server and CNR server.

Step 12   After the G2 RPHY LC boots up, verify the status with **show platform** command.

```
Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
0         CBR-CCAP-LC-G2-R    ok                    01:55:41
0/1       CBR-DPIC-2X100G     ok                    01:44:33
```

Step 13   Make sure RPD setup and configurations is correct, refer to RPD software configuration guide.

100G mode configuration example:

- DPIC interface configuration:

```
interface HundredGigE1/1/8
 vrf forwarding hu118
 ip address x.x.x.x x.x.x.x
 cdp enable
 ipv6 address x:x:x:x:x:x/x
 ipv6 enable
 ipv6 nd ra suppress all
 no shutdown
```

- RPD configuration:

```
cable rpd nodex
 identifier x.x.x
 core-interface Hu1/1/8
  principal
  rpd-ds 0 downstream-cable 1/0/0 profile 1
  rpd-us 0 upstream-cable 1/0/0 profile 1
 r-dti 1
 rpd-event profile 0
 rpd-55d1-us-event profile 0
```

- Fiber-node configuration:

```
cable fiber-node 1
 downstream Downstream-Cable 1/0/0
 upstream Upstream-Cable 1/0/0
```

- Cable interface configuration:

```
interface Cable1/0/0
 downstream Downstream-Cable 1/0/0 rf-channel 0-23
 upstream 0 Upstream-Cable 1/0/0 us-channel 0
```

```
upstream 1 Upstream-Cable 1/0/0 us-channel 1
upstream 2 Upstream-Cable 1/0/0 us-channel 2
upstream 3 Upstream-Cable 1/0/0 us-channel 3
cable upstream bonding-group 1
 upstream 0
 upstream 1
 upstream 2
 upstream 3
 attributes 80000000
cable bundle 1
```

- WB interface configuration:

```
interface Wideband-Cable1/0/0:0
 cable bundle 1
 cable rf-channels channel-list 0-7 bandwidth-percent 10
```

8x10G mode configuration example:

- DPIC interface configuration:

```
interface TenGigabitEthernet1/1/0
 vrf forwarding te110
 ip address x.x.x.x x.x.x.x
 cdp enable
 ipv6 address x:x:x:x:x:x/x
 ipv6 enable
 ipv6 nd ra suppress all
 no shutdown
```

- RPD configuration:

```
cable rpd nodex
 identifier x.x.x
 core-interface Te1/1/0
  principal
  rpd-ds 0 downstream-cable 1/0/0 profile 1
  rpd-us 0 upstream-cable 1/0/0 profile 1
 r-dti 1
 rpd-event profile 0
 rpd-55d1-us-event profile 0
```

- Fiber-node configuration:

```
cable fiber-node 1
 downstream Downstream-Cable 1/0/0
 upstream Upstream-Cable 1/0/0
```

- Cable interface configuration:

```
interface Cable1/0/0
 downstream Downstream-Cable 1/0/0 rf-channel 0-23
 upstream 0 Upstream-Cable 1/0/0 us-channel 0
 upstream 1 Upstream-Cable 1/0/0 us-channel 1
 upstream 2 Upstream-Cable 1/0/0 us-channel 2
 upstream 3 Upstream-Cable 1/0/0 us-channel 3
 cable upstream bonding-group 1
  upstream 0
  upstream 1
  upstream 2
  upstream 3
  attributes 80000000
 cable bundle 1
```

- WB interface configuration:

```
interface Wideband-Cable1/0/0:0
 cable bundle 1
 cable rf-channels channel-list 0-7 bandwidth-percent 10
```

Note   If CM is not w-online as expected. Delete CM with command **clear cable modem cable X/X/X all delete**.

Step 14   Configure LC to redundancy group if needed.

Step 15   Save configure to harddisk: and startup-config.

Step 16   Check the system health and service.

- **show version**

- **show platform**

- **show run | in card**

- **show cable rpd**

- **show ip interface brief | in X/0/**

- **show ip interface brief | in X/1/**

- **show platform diag**

- **show environment**

- **show cable modem summary total**

- **show processes cpu sorted**

- **show logging**

Install G2 RPHY LC/DPIC 100G in Empty Slot

Note   G2 RPHY LC/DPIC 100G can only run with IOS image, otherwise it may cause unexpected consequence, such as SUP crash.

Step 1   Boot up chassis with IOS image. Remove linecard to be removed from redundancy group if any.

Step 2   Check if the card configuration exists for the target blank slot (slot 1 in the example).

Example:

```
Router#show run | s card 1
card 1/0 cBR-CCAP-LC-40G r-phy
```

If there is card configuration, proceed to next step. Otherwise skip to Step 6.

Step 3   Shutdown all mac domain interfaces for this linecard. Cisco IOS XE Gibraltar 16.12.1 has 32 MD per linecard.

Example:

```
Router(config)#interface Cable 1/0/0
Router(config-if)#shutdown
```

Step 4 Shutdown all DPIC interfaces for this linecard if any.

Example:

```
Router(config)#interface tenGigabitEthernet 1/1/0
Router(config-if)#shutdown
```

Step 5 Delete slot configuration of the target blank slot.

Example:

```
Router(config)#no card 1/0 cBR-CCAP-LC-40G r-phy
```

Step 6 Configure 2x100G or 2x4x10G mode for DPIC 100G before install DPIC card.

Example:

```
Router(config)#card 1/0 CBR-CCAP-LC-G2-R r-phy DPIC-G2-100GE
```

or

```
Router(config)#card 1/0 CBR-CCAP-LC-G2-R r-phy DPIC-G2-10GE
```

Step 7 Insert DPIC 100G into the slot and tighten the hook screw.

Step 8 Insert G2 RPHY LC into the slot and tighten the hook screw.

Step 9 Connect QSPF and fiber to chassis and make sure network configuration is working for 1588 server and CNR server.

Step 10 After the G2 RPHY LC boots up, verify the status with **show platform** command.

```
Slot      Type                State                Insert time (ago)
--------- ------------------- -------------------- -----------------
0         CBR-CCAP-LC-G2-R    ok                   01:55:41
0/1       CBR-DPIC-2X100G     ok                   01:44:33
```

Step 11 Make sure RPD setup and configurations is correct, refer to RPD software configuration guide.

100G mode configuration example:

- DPIC interface configuration:

```
interface HundredGigE1/1/8
 vrf forwarding hu118
 ip address x.x.x.x x.x.x.x
 cdp enable
 ipv6 address x:x:x:x:x:x/x
 ipv6 enable
 ipv6 nd ra suppress all
 no shutdown
```

- RPD configuration:

```
cable rpd nodex
 identifier x.x.x
 core-interface Hu1/1/8
  principal
  rpd-ds 0 downstream-cable 1/0/0 profile 1
  rpd-us 0 upstream-cable 1/0/0 profile 1
 r-dti 1
```

```
  rpd-event profile 0
  rpd-55d1-us-event profile 0
```

- Fiber-node configuration:

```
cable fiber-node 1
 downstream Downstream-Cable 1/0/0
 upstream Upstream-Cable 1/0/0
```

- Cable interface configuration:

```
interface Cable1/0/0
 downstream Downstream-Cable 1/0/0 rf-channel 0-23
 upstream 0 Upstream-Cable 1/0/0 us-channel 0
 upstream 1 Upstream-Cable 1/0/0 us-channel 1
 upstream 2 Upstream-Cable 1/0/0 us-channel 2
 upstream 3 Upstream-Cable 1/0/0 us-channel 3
 cable upstream bonding-group 1
  upstream 0
  upstream 1
  upstream 2
  upstream 3
  attributes 80000000
 cable bundle 1
```

- WB interface configuration:

```
interface Wideband-Cable1/0/0:0
 cable bundle 1
 cable rf-channels channel-list 0-7 bandwidth-percent 10
```

8x10G mode configuration example:

- DPIC interface configuration:

```
interface TenGigabitEthernet1/1/0
 vrf forwarding te110
 ip address x.x.x.x x.x.x.x
 cdp enable
 ipv6 address x:x:x:x:x:x/x
 ipv6 enable
 ipv6 nd ra suppress all
 no shutdown
```

- RPD configuration:

```
cable rpd nodex
 identifier x.x.x
 core-interface Te1/1/0
  principal
  rpd-ds 0 downstream-cable 1/0/0 profile 1
  rpd-us 0 upstream-cable 1/0/0 profile 1
 r-dti 1
 rpd-event profile 0
 rpd-55d1-us-event profile 0
```

- Fiber-node configuration:

```
cable fiber-node 1
 downstream Downstream-Cable 1/0/0
 upstream Upstream-Cable 1/0/0
```

- Cable interface configuration:

```
interface Cable1/0/0
 downstream Downstream-Cable 1/0/0 rf-channel 0-23
```

```
upstream 0 Upstream-Cable 1/0/0 us-channel 0
upstream 1 Upstream-Cable 1/0/0 us-channel 1
upstream 2 Upstream-Cable 1/0/0 us-channel 2
upstream 3 Upstream-Cable 1/0/0 us-channel 3
cable upstream bonding-group 1
 upstream 0
 upstream 1
 upstream 2
 upstream 3
 attributes 80000000
cable bundle 1
```

- WB interface configuration:

```
interface Wideband-Cable1/0/0:0
 cable bundle 1
 cable rf-channels channel-list 0-7 bandwidth-percent 10
```

Note   If CM is not w-online as expected. Delete CM with command **clear cable modem cable X/X/X all delete**.

Step 12   Configure LC to redundancy group if needed.

Step 13   Save configure to harddisk: and startup-config.

Step 14   Check the system health and service.

- **show version**

- **show platform**

- **show run | in card**

- **show cable rpd**

- **show ip interface brief | in X/0/**

- **show ip interface brief | in X/1/**

- **show platform diag**

- **show environment**

- **show cable modem summary total**

- **show processes cpu sorted**

- **show logging**

Replace RPHY LC/G2 RPHY LC/DPIC 40G with G2 RPHY LC/DPIC 100G (2x100G mode) by Modifying Configuration File

Step 1   Copy the current configuration to a server and edit it manually. Replace the card type with "CBR-CCAP-LC-G2-R r-phy DPIC-G2-100GE". Modify other necessary configuration, including RPD configuration and DPIC configuration. Refer to Step 12.

Step 2   Copy the modified configuration file to harddisk:.

Note	G2 RPHY LC only supports US sharing ratio 1:4. If there is configuration for 1:8, switch it to 1:4 or remove it.

Step 3   Copy the modified configuration file to startup-config.

Step 4   Modify config-register 0x0, reload chassis and enter ROMMON.

Step 5   Power off the chassis.

Step 6   Loosen the hook screw on RPHY LC/G2 RPHY LC/DPIC 40G and pull out the card from chassis.

Step 7   Insert the G2 RPHY LC/DPIC 100G into chassis and tighten the hook screw.

Step 8   Connect QSPF and fiber to chassis and make sure network configuration is working for 1588 server and CNR server.

Step 9   Power on the chassis and enter ROMMON.

Step 10   Boot up cBR-8 chassis with IOS image.

Step 11   After the system enters IOS mode, verify the status of G2 RPHY LC/DPIC 100G with **show platform** command.

```
Slot      Type               State                 Insert time (ago)
--------- ------------------ --------------------- ----------------
0         CBR-CCAP-LC-G2-R   ok                    01:55:41
0/1       CBR-DPIC-2X100G    ok                    01:44:33
1         CBR-CCAP-LC-G2-R   ok                    01:55:41
1/1       CBR-DPIC-2X100G    ok                    01:44:32
2         CBR-CCAP-LC-G2-R   ok                    01:55:41
2/1       CBR-DPIC-2X100G    ok                    01:44:33
3         CBR-CCAP-LC-G2-R   ok                    01:55:41
3/1       CBR-DPIC-2X100G    ok                    01:44:32
6         CBR-CCAP-LC-G2-R   ok                    01:55:41
6/1       CBR-DPIC-2X100G    ok                    01:44:32
7         CBR-CCAP-LC-G2-R   ok                    01:55:41
7/1       CBR-DPIC-2X100G    ok                    01:44:32
8         CBR-CCAP-LC-G2-R   ok                    01:55:41
8/1       CBR-DPIC-2X100G    ok                    01:44:32
9         CBR-CCAP-LC-G2-R   ok                    01:55:41
9/1       CBR-DPIC-2X100G    ok                    01:44:32
```

Step 12   Verify if all RPDs and CMs are coming online with **show cable rpd** and **show cable modem** commands.

DPIC 100G working mode switchover

DPIC 100G card supports 2x100GE and 2x4x10GE working mode. To switchover the working mode, remove existing linecard configuration first, then configure the new working mode. Both linecard and DPIC card reload are needed.

Method 1: Re-configure CMTS without Reload

Step 1   Boot up chassis with IOS image. Remove linecard to be removed from redundancy group if any.

Step 2   Shutdown all mac domain interfaces for the target linecard.

Example:

```
Router(config)#interface Cable 1/0/0
Router(config-if)#shutdown
```

Step 3   Shutdown all DPIC interfaces for this linecard if any.

Example:

```
Router(config)#interface tenGigabitEthernet 1/1/0
Router(config-if)#shutdown
```

Step 4   Shutdown the linecard and DPIC card.

Example:

```
Router(config)#hw-module slot 1 shutdown
Router(config)#hw-module subslot 1/1 shutdown
```

Step 5   Delete the existing linecard/DPIC card configuration.

Example:

```
Router(config)#no card 1/0 CBR-CCAP-LC-G2-R r-phy DPIC-G2-100GE
```

or

```
Router(config)#no card 1/0 CBR-CCAP-LC-G2-R r-phy DPIC-G2-10GE
```

Step 6   Change SFP/QSFP module to match the target working mode and make sure the network is working.

Step 7   Configure linecard/DPIC card to expected working mode.

Example:

```
Router(config)#card 1/0 CBR-CCAP-LC-G2-R r-phy DPIC-G2-10GE
```

or

```
Router(config)#card 1/0 CBR-CCAP-LC-G2-R r-phy DPIC-G2-100GE
```

Step 8   Enable the linecard/DPIC card.

Example:

```
Router(config)#no hw-module slot 1 shutdown
Router(config)#no hw-module subslot 1/1 shutdown
```

Step 9   After the G2 RPHY LC boots up, verify the status with **show platform** command.

```
Slot       Type                 State                 Insert time (ago)
---------  -------------------  --------------------  -----------------
1          CBR-CCAP-LC-G2-R     ok                    04:06:50
1/1        CBR-DPIC-2X100G      ok                    04:00:40
```

Step 10   Make sure RPD setup and configurations is correct, refer to RPD software configuration guide.

100G mode configuration example:

  • DPIC interface configuration:

```
interface HundredGigE1/1/8
 vrf forwarding hu118
 ip address x.x.x.x x.x.x.x
 cdp enable
 ipv6 address x:x:x:x:x:x/x
 ipv6 enable
 ipv6 nd ra suppress all
 no shutdown
```

- RPD configuration:

```
cable rpd nodex
 identifier x.x.x
 core-interface Hu1/1/8
  principal
  rpd-ds 0 downstream-cable 1/0/0 profile 1
  rpd-us 0 upstream-cable 1/0/0 profile 1
 r-dti 1
 rpd-event profile 0
 rpd-55d1-us-event profile 0
```

- Fiber-node configuration:

```
cable fiber-node 1
 downstream Downstream-Cable 1/0/0
 upstream Upstream-Cable 1/0/0
```

- Cable interface configuration:

```
interface Cable1/0/0
 downstream Downstream-Cable 1/0/0 rf-channel 0-23
 upstream 0 Upstream-Cable 1/0/0 us-channel 0
 upstream 1 Upstream-Cable 1/0/0 us-channel 1
 upstream 2 Upstream-Cable 1/0/0 us-channel 2
 upstream 3 Upstream-Cable 1/0/0 us-channel 3
 cable upstream bonding-group 1
  upstream 0
  upstream 1
  upstream 2
  upstream 3
  attributes 80000000
 cable bundle 1
```

- WB interface configuration:

```
interface Wideband-Cable1/0/0:0
 cable bundle 1
 cable rf-channels channel-list 0-7 bandwidth-percent 10
```

8x10G mode configuration example:

- DPIC interface configuration:

```
interface TenGigabitEthernet1/1/0
 vrf forwarding te110
 ip address x.x.x.x x.x.x.x
 cdp enable
 ipv6 address x:x:x:x:x:x/x
 ipv6 enable
 ipv6 nd ra suppress all
 no shutdown
```

- RPD configuration:

```
cable rpd nodex
 identifier x.x.x
 core-interface Te1/1/0
  principal
  rpd-ds 0 downstream-cable 1/0/0 profile 1
  rpd-us 0 upstream-cable 1/0/0 profile 1
 r-dti 1
 rpd-event profile 0
 rpd-55d1-us-event profile 0
```

- Fiber-node configuration:

```
cable fiber-node 1
 downstream Downstream-Cable 1/0/0
 upstream Upstream-Cable 1/0/0
```

• Cable interface configuration:

```
interface Cable1/0/0
 downstream Downstream-Cable 1/0/0 rf-channel 0-23
 upstream 0 Upstream-Cable 1/0/0 us-channel 0
 upstream 1 Upstream-Cable 1/0/0 us-channel 1
 upstream 2 Upstream-Cable 1/0/0 us-channel 2
 upstream 3 Upstream-Cable 1/0/0 us-channel 3
 cable upstream bonding-group 1
  upstream 0
  upstream 1
  upstream 2
  upstream 3
  attributes 80000000
 cable bundle 1
```

• WB interface configuration:

```
interface Wideband-Cable1/0/0:0
 cable bundle 1
 cable rf-channels channel-list 0-7 bandwidth-percent 10
```

Note   If CM is not w-online as expected. Delete CM with command **clear cable modem cable X/X/X all delete**.

Step 11   Configure LC to redundancy group if needed.

Step 12   Save configure to harddisk: and startup-config.

Step 13   Check the system health and service.

• **show version**

• **show platform**

• **show run | in card**

• **show cable rpd**

• **show ip interface brief | in X/0/**

• **show ip interface brief | in X/1/**

• **show platform diag**

• **show environment**

• **show cable modem summary total**

• **show processes cpu sorted**

• **show logging**

Method 2: Reload CMTS with Modified Configuration File

Step 1   Save existing running-config to startup-config.

Step 2 Edit startup-config to match the new card/interfaces.

Example:

Old configuration:

```
card 1/0 CBR-CCAP-LC-G2-R r-phy DPIC-G2-10GE

interface TenGigabitEthernet1/1/0
 vrf forwarding te118
 ip address 120.104.2.129 255.255.255.128
 cdp enable
 ipv6 address 2001:120:104:2:129::1/80
 ipv6 enable
 ipv6 nd ra suppress all

interface HundredGigE1/1/8
 no ip address
 shutdown

cable rpd node2
 core-interface Te1/1/0
```

New configuration:

```
card 1/0 CBR-CCAP-LC-G2-R r-phy DPIC-G2-100GE

interface TenGigabitEthernet1/1/0
 no ip address
 shutdown

interface HundredGigE1/1/8
 vrf forwarding te118
 ip address 120.104.2.129 255.255.255.128
 cdp enable
 ipv6 address 2001:120:104:2:129::1/80
 ipv6 enable
 ipv6 nd ra suppress all

cable rpd node2
 core-interface Hu1/1/8
```

Step 3 Reboot the chassis with modified startup-config.

Note This method will print out harmless traceback information that caused by different mode configuration in **.board.conf** and **startup-config**.

Step 4 Change SFP/QSFP module to match the target working mode and make sure the network is working.

G2 RPHY LC U-boot and CPLD Upgrade

The latest G2 RPHY LC U-boot (Rommon) version is 2013.07.14 k2.4, CPLD (daybreak) version is 00000033. If the current version is lower than the latest version, upgrade following the steps below.

Upgrade U-boot

Step 1   Upgrade the Uboot using the following command:

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

Note   This CLI takes about 1 minutes to complete, **DO NOT** powercycle or OIR G2 RPHY LC when the CLI is executing.

Example:

`upgrade hw-programmable cable 1 rommon pkg_name /harddisk/cbrsup-programmable_firmware.16.12.01.SPA.pkg`

```
UBOOT:
  FILE    : /tmp/fpd/mount/uboot-kobol.bin
  VERSION : U-Boot 2013.07.14 k2.4
  BYTES   : 2097152
  Upgrade Field Region: SUCCESS! Please reload the card to let the new firmware take effect.
```

Step 2   Reload G2 RPHY LC and check U-boot version with **show platform**.

Example:

```
Router#hw-module slot 1 reload
Proceed with reload of module? [confirm] y

Router#show platform
…….

Slot      CPLD Version        Rommon Version
--------- ------------------- --------------------------------------
0         0000007F            2013.07.14 k2.0
1         0000007F            2013.07.14 k2.4
```

Upgrade CPLD

Step 1   Upgrade the CPLD using the following command:

`upgrade hw-programmable cable` *`slot-id`* **`daybreak pkg_name`** *`firmware-name`*

Note   This CLI takes about 1 minutes to complete, **DO NOT** powercycle or OIR G2 RPHY LC when the CLI is executing.

Example:

`upgrade hw-programmable cable 1 daybreak pkg_name`
`/harddisk/cbrsup-programmable_firmware.16.12.01.SPA.pkg`

Step 2   Post upgrade the CPLD using the following command:

`upgrade hw-programmable cable` *`active-sup`* **`daybreak post-upgrade slot`** *`slot-id`*

Note   This CLI takes about 1 minutes to complete, **DO NOT** powercycle or OIR G2 RPHY LC when the CLI is executing.

Example:

```
upgrade hw-programmable cable r0 daybreak post-upgrade slot 1
The upgrade will take about 3 minutes, please DON'T power cycle the chassis during this period.
LC will be power up after the upgrade automatically...
```

Step 3   Wait for about 5 minutes, the linecard will reboot automatically once the command is complete. If the linecard does not reboot automatically, reload the linecard with below command:

Example:

```
Router#hw-module slot 1 reload
Proceed with reload of module? [confirm] y
```

Step 4   Check upgraded CPLD version with **show platform**.

Example:

```
Router#show platform
......

Slot      CPLD Version        Rommon Version
--------- ------------------- -------------------------------------
1         00000033            2013.07.14 k2.4
SUP0      170724E0            16.7(2r)S
SUP1      170724E0            16.7(2r)S
```

Upgrade DPIC 100G FPD

If you find **?.?** in **show hw-module all fpd** output, upgrade the DPIC 100G FPD using the following steps.

Step 1   Upgrade the DPIC 100G FPD using the following command:

upgrade hw-module subslot *slot-id***/1 fpd bundled reload**

Example:

```
Router#upgrade hw-module subslot 1/1 fpd bundled reload
% The following FPD will be upgraded for CBR-DPIC-2X100G (H/W ver = 2.0) in subslot 1/1:

  ================== =========== =========== ============
  Field Programmable  Current     Upgrade     Estimated
  Device: "ID-Name"   Version     Version     Upgrade Time
  ================== =========== =========== ============
  61-CBR DIGI G2 PIC    ?.?         2.5         00:05:00
  ================== =========== =========== ============

% NOTES:
  - Use 'show upgrade fpd progress' command to view the progress of the FPD
    upgrade.
  - The target card will be automatically reloaded after the upgrade
    operation. This reload will interrupt normal operation of the card. If
    necessary, ensure that appropriate actions have been taken to redirect
    card traffic before starting the FPD upgrade.

% Are you sure that you want to perform this operation? [no]: yes
```

```
% Initiating the upgrade operation on the target card ...
  (Use "show upgrade fpd progress" command to see upgrade progress)
```

Step 2 Check upgrade status with **show upgrade fpd progress**.

Example:

```
Router#show upgrade fpd progress

Load for five secs: 82%/4%; one minute: 93%; five minutes: 89%
Time source is NTP, *18:18:58.268 CST Mon May 6 2019


FPD Image Upgrade Progress Table:

 ==== ================== ====================================================
                                             Approx.
                         Field Programmable   Time      Elapsed
 Slot Card Type          Device : "ID-Name"   Needed     Time     State
 ==== ================== ================== ========== ========== ===========
  1/1 CBR-DPIC-2X100G    61-CBR DIGI G2 PIC  00:05:00   00:00:58  Updating...
 ==== ================== ====================================================
```

Step 3 After the upgrade is complete, **show hw-module all fpd** output will show correct version.