



## **Upgrading the Cisco cBR Series Converged Broadband Routers for Cisco IOS XE Everest 16.5.1**

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## CONTENTS

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### CHAPTER 1

#### Upgrading the Cisco cBR-8 Router System 1

Upgrading Cisco cBR-8 Router to Cisco IOS-XE Everest 16.5.1 1

Upgrading Manually 2

Upgrading with Ansible 7

---

### CHAPTER 2

#### Installing the Patch on Cisco cBR-8 Router System 11

Installing the Patch for Cisco IOS-XE Everest 16.5.1 11





# CHAPTER 1

## Upgrading the Cisco cBR-8 Router System

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

- [Upgrading Cisco cBR-8 Router to Cisco IOS-XE Everest 16.5.1, on page 1](#)

## Upgrading Cisco cBR-8 Router to Cisco IOS-XE Everest 16.5.1

It is mandatory to upgrade Supervisor ROMMON/Line card CPLD firmwares version to make system working with Cisco IOS-XE Everest 16.5.1 image.



**Note** System must running Cisco IOS-XE 3.18.1SP and later releases with all Superviors and Line cards in active state. If the system release is earlier than Cisco IOS-XE 3.18.1SP, the system must be upgraded to Cisco IOS-XE 3.18.1SP release before performing the upgrade described in this procedure. See [https://www.cisco.com/c/en/us/td/docs/cable/cbr/upgrade/guide/b\\_cbr\\_upgrade-3-18s/b\\_cbr\\_upgrade\\_software.html](https://www.cisco.com/c/en/us/td/docs/cable/cbr/upgrade/guide/b_cbr_upgrade-3-18s/b_cbr_upgrade_software.html).

The following table encompasses all versions that customers are required to update to support 16.5.1. All other firmware versions are either not upgradable by the customer, or not required to be upgraded for 16.5.1 support. Use the commands in the tables to verify the firmware versions.

**Table 1: Firmware Versions**

Internal Name	Component Name	Correct Version	Command
Supervisor CPLD	CBR-CCAP-SUP-160G Rommon CPLD	16052011	<b>show platform</b>
Supervisor ROMMON	CBR-CCAP-SUP-160G Rommon	16.5(1r)S	<b>show platform</b>
Linecard CPLD	CBR-CCAP-LC-40G CPLD	00000025	<b>show platform</b>
Linecard Uboot	CBR-CCAP-LC-40G Rommon	2011.03.18	<b>show platform</b>

Linecard PSOC	CBR-CCAP-LC-40G PSOC	4.6	<b>show platform diag</b>
Docsis 3.0 downstream module PSOC	CBR-CCAP-LC-40G Gemini1 PSOC	3.9	<b>show platform diag</b>
Docsis 3.0 downstream module CPLD	CBR-CCAP-LC-40G Gemini1 CPLD	0.7	<b>show platform diag</b>
Docsis 3.0 downstream module Micro	CBR-CCAP-LC-40G Gemini1 Micro	1.E	<b>show platform diag</b>
Docsis 3.0 downstream module FPGA	CBR-CCAP-LC-40G Gemini1 Apollo	2.F	<b>show platform diag</b>
Docsis 3.1 downstream module PSOC	CBR-CCAP-LC-40G Gemini2 PSOC	4.4	<b>show platform diag</b>
Docsis 3.1 downstream module CPLD	CBR-CCAP-LC-40G Gemini2 CPLD	0.7	<b>show platform diag</b>
Docsis 3.1 downstream module Micro	CBR-CCAP-LC-40G Gemini2 Micro	3.18	<b>show platform diag</b>
Docsis 3.1 downstream module FPGA	CBR-CCAP-LC-40G Gemini2 Apollo	4.4148	<b>show platform diag</b>

## Upgrading Manually

### Before you begin

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

- The firmware versions are not lower than the ones listed in [Firmware versions](#) table. Otherwise upgrade the firmware versions, see [Upgrading the Cisco cBR-8 Router Firmware](#).
- 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 16.5.1: **cbrsup-universalk9.16.05.01.SPA.bin**
- IOS XE Hardware Programmable Devices Version 16.5.1:  
**cbrsup-programmable\_firmware.16.05.01\_compat\_with\_3.18SP.SSA.pkg**

- Console access for both SUPs are required.
- Ability to power cycle the chassis. Power cycle chassis is required to upgrade Supervisor CPLD.



**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 Everest 16.5.1 package to bootflash: and stby-bootflash:.

```
copy <location>/cbrsup-universalk9.16.05.01.SPA.bin bootflash:
copy <location>/cbrsup-universalk9.16.05.01.SPA.bin stby-bootflash:
```

**Step 2** Verify Cisco IOS-XE Everest 16.5.1 package against the md5 hash as provided in the Cisco.com Software center.

```
verify /md5 bootflash:cbrsup-universalk9.16.05.01.SPA.bin
verify /md5 stby-bootflash:cbrsup-universalk9.16.05.01.SPA.bin
```

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

```
copy <location>/cbrsup-programmable_firmware.16.05.01_compat_with_3.18SP.SSA.pkg
harddisk:
copy <location>/cbrsup-programmable_firmware.16.05.01_compat_with_3.18SP.SSA.pkg
stby-harddisk:
```

**Step 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.16.05.01_compat_with_3.18SP.SSA.pkg
verify /md5
stby-harddisk:cbrsup-programmable_firmware.16.05.01_compat_with_3.18SP.SSA.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** Configure the chassis to boot the system with Cisco IOS-XE Everest 16.5.1 image.

```
Configure terminal
no boot system
boot system bootflash:cbrsup-universalk9.16.05.1.SPA.bin
end
write mem
```

**Step 7** Remove the secondary line card from line card redundancy group if redundancy is configured.

```
Configure terminal
```

```

redundancy
 linecard-group 0 internal-switch
 no member slot 0 secondary
end

```

**Step 8** Configure config-register to manual boot.

```

Configure terminal
config-register 0x0
end

```

**Step 9** Check Supervisor 0/1 CPLD version via **show platform**. If it is not the latest version 16052011, upgrade Supervisor CPLD using the command shown below. Or skip this step.

```

upgrade hw-programmable cable r0 viper pkg_name
/harddisk/cbrsup-programmable_firmware.16.05.01_compat_with_3.18SP.SSA.pkg
upgrade hw-programmable cable r1 viper pkg_name
/harddisk/cbrsup-programmable_firmware.16.05.01_compat_with_3.18SP.SSA.pkg

```

**Step 10** Check Line card CPLD version via **show platform**. If it is not the latest version 00000025, upgrade Line card CPLD following the sub steps below. Or 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
Daggit 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.16.05.01_compat_with_3.18SP.SSA.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 changed to 00000025:



Example:

```
cBR8#show platform
.....
Slot      CPLD Version      Rommon Version
-----
0          00000025             2011.03.13
...
SUP0      15091511             15.5(2r)S1
SUP1      15091511             15.5(2r)S1
```

- 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 11

Check Docsis 3.0 downstream module and Docsis 3.1 downstream module FPGA and Micro versions via **show platform diag**. If it is not the latest version (1.E and 2.F for Docsis 3.0 downstream module Micro and FPGA, 3.18 and 4.4148 for Docsis 3.1 downstream module Micro and FPGA), upgrade them following the sub steps below. Or skip this step.

- a) Run the below command for each installed line card that requires Micro upgrade.

Example:

```
Router# upgrade hw-programmable cable 0 dsphy micro pkg_name
/harddisk/cbrsup-programmable_firmware.16.05.01_compat_with_3.18SP.SSA.pkg
Please wait - firmware download may take up to 5 minutes to complete.
```

- b) Wait for log message similar to the following for each line card.

Example:

```
CLC0: cdman: Suggest reload the line card for new FW to take effect using CLI: hw slot <slot-id>
reload
```

- c) Reload the line card.

```
hw slot 0 reload
```

- d) Run the below command for each installed line card that requires FPGA upgrade.

Example:

```
Router# upgrade hw-programmable cable 0 dsphy fpga pkg_name
/harddisk/cbrsup-programmable_firmware.16.05.01_compat_with_3.18SP.SSA.pkg
Please wait - firmware download may take up to 5 minutes to complete.
```

- e) Wait for log message similar to the following for each line card.

Example:

```
CLC0: cdman: Suggest reload the line card for new FW to take effect using CLI: hw slot 0 reload
```

**Note** To reduce the time taken for upgrade, reloading line card in this step is combined with the powercycle of the chassis. So it is not necessary to execute the command **hw slot x reload** for each line card x in this step.

**Step 12** Reload the system by typing **reload** on the active SUP and answering **no** to not save the configuration.

```
cBR8#reload
System configuration has been modified. Save? [yes/no]: no
Proceed with reload? [confirm]
cBR8#
```

**Step 13** From ROMMON issue the following command on both SUPs.

```
rommon 1 > confreg 0x2102
rommon 2 > sync
rommon 3 >
```

**Step 14** Power cycle chassis, wait for both SUPs to auto boot to 16.5.1 image.

```
rommon 1>
Initializing Hardware ...

?

System Bootstrap, Version 16.5(1r)S, RELEASE SOFTWARE
Copyright (c) 1994-2016 by cisco Systems, Inc.

Current image running: Boot ROM1

Last reset cause: PowerOn

Viper version register: 0x16052011
Set Chassis Type to 13RU
Cisco cBR-8 platform with 50331648 Kbytes of main memory
```

**Step 15** After cBR8 bootup, verify the supervisor CPLD, linecard CPLD and downstream module FGPA and Micro are successfully upgraded.

**Step 16** Check system status after upgrade. Compare the information against the system status prior to upgrade. For the commands to use to check the status, see the **show** commands at the end of this section.

---

### 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 with Ansible

### Before you begin

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

1. Prepare Ansible Server, operating system can be Linux/Windows/Mac, with docker service pre-installed.

For docker installation guide, please check following link:

<https://docs.docker.com/engine/installation/>

2. Check if the chassis supports AAA or local authentication with username & password. If not configured, use following CLI to enable local authentication, for example:

```
Cbr8#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
cBR8(config)#username cisco privilege 15 password 0 cisco
cBR8(config)#enable secret cisco
cBR8(config)#line vty 0 15
cBR8(config)#login local
cBR8(config)#exec-timeout 0 0
```

```
cBR8(config)#session-timeout 0
cBR8(config)#exit
```

3. If SSH is not enabled, use following CLI to enable SSH on cBR8, skip the domain name configuration if already configured.

```
cBR8(config)# ip domain-name domain.com
cBR8(config)#crypto key generate rsa
The name for the keys will be: cbr8.domain.com
Choose the size of the key modulus in the range of 360 to 4096 for your
General Purpose Keys. Choosing a key modulus greater than 512 may take
a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 0 seconds)

cBR8(config)#end
cBR8#copy running-config startup-config
cBR8#show ip ssh
SSH Enabled - version 1.99
```

4. Verify if the Ansible server can access cBR-8 using SSH.

```
[ansible@server ~]$ ssh cisco@100.0.0.1
The authenticity of host '100.0.0.1 (100.0.0.1)' can't be established.
RSA key fingerprint is c3:be:8f:cf:76:f4:31:4b:80:d8:2e:f0:76:6d:ff:bf.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '100.0.0.1' (RSA) to the list of known hosts.
Password:
cBR8#
```

5. Download three files from the following Cisco.com Software Center URL:

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

- IOS XE Software Version 16.5.1: **cbrsup-universalk9.16.05.01.SPA.bin**
- IOS XE Hardware Programmable Devices Version 16.5.1:  
**cbrsup-programmable\_firmware.16.05.01\_compat\_with\_3.18SP.SSA.pkg**
- **cbr-8\_upgrade\_ansible\_16.5.1.tar**

6. Copy **cbrsup-universalk9.16.05.01.SPA.bin** and **cbrsup-programmable\_firmware.16.05.01\_compat\_with\_3.18SP.SSA.pkg** to TFTP/FTP/SCP server or usb disk. Upload **cbr-8\_upgrade\_ansible\_16.5.1.tar** to Ansible server.
7. Console access for both SUPs are required.
8. Ability to power cycle the chassis. Power cycle chassis is required to upgrade Supervisor CPLD.

---

**Step 1** Run following CLI on the Ansible server to create the docker image.

```
docker import cbr-8_upgrade_ansible_16.5.1.tar ansible_mop
```

**Step 2** Start docker container with the image and enter the container shell.

```
docker run -it --name=mop ansible_mop /bin/bash
```

**Step 3** Change current directory to the playbook folder for this software and firmware upgrade.

```
cd /opt/cbr-8_upgrade_ansible_16.5.1
```

**Step 4** Modify hosts file to add target cBR-8 ip addresses, can be multiple lines if customer wants to upgrade firmware on multiple cBR8 routers simultaneously, sample file is as below:

```
[cbr]
100.110.110.110
100.185.185.185
```

**Step 5** Modify secrets.yaml file, change the username/password/enable password to reflect the real username/password/enable configuration for target cBR. If no enable password is set, just keep the sample **cisco** for **auth\_pass**.

```
creds:
  username: cisco
  password: cisco
  auth_pass: cisco
```

**Step 6** Modify upgrade\_vars.yaml file to indicate the firmware package name, ios image name and source (Optional if the package files are already on cbr-8 harddisk:).

```
file_info:
  image_name: cbrsup-universalk9.16.05.01.SPA.bin
  pkg_name: cbrsup-programmable_firmware.16.05.01_compat_with_3.18SP.SSA.pkg
  #if the pkg file in the TB, just modify dst_dir to the pkg location
  #the two examples shows the usage
  #example1
  #src_dir: "ftp://username:password@20.11.0.42:~/ "
  #example2
  #src_dir: "tftp://192.168.3.47/ "
  #example3
  #src_dir: "usb0:"
  src_dir: "ftp://username:password@20.11.0.42:~/../images/"

slot_info:
  #slot_to_upgrade: [2,3,6,7,8,9]
  slot_to_upgrade: "ALL"
```

**Step 7** Execute following command to start the playbook to upgrade firmware.

```
./run_mop_upgrade
```

**Step 8** Reload the system by typing **reload** on the active SUP and answering **no** to not save the configuration.

```
cBR8#reload
System configuration has been modified. Save? [yes/no]: no
Proceed with reload? [confirm]
cBR8#
```

**Step 9** From ROMMON issue the following command on both SUPs.

```
rommon 1 > confreg 0x2102
rommon 2 > sync
rommon 3 >
```

**Step 10** Power cycle chassis, wait for both SUPs to auto boot to 16.5.1 image.

```
rommon 1>
Initializing Hardware ...

?

System Bootstrap, Version 16.5(1r)S, RELEASE SOFTWARE
Copyright (c) 1994-2016 by cisco Systems, Inc.

Current image running: Boot ROM1

Last reset cause: PowerOn

Viper version register: 0x16052011
Set Chassis Type to 13RU
Cisco cBR-8 platform with 50331648 Kbytes of main memory
```

**Step 11** After system bootup and stable, execute following command to start the playbook to check the upgrade result.

```
./run_mop_upgrade_post

...
TASK [debug] *****
Friday 17 March 2017  14:30:25 +0800 (0:00:00.014)          0:01:10.187 *****
ok: [100.185.185.185] => {
    "msg": "Mop upgrade passed!"
}
PLAY RECAP *****
100.185.185.185      : ok=120  changed=1    unreachable=0    failed=0
```

**Step 12** Exit the container if finished upgrading this time to stop the container.

```
exit
```

**Step 13** If user wants to start the container again, use following command to start the container and enter its shell.

```
docker start mop
docker attach mop
```

**Step 14** All the file changes are kept in the container, user can run step 4-11 to upgrade again.

---



## CHAPTER 2

# Installing the Patch on Cisco cBR-8 Router System

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

- [Installing the Patch for Cisco IOS-XE Everest 16.5.1, on page 11](#)

## Installing the Patch for Cisco IOS-XE Everest 16.5.1

### Before you begin

Before installing the patch, make sure the system is running in Sub-Package Mode.

- Step 1** Verify the directory in which the .conf file is booted.
- Step 2** Verify LCHA is configured and all linecards are member of LCHA group.
- Step 3** Verify Peer State is "Stdby Warm" for all active cards using **show redundancy linecard all** command.

### Example:

```
Router# show redundancy linecard all
Load for five secs: 18%/4%; one minute: 20%; five minutes: 29%
Time source is NTP, 19:48:34.289 PDT Mon Sep 5 2016
```

Slot	Subslot	LC Group	My State	Peer State	Peer Slot	Peer Subslot	Role	Mode
2	-	0	Active	Stdby Warm	0	-	Active	Primary
3	-	0	Active	Stdby Warm	0	-	Active	Primary
6	-	0	Active	Stdby Warm	0	-	Active	Primary
8	-	0	Active	Stdby Warm	0	-	Active	Primary
9	-	0	Active	Stdby Warm	0	-	Active	Primary
1	-	0	Active	Stdby Warm	0	-	Active	Primary
7	-	0	Active	Stdby Warm	0	-	Active	Primary
0	-	0	-	-	Multiple	None	Standby	Secondary

- Step 4** Download the new patch .tar file to this active directory.
- Step 5** Start the patch installation process using the following command. It will first install patch on standby RP and then on active RP. All of these happen automatically.

```
request platform software package install node file patch filename.tar
```

**Example:**

```
Router# request platform software package install node file harddisk:subpkg/cbr_patch-16.5.1-patch1.tar
```

**Step 6**

Verify the patch is applied to all linecards as expected with the following command:

```
show platform software patch slot info
```

**Example:**

```
Router# show platform software patch 1 info
cbrsup-clciosdb: 16.5.1 (0.0)
cbrsup-clc-firmware: 16.5.1 (0.0)
cbrsup-clcvideo: 16.5.1 (0.0)
cbrsup-clcios: 16.5.1 (0.0)
cbrsup-clccontrol: 16.5.1 (0.0)
cbrsup-clcdocsis: 16.5.1 (1.0)
cbrsup-clcmipsbase: 16.5.1 (0.0)
```

As shown in the example above, after the patch installation, only clcdocsis is changed to 1.0.

---