Introduction

Note

Explore the Content Hub, the all new portal that offers an enhanced product documentation experience.

- Use faceted search to locate content that is most relevant to you.

- Create customized PDFs for ready reference.

- Benefit from context-based recommendations.

Get started with the Content Hub at content.cisco.com to craft a personalized documentation experience. Do provide feedback about your experience with the Content Hub.

This release notes contain information about downloading and installing Cisco IOS XE Fuji 16.8.x and its maintenance releases. It also provides new and changed information, hardware support, limitations and restrictions, and caveats for Cisco IOS XE Fuji 16.8.x and its maintenance releases.

We recommend that you view the field notices for this release to see if your software or hardware platforms are affected. If you have an account on Cisco.com, you can find field notices at http://www.cisco.com/en/US/customer/support/tsd_products_field_notice_summary.html .

If you do not have a Cisco.com login account, you can find field notices at http://www.cisco.com/en/US/support/tsd_products_field_notice_summary.html .

Note

- Cisco IOS XE Fuji 16.8.x is generally available for field deployment. However, we recommend that you validate and qualify Cisco IOS XE Fuji 16.8.x in a limited field trial with your specific network configuration requirements. The validation would ensure a smoother, faster, and successful field deployment.

- The **no http secure server-identity-check** option was the default in versions 16.7.2 or earlier, and was not configurable. Ensure that you configure the **no http secure server-identity-check** option after upgrading to maintain parity with images earlier than 16.7.3. The default option is **http secure server-identity-check**.

This chapter includes the following sections:

System Requirements

These sections describe the system requirements for Cisco IOS XE Fuji 16.8.x:

Memory Requirements

The following table displays the memory recommendations for the Cisco cBR Series Converged Broadband Routers with Cisco IOS XE Release 16.8.1e feature sets.

Table 1: Memory Recommendations for the Cisco cBR Series Converged Broadband Routers

Feature Set	Cisco cBR Route Processor	Software Image	Recommended Flash Memory	Recommended DRAM Memory	Runs From
CISCO IOS-XE universalk9	Cisco cBR8 (CBR) Processor	cbrsup-universalk9.16.08.01e.SPA.bin	8G	48G	Bootflash:
CISCO IOS-XE CLC K9	Cisco cBR8 (CYLONS) Processor	cbrsup-universalk9.16.08.01e.SPA.bin	8G	16G	Supervisor

The following table displays the memory recommendations for the Cisco cBR Series Converged Broadband Routers with Cisco IOS XE Release 16.8.1d feature sets.

Table 2: Memory Recommendations for the Cisco cBR Series Converged Broadband Routers

Feature Set	Cisco cBR Route Processor	Software Image	Recommended Flash Memory	Recommended DRAM Memory	Runs From
CISCO IOS-XE universalk9	Cisco cBR8 (CBR) Processor	cbrsup-universalk9.16.08.01d.SPA.bin	8G	48G	Bootflash:
CISCO IOS-XE CLC K9	Cisco cBR8 (CYLONS) Processor	cbrsup-universalk9.16.08.01d.SPA.bin	8G	16G	Supervisor

The following table displays the memory recommendations for the Cisco cBR Series Converged Broadband Routers with Cisco IOS XE Release 16.8.1 feature sets.

Table 3: Memory Recommendations for the Cisco cBR Series Converged Broadband Routers

Feature Set	Cisco cBR Route Processor	Software Image	Recommended Flash Memory	Recommended DRAM Memory	Runs From
CISCO IOS-XE universalk9	Cisco cBR8 (CBR) Processor	cbrsup-universalk9.16.08.01.SPA.bin	8G	48G	Bootflash:
CISCO IOS-XE CLC K9	Cisco cBR8 (CYLONS) Processor	cbrsup-universalk9.16.08.01.SPA.bin	8G	16G	Supervisor

Hardware Supported

For detailed information about the hardware supported in Cisco IOS XE Release 16.8.x and its maintenance releases, see:

http://www.cisco.com/c/en/us/td/docs/cable/cbr/installation/guide/b_cbr_how_and_what_to_order.html.

Note The Cisco cBR chassis must house line cards with either Downstream DOCSIS 3.0 PHY modules or Downstream DOCSIS 3.1 PHY modules. Mixed configuration is not supported.

Determining the Software Version for Cisco IOS XE Fuji 16.8.1e

To determine the version of the Cisco IOS XE software running on your Cisco cBR Series Converged Broadband Routers, , log in and enter the **show version** EXEC command:

```
Router#show version
Cisco IOS XE Software, Version 16.08.01e
Cisco IOS Software [Fuji], cBR  Software (X86_64_LINUX_IOSD-UNIVERSALK9-M), Version 16.8.1e,
 RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2018 by Cisco Systems, Inc.
Compiled Wed 28-Nov-18 20:49 by mcpre


Cisco IOS-XE software, Copyright (c) 2005-2018 by cisco Systems, Inc.
All rights reserved.  Certain components of Cisco IOS-XE software are
licensed under the GNU General Public License ("GPL") Version 2.0.  The
software code licensed under GPL Version 2.0 is free software that comes
with ABSOLUTELY NO WARRANTY.  You can redistribute and/or modify such
GPL code under the terms of GPL Version 2.0.  For more details, see the
documentation or "License Notice" file accompanying the IOS-XE software,
or the applicable URL provided on the flyer accompanying the IOS-XE
software.
```

```
ROM: IOS-XE ROMMON

CST-CBR8-Hongkong uptime is 10 minutes
Uptime for this control processor is 16 minutes
System returned to ROM by reload at 15:11:13 CST Wed Dec 12 2018
System restarted at 15:19:30 CST Wed Dec 12 2018
System image file is "harddisk:cbrsup-universalk9.16.08.01e.SPA.bin"
Last reload reason: Reload Command



This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.

Cisco cBR-8 (CBR) processor (revision CBRVE) with 11398169K/6147K bytes of memory.
Processor board ID FXS17440AT5
16 Ten Gigabit Ethernet interfaces
4 Hundred Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
50331648K bytes of physical memory.
7649279K bytes of eUSB flash at bootflash:.
117155287K bytes of SATA hard disk at harddisk:.
0K bytes of WebUI ODM Files at webui:.

Configuration register is 0x2
```

Determining the Software Version for Cisco IOS XE Fuji 16.8.1d

To determine the version of the Cisco IOS XE software running on your Cisco cBR Series Converged Broadband Routers, , log in and enter the **show version** EXEC command:

```
Router#show versionLoad for five secs: 100%/0%; one minute: 9%; five minutes: 1%
Time source is NTP, *13:02:37.069 PDT Thu Feb 14 2019
Cisco IOS XE Software, Version 16.08.01d
Cisco IOS Software [Fuji], cBR  Software (X86_64_LINUX_IOSD-UNIVERSALK9-M), Version 16.8.1d,
 RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2018 by Cisco Systems, Inc.
Compiled Tue 11-Sep-18 20:15 by mcpre


Cisco IOS-XE software, Copyright (c) 2005-2018 by cisco Systems, Inc.
All rights reserved.  Certain components of Cisco IOS-XE software are
licensed under the GNU General Public License ("GPL") Version 2.0.  The
software code licensed under GPL Version 2.0 is free software that comes
with ABSOLUTELY NO WARRANTY.  You can redistribute and/or modify such
GPL code under the terms of GPL Version 2.0.  For more details, see the
documentation or "License Notice" file accompanying the IOS-XE software,
```

```
or the applicable URL provided on the flyer accompanying the IOS-XE
software.


ROM: IOS-XE ROMMON

Galaxy uptime is 2 minutes
Uptime for this control processor is 7 minutes
System returned to ROM by reload at 12:51:36 PDT Thu Feb 14 2019
System image file is "harddisk:cbrsup-universalk9.16.08.01d.SPA.bin"
Last reload reason: Reload Command



This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.

Cisco cBR-8 (CBR) processor (revision CBR) with 8468493K/6147K bytes of memory.
Processor board ID FXS1921Q1XR
16 Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
50331648K bytes of physical memory.
7743487K bytes of eUSB flash at bootflash:.
97620247K bytes of SATA hard disk at harddisk:.
30659088K bytes of USB flash at usb0:.
0K bytes of WebUI ODM Files at webui:.

Configuration register is 0x0
```

Determining the Software Version for Cisco IOS XE Fuji 16.8.1

To determine the version of the Cisco IOS XE software running on your Cisco cBR Series Converged Broadband Routers, , log in and enter the **show version** EXEC command:

```
Router#show ver
Load for five secs: 32%/0%; one minute: 12%; five minutes: 2%
No time source, *15:53:06.437 CST Thu Mar 29 2018
Cisco IOS XE Software, Version 16.08.01
Cisco IOS Software [Fuji], cBR  Software (X86_64_LINUX_IOSD-UNIVERSALK9-M), Version 16.8.1,
 RELEASE SOFTWARE (fc3)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2018 by Cisco Systems, Inc.
Compiled Tue 27-Mar-18 13:31 by mcpre


Cisco IOS-XE software, Copyright (c) 2005-2018 by cisco Systems, Inc.
All rights reserved.  Certain components of Cisco IOS-XE software are
licensed under the GNU General Public License ("GPL") Version 2.0.  The
software code licensed under GPL Version 2.0 is free software that comes
with ABSOLUTELY NO WARRANTY.  You can redistribute and/or modify such
```

```
GPL code under the terms of GPL Version 2.0.  For more details, see the
documentation or "License Notice" file accompanying the IOS-XE software,
or the applicable URL provided on the flyer accompanying the IOS-XE
software.


ROM: IOS-XE ROMMON

RphyNode-L09 uptime is 1 minute
Uptime for this control processor is 6 minutes
System returned to ROM by reload at 15:43:25 CST Thu Mar 29 2018
System image file is "harddisk:cbrsup-universalk9.16.08.01.SPA.bin"
Last reload reason: Reload Command


This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.

Cisco cBR-8 (CBR) processor (revision CBR) with 7492070K/6147K bytes of memory.
Processor board ID FXS2011Q09U
48 Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
50331648K bytes of physical memory.
7649279K bytes of eUSB flash at bootflash:.
117155287K bytes of SATA hard disk at harddisk:.
0K bytes of WebUI ODM Files at webui:.

Configuration register is 0x0
```

Microcode Software

This section describes microcode software that is supported for the Cisco cBR Series Converged Broadband Routers.

For more information, see Upgrading the Cisco cBR Series Converged Broadband Routers for Cisco IOS XE Fuji 16.8.x.

Feature Support

Cisco IOS XE software is packaged in feature sets that consist of software images that support specific platforms. The feature sets available for a specific platform depend on which Cisco IOS XE software images are included in a release. Each feature set contains a specific set of Cisco IOS XE features.

⚠️

Caution Cisco IOS XE images with strong encryption (including, but not limited to 168-bit [3DES] data encryption feature sets) are subject to U.S. government export controls and have limited distribution. Strong encryption images to be installed outside the United States are likely to require an export license. Customer orders may be denied or subject to delay because of U.S. government regulations. When applicable, the purchaser or user must obtain local import and use authorizations for all encryption strengths. Please contact your sales representative or distributor for more information, or send an e-mail to export@cisco.com.

New and Changed Information

The following section lists the new software and hardware features supported on the Cisco cBR Series Converged Broadband Routers in this release:

New Software Features in Cisco IOS XE Fuji 16.8.1e

There are no new software features in Cisco IOS XE Fuji 16.8.1e release.

New Software Features in Cisco IOS XE Fuji 16.8.1d

There are no new software features in Cisco IOS XE Fuji 16.8.1d release.

New Software Features in Cisco IOS XE Fuji 16.8.1

PTP Subordinate Through DPIC

Cisco cBR supports PTP subordinate mode when connected to the Ethernet ports of the DPIC card. The protocol allows the user to synchronize clocks between the different nodes of a network, thereby enabling accurate time distribution.

For more information, see the Cisco cBR Converged Broadband Routers Basic Configuration guide.

100G License for Supervisor 250G

The Smart Account supports both 100G WAN licenses and 10G WAN licenses. You can configure the Cisco cBR to consume 100G WAN licenses for Supervisor 250G. This would accommodate existing 10G WAN licenses for 100G port, in addition to the 100G WAN licenses.

The 100G WAN licenses facilitate the ordering and management of WAN license for Supervisor 250G. This would help avoid the overhead of maintaining multiple 10G WAN licenses, and you can manage a single 100G WAN license for one 100G port of Supervisor 250G, instead of ten individual 10G WAN licenses.

For more information, see the Cisco cBR Converged Broadband Routers Basic Configuration guide.

DOCSIS3.1 Downstream Zero Bit Loading

Zero Bit Loading (ZBL) is a subcarrier in an OFDM channel, it has power but does not carry any user data. ZBL can be used if the user wants to bypass one or more subcarrier because, for example, cable modem reports that Modulation Error Ratio (MER) is too low on these subcarriers.

For more information, see the Cisco cBR Converged Broadband Routers Layer 2 and DOCSIS 3.1 Configuration guide.

G.8275.2 Telecom Profile

The Cisco cBR-8 router now supports the ITU- T G.8275.2 telecom profile (PTP telecom profile for Phase and Time-of-day synchronization with partial timing support from the network).

The G.8275.2 is a PTP profile for use in telecom networks where phase or time-of-day synchronization is required. It differs from G.8275.1 in that it is not required that each device in the network participates in the PTP protocol. Also, G.8275.2 uses PTP over IPv4 and IPv6 in unicast mode.

For more information, see the Cisco cBR Converged Broadband Routers Basic Configuration guide.

Advanced MPEG Features

The Cisco cBR-8 router supports the following advanced MPEG features:

- PID filtering

- Program filtering

- Custom PID remapping

- Multiprogram Transport Stream (MPTS) remuxing

- Enhanced input source switching

PID filtering and program filtering allows the user to filter PIDs and programs from a MPTS pass-through stream in the table-based video configuration mode. Custom PID remapping allows the user to specify remap rules for all four types of processing types—data piping, pass-through, remap, and remux sessions.

MPTS remuxing allows the user to choose specific programs from MPTS sessions using the program number. Enhanced input source switching allows the user to switch sources when the PCR PID is missing.

For more information, see the Cisco cBR Converged Broadband Routers Video Features guide.

Recovering Unresponsive Modems

If the cable modem does not respond to pings from the Cisco Converged Broadband Router, the modem DSBG, DSID, and the BPI index values on the Cisco Converged Broadband Router may be incorrect.

A new command has been introduced to recover unresponsive modems by generating the correct DSBG, DSID, and the BPI index values.

For more information, see the Cisco cBR Converged Broadband Routers Basic Configuration guide.

Modified Software Features in Cisco IOS XE Fuji 16.8.1e

There are no modified software features in Cisco IOS XE Fuji 16.8.1e release.

Modified Software Features in Cisco IOS XE Fuji 16.8.1d

There are no modified software features in Cisco IOS XE Fuji 16.8.1d release.

Modified Software Features in Cisco IOS XE Fuji 16.8.1

Extended the maximum frequency value of an OFDMA channel

The Cisco IOS XE 16.8.1 release extends the supported maximum frequency value of an OFDMA channel from 85 Mhz to 204 Mhz in an upstream cable controller.

For more imformation, see the Cisco cBR Converged Broadband Routers Layer 2 and DOCSIS 3.1 Configuration guide.

Mixed Mode Phase 2

Starting from Cisco IOS XE 16.8.1 release, RPHY line card CBR-CCAP-LC-40G-R can be plugged in any slot, that is, slot 0, 1, 2, 3, 6, 7, 8, and 9. If there is iCMTS line card inserted in the system, they can work in mix mode, but only iCMTS line cards support LCHA. iCMTS line cards must be inserted in adjacent slots, with no RPHY line card in between.

Onboard Failure Logging

Onboard Failure Logging (OBFL) is an existing feature that provides a mechanism to store hardware failure and environmental information such as temperature data, voltage data, uptime data and so on. The following features are introduced or enhanced in this release:

Temperature Logging Enhancement

Currently, OBFL stores the temperature of the system when it boots up or when the temperature exceeds the threshold value, for example, from normal temperature to a defined critical temperature. Starting from Cisco IOS-XE 16.8.1 Release, OBFL will store temperature values when the temperature of the system increases or decreases by 3 degrees Celsius.

Uptime Logging Enhancement

Currently, OBFL stores the time the system boots up. Starting from Cisco IOS-XE 16.8.1 Release, OBFL will store additional information such as the time when you powered on the card, the number of times the card was reset, the number of times you moved a card from one slot to another, the reason why a card was reset, the current slot in which you installed the card, and the last time when you powered on the card.

Firmware Version

Starting from Cisco IOS-XE 16.8.1 Release, OBFL will store firmware versions of slot cards such as SUP, LC and so on and PIC cards such as SUP-PIC, RF-PIC, D-PIC, and so on.

For more imformation, see the Cisco cBR Series Converged Broadband Routers Troubleshooting and Network Management Configuration guide.

Subscriber-side SBRL

In the Cisco IOS XE 16.8.1 release, subscriber-side SBRL is significantly modified. The global configuration is deprecated, and all subscriber-side punts (except ARPs, which are still handled by the ARP-filter) are rate-limited on a per-srcMACaddr/punt-cause basis. Configuration is on a per-punt-cause basis. The default rate for cable-l3-mobility remains at 4 packet/second. There are no other default settings in 16.8.X releases, which means that for all other punt-causes, rate-limiting is disabled by default. Using the 'no' configuration returns the rate to the default value. The rate is specified in packets-per-4-second, and is restricted to powers-of-2 between 1 and 256. This allows a packet/second rate in the range [0.25, 0.50, 1, 2, 4, 8, 16, 32, 64]. The 'no-drop' keyword disables rate-limiting for the specified punt-cause.

There is an optional quarantine configuration. When a traffic stream enters quarantine, all punted packets in the stream are dropped for the configured period. A traffic stream enters quarantine when approximately (burst-factor x rate) packets arrive at a rate faster than the configured rate. The following subscriber-side SBRL is strongly recommended. This covers the expected subscriber-side punt-causes.

```
platform punt-sbrl subscriber punt-cause for-us-data rate-per-4-sec 32
platform punt-sbrl subscriber punt-cause for-us-ctrl rate-per-4-sec 8
platform punt-sbrl subscriber punt-cause sv-match-unknown rate-per-4-sec 4
platform punt-sbrl subscriber punt-cause cable-pre-reg rate-per-4-sec 8
platform punt-sbrl subscriber punt-cause cable-dhcp rate-per-4-sec 8
platform punt-sbrl subscriber punt-cause cbl-dhcpv6-solicit rate-per-4-sec 8
platform punt-sbrl subscriber punt-cause cbl-dhcpv6-req rate-per-4-sec 8
```

For more imformation, see the Cisco cBR Series Converged Broadband Routers Security and Cable Monitoring Configuration Guide.

New Hardware Features in Cisco IOS XE Fuji 16.8.1e

There are no new hardware feature for Cisco IOS XE Fuji 16.8.1e release.

New Hardware Features in Cisco IOS XE Fuji 16.8.1d

There are no new hardware feature for Cisco IOS XE Fuji 16.8.1d release.

New Hardware Features in Cisco IOS XE Fuji 16.8.1

There are no new hardware feature for Cisco IOS XE Fuji 16.8.1 release.

MIBs

To locate and download MIBs for selected platforms, Cisco IOS XE releases, and feature sets, use Cisco MIB Locator found at the following URL:

https://mibs.cloudapps.cisco.com/ITDIT/MIBS/servlet/index

New and Changed MIB Information in Cisco IOS-XE Fuji 16.8.1e

There are no new MIBs in Cisco IOS XE Fuji 16.8.1e.

New and Changed MIB Information in Cisco IOS-XE Fuji 16.8.1d

SCTE-ALARMS-MIB

The SCTE-ALARMS-MIB provides enhanced support to improve the manageability of video services on Cisco cBR-8 routers. The SCTE-ALARMS-MIB defines a set of alarms and corresponding SNMP traps for the following events and errors:

- PME CEM Connection Loss

- PME ECM Missing

- DVB ECMG Connection Loss

- DVB EIS Connection Loss

- D6 (Ramsden) Connection Loss

- GQI ERM Connection Loss

- QAM Oversubscription

- PID Conflict

- Program Number Conflict

In addition to these alarms, from Cisco IOS XE Fuji 16.8.1d release, Cisco cBR supports the following three alarms:

- Input Stream Failure—Input traffic is not available.

- Backup Source Active—Active source switches to a backup source.

- PMT Missing—PMT is defined in PAT. However, the PMT is not visible in the input stream.

New and Changed MIB Information in Cisco IOS-XE Fuji 16.8.1

The **DOCS-RPHY-MIB** was added in Cisco IOS-XE Fuji 16.8.1.

Best Practice Manual of Procedure for Cisco IOS XE Fuji 16.8.x Upgrade

See Upgrading the Cisco cBR Series Converged Broadband Routers for Cisco IOS XE Fuji 16.8.x.

Cisco cBR Series Converged Broadband Routers Documentation References

Go to the following link to access the technical documents:

http://www.cisco.com/c/en/us/support/video/cbr-series-converged-broadband-routers/tsd-products-support-series-home.html

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see What's New in Cisco Product Documentation.

To receive new and revised Cisco technical content directly to your desktop, you can subscribe to the What's New in Cisco Product Documentation RSS feed. The RSS feeds are a free service.