



What's New in Cisco cBR-8 Series Routers



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Cisco is continuously enhancing the product with every release and this section covers a brief description of key features and enhancements that were added. It also includes links to detailed documentation, where available.

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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 Dublin 17.12.1z1

Feature	Description
Cisco cBR Converged Broadband Routers DOCSIS Software	

Feature	Description
Clearing OFDM Unfit Profile List	<p>CMTS devices clear all the profiles from the Unfit profile list upon receiving a Dynamic Bonding Change Response (DBC-RSP) message from the cable modem.. The profiles are cleared as long as they aren't present in the Dynamic Bonding Change Request (DBC-REQ) list of Profiles.</p> <p>This feature ensures that good profiles don't remain in the unfit list.</p> <p>Command enhanced: <code>show cable modem [ip-address mac-address] prof-mgmt downstream</code></p>
Support for 4xOFDM channel bonding on cBR8 platform	<p>Starting with this release, DOCSIS 4.0 modems on cBR-8 routers may use four OFDM channels for channel bonding, operating at their highest capacity to enhance functionality.</p>
Disabling OFDM Unfit Profile Aging	<p>With this release, you can disable the OFDM unfit profile aging functionality. As a result, profiles move out of the unfit profile list, when the CMTS receives CM-STATUS Event 24 from the cable modem.</p> <p>Disabling OFDM Unfit Profile aging allows you to have better control of moving downstream profiles out of the unfit list. Downstream profiles only move out of the unfit list if there are no Forward Error Correction (FEC) errors and don't need to wait for the timer to expire.</p> <p>Command Added: <code>cable downstream ofdm-prof-mgmt unfit-profile-age disable</code></p>
Downstream Resiliency Enhancements	<p>In this release, CMTS handles</p> <ul style="list-style-type: none"> • a CM-STATUS Event 16 on profile 0 as a downstream impairment. • a CM-STATUS Event 24 on profile 0 as a downstream impairment recovery. <p>Configuring this feature helps reduce packet loss.</p> <p>Command introduced: <code>ofdm-rf-change-trigger prof-zero-fail dampen-time seconds recovery-multiplier number</code>.</p>
Implementing hysteresis timer for profile recovery	<p>CMTS can implement a hysteresis function or timer for profile recovery starting with this release. This timer uses the OPT process to check RxMER values at the CM before recovery or upgrading to the profile.</p>
Kafka support for OFDMA channel information	<p>The cBR-8 routers now include a new telemetry event, OFDMA-Status, which serves to identify channel configurations and monitor the upstream status of channels.</p>
Kafka support for multiple brokers	<p>Starting from this release, Kafka broker cluster now provides support for monitoring the connection status of up to a maximum of two brokers. Each broker connection can be maintained independently.</p>

Feature	Description
Configuring OFDMA Modulation Profile Downgrade	<p>With this release, the operator can downgrade to the desired interval usage codes (IUC), while configuring the codeword error threshold.</p> <p>The operator can configure the data-iuc <i>data-iuc-type</i> modulation <i>modulation</i> pilot-pattern <i>pilot-pattern-id</i> cwerr-downgrade-iuc <i>cwerr-downgrade-iuc</i> keyword under the cable mod-profile-ofdma command to enable this feature.</p> <p>The benefit of configuring this command is that you can skip the trial of multiple profiles until it reaches the final IUC13 profile and manually configure the exact downgrade that you need. The time taken to downgrade the profile to IUC13 is reduced as some profiles are skipped.</p>
Optimizing OFDM Profile Downgrade	<p>With this release, the process of downgrading an OFDM profile to is optimized to ensure that the best available profile is selected. We have added a capacity based profile ordering method to ensure that a good profile is not skipped. Here, capacity refers to the data transfer rate in Kbps for a profile.</p> <p>Configure the cable downstream ofdm-prof-mgmt prof-order-method capacity command to enable this feature. By default, the bit-loading order method is configured.</p> <p>As part of this feature, CMTS always skips a profile downgrade if CM-STATUS event 16 is not on the current profile, regardless of profile-order-method configuration.</p>
Upstream transmit Power Ceiling SC-QAM Channel Assignment	<p>Modems with restricted transmit power now benefit from this release that assigns them a set of ATDMA channels. Also, it ensures optimal path selection by checking power levels.</p>
show cable modem command update	<p>With this release, the command show cable modem phy us-pwr has been introduced. The implementation of this command will help display all the upstream channel attributes with referene to 1.6MHz, 6.4MHz and channel width values.</p>

New Hardware Features in Cisco IOS XE Dublin 17.12.1z1

There are no new hardware features in the Cisco IOS XE Dublin 17.12.1z1 release for Cisco cBR-8 series routers.

New Software Features in Cisco IOS XE Dublin 17.12.1y

Feature	Description
Cisco cBR Converged Broadband Routers DOCSIS Software	

Feature	Description
Channel Utilization Consistency	<p>We have enhanced docsIf31CmtsDsOfdmChanUtilization and docsIfCmtsChannelUtUtilization MIBS to calculate a rolling average utilization. The utilization calculation window is specified by the operator using the cable util-interval command.</p> <p>With this release, you can observe consistency in the Upstream and Downstream SCQAM/OFDMA Channel utilization and MIB data.</p> <p>We have also updated the output of the show controllers downstream-cable slot/subslot/port [counter rf-channel counter ofdm-channel] snmp-rolling-avg command to include the rolling average values.</p>
Support For Platform Automated Monitoring	<p>With this release, cBR-8 supports Platform Automated Monitoring (PAM), which is a system monitoring tool that is integrated with Cisco IOS XE Software image to monitor the following issues:</p> <ul style="list-style-type: none"> • Process Crashes • When StandbySUP cannot bootup <p>PAM is an IOSd-process running on the Supervisor Card (SUP) to periodically monitor the system's crash. When an RP/FP/CC crashinfo or corefile is detected, the syslog displays on the active SUP's IOSd console.</p> <p>The benefit of PAM is that you can use a script (for example, EEM) to monitor PAM and automatically submit a TAC case and share the core/crashinfo with TAC, when a crash event is detected.</p>
Upstream External PMA with Kafka	<ul style="list-style-type: none"> • In this release, Upstream External PMA is supported with Kafka. cBR8-routers publish US RxMER data automatically based on OFDMA prof-mgmt configured interval. The Publish rate can be down-sampled using the cable telemetry topic us-rxmer publish-rate command. • In this release, Receive modulation error ratio (RxMer) probe averaging is supported. RxMer Probe averaging allows the operator to specify the number of RxMer measurements to acquire per modem in a given polling interval. These results are averaged and forwarded to the TFTP server or Kafka broker as one averaged measurement per modem. <p>RxMer averaging can improve RF measurement consistency in some situations, resulting in improved modulation profile assignment.</p>
Schema version update for DOCSIS CMTS Topology service	<p>In this release, the schema version for the DOCSIS CMTS Topology service has been updated to DOCSIS-CMTS-TOPOLOGY-TYPE_3.5.1-A.3.xsd to support the latest templates for the IPDR exporter.</p>
Schema version update for DOCSIS Utilization Statistics service	<p>In this release, the schema version for the DOCSIS Utilization Statistics service has been updated to DOCSIS-CMTS-US-UTIL-STATS-TYPE_3.7-A.6.xsd to support the latest templates for the IPDR exporter.</p>

Feature	Description
Channel power width MIB Update	In this release, the received power for all the upstream channels, SCQAM and OFDMA, will be reported in 1.6MHz reference. It will also include upstream RF port basepower if configured (applicable to rphy only). The following MIBs has been enhanced: <ul style="list-style-type: none"> • DocsIf3CmtsCmUsStatusRxPower • docsIf31CmtsCmUsOfdmaChannelRxPower
Show cable modem verbose command update	With this release, the command show cable modem verbose has been updated to support functionalities with no base power and channel power upto 0 to accommodate 1.6 MHz upstream channel power conversion.

New Hardware Features in Cisco IOS XE Dublin 17.12.1y

Feature	Description
Optics	This release launches the new optics on selective hardware within the product portfolio. For details refer to the Transceiver Module Group (TMG) Compatibility Matrix . <p>Cisco 100GBASE QSFP-100G Modules</p> <p>QSFP-100G-CWDM4: The 100GBASE CWDM4 QSFP Transceiver uses the LC connector type to provide connectivity for platforms located upto 2km over SMF. This optics is supported by the following interface cards.</p> <ul style="list-style-type: none"> • SUP250 SUPPIC (Supervisor Physical Interface Card) • CBR-DPIC-2X100G (Digital Physical Interface Card)

New Software Features in Cisco IOS XE Dublin 17.12.1x

Feature	Description
Cisco cBR Converged Broadband Routers DOCSIS Software	
Enabling Line Card Redundancy When DPIC Fails	In this release, Line Card Redundancy (LCHA) triggers when Digital Physical Interface Cards (DPIC) encounters a hardware failure. This action ensures that the service is not impacted when a DPIC has a Hardware failure. This feature supports the CBR-DPIC-8X10G and CBR-DPIC-2X100G Interface Cards. <p>In previous releases, when a DPIC encounters a hardware failure, the DPIC state moves to out of service and LCHA cannot be triggered. Triggering of LCHA was based on the state of the line card.</p>

Feature	Description
Excluding Cable Modems from Downstream Resiliency Operations	<p>You can now exclude cable modems from Downstream Resiliency operations and move them to an exclusion list using the cable resiliency exclude command. Excluding cable modems ensures that RBG and NB are not used and the resiliency activity reduces. The exclusion list is stored on the SUP and you can use the show cable resiliency exclude to view the exclusion list.</p> <p>By excluding cable modems, you can manage the downstream resiliency feature better and improve CPU efficiency. The following scenarios are examples of when you can use this feature and exclude cable modems from Downstream Resiliency operations.</p> <ul style="list-style-type: none"> • Cable modems that report an excessive amount of impairment or recovery events, can be moved to the exclusion list. You can use the show cable resiliency counts command introduced in Cisco IOS XE Dublin 17.12.1x to identify which downstream channels and cable modems have the most impairments. • During planned maintenance windows, cable modems can be moved to the exclusion list.
Fast Fourier Transform (FFT) Enhancements	<p>In this release, we have optimized legacy periodical FFT for both cBR-8 and RPD which helps in reducing system memory and CPU resources. Use the cable rpd period-fft [start stop] command to start or stop RPD periodical FFT polling.</p>
Moving a DS Partial Cable Modem Back to the Original BG	<p>In this release, you can move a DS Partial cable modem back to the original BG. The cable modem remains online and does not reset or reinitialize partial service modems. The cable modem recovers to the w-online state.</p> <p>You can use this feature to recover cable modems that may send the cm-status recovery events which are not received by the cable modem.</p> <p>Cisco can provide the feature details upon request.</p>
Queue protection	<p>In this release, you can configure queue protection for Low Latency Service Flows. Use this feature to identify traffic on low latency flows that does not comply with the non-queue-building behavior and move some of them to classic flows.</p> <p>The benefit of using Queue protection is that latency is reduced for latency-critical applications that are classified to Low Latency Service Flows, that are well-behaved.</p> <p>Reducing the latency can provide more responsive gaming, faster and responsive website loads, and also provide a telepresence experience with minimum lag.</p>
RPD PTP MIB Update	<p>The MIB table (docsRphyPtpRpdClockStatusTable) is updated to capture additional clock states. This update enables you to identify PTP clock state issues by polling clock state information from the Generic Control Protocol (GCP). The MIB polling works even if the RPD is stuck in the init (clock) state.</p>

Feature	Description
Registering DOCSIS 4.0 Modems as DOCSIS 3.1 Modems	<p>In this release, you can register DOCSIS 4.0 Modems as DOCSIS 3.1 Modems. On cBR-8 routers, you can register DOCSIS 4.0 Modems in D3.1 modes.</p> <p>DOCSIS 4.0 modems advertising as DOCSIS 3.1 capable during registration are included in the show cable modem docsis version d31-capable [operational not-operational] command. Such modems display more than 2 OFDM channels available in the MRC column of the command output.</p> <p>DOCSIS 4.0 modems advertising as DOCSIS 4.0 capable during registration are included in the show cable modem docsis version d40-capable [operational not-operational] command. Such modems register as DOCSIS 3.1 operational.</p>
Monitor RBG Creation Count Per Port	Use the show cable resiliency counts command in privileged EXEC mode, to display the number of RBGs created per downstream port.
SNMP RX Queuing Redesign	<p>In previous releases, SNMP RX Queuing could impact AOM to CPP downloads, resulting in slow response to changing cable conditions.</p> <p>In this release, the new design fixes these issues. SNMP RX Queuing is more responsive to cable modem flaps, more responsive to resiliency changes of bandwidth on a link in response to impairments, and so on, while using the SNMP RX queue with saturating SNMP traffic.</p>
Support for 2x4 RPD	The 2x4 RPD support is introduced for cBR-8 Converged Broadband Routers. This RPD handles up to 4 upstream ports of cBR-8, resulting in higher port utilization and improved upstream traffic handling. The new RPD continues to provide support for DOCSIS, OOB(Out-Of-Band), and pseudo-wire functions.
Upstream External PMA with SNMP/TFTP	<p>In previous releases, the operator would need to provision static OFDMA modulation profile definitions that addressed all known and anticipated plant conditions, both static and dynamic.</p> <p>In this release, the operator has the ability to allow an external Artificial Intelligence (AI) to both tune the profiles for specific plants and dynamically change modulation definitions to address dynamic plant conditions. The AI resides within an external Profile Management Application (PMA).</p>

New Hardware Features in Cisco IOS XE Dublin 17.12.1x

Feature	Description
Optics	<p>This release launches the following new optics on selective hardware within the product portfolio. For details refer to the Transceiver Module Group (TMG) Compatibility Matrix.</p> <p>Cisco 100GBASE QSFP-100G Modules</p> <ul style="list-style-type: none"> • QSFP-100G-ZR4-S: 100GBASE QSFP Transceiver, 80KM reach over SMF. This module is supported on the following interfaces. <ul style="list-style-type: none"> • SUP250 SUPPIC

New Software Features in Cisco IOS XE Dublin 17.12.1w

Feature	Description
Cisco cBR Converged Broadband Routers DOCSIS Software	
Configure the time interval between DBG unused and reclaim.	<p>In this release, you can use the cable dynamic-bonding-group reclaim-hold-interval command to configure a time interval in seconds between DBG unused and reclaim. Configuring this command has the following benefits:</p> <ul style="list-style-type: none"> • Reduces the chance of receiving the AOM download to CPP stuck or AOM download to CPP queue error messages. • Increasing the hold interval can help you avoid DBG reclaim or DBG create requests.
Configuring 10 Channels in Upstream Bonding Group (USBG)	<p>In this release, you can configure up to 10 channels (8 ATDMA and 2 OFDMA) for USBG. In addition to TLV 47, TLV 89 is also supported. Configuring 10 channels allows you to optimally use the spectrum in USBG.</p> <p>In previous releases, you can only configure 8 channels.</p>
Enhancements for LCHA Associated with DPIC Interfaces	<p>In this release, the robustness of LCHA associated with DPIC interfaces is enhanced. This enhancement decouples the downstream queue in SUP and DPIC interface datapath change during LCHA. This ensures that RPDs on the line card stay online even if the active SUP is experiencing a stuck queue event. See show platform hardware qfp active cable dpic-lcha if-name.</p>
New MIB tables for SNMP background synchronization	<p>The following MIB tables are added to the SNMP background synchronization:</p> <ul style="list-style-type: none"> • ccwbRFChannelEntry • docsIfUpstreamChannelEntry • cdxIfUpChannelExtEntry
New MIBs for OUDP doc leakage detection (DOCS-LEAK-DETECT)	<p>New MIB support helps to fetch the details of OUDP leak detect test sessions. The following are the new MIBs supported:</p> <ul style="list-style-type: none"> • docsLeakDetTestCapabilities • docsLeakDetTestSessionStatusTable • docsLeakDetTestSessionStatsTable • docsLeakDetTestChannelStatusTable <p>Supported MIB version: DOCS-LEAK-DETECT-MIB-2022-09-15.txt.</p>
New RPD location attributes to configure RPD's description, latitude, and longitude.	<p>You can now configure RPD's description, latitude, and longitude that helps you to track the location attributes of an RPD seamlessly.</p>

Feature	Description
ROMMON Enhancements	<p>With this release, ROMMON autoupgrade takes place when the existing ROMMON version is older than version 16.7(9r)S. Manual ROMMON upgrade continues to be supported.</p> <p>In ROMMON version 16.7(9r)S, we remove DEV key support from cBR-8 routers. You need a challenge key if you need to run an engineer-signed image.</p>
Resiliency Bonding Group (RBG) Commands	<p>In this release you can:</p> <ul style="list-style-type: none"> • Use the cable resiliency cm-max-rbg-moves command to configure the maximum number of times a CM can be moved to any RBG within the configured interval. This allows you to have better control on CM movement in a specified duration. • Use the show cable modem rbg-activity command to view CM RBG usage statistics.

New Hardware Features in Cisco IOS XE Dublin 17.12.1w

Feature	Description
Optics	<p>This release launches the following new optics on selective hardware within the product portfolio. For details refer to the Transceiver Module Group (TMG) Compatibility Matrix.</p> <p>Cisco 100GBASE QSFP-100G Modules</p> <ul style="list-style-type: none"> • QSFP-100G-DR-S: QSFP-100G-DR-S: 100GBASE DR QSFP Transceiver, 500m over SMF. This module is supported on the following interfaces. <ul style="list-style-type: none"> • SUP250 SUPPIC • DPIC100

New Software Features in Cisco IOS XE Dublin 17.12.1

Feature	Description
Ability to configure IPv6 Querier Robustness Variable value in MLD queries.	<p>This feature fine-tunes the MLD robustness variable, and specifies the retransmission count of MLD packets to minimize the impact of packet loss on a subnet.</p> <p>You can increase the robustness variable on a congested network to increase the number of times that packets are resent.</p>
Ability to enable packet classifier in compliant with DOCSIS spec.	<p>You can now enable the packet classifier that is provisioned already to be compliant with the DOCSIS spec. This helps to match the IPv4 type of service (ToS) or IPv6 Traffic Class (TC) value range as per the DOCSIS spec.</p>

Feature	Description
Enhancements to Factory Reset	<p>You can use the factory-reset all secure command to reset the router and securely clear the files that are stored in both bootflash and SSD. This command performs sanitization and clears all the user data from eUSB, SSD, ROMVAR, and ACT2.</p> <p>With this release, the factory-reset all secure command is more secure and performs better sanitization.</p> <ul style="list-style-type: none"> • factory-reset all • factory-reset all secure • show usb-devices summary • show hdd-devices summary
Multiple Bulk Data Transfer support	<p>You can now configure multiple BDTs for the following:</p> <ul style="list-style-type: none"> • For TFTP in CM-MAC and Other trigger modes. PNM BDT (DocsPnmBulkDataTransferCfgTable) MIB extends support from one TFTP server address to three. • Guestshell in IPv4 for all UTSC modes.
Multiple Spectrum Acquisition Circuits on a single port	<p>You can now configure two Spectrum Acquisition Circuits on a single port.</p>
PNM BDT MIB Updates	<p>In this release, PNM BDT MIB (docsPnmBulkDataTransferCfg) can support both OFDMA RxMER and UTSC. (UTSC has three trigger modes: Freerun, other, and CM-MAC.) The docPnmBulkDestIpaddr object (UTSC CM-MAC) is also supported.</p>
Support for 262144 L2TP sessions	<p>The maximum number of L2TP sessions is increased from 131072 to 262144. The benefit of having more L2TP sessions is that it enables better support for large-scale RPD deployments.</p> <p>Note:</p> <p>System logs are created when the number of sessions get close 262144. Configure the memory chunk siblings threshold 20000 command, to eliminate system logs.</p> <p>The rate-limit warning is logged when L2TP session number is greater than 262144.</p>
Entropy Source Update	<p>In this release, CPU Jitter entropy source is implemented in cBR-8 SUP IOSd. Entropy is collected periodically and mixed from two sources which are Intel CPU RDRAND and ACT2. The output of the show crypto entropy status includes this entropy source information. A new command show cable entropy status is introduced to display the status of the Entropy sources.</p>

Feature	Description
Support for DOCSIS 3.1 Battery Reduction Mode	<p>You can configure channel bonding downgrade for cable modems in battery backup mode by using the cable reduction-mode mta-battery command in global configuration and interface configuration mode</p> <p>In this release, you can configure the scqam-primary keyword for the cable reduction-mode mta-battery command. Use the SCQAM primary channel in battery backup mode when the modem is with OFDM primary channel. This option is disabled by default.</p> <p>Note: For DOCSIS 3.1 battery mode, the inter-op testing with real CM is limited due to CM limitation. Most of the testing was run by simulation.</p>
Low Latency DOCSIS Histogram Support	Low Latency DOCSIS (LLD) Histograms can now be configured and statistics collected via CLI and new MIBS. This provides visibility into how Active Queue Management (AQM) is managing average latencies on LLD-configured modems.
Support for Smart Transport	Smart Transport provides a new transport protocol from the cBR-8 to the Smart Licensing server, and replaces Smart Call-Home
Support for the Configuration of 4 OFDM Channels	In this release, you can configure 4 OFDM Channels per Service Group (SG) on cBR-8 routers. 2Gx1G Service Tiers are supported by configuring 4 OFDM channels in each downstream (DS) SG. This feature is supported on KOBOL-R and Cylon-R line cards.
Updates for Active Queue Management(AQM)	In this release, AQM is updated to include Immediate AQM, where Explicit Congestion Notification can be sent to the sender to control the latency of the queue. Also included in 17.12.1 is queue coupling, which ensures fairness between the classic and low-latency queues in an ASF.
Updates for Aggregate Service Flow (ASF) Provisioning	You can also use the AQP Expansion procedure to provision ASFs. There are no ASF TLVs present in the REG-REQ. A constituent SF TLV is present and specifies an AQP in the sub-tlv [24/25].4. The cBR-8 router performs an AQP table lookup based on this AQP name and provisions the ASF and constituent SFs from the AQP table entry.
UTSC CM-MAC for third-party RPD	cBR-8 now supports the suitable spectrum acquisition circuit and sends the related spectrum acquisition circuit index for the CM-MAC trigger mode. The UTSC CM-MAC works with the Cisco RPD and third-party RPD.

New Hardware Features in Cisco IOS XE Dublin 17.12.1

There are no new hardware features in the Cisco IOS XE Dublin 17.12.1 release for Cisco cBR-8 series routers.

Behaviour Changes Introduced Features

Modified Software Features in Cisco IOS XE Dublin 17.12.1z1

There are no modified software features in the Cisco IOS XE Dublin 17.12.1z1 release for Cisco cBR-8 series routers.

Modified Hardware Features in Cisco IOS XE Dublin 17.12.1z1

There are no modified hardware features in the Cisco IOS XE Dublin 17.12.1z1 release for Cisco cBR-8 series routers.

Modified Software Features in Cisco IOS XE Dublin 17.12.1y

There are no modified software features in the Cisco IOS XE Dublin 17.12.1y release for Cisco cBR-8 series routers.

Modified Hardware Features in Cisco IOS XE Dublin 17.12.1y

There are no modified hardware features in the Cisco IOS XE Dublin 17.12.1y release for Cisco cBR-8 series routers.

Modified Software Features in Cisco IOS XE Dublin 17.12.1x

There are no modified software features in the Cisco IOS XE Dublin 17.12.1x release for Cisco cBR-8 series routers.

Modified Hardware Features in Cisco IOS XE Dublin 17.12.1x

There are no modified hardware features in the Cisco IOS XE Dublin 17.12.1x release for Cisco cBR-8 series routers.

Modified Software Features in Cisco IOS XE Dublin 17.12.1w

There are no modified software features in the Cisco IOS XE Dublin 17.12.1w release for Cisco cBR-8 series routers.

Modified Hardware Features in Cisco IOS XE Dublin 17.12.1w

There are no modified hardware features in the Cisco IOS XE Dublin 17.12.1w release for Cisco cBR-8 series routers.

Modified Software Features in Cisco IOS XE Dublin 17.12.1

There are no modified software features in the Cisco IOS XE Dublin 17.12.1 release for Cisco cBR-8 series routers.

Modified Hardware Features in Cisco IOS XE Dublin 17.12.1

There are no modified hardware features in the Cisco IOS XE Dublin 17.12.1 release for Cisco cBR-8 series routers.