

Cisco cBR-8 Converged Broadband Router

Product Overview

Cable operators have seen exponential growth in broadband traffic in recent years. According to industry reports, downstream and upstream traffic grew significantly annually for the past several years. Even after many years of high rates of traffic growth, the pace continues. Much of this growth is due to the consumption of video, which accounts for a significant and growing percentage of bandwidth used in hybrid fiber-coaxial (HFC) networks.

Cisco® Converged Broadband Router-8 (cBR-8) is the next-generation, highly available, fully redundant, terabit-capable converged cable access platform (CCAP) from Cisco. It allows cable operators to deliver more bandwidth, higher service tiers, and greater agility in deploying new applications and services, while minimizing operational expenses, power requirements, and rack space requirements in cable headends.

With industry-leading density and the capability to converge DOCSIS data, MPEG video, and IP video onto a single system, the Cisco cBR-8 Converged Broadband Router provides cable operators with a simple, cost-effective path to a full CCAP and the all-IP infrastructure. In addition to new DOCSIS® and optical networking capabilities, the Cisco cBR-8 Converged Broadband Router will also be capable of applying software-defined networking (SDN) and virtualization technologies to virtualize, integrate, and automate the access architecture of cable operators.

Figure 1. Cisco cBR-8 Converged Broadband Router



Stay One Step Ahead of Bandwidth Demand

There are at least 32 channels of DOCSIS 3.0 QAM channels and DOCSIS 3.1 (OFDM) blocks per service group. That's what cable multiservice operators (MSOs) report they need to handle growing bandwidth requirements with gigabit and higher services. DOCSIS 3.1 promises higher spectral efficiency (30-50 percent) but also places a heavier demand on the headend equipment in terms of power, cooling, and bandwidth requirements.

Cisco has seen that cable MSOs are also aggressively pursuing a strategy to converge legacy MPEG services with DOCSIS high-speed Internet services to maximize the benefits of the transition to CCAP architectures. Furthermore, MSOs are considering fiber deep architectures (Remote PHY in the fiber node) as well hub consolidation solutions (Remote PHY shelf) to position themselves to compete effectively against fiber-to-the-x (FTTx) overbuilders. A hub consolidation strategy opens new vistas for MSOs to consider virtualizing cable modem termination system (CMTS) and CCAP functions on server farms in the data center and to think about newer ways of orchestrating and managing their networks through automation technologies.

MSOs need a next-generation CCAP solution that can not only solve today's bandwidth demands in a cost-effective and efficient way but also includes an architecture that can evolve as the HFC plant evolves. They need a platform that is ready for the challenges posed by DOCSIS 3.1 and the convergence of video and data and can provide disruptive technologies such as SDN to simplify network management and orchestration. They need the Cisco cBR-8.

In addition to its impressive bandwidth capacity as well as SDN capabilities and Remote PHY, the Cisco cBR-8 software architecture based on Cisco IOS® Software XE is truly next generation in terms of its resiliency and high availability. Cisco delivers a modular software design that supports memory protection, fault isolation, zero packet loss failure recovery (in many cases), software patch capabilities, hitless upgrades, and more on the Cisco cBR-8.

It's the only truly next-generation CCAP device available that is able to address today's requirements but that can also evolve and provides cable MSOs with a migration path to an all-IP, terabit forwarding, Remote PHY, and SDN future.

Features and Benefits

Table 1. Product Features and Benefits

Feature	Benefit
Carrier Class System	
Delivers 99.999% availability	Provide system and business continuity
Integrated N+1 RF Switch	Supports cost effective and efficient N+1
Cisco IOS XE Software subsystem process restart and independent patching ability	Software components with flaws can be fixed by installing a newer, patched version and restarting a process without impacting other components.
Industry-leading software quality and resiliency	Process restartability helps enable zero packet loss failure recovery in many cases. Software modularity allows for fault containment and memory protection.
Industry-leading routing capabilities	Highly intelligent edge routing platform provides full routing functionality including full IPv6 routing feature set, MPLS, etc.
Unprecedented and Scalable Capacity and Throughput	
13 RU and 10-slot chassis (8 subscriber side slots, 2 supervisor slots)	Industry's most compact and densest CCAP
64 service groups (56 SG with N+1)	8DS ports X 16 US ports make sure that service group capacity is preserved regardless of 1:1 or 1:2 DS:US SG ratio
Up to 256 service groups with Remote PHY	Unprecedented SG scalability with Remote PHY
1+ terabit backplane	A fully integrated and scalable platform easily allows higher bandwidth new services deployment
DS capacity	768 unique D3.0 QAM per line card (6144 per chassis) Plus 2 orthogonal frequency-division multiplexing (OFDM) blocks (192MHz each) per port (16 per line card) - future capability Almost 4 Gbps per DS port

Feature	Benefit
US capacity	96 US channels per line card (768 per chassis) Plus 2 OFDMA blocks (96MHz each) per port (32 per line card) - future capability
Up to 200Gbps forwarding	Performance with service intelligence
High-performance control plane	Multicore 64-bit architecture with 48GB of memory (expandable to 96 GB)
Investment Protection	
A platform designed to evolve with your network	<ul style="list-style-type: none"> • Modular design allows for easy upgradability to fully deployable D3.1. • Modularity supports easy transition to Remote PHY architectures with minimal investments. • Midplane design supports analog and digital fiber connectivity options • Flexible platform architecture allows for implementing other access technologies (e.g., DOCSIS Provisioning of Ethernet Passive Optical Network [DPoE])
Pay-as-you-grow Cisco Smart Licensing model	Add capacity by simply activating more software licenses. Also, Cisco Smart Licensing allows for simpler licensing operations for operational ease of use.
SDN and Automation Ready	
SDN Orchestration	Seamlessly manage your network with Cisco SDN orchestration solutions
SDN operational simplicity	Provision and manage various network components via standards-based SDN programmatic interfaces
SDN application suite	Allow value added applications via SDN
Virtual cBR	Support Hub consolidation and software based CCAP solutions for the data center.

Product Specifications

Table 2. Product Specifications

Description	Specification									
RF characteristics, DOCSIS 3.0 and 3.1	<table border="1"> <thead> <tr> <th></th> <th>CBR-D30-DS-MOD D3.0 DS PHY</th> <th>CBR-D31-DS-MOD D3.1 DS PHY</th> </tr> </thead> <tbody> <tr> <td>Downstream Frequency Range</td> <td>SC-QAM: 45-1002 MHz</td> <td>SC-QAM: 45-1002 MHz OFDM: 108-1218 MHz</td> </tr> <tr> <td>RE Output Power Range</td> <td>52 - 61 dBmV, N=1 (DRFI + 1)</td> <td>61 - Ceil [3.6*log2(N*)] dBmV max per channel 52 - Ceil [3.6*log2(N*)] dBmV min per channel</td> </tr> </tbody> </table>		CBR-D30-DS-MOD D3.0 DS PHY	CBR-D31-DS-MOD D3.1 DS PHY	Downstream Frequency Range	SC-QAM: 45-1002 MHz	SC-QAM: 45-1002 MHz OFDM: 108-1218 MHz	RE Output Power Range	52 - 61 dBmV, N=1 (DRFI + 1)	61 - Ceil [3.6*log2(N*)] dBmV max per channel 52 - Ceil [3.6*log2(N*)] dBmV min per channel
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Upstream Frequency Range	5-85 MHz	5-204 MHz								
Modulation	ATDMA: QPSK - 64 QAM	ATDMA: QPSK - 64 QAM OFDMA: QPSK-4K QAM								
Physical specifications	Height: 13RU (22.75 in./57.78 cm) Width: 17.45 in. (44.32 cm) (no rack mounts) 17.65 in. (44.83 cm) with rack mounts installed. Overall Depth: 28.075 in. (71.3 cm) Weight: 429 lb (195 kg) maximum fully loaded									
Route processor	High Performance 64-bit Control Plane									
WAN backhaul	8 + 8 10GE WAN Ports and 80 + 80 Gbps WAN Backhaul									
Memory	48 GB expandable to 96 GB in the future									
Performance (forwarding)	200Gbps with features activated									

Description	Specification
Fan module	5 Fan Modules: <ul style="list-style-type: none"> • 2 high-efficiency fans per module • Variable-speed fans for optimal thermal performance • No single point of failure
Supported SFP	SFP-10G-SR SFP-10G-LR SFP-10G-ER SFP-10G-ZR SFP-10G-LRM
Power Requirements	
Redundant power supply	AC: Cisco cBR-8 supports N+1 (e.g. 3+1) or N+1 (e.g. 3+3) redundancy DC: Cisco cBR-8 support N+1 (e.g. 4+1) redundancy
Power input	Worldwide ranging AC (200-240V; 50-60 Hz; 16A maximum) Worldwide ranging DC (-40 to -72V; 50A nominal, 60A maximum)
Power consumption	Cisco cBR-8 Lifetime Facility Power Requirement: 9000W Cisco cBR-8 FCS Hardware Facility Power Requirement (D3.0): 7300W Cisco cBR-8 FCS Hardware Facility Power Requirement (D3.1) 7900W Cisco would be happy to provide typical power consumption for configurations of interest
Airflow	Front-to-back
Environmental Specifications	
Operating temperature (nominal)	32 to 104°F (0 to 40°C) sealevel
Operating humidity (nominal) (relative humidity)	5 to 85%
Operating humidity (short-term)	5 to 90% Note: Not to exceed 0.024 kg water per 1 kg of dry air
Storage temperature	-40 to 158°F (-40 to 70°C)
Storage (relative humidity)	5 to 95% Note: Not to exceed 0.024 kg water per 1 kg of dry air.
Operating altitude	-60 to 4000m
Reliability and availability	Supports Online Insertion and Removal (OIR) Supports Nonstop Forwarding (NSF) and Stateful Switchover (SSO) Supports In-Service Software Upgrades (ISSUs)
MIBs	Feature Parity with the Cisco uBR10K platform ^{1, 2}
Regulatory and compliance	Safety <ul style="list-style-type: none"> • UL/CSA/IEC/EN 60950-1 2nd Ed. - United States, Canada, Europe • AS/NZS 60950.1 - Australia • EN60825/IEC 60825 Laser Safety • FDA - Code of Federal Regulations Laser Safety Electromagnetic Emissions Certification <ul style="list-style-type: none"> • EN50083-2 - Europe • KN 22 Class A - Korea • FCC Part 15 Class A - United States • ICES 003 Class A - Canada • AS/NZS Class A - Australia • CISPR 22 Class A - Europe • EN55022 Class A - Europe • VCCI Class A - Japan • CNS13438 Class A - Taiwan • IEC/EN61000-3-2 Power Line Harmonics - Europe • IEC/EN61000-3-3 Voltage Fluctuations and Flicker - Europe Immunity <ul style="list-style-type: none"> • EN50083-2 - Europe • CISPR 24 - Europe • KN 24 - Korea • IEC/EN61000-4-2 Electrostatic Discharge Immunity (8kV contact, 15kV air)

Description	Specification
	<ul style="list-style-type: none"> • IEC/EN61000-4-3 Radiated Immunity (10V/m) • IEC/EN61000-4-4 Electrical Fast Transient Immunity (2kV power, 1kV signal) • IEC/EN61000-4-5 Surge AC Port (4kV CM, 2kV DM) • IEC/EN61000-4-5 Surge Signal Port (1kV) • IEC/EN61000-4-5 Surge DC Port (1kV) • IEC/EN61000-4-6 Immunity to Conducted Disturbances (10Vrms) • IEC/EN61000-4-8 Power Frequency Magnetic Field Immunity (30A/m) • IEC/EN61000-4-11 Voltage Dips, Short Interruptions, and Voltage Variations <p>Network Equipment Building Standards</p> <p>The system is designed to meet the following Networking Equipment Building Standards (NEBS):</p> <ul style="list-style-type: none"> • NEBS Level 3, Bellcore: GR-63-CORE, GR-1089-CORE <p>European Telecommunication Standards Institute (ETSI)</p> <ul style="list-style-type: none"> • EN 300 386 Telecommunications Network Equipment (EMC) • EN50083-2 Cable networks for television signals, sound signals and interactive services • EN55022 Information Technology Equipment (Emissions) • EN55024 Information Technology Equipment (Immunity) • EN61000-6-1 Generic Immunity Standard • EN61000-6-2 Generic Immunity Standard for Industrial Environments

* Some features and MIBs available in later releases.

** Additional MIBs for DOCSIS 3.1 to be determined at DOCSIS 3.1 release.

Ordering Information

To place an order, visit the [Cisco Ordering page](#).

Table 3. Ordering Information for Cisco cBR-8 Router

Product Description	Part Number
Cisco cBR-8 Converged Cable Access Chassis	
cBR-8 CCAP Chassis	CBR-8-CCAP-CHASS
cBR-8 AC Power Supply	CBR-AC-PS
cBR-8 AC PEM (AC Facility connectivity)	CBR-PEM-AC-6M
cBR-8 AC Power Tray where AC Power Supplies reside	CBR-AC-PWR-TRAY
cBR-8 DC Power Supply	CBR-DC-PS
cBR-8 DC PEM (DC Facility connectivity)	CBR-PEM-DC-6M
cBR-8 DC Power Tray where DC Power Supplies reside	CBR-DC-PWR-TRAY
cBR-8 Power Supply Blanks (for empty Power Supply slots)	CBR-PS-BLANK
Fan Modules (5 modules)	CBR-FAN-ASSEMBLY

Table 4. Ordering Information for Cisco cBR-8 Router Supervisor Modules

Product Description	Part Number
Cisco cBR-8 Supervisor Modules	
The Supervisor includes 200G forwarding capability as well as a robust and powerful control plane complex. The Supervisor ships with 48 GB of memory.	CBR-CCAP-SUP-160G
The Supervisory PIC includes WAN backhaul connectivity options	CBR-SUP-8X10G-PIC
Supported SFP+ Options:	SFP-10G-SR SFP-10G-LR SFP-10G-ER SFP-10G-ZR SFP-10G-LRM

Product Description	Part Number
Blank for an empty Supervisor Slot	CBR-SUP-BLANK
Blank for an empty Supervisor PIC slot	CBR-SUP-PIC-BLANK
Software Licenses For Cisco cBR-8 Supervisor Modules	
10G WAN license	CBR-SUP-10G-LIC

Table 5. Ordering Information for Cisco cBR-8 Router Interface and Modules

Product Description	Part Number
Cisco cBR-8 Integrated CCAP, Remote PHY line cards and Physical Interface Cards	
cBR CCAP line card includes 2 DS D3.1 modules as well as 1 US D3.1 Module.	CBR-LC-8D31-16U31
cBR CCAP line card includes 2 DS D3.0 modules as well as 1 US D3.0 Module. The line card is upgradable to D3.1 on both DS and US.	CBR-LC-8D30-16U30
cBR CCAP line card includes 1 DS D3.1 modules as well as 1 US D3.1 Module.	CBR-LC-4D31-16U31
cBR CCAP line card includes 1 DS D3.1 modules as well as 1 US D3.0 Module. The line card is upgradable to D3.1 on the US.	CBR-LC-4D31-16U30
cBR CCAP 40G Remote PHY line card	CBR-CCAP-LC-40G-R
cBR CCAP 8x10G Remote PHY Digital Physical Interface Card	CBR-DPIC-8X10G
cBR CCAP RF Through PIC (Connectivity to the RF Plant)	CBR-RF-PIC
cBR CCAP Protect PIC (for N+1 redundancy)	CBR-RF-PROT-PIC
cBR-8 RF Cables	CBR-CABLE-8X16
Software Licenses For Cisco cBR-8 RF Line Cards	
D3.1 DS License	CBR-D31-DS-LIC
D3.0 DS License	CBR-D30-DS-LIC
D3.0 US License	CBR-D30-US-LIC

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For More Information

For more information about the Cisco cBR-8 Converged Broadband Router, visit <http://www.cisco.com/go/ccap> or contact your local account representative.




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