Cisco Cloud Native Broadband Router

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The Cisco® Cloud Native Broadband Router (cnBR) transforms a cable network's headend, virtualizing hardware-based Converged Cable Access Platform (CCAP) services, delivering the advantages of web-scale operations in a resilient, elastic, and openly composable set of microservices.

Product overview

Cable networks are undergoing a major transformation, migrating from analog to digital systems, adding capacity and scale, and deploying new and improved service features to support the increasing needs of their customers. Replacing analog systems with digital devices such as Remote PHY and Converged Interconnect Network (CIN) routers and switches is a preparation for what is to come: the transformation of the cable headend. With a digital access network, cable services reliant on headend hardware are no longer tied to physical hardware-based solutions.

The Cisco Cloud Native Broadband Router is a fundamental rewrite of the CCAP, virtualizing the once hardware-based services with a truly cloud-native design, offering unprecedented service velocity, highly simplified operations, and economic scalability for profitably operating your network. Instead of lifting and shifting existing code from legacy hardware and placing it in the cloud to run as a virtual machine, the Cloud Native Broadband Router is a full software rewrite for CCAP-enabled services, built as a composable set of microservices that utilize standard tools such as Kubernetes for container orchestration and Docker for creating, deploying, and running containerized applications. The end result is a highly-scalable and resilient platform designed with automation in mind. Its API-driven architecture, developed for CI/CD DevOps workflow and intuitive and customizable dashboard have the goal of simplifying network operations and increasing feature deployment speed.

The Cisco Cloud Native Broadband Router utilizes Cisco Operations Hub (Ops Hub) as the single plane of glass dashboard to configure, monitor and operate the platform. Operations Hub follows the same cloud native principles with high-resiliency, microservices-based architecture designed to be fully customizable, leveraging best-in-class open source tools.

Features and benefits

Feature	Benefit
Cloud native	Composable, elastic, and resilient network services that optimize resource utilization and increase service velocity from ideation to revenue-generating deployments.
Microservices	Quickly develop, test, and deploy new services. Update features and functions without downtime. Autoprovision and scale services more efficiently. Highly resilient operation, thanks to small blast radius inherent in microservices.
Containerized software architecture	Each part is packaged in its own software container. Facilitating reproducibility, composability, transparency, and resource isolation. Enables highly efficient resource utilization, with granular and elastic scaling as well as fast recovery after a failure, thanks to a lightweight microservices-based design.
Streaming telemetry	Gain visibility into all aspects of system operation, in a lightweight fashion that minimizes resource effects.
Full lifecycle management	Simplify all aspects of the CCAP lifecycle, from initial deployment to real time monitoring, software upgrades, feature updates, and more.

Feature	Benefit
Single Pane of Glass	OperationsHub allows customers to manage multiple cnBR instances across multiple geographic deployments.
FD.io/Ligato.io-based data plane	High performance and flexibility for the network data plane using Commercial Off-The-Shelf (COTS) servers. Software written with versatility to rapidly adopt hardware innovations as they become available.
API-centric design	Simplify operations and begin automating with direct programmatic access to CCAP services and functions using open interfaces and tools.
Kubernetes container orchestration	Open-source cluster and container management, orchestrating server hardware resources to be efficiently shared with other cloud-native applications, virtual network functions, and general-purpose web services.
Open standards	Built with open-source software and tools for integrating with all ecosystems. Using open standards for software development makes the Cloud Native Broadband Router adaptable for new technology and the evolving needs of the network.
CI/CD software updates and upgrades	Enables software upgrades to be performed early and often in a seamless fashion without disrupting services. Continuously deploy new services and features early and often while minimizing risk with Canary deployments.
Hardware disaggregation	Compatible with bare metal and designed to be portable across multicloud environments.

Product specifications

CCAP capabilities	
CableLabs DOCSIS support	DOCSIS 2.0 DOCSIS 3.0 DOCSIS 3.1
DAA interface support	Remote PHY devices adhering to the CableLabs Remote PHY specification.
System visibility	Native streaming telemetry via Google Remote Procedure Call (gRPC) and other open-standards protocols. Exposed APIs to interface between the platform and 3rd party tools.
Health monitoring	Open telemetry collection and visualization system, including industry-standard hooks for extensions as well as easy integration into existing OSSs and BSSs. Prometheus for real-time metrics monitoring and alerting, as well as Grafana for visualization.
Automation/programmatic interfaces	Highly flexible and layered cloud-native system, lends itself to easy automation by allowing direct programmatic access using open interfaces and tools. Management APIs are REST-based and language-agnostic, continuously posted and updated to Github repositories.

Infrastructure	
Microservices orchestration framework	Kubernetes running on Linux
Container networking	Open-source interface based on FD.io and Ligato.io
Server requirements	System highly flexible and scalable, targeting optimizations for Intel Xeon Skylake-based CPUs and later
Service group capacity	Minimum of 40 service groups per recommended server cluster
Gbps capacity	Minimum of 40 Gbps per recommended server cluster

System requirements

CPU requirements	Minimum: Intel Xeon Broadwell-class E5 v4 Recommended: Dual-CPU Intel Xeon Skylake-class Gold with 20+ cores per CPU
Memory	Minimum: 384GB
Disk space	Minimum: 3.2 TB Recommended: 6 TB

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