



Transform Your Cable Access Network

Overview

Today, cable operators effectively maintain separate overlay networks to deliver their services—network services that have traditionally required dedicated equipment, management, and technical expertise. Operations also tend to be divided between applications running in a data center and the traditional services that rely on intelligence, manually distributed out to legacy analog equipment. Some operators find themselves managing multiple access networks (HFC, DSL, PON, wireless) making for a very complex balance between network operations and the agility for pursuing new business opportunities.

These networks are expensive to operate and require time-consuming, manually-intensive processes, resulting in substantial operational overhead. The built-in operational costs for power, cooling, and maintenance are also mounting as increased demand for services has necessitated additional equipment to be installed throughout the network.

Over time, the incremental additions for capacity and new services have created a system that is difficult to manage, change, and scale. Existing services have been built on top of a legacy infrastructure with stringent service level agreements. Managing, updating, upgrading, changing and/or scaling the network has become an extremely complex task—making even the most basic service updates and new service roll-outs slow. Accommodating new business opportunities (managed Wi-Fi, enterprise SD-WAN connectivity, mobile backhaul, etc) can be a cumbersome endeavor. And new revenue generating opportunities tend to come to market late or not at all.

Implementation tailored to your business

Cisco services can help you transform your cable access network to enhance and support new customer experiences, simpler operations, faster time to market, and profitable growth. To help you achieve your specific business goals, we deliver innovative solutions, unmatched expertise, and smart service capabilities using a collaborative partner approach.

Our intellectual capital, tools, experience, and expertise set Cisco Services apart from the competition. We have delivered successful plan, build, and manage services to all types of service providers around the world. Trust the success of your network operations to the worldwide leader in networking services and solutions.

How can cable operators compete and grow?

To break the cycle of proliferating bandwidth demand and declining revenues, cable operators need to change their business economics. Network services need to be more agilely deployable and less constrained by the physical layer. The underlying technical changes for transforming the cable network requires abstracting away complexity, automating previously manual processes, and scaling capacity using fewer resources.

This kind of transformation requires consolidating the access network into a single, standards-based, end-to-end IP framework. An all IP network supports the delivery of any and all services as well as flexibility for the future. By converging the network infrastructure, operators gain the ability to support provisioning and scaling of different types of services throughout their network, while freeing higher-level services from their traditional cable network ties to the complex underlying infrastructure.

Underlying access network resources would need to be virtualized so they can be elastically scaled and positioned where and when they are needed. Physical and virtual devices would need to work in unison and have programmable feature sets for adapting to network environments. And the overarching management framework would need to become massively aware of network states; proactively monitoring network health, provisioning new services and devices automatically, and remediating network issues as they occur.

Cable access network evolution

Cisco's comprehensive product portfolio provides a full migration path to help you establish a long-term, scalable network foundation. Our solutions are committed to interoperable standards, flexibility, and automation farther out into the cable network. You can evolve at your pace, taking pragmatic steps to evolve your access network today and lay a foundation for the programmable, all-IP, cloud-powered cable networks of tomorrow.

Cisco's cable access evolution solution incorporates four primary technology areas:

Physical Network infrastructure

- The Cisco cBR-8 is a hardware-based CCAP that converges DOCSIS data, MPEG video, and IP video services onto a single platform. The cBR-8 delivers up to 10 times the bandwidth of legacy CMTS platforms. Built for evolving cable network up to and beyond DOCSIS 3.1, the cBR-8 can integrate services throughout your network for years to come, without hardware overhauls.
- Cisco Remote PHY solutions boost capacity and lower costs by centralizing CCAP core functions, while distributing CMTS physical-layer QAM and OFDM modulation functions out closer to subscribers. There are two basic options:
 - Remote PHY shelf: Extends CCAP features and capacity from larger hubs to smaller sites
 - allowing you to streamline network function by eliminating the need for full-featured CMTS platforms in your smaller hub sites, freeing up

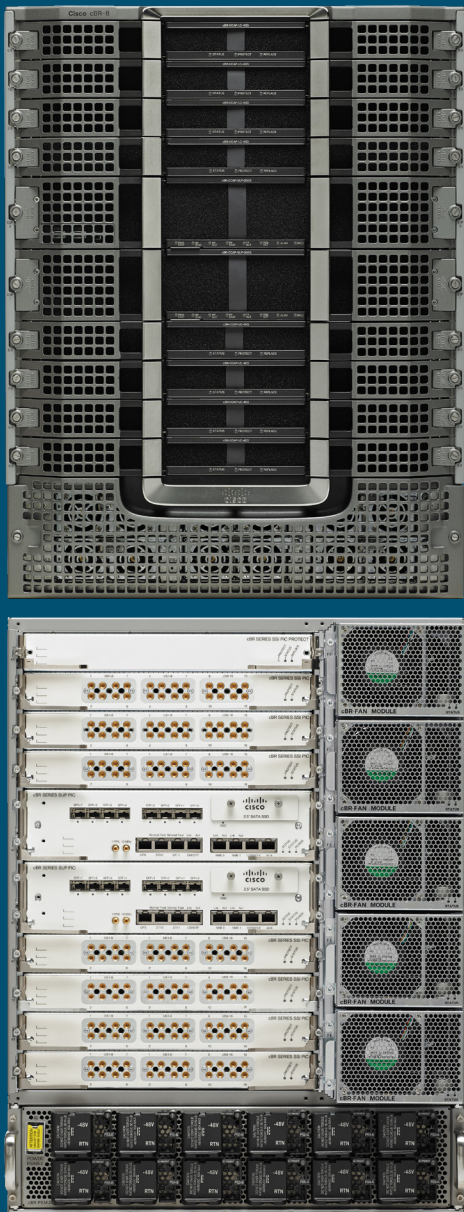
rack space and reducing power and cooling costs. At the same time, you gain scalability in the number of service groups those smaller sites can support well beyond your existing capacity.

- Remote PHY node: Enables the evolution to a fiber-deep architecture by extending digital fiber out closer to subscribers. With a Remote PHY node, you replace/upgrade analog HFC fiber nodes in the last mile with Remote PHY nodes connected to next-generation CMTS platforms at hub sites. Now you can eliminate the analog fiber network connecting hubs to nodes, replacing it with a more cost effective, higher-quality Ethernet network.

Cloud Native Broadband Router (cnBR)

With Remote PHY in place, your hub sites are simplified and you can begin transforming your network with the Cisco Cloud Native Broadband Router. Written from the ground up using open source standards, the Cisco Cloud Native Broadband Router virtualizes traditional CCAP hardware services with composable containerized microservices. Traditional CCAP and CMTS network functions can be run on bare-metal from a centralized or distributed data center in conjunction with other virtualized services. The Cisco cnBR is designed to be interoperable, allowing for blended environments, where operators can seamlessly mix and match physical and virtual solutions in different parts of the network. With Cisco, you can bring web-scale reliability, elasticity, scalability, and feature velocity to the cable access network.

Figure 1. Cisco cBR-8 platform



Network abstraction

Cisco provides industry-leading, standards-based network virtualization capabilities to free services from infrastructure dependencies. Using open standards and interfaces, services and applications can be designed at a high level and provisioned the same way: independently of the devices or last-mile networks that will deliver them. Services that once were tied to entirely separate infrastructures—CMTS, metro Ethernet, Wi-Fi, and others—are now just different applications running on the same unified network. The entire heterogeneous environment—physical and virtual devices, equipment from multiple vendors—can be addressed through a single orchestration layer that abstracts away the underlying complexity. Network Function Virtualization (NFV) and Software-Defined Networking (SDN) can be used to automate access network operations while adding resiliency and dynamic scalability. Elements of the access network that once required complex dedicated infrastructures become composable cloud resources, repositioned and scaled up and down as business needs dictate.

Management and automation

Cisco tools provide cable operators with mass awareness and proactive control throughout their networks. You can actively monitor the health, utilization, and capacity of your network while streaming real-time inventory and telemetry data from your infrastructure using open-source SDN. New applications that draw on Cisco network abstraction and orchestration capabilities can be used to automate the configuration of devices throughout your network and will drive down the time and costs of migrating to Remote PHY and establishing a robust CIN.

Evolving your cable network with Cisco lays the foundation for delivering new consumer and business services over a highly scalable, dynamically controllable, all-IP network. Whether providing business WAN connectivity, managed Wi-Fi, mobile backhaul, or other new revenue-generating services, you can provision any and all services over the your IP infrastructure. And, when you partner with Cisco, your network foundation is ready for cable innovations of the future, including full-duplex DOCSIS, segment routing, and doing network function virtualization right by going cloud native.

Cisco innovation: Remote PHY

With so much buzz in the marketplace around Remote PHY, it's easy to forget how it came about in the first place. But we remember, because the person who invented it, John T. Chapman, is the chief technology officer of our Cable Business Unit.

Chapman played a central role in the creation and ongoing development of the DOCSIS standard and invented the primary technologies that are the foundation for DOCSIS 3.0 and DOCSIS 3.1. He was inducted into the Society of Cable Telecommunications Engineers (SCTE) Hall of Fame for this work. And the Remote PHY architecture that's now standardized by CableLabs, as well as the open-source Remote PHY Software program, are based on his designs.

It's no stretch to say that the reason why standardized Remote PHY solutions are now possible is largely due to Chapman's work. His commitment to open-source development and industry standards continues to drive Cisco's efforts to fuel cable industry innovation.

Benefits

- Comprehensive network transformation capabilities, with an end-to-end product portfolio, top-to-bottom software integration, and security integrated throughout. No one knows DOCSIS and IP networks better than Cisco. Designed from the ground up to support DOCSIS 3.1, the Cisco® cBR-8 Converged Broadband Router supports multigigabit broadband services at a much lower Total Cost of Ownership (TCO) than Cable Modem Termination System (CMTS) solutions built on legacy DOCSIS 3.0 designs.
- Flexible and interoperable Remote PHY solutions (Remote PHY shelves and Remote PHY nodes) boost capacity and lower costs. Traditional CCAP functions can be easily centralized, and CMTS physical-layer Quadrature Amplitude Modulation (QAM) and OFDM functions can be distributed closer to subscribers.
- The Cisco Cloud Native Broadband Router (cnBR) solution allows you to transform your CCAP at your own pace, allowing you to mix and match physical and virtual CMTS solutions in different parts of your network, all while bringing web-scale reliability, elasticity, and feature velocity to the cable access network.
- Standards-based, cloud native approach to network virtualization for freeing services from infrastructure dependencies. Design services and applications at a high level and provision them in the same way: independently of the devices or last-mile networks that will deliver them.
- Easily monitor the health, utilization, and capacity of your network by streaming and collecting real-time inventory and telemetry data from your network infrastructure. Simplify and reduce the expense of digitalizing your access network with Remote PHY, using built in Smart PHY technology to automate and orchestrate your way through the migration.

Achieve infinite broadband with Cisco

Capacity and speed

Deliver multigigabit speeds and drive higher capacity for improved experiences over existing hybrid fiber-coaxial networks.

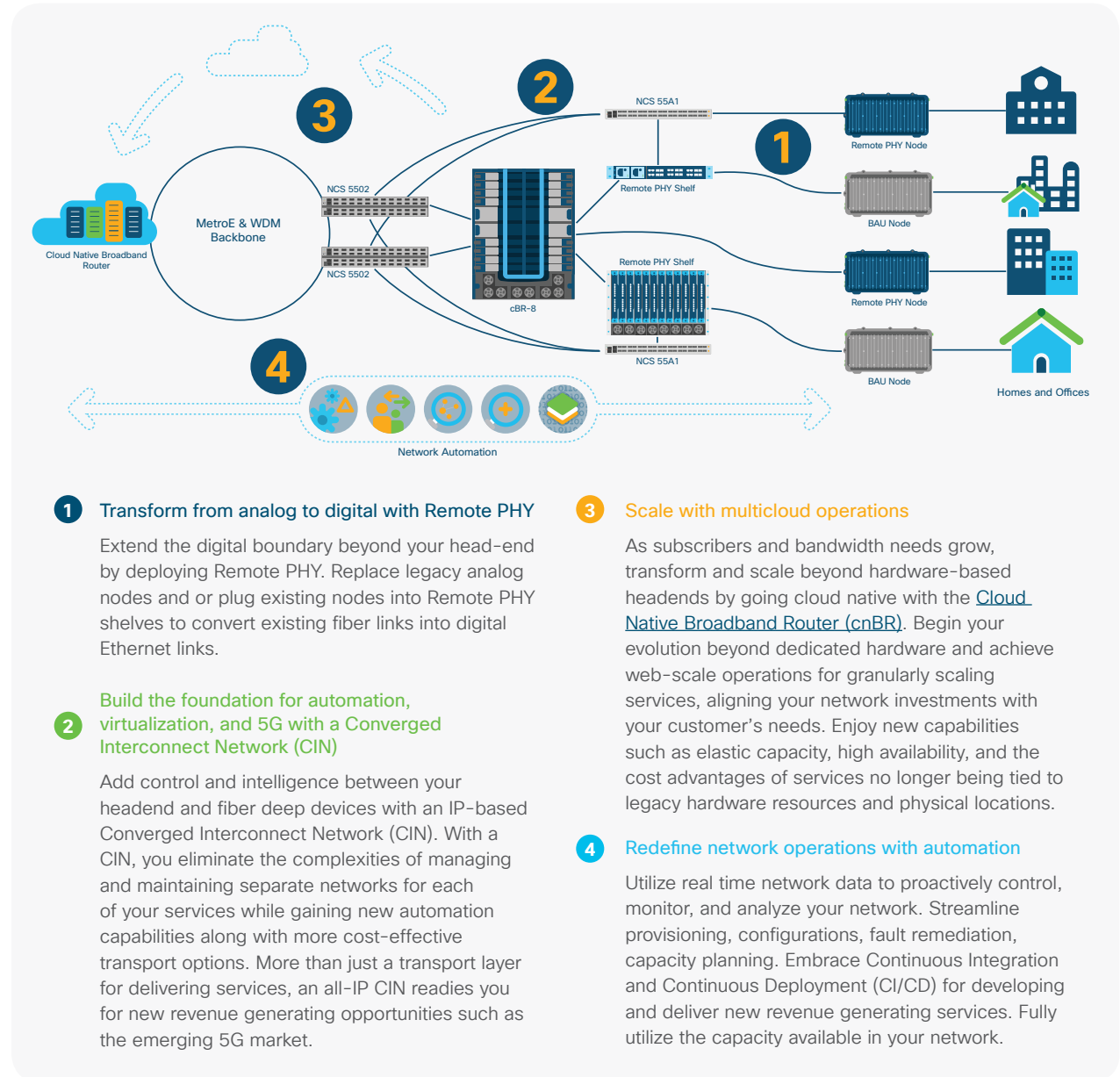
Simplicity

Abstract away the complexities of siloed physical and virtual infrastructures and operate all services as a seamless system, more easily, and at a lower cost.

Flexibility

Introduce new revenue-generating services and expand into new markets efficiently across an all-IP access network that connects every household and business customer.

Figure 2. Cisco cable access solution



Automation

Design innovative new services and experiences without worrying about dependencies on the underlying infrastructure. Provision services as elastically scalable applications that can be dynamically configured and positioned for business and customer demands.

Standardization

Cisco is committed to interoperability, open APIs, open standards, and open-source collaboration to preserve full flexibility and introduce new multivendor innovations in the future.

The Cisco advantage

Cisco's cable access solution provides cable operators with a platform for business transformation. Scale your network, develop and deploy new services, while delivering the high-quality experience your customers demand. Grow your business while you transform your network and enable new services like multigigabit broadband. Gain capacity, insight, and control of your fiber deep network with Remote PHY nodes and shelves and avoid the radical physical replacement of your existing HFC infrastructure. Turn your networks from analog to digital and make use of these new access technologies that support a fully virtualized, orchestrated, and cloud-scale operating model. Together, these products and technologies provide the cloud-scale flexibility and economics you need to differentiate and grow your business, allowing you to deliver any service, anywhere, quickly and automatically.

Cisco Capital

Cisco Capital® can help you acquire the technology you need to achieve your objectives and stay competitive. We can help you reduce CapEx. Accelerate your growth. Optimize your investment dollars and ROI. Cisco Capital financing gives you flexibility in acquiring hardware, software, services, and complementary third-party equipment. And there's just one predictable payment. Cisco Capital is available in more than 100 countries. [Learn more.](#)

Take the next step

Are you ready to drive down network complexity and reduce your operating costs? Find out how Cisco's cable access evolution strategy can transform your business. To learn more, contact your Cisco account representative or visit <https://www.cisco.com/c/en/us/solutions/service-provider/cable-access-solutions/index.html>.