Preparing for the High-bandwidth Future with Ciena's Ethernet solutions

One of Europe's leading multinational telecommunications companies replaces its disparate legacy aggregation networks with standardised Ethernet solutions from Ciena to maximise operating efficiency and scale services without limits

Challenge: Handling 30 percent year-on-year traffic growth cost-effectively

Cable operators are facing a massive challenge as traffic volumes continue to explode due to cloud computing, OTT video, 4G backhaul, IoT and other high-bandwidth use cases, putting their existing network infrastructure under pressure. In addition, many are operating a number of complex proprietary network infrastructures in different regions, increasing operating costs and impacting already constrained margins on key business and residential services.

These were the challenges for one of Europe's leading multinational telecommunications companies, and a top quad-play service provider. To remain competitive, and maximise revenues and margins, the company needed to evolve its traffic aggregation network to handle fast-growing traffic demands—while also minimizing network complexity and management costs.

As a further challenge, the international TV and broadband company has grown rapidly through acquisitions in recent years, creating a complex web of regional access and aggregation networks that were costly to run, complex to manage, and unable to scale to meet growing traffic demands. To reduce complexity and costs, the operator needed to replace a dozen or so regional networks with a standardised, highly scalable network architecture that could support the next generation of high-bandwidth and low-latency services.

Summary

Challenges
- Handling traffic growth cost-effectively
- Lowering networking costs
- Reducing management complexity
- Replacing multiple costly, disparate aggregation networks

Solution
- Next-generation Ethernet aggregation solutions
- Ciena's 8700 and 5100 family
- MCP domain controller
- Full integration with the MPLS core network and control plane
- Network functions centralised for 'service agnostic' networking
- End-to-end deployment support from Ciena Services

Benefits
- Reduced network complexity and costs
- Scalability on demand to 400G
- Ability to deploy multiple services on a single network
- Support for 'fibre-deep' networking that delivers bandwidth closer to customers
- A simple, efficient repeatable architecture for all operating areas

Solution: A standardised, repeatable, highly efficient aggregation solution from Ciena

To future-proof its operations, the quad play telecoms operator decided to implement a new, standardised Ethernet aggregation architecture in each of its operating regions—all built on Ciena's IP and Ethernet equipment.

The Ciena architecture has helped to simplify the network by replacing a large number of IP routers and legacy switches with fewer, more efficient Ethernet nodes. This process has also created a replicable blueprint for an aggregation network that could support residential traffic, B2B services, and mobile traffic. The Ethernet equipment is seamlessly integrated into Ciena's optical transport layer of the network, allowing Ethernet connections to be scaled on demand to 100G and beyond, with no need for additional network equipment.

The Ciena architecture is currently being used to support business Ethernet traffic, and additional IP protocols can be deployed centrally to support additional service types—such as residential broadband or mobile backhaul—if required in the future. These IP protocols are provided as centralised functions in the network, reducing the need for complex IP equipment and protocols on each and every network device.

The network architecture comprises the 8700 Packetwave® Platform at the head end, and the 5160 and 5170 Platforms. The 8700 'head-end' device uses 10G and 100G Ethernet interfaces to hand off traffic seamlessly to the PE nodes of the cable operator's MPLS core network. Each 8700 supports multiple regional ring networks that use the 5160 and 5170 at hub locations on each ring. All elements of the network are managed by Ciena's Manage, Control and Plan (MCP) domain controller.

Already, the operator has implemented the simple, repeatable network architecture in six key regions, with another six currently being rolled out. The company is now planning to deploy the same Ciena architecture in other areas of its business and in other countries and regions as required.

Results: Scalability on demand, with lower network operating costs and flexibility to support future converged services

With a simple, repeatable Ethernet architecture and 'right-sized' IP functions to support key services, the cable operator has successfully reduced the cost and complexity of its network operations. The new architecture is helping to decrease the size and variety of access and aggregation networks and limit the requirements for multiple complex, costly routers.
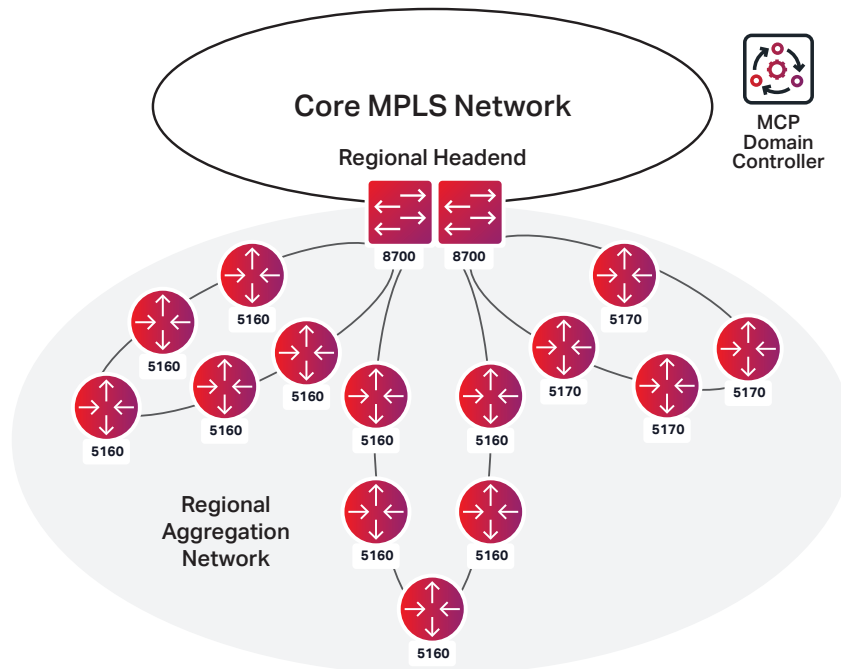

Figure 1. Ciena's standardised, highly efficient Ethernet ring architecture is based on a pair of 8700 head-end devices and a series of 5160/5170 Ethernet switches in a ring configuration. The same Ciena architecture is being implemented in a total of 12 network 'regions'.

The operator can also scale its network programmatically on demand to prevent future equipment sprawl and to take rapid traffic growth in stride.

With its network refresh almost 50 percent complete, the cable operator is now planning to deploy the Ciena architecture in other countries across Europe to further simplify its operations. The outcome will be an efficient, standardised networking model that is capable of scaling rapidly to meet future traffic and service demands.

Distributed Access Architecture (DAA)

The Ciena architecture also provides a framework for future plans to extend the network edge closer to customers based on a 'fibre-deep' network model with a solution that carries cable access features seamlessly (including DAA, R-PHY, and R-MAC/PHY).

With the Ethernet aggregation network in place, the cable operator can now choose to deploy additional Ethernet equipment in street cabinets and other locations much closer to end users. This enables savings on data centre costs and the removal of legacy equipment between data centres and street cabinets that are expensive to maintain, while also maximising service performance for low-latency applications by bringing bandwidth closer to where it's needed.

Finally, but equally important, the cable operator is future-proofing its business based on the centralisation of key network functions.

If the cable operator decides to support an additional service on the network in the future—such as residential broadband or mobile backhaul—Ciena can deploy the required IP protocols and functionality centrally, rather than deploying a modular IP stack on all devices across the network. That means they can use lower-cost network equipment and still converge multiple services on a single network if needs change in the future. They can also bring new services to market faster to maximise their competitive advantage and market share—all excellent reasons for deploying a next-generation Ethernet aggregation network from Ciena.

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As traffic continues to increase exponentially, the cable operator will be able to scale their network cost-effectively to 100G and beyond with no need for additional network equipment. Highly scalable Ethernet connections mean the company can maintain a smaller network footprint and minimise their equipment, real estate, power and cooling and maintenance costs— with obvious advantages for the bottom line.

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