Asia-Pacific carrier-neutral provider expands network coverage with application-optimized optical line systems that provide ultra-scale, flexibility and resilience

Case study

Needs and opportunities

In a world dominated by cloud and digital experiences, businesses need platforms and network infrastructures that can boost the next wave of digital transformation and new-age technologies. This need is evident in the highly populated, technology-forward Asia–Pacific region.

A pioneering carrier-neutral provider (CNP) in one of the region's largest markets has a clear vision for addressing this need:

- Create a world in which the digital business ecosystem experiences seamless, uncompromising network connectivity
- Provide world-class connectivity infrastructures that enable enterprises to accelerate their digital transformation

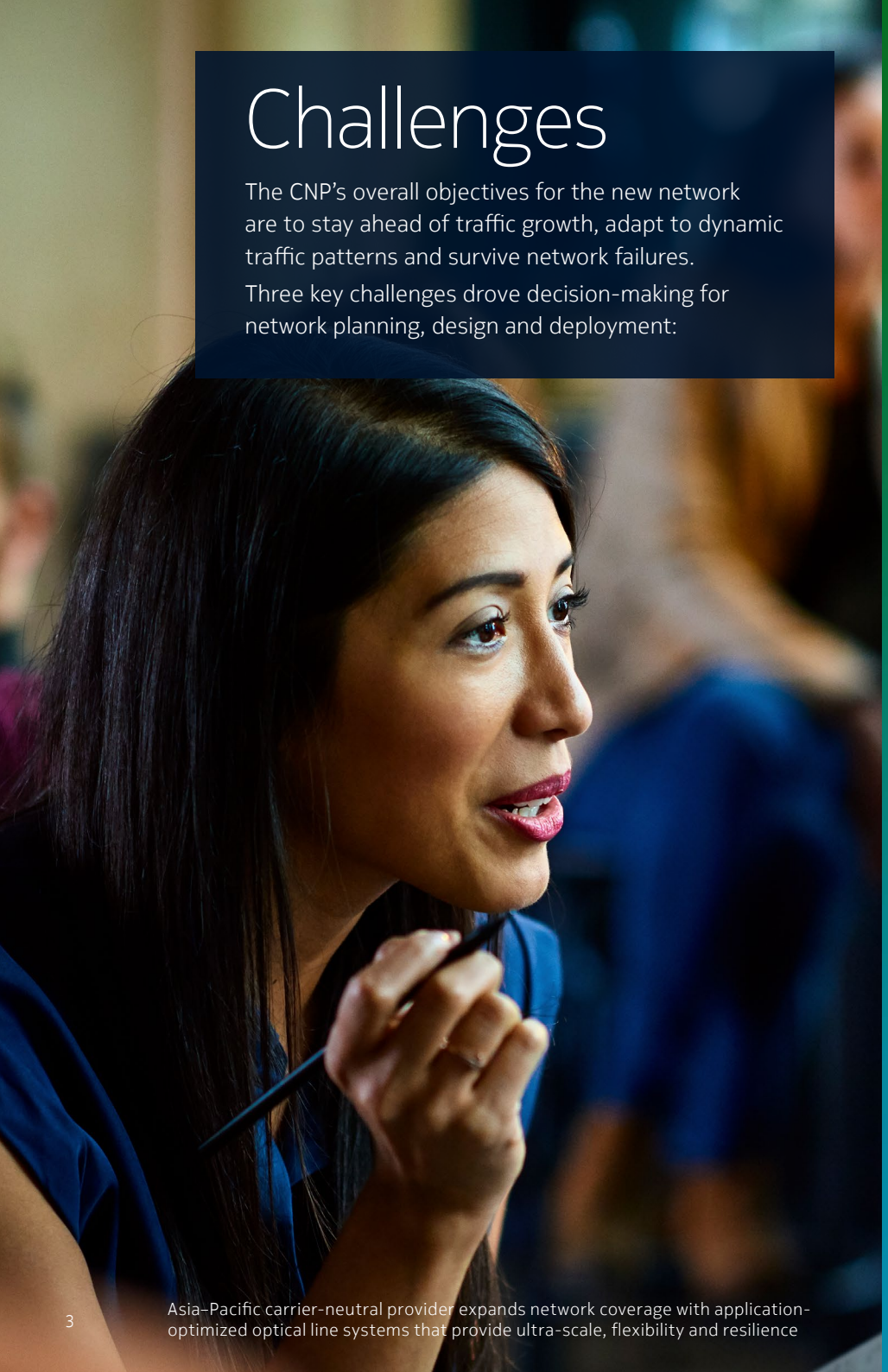
However, the nation's existing network infrastructure could not provide the bandwidth, agility and reliability required to meet growing cloud and data connectivity demands. This created an opportunity for the CNP.

The CNP addressed this opportunity by building the region's first carrier-neutral platform, based on a scalable, utility-grade resilient fiber network that connects five major economic hubs. As a provider of internet exchange, data center interconnect, cloud connect, network-as-a-service, and NOC-as-a-service offerings, the CNP is a trusted partner to several Fortune 500 companies. To meet continuing demands, it is building out new metro, national long-distance and international gateway networks.

Challenges

The CNP's overall objectives for the new network are to stay ahead of traffic growth, adapt to dynamic traffic patterns and survive network failures.

Three key challenges drove decision-making for network planning, design and deployment:



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1

Seamlessly and cost-effectively maximize network capacity

Bandwidth demand is growing exponentially, driven largely by bandwidth-intensive video-based consumer services and the increasing compute, storage and interconnectivity requirements of enterprises. What's more, transport networks are approaching the Shannon Limit of capacity and spectral efficiency, which limits capacity growth in the C-band.

2

Manage network bandwidth management more flexibly and simplify network architectures and operations

Dynamic and high-performance services such as 5G, cloud services and Internet of Things (IoT) connectivity are complicating network planning and challenging network agility. Emerging applications and services driven by artificial intelligence (AI), machine learning (ML) and augmented reality (AR) will increase stress on inefficient network infrastructures and operations.

3

Maximize service uptime and optimize network resource utilization

Quality of experience, or QoE, is the new QoS because what we learned through the pandemic is that all services—from enterprise to Industry 4.0 to working from home over the internet—are "mission-critical." Customers do not accept downtime.

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Solution

The CNP extended its partnership with Nokia to expand network coverage in the eastern and northern regions of the country.

Nokia 1830 Photonic Service Switch (PSS) optical transport platforms provide a foundation for the network. They incorporate Nokia Photonic Service Engine Super Coherent (PSE-s) optics to boost total capacity to multiple terabytes.

To meet its key challenges, the company uses the Nokia application-optimized optical line system solution to maximize critical network scalability, flexibility and resilience.

Key enabling components:

- 1830 PSS-8 (access/metro), 1830 PSS-16II (metro/regional/long-haul) and 1830-24x OTN/WDM (core) platforms supported by common hardware and a common management system
- 1830 PSS-8 (access/metro) and 1830 PSS-16II (metro/regional/long-haul) platforms supported by common hardware and a common management system
- PSE-Vs Super Coherent optics with 600G muxponders and n x 10G multiprotocol muxponders to optimize capacity, reach and networking efficiency
- Integrated ROADMs (iROADMs) with modular C+L-band and CDC-F configurations to double fiber capacity and provide dynamic, reconfigurable networking
- Layer 0 GMPLS intelligent control plane with bidirectional switching protection and restoration capabilities to maximize network uptime
- Nokia integration and consulting services to ensure seamless and timely deployment

Application-optimized optical line system solution

Seamless scalability: Modular and integrated C+L-band DWDM options enable the solution to double fiber capacity. The modular optical line system solutions allow the CNP to scale network capacity with selective C+L upgrades—link by link, node by node or degree by degree. When the CNP requires additional capacity, it can simply upgrade ROADM and inline amplifier (ILA) sites with additional L-band modules.

The modular C+L solution also offers an option to install combined C+L nodes at ILA sites during the initial deployment stage without needing to revisit them for future upgrades. When the CNP expands capacity, it only needs to upgrade ROADM sites with additional L-band equipment. This saves time and money and reduces truck rolls to multiple sites.

Both modular options allow the CNP to avoid the cost of leasing additional fiber pairs, reduce operating costs and minimize future network disruptions.

The Nokia 1830 Integrated C+L line system can maximize fiber capacity in a single deployment to ensure maximum density and operational simplicity. It integrates the C- and L-band components into a single, managed continuous solution for ROADM and ILA functions.

Benefit: Cost-effectively and seamlessly install and expand network capacity to optimize CAPEX and reduce OPEX

No-compromise flexibility: Nokia offers a range of optical line system solutions to provide the capacity, reach and flexibility required for access, metro, regional, long-haul and subsea applications. The Nokia 1830 family supports WDM optical line system functions in telco-optimized chassis and compact modular data-center-optimized chassis.

These application-optimized, no-compromise solutions provide a full suite of iROADMs to support small, low-degree, low add/drop nodes and large, high-degree, high add/drop nodes. The CNP can choose the ROADM configurations that best address its needs—from classic fixed-port, static-wavelength ROADMs to dynamic CDC-F ROADMs. FlexGrid ROADMs and multiple configuration options use evolving coherent DSP modulation schemes. This makes them key building blocks for using network automation to meet dynamic traffic needs. Advanced C-F and CDC-F FlexGrid ROADMs with flexible add/drop options enable dynamically reconfigurable networking that can autonomously deploy, optimize and restore wavelengths.

By taking advantage of common, interoperable hardware and management across data center- and telco-optimized platforms, the CNP will be able to maximize deployment flexibility and simplify its operations and sparing plans.

Benefit: Maximize network bandwidth agility and simplify architectures and operations to reduce OPEX and maximize revenue generation

Ultra-resilience: Nokia application-optimized line system solutions will help the CNP maximize network uptime to increase reliability. Optical layer restoration and protection options help ensure high network reliability for mission-critical services.

The solution offers application-driven network resilience options. One option is to implement Layer 0 1+1 protection switching that provides ultrafast <50 ms wavelength switching on reserved dual paths. A second option is to implement optical layer restoration with the ability to automatically reroute and restore traffic around network faults using CDC-F and GMPLS—thus avoiding a 50 percent capacity penalty. A third option combines protection switching with optical layer restoration for the ultimate mission-critical service assurance capability.

Benefit: Maximize network availability and service uptime, and optimize network utilization to adhere to service-level agreements (SLAs) and maximize revenue generation

Why this CSP chose Nokia

A scalable, flexible, resilient solution

- Application-optimized optical line systems based on industry-leading C+L-band solutions, iROADMs and proven critical-network protection options
- 1830 PSS platforms supported by common hardware and management systems versus inflexible one-off, one-size-fits-all line systems
- PSE-Vs Super Coherent optics that enable future-proof evolution to PSE-6s when needed

Professional integration and consulting services

- Experienced in planning and deploying the world's largest networks

A proven and reliable partner

- The preferred, leading optical networking partner to the top CSPs, CNPs and webscale companies in the region and globally
- An unmatched performance record as the leading supplier for metro, regional and national long-distance networks based on WDM, OTN, C+L and layer 0/1 protection

Learn more about Nokia optical solutions at
https://www.nokia.com/networks/optical-networks/

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About Nokia

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering networks that sense, think and act by leveraging our work across mobile, fixed and cloud networks. In addition, we create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs.

Service providers, enterprises and partners worldwide trust Nokia to deliver secure, reliable and sustainable networks today – and work with us to create the digital services and applications of the future.

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