Asia Pacific operator modernizes national optical network to increase scale, agility and availabilty

- Solution easily scales using dual C+L band CDC-F ROADMs capable of doubling capacity

- New network provides bandwidth-efficient grooming with up to 48 Tb of switching capacity

- Multi-layer OTN and ROADM network reduces TCO through improved bandwidth management

- A Multi-Region Network architecture with GMPLS intelligence increases network resiliency and agility

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Challenges and opportunities

A large tier-1 operator in the Asia Pacific region was looking to modernize its extensive optical network to address growing traffic demand arising from its wireless, fiber broadband and enterprise services. In doing so, the company was looking to improve its network with the latest technologies and innovations to provide better services to customers.

Three key business and technical objectives drove its optical network transformation initiative:

1. **Scale the network to meet new demands:** The operator needs to address rapid data growth fueled by increasing broadband network penetration, more affordable devices and services, and new digital use cases. Mobile data usage has reached 10 exabytes per month, partly driven by its affordable data plans. Data usage will grow even more as the company rolls out its 5G service nationwide.

2. **Improve the user experience:** The operator wants to build a feature-rich DWDM transmission network that will ensure high service quality and a differentiated user experience for its nationwide 4G, 5G and FTTx broadband services.

3. **Increase network resiliency and agility:** The company wants a platform that will enable it to quickly and cost effectively deploy optical backbone, metro core and access DWDM functionality. This platform must also be highly resilient to minimize service disruptions and ensure high availability.

Solution

The operator is focused on modernizing its national WDM network from the metro access/core to regional and nationwide long-distance core nodes. It aims to dramatically boost network capacity and speed, ensure more reliable service for its customers and help implement the government's vision to bridge the digital divide.

The company is deploying Nokia optical transport solutions to enhance network capacity and reliability across its nationwide footprint. These new solutions allow it to offer innovative, high-capacity digital services to underserved regions, along with a nationwide long-distance (NLD) service.

The operator has deployed the Nokia 1830 Photonic Service Switch (PSS) and 1830 Photonic Service Interconnect (PSI) product families across multiple network layers, from metro access to the core. In the NLD core, the deployment includes high-capacity packet optical transport network (P-OTN) switches (1830 PSS-24x) that can scale switching capacity up to 48 Tb. These platforms rely on the Nokia PSE-V Super Coherent Digital Signal Processor (PSE-Vs) to optimize capacity/reach with support of line rates up to 600 Gb/s.

The solution also uses a Multi-Region Network (MRN) architecture that provides proven Layer 0 control plane capability across the network layers (CD/CDC-F C/CDC-F C+L) with GMPLS intelligence to support capacity management and restoration. The deployment ensures that the company will be able to meet the changing needs of its customers well into the future.

Benefits and advantages

The operator is modernizing its optical transport network with Nokia optical equipment to improve scale, flexibly accommodate growing bandwidth demand and changing service requirements, and drive out cost through operational efficiencies.

The company has chosen power- and footprint-optimized Nokia 1830 PSS equipment that offers rates of 100G and beyond at metro access sites. The 1830 PSS also supports CDC-F ROADM technology that enables maximum reconfigurability, scalability and future-proofing at metro/regional core and NLD core sites.

The operator uses high-capacity Nokia 1830 PSS-x OTN switches within the NLD core to enable service aggregation, traffic grooming and service differentiation with rich performance-monitoring capabilities in support of strict service-level agreements (SLAs). The Nokia equipment is powered by advanced digital coherent optics (DCOs), including Nokia PSE-Vs. The PSE-Vs offers high-performance capacity/reach, including support for 400G clients over any distance. It will support future upgrades to the Nokia PSE-6 as needed.

The network uses an intelligent GMPLS control plane at the optical layer (Layer 0) to unlock benefits such as:

- Increased scale

- More flexible control of optical resources, including wavelengths

- Improved agility through real-time traffic and performance optimization

- High availability through efficient protection and restoration mechanisms.

An MRN architecture brings superior scalability and flexibility to the deployment. The multi-layer OTN and ROADM network helps reduce TCO by supporting a layered approach to bandwidth management. This approach enables savings at the electrical layer (Layer 1) through better grooming, which results in fewer interfaces, fewer wavelengths and lower power consumption. At the same time, it takes advantage of photonic bypass and restoration at Layer 0 to help offload traffic from the core OTN switches. The company can improve its ability to monetize services by using Layer 0 restoration with Layer 1 service granular SLAs to ensure that customer service requirements are met.

Why the operator chose Nokia

To learn more about Nokia optical solutions, visit
https://www.nokia.com/networks/optical-networks/

The operator chose Nokia because its market-leading optical network products and solutions provide the scale, operational simplicity and performance required to address growing demand for mobile (4G/5G), fiber broadband and enterprise services. They can also enable new services that will bring more value to the company and its customers. Several key factors contributed to the decision:

- **Scalability, operational ease and performance**: The Nokia solutions will enable the operator to keep pace with demand across its extensive network (i.e., control plane scaling to handle thousands of network elements).

- **Fast and easy service introduction**. The Nokia solutions will enable the operator to build a service-centric network.

- **Advanced photonic service engines**: The Nokia PSE-Vs maximizes performance and supports cutting-edge technology such as probabilistic constellation shaping, continuous baud rate adjustment and advanced forward error correction (SD-FEC).

- **Reduced network costs and power consumption per bit**: The Nokia optical systems can transport high-capacity client traffic (200G–600G) over long distances.

- **Improved bandwidth management**: The Nokia solutions support a multilayer network (Layer 0/1) that optimizes network resource usage, enhances network resiliency and boosts availability.

- **A future-ready network**: The Nokia solution provides highly scalable core OTN switches (with up to 48 Tb of switching capacity) and dual C+L band CDC-F ROADMs capable of doubling capacity.

- **Highly accurate frequency and phase/time synchronization**: The Nokia solution meets the stringent synchronization requirements of 5G cell sites.

- **Increased network resiliency and agility**: The Nokia solution by an MRN architecture with GMPLS intelligence.

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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.