



FSP 3000 OpenFabric™ traffic grooming solutions

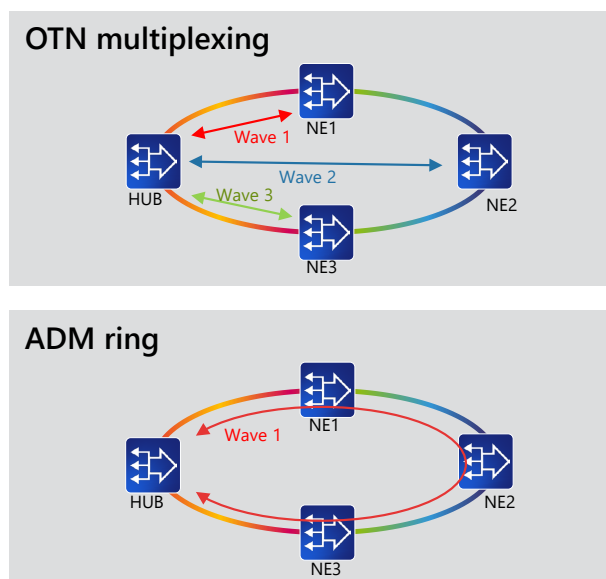
Open and innovative OTN switching for next-generation metro networks

Highlights

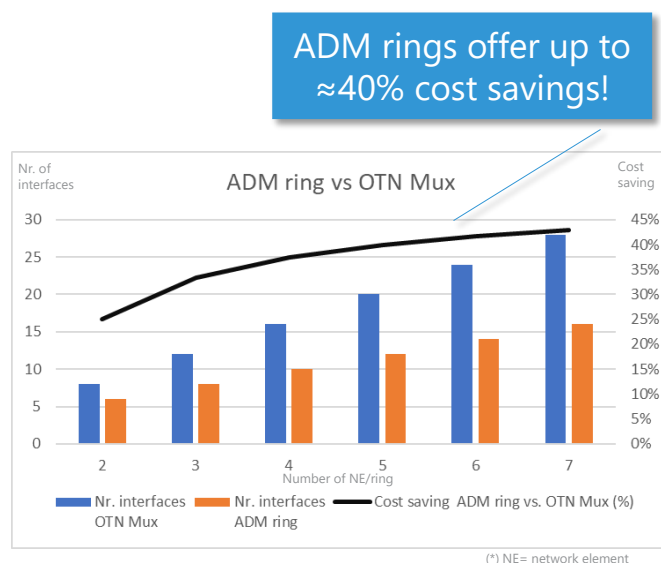
- Open and disaggregated grooming solutions that maximize fiber use capacity
- Compact design on a card engineered to meet metro network demands
- Easy upgrade of legacy networks to leverage coherent pluggable technology benefits
- Scale as and when needed, and get maximum profit from your network infrastructure

The need to grow transport capacity at lowest cost per bit is driving the adoption of higher wavelength speeds in metro networks. However, today's metro and aggregation networks still need to transport a significant number of low-speed client services, which causes severe bandwidth inefficiencies with high-speed wavelengths. OTN switching is an effective technology for grooming low-speed services onto high-speed wavelengths. But metro networks need an OTN switching solution specifically designed to meet metro network demands.

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Use case example: hub and spoke ring with protected traffic. Comparison of number of interfaces and cost savings vs. number of nodes per ring



Metro networks have particular needs

Low-speed services continue to be predominant in metro networks and will coexist with high-speed services for some time. A common solution to this problem is to combine OTN switching with high-capacity DWDM to groom low-speed services into higher-speed wavelengths. But what seems to be a simple answer often creates difficulties, since classical OTN switching solutions are not efficient for metro networks. Their size and cost, coupled with a closed design with a cumbersome system of adapters, cables and backplane connectivity, make it difficult to respond quickly and efficiently to any changes. Metro networks need a grooming solution engineered to meet their specific demands in terms of cost, size, flexibility and operational simplicity. What's more, it must be open and ready to accommodate technology innovation.

Add/drop multiplexing (ADM) rings

One of the most common traffic grooming solutions consists of multiplexing low-speed services with the same start and end nodes into a higher-speed wavelength. This is optimum in applications with static traffic demands and high fill-in rates. However, if not, this approach leads to partially filled wavelengths, with the consequent waste of transport capacity. Furthermore, if traffic patterns often vary, this requires tedious on-site changes in the configuration of the network elements. Within these scenarios, it's more efficient to create ADM rings using OTN switching. This means, collecting the traffic into a single wavelength interconnecting all network elements. The figure below compares the cost of implementing a classical aggregation ring with both grooming options. The scenario with OTN multiplexing requires one partially filled wavelength between each site and the hub node. In the scenario with an ADM ring, all traffic is collected into one single wavelength so that the full wavelength capacity is used. Despite the need for additional interfaces in the add/drop nodes, the overall number of interfaces is lower compared to the multiplexing option, since the number of interfaces in the hub is independent from the number of sites, as long as wavelength capacity is not completely filled. The cost benefits increase with the number of nodes.

Open and innovative OTN switching for next-generation metro networks

Grooming minimizes cost per bit

The combination of OTN and DWDM enables the transport of multiple and different types of services (from legacy to the latest protocols) into a common wavelength. This client flexibility and data transparency makes it the ideal solution to evolve legacy networks. What's more, grooming low-speed traffic into higher-speed wavelengths maximizes fiber usage and minimizes cost per bit. And the benefits go beyond metro networks. Grooming traffic close to the transition to the core network reduces the number of high-speed interfaces in the hub. This saves capital and operational expenses.

FSP 3000 OpenFabric™ Series

Our FSP 3000 OpenFabric™ Series provides an open, compact and cost-efficient OTN grooming layer engineered to meet current and future metro and aggregation network demands. Its design concept is based on a single card with a fully open and flexible front plane with standard pluggable interfaces. The open architecture without backplane connectivity restrictions enables the direct connection of client services in a pay-as-you-grow approach. This offers maximum openness, flexibility and scalability with minimum cost and footprint, and makes OpenFabric™ ideal for open metro network infrastructure. Designed to meet metro and aggregation network demands, the OpenFabric™ Series offers several card variants, with 400Gbit/s (OpenFabric™ and OpenFabric+™) or 1200Gbit/s interface capacity (OpenFabric1200™) and optional Layer 1 encryption (CryptoMux™ and CryptoMux+™).



OpenFabric™/
CryptoMux™

OpenFabric+™/
CryptoMux+™

OpenFabric1200™

OpenFabric™ Series

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OpenFabric1200™ : Terabit ADM on a card

With 1200Gbit/s interface capacity per card, multi-service support and two CFP2 coherent pluggable interfaces supporting up to 400Gbit/s, the OpenFabric1200™ is the ideal solution to easily upgrade metro and aggregation networks for the 400G era. This innovative switchponder integrating DWDM and OTN switching technology on a card supports OTN and Ethernet services from 10Gbit/s up to 400Gbit/s with a wide range of pluggable interfaces. It can work in multiple operation modes: as multi-service ADM, muxponder and OTN cross-connect. Furthermore, OpenFabric1200™ can also work in a dual-card

configuration to increase switching and interface capacity. This outstanding flexibility enables customers to make changes in the network configuration without having to invest in new DWDM equipment. What's more, OpenFabric1200™ leverages the benefits of the widely used CFP2 coherent pluggable modules, including OpenROADM 3.0 compatible devices. Among other benefits, these pluggables provide long reach performance and the support of OTN services. OpenFabric1200™ opens the door to the benefits of open, disaggregated environments and the latest coherent technology.

