Long Haul Network Extension to the Metro Edge

OVERVIEW

Core optical networks are experiencing expansive bandwidth growth driven by numerous end user applications, including 3G wireless data services, residential broadband data and video, and a range of Business-to-Business (B2B) and Business-to-Consumer (B2C) applications. Carriers deploy long haul network solutions according to scalability, reach, networking flexibility and operational criteria to optimally meet the needs of their individual networks and customers.

Metro networks extend connectivity from the core network to the edge and provide aggregation for a wide range of end user services within cities, but also in rural applications in support of broadband deployments to areas currently underserved by broadband access. SONET/SDH ring networks are deployed widely for many metro applications, although, increasingly metro WDM solutions are deployed to enable greater scalability and efficient high capacity Ethernet transport. Metro WDM platforms must support a wide range of services to support legacy requirements as well as future needs. CWDM solutions provide typically 8 wavelengths of capacity while DWDM solutions enable greater scalability to 40 or more wavelengths. ROADMs are deployed in many metro applications where large node count rings and high traffic capacity justify additional equipment costs compared with fixed filter optical networks.

Optimum metro WDM transport solutions conserve space and power while providing flexible configuration options to meet the varying metro topology needs including efficient service aggregation onto wavelengths and integrated network protection to support high availability services. In addition, operators are increasingly focused on operational features to simplify planning, deployment and management of networks.

APPLICATION

Figure 1 shows a metro network extension using the new Infinera ATN platform. The long haul network is implemented with DWDM transport equipment and extends Nx10Gbit/s transport over regional or national distances. The Infinera DTN digital transport platform in the long haul application provides unique benefits and enables specific, integrated solution capabilities when used with the ATN platform. Typically the long haul solution will support 80 or even 160 wavelengths and will provide 2.5Gb/s, 10Gb/s and 40Gb/s client interfaces supporting a wide of protocols.

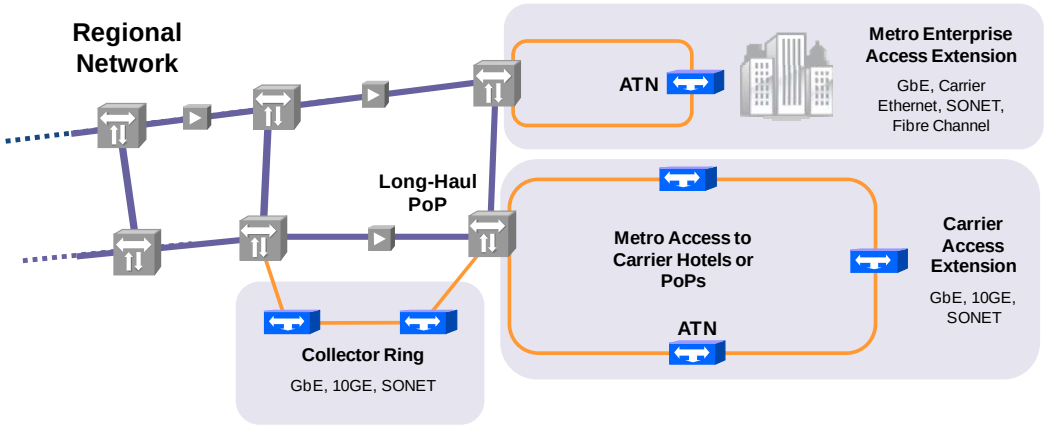

Figure 1. Long Haul Network Extension.

The metro extension provides connectivity from the long haul PoP to the metro end points, including large enterprise premises, data centers, carrier hotel locations and aggregation or edge offices. Service types aggregated at the metro edge typically include, OC3/12/48 SONET interfaces, GbE/10GbE along with SAN services in many cases.

Metro extension applications require flexible equipment configurations to cost effectively support a range of different physical network topologies, differing end user types, and varying service and bandwidth demands. CWDM/DWDM options and flexible filter and optical amplifier options are key features to meet these requirements. In addition, multi-service transponders and muxponders are required to efficiently aggregate multiple services with a minimum number of transponder types and also to provide high availability through integrated, fast network protection.

Figure 1 also shows the application for a subtended ATN collector network providing service aggregation over an extended region. This application is characteristic of a regional aggregation network interconnecting to a long haul network. It may also be used to interconnect distinct regional or long haul networks owned by different operators. Both these applications require a WDM platform providing efficient multi-service transport, bandwidth scalability and simplified network planning and turn-up.

The Infinera ATN system is a new market leading platform that delivers key benefits to operators seeking an optimum solution for metro extension applications. Attributes of the Infinera ATN platform for these applications include:

- Delivers very high density and power efficiency in a compact 19" wide 3RU chassis.
- Provides flexible optical configurations that support optimization across varying topology and traffic demands.
- Offers a wide range of multi-service, all-pluggable line cards enabling efficient wavelength utilization for all service types with a minimum number of orderable parts.
- Supports extension of long haul network services, including OC48/STM16, OC192/STM64, 10GbE Ethernet, OTU1, OTU2, OTU2e including rich OTN functionality.
- Utilizes an intelligent control plane that simplifies operations while minimizing manual configuration.
- Delivers a carrier class, high availability network solution with comprehensive end-to-end network management.

INFINERA ATN

The Infinera ATN shown in Figure 2 is a new metro-optimized CWDM and DWDM platform designed for cost-effective WDM transport and multi-service aggregation in metro networks. The ATN extends Infinera's digital optical networking benefits into the metro environment by providing a small form-factor, cost-efficient wavelength-granular add/drop system that interoperates with Infinera DTN. It is designed to support up to 40 DWDM wavelengths or up to 8 CWDM wavelengths and support a range of add/drop services ranging from 100Mb/s up to 10Gb/s. The ATN can be managed through an ATN Graphical Node Manager (GNM) and the Infinera Digital Network Administrator (DNA) to provide consistent, simple operations with other Infinera products with end-to-end service provisioning.

Figure 2. Infinera ATN Metro Edge Platform.

ABOUT INFINERA

Infinera provides Digital Optical Networking systems to network operators worldwide. Infinera's systems are unique in their use of a breakthrough semiconductor technology: the photonic integrated circuit (PIC). Infinera's systems and PIC technology are designed to provide customers with simpler and more flexible engineering and operations, faster time-to-service, lower latency, and the ability to rapidly deliver differentiated services without reengineering their optical infrastructure. For more information, please visit http://www.infinera.com/.