

NTT West Delivers World's First Field connectivity test using C+L band Coherent pluggable optics with Cisco in Osaka

- Empowering Sustainable Network with High-Capacity and Low-Power Consumption -

Osaka, Japan, March 19, 2025 — Nippon Telegraph and Telephone West Corporation (NTT West) and Cisco Systems G.K.(Cisco), the worldwide leader in networking and security, have successfully completed the world's first field verification with C+L band coherent pluggable optics (*1) over 60 km distance in Osaka. This groundbreaking achievement marks a significant advancement in creating sustainable networks with high-capacity and low power consumption.

By adopting Cisco coherent pluggable optics, NTT West can reduce the number of devices needed even in C+L band high-capacity network, resulting in both of power consumption and footprint savings.

This time, NTT West was the first in the world to confirm the feasibility of C+L-band compatible configuration in coherent pluggable optics on the field trial, utilizing the latest optical technology. The innovative integration of IP layer and optical transport layer networks, supported by Cisco's Routed Optical Networking technology, enhances operational efficiency and service flexibility. By expanding the application areas of optical transport technology, including this initiative, the NTT Group aims to continue its evolution toward a high-capacity and low-power-consumption all-photonics network, which it is promoting as part of its IOWN vision (*2).

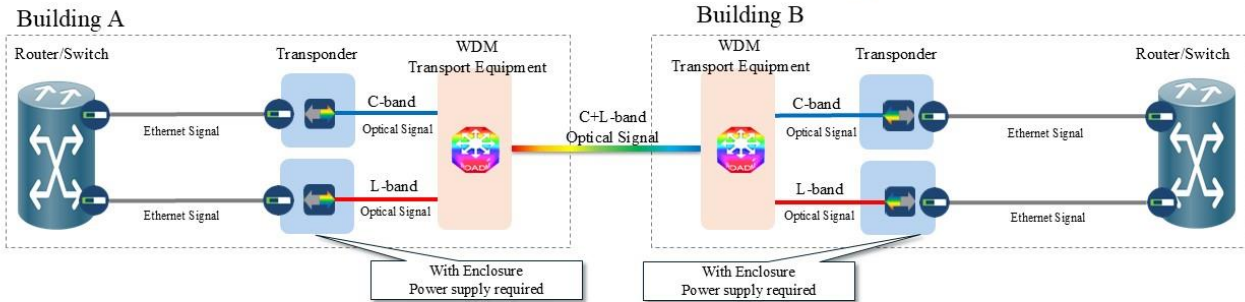
Background and Objectives

The rapid increase in data traffic, driven by large-scale data processing, machine learning model training, and the widespread adoption of cloud services and video streaming, necessitates a network capable of handling higher capacities while remaining efficient. By expanding the use of both C and L-bands, the network doubles its transport capacity, enabling more efficient data transfer. To address this challenge more cost-effectively, an approach that increases the capacity of each optical fiber is effective.

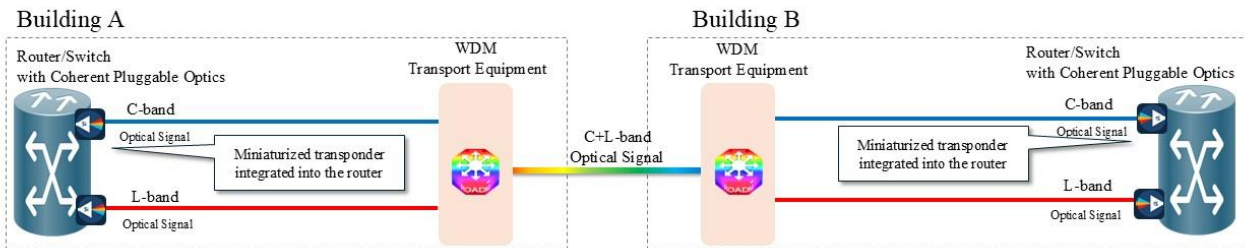
Typically to increase optical fiber capacity, the combined C+L bands wavelength range is leveraged, rather than relying solely on traditional C-band (1530-1565 nm) or L-band (1565-1625 nm) multiplexing. This approach effectively doubles transport capacity compared to conventional methods.

Traditionally, achieving such high-capacity networks required the use of transponders and WDM transport equipment for both C-band and L-band signals. However, NTT West has pioneered the use of coherent pluggable optics, initially advanced in the C-band, and successfully became the first in the world to complete a C+L bands WDM optical transport verification utilizing coherent pluggable optics realized through the latest technological innovations in the L-band. This innovation allows direct connection to WDM optical transport equipment without the need for transponders. As a result, NTT West is able to construct a sustainable network that maintains high capacity while significantly reducing power consumption by 50% and minimizing installation footprint by 30%.

Current Configuration



IP and Optical Transport Integrated Configuration



Overview of Field Connectivity Verification

Location: Osaka Prefecture

Details of Verification:

Achieving High-Capacity Transport in a Multi-Vendor Configuration:

Through the integration of coherent pluggable optics in both the C-band and L-band Cisco's advanced L-band compatible RON (Routed Optical Networking) technology, we successfully demonstrated ultra-high-capacity transport achieving approximately double the capacity of traditional methods. This advancement underscores our commitment to pushing the boundaries of network capability.

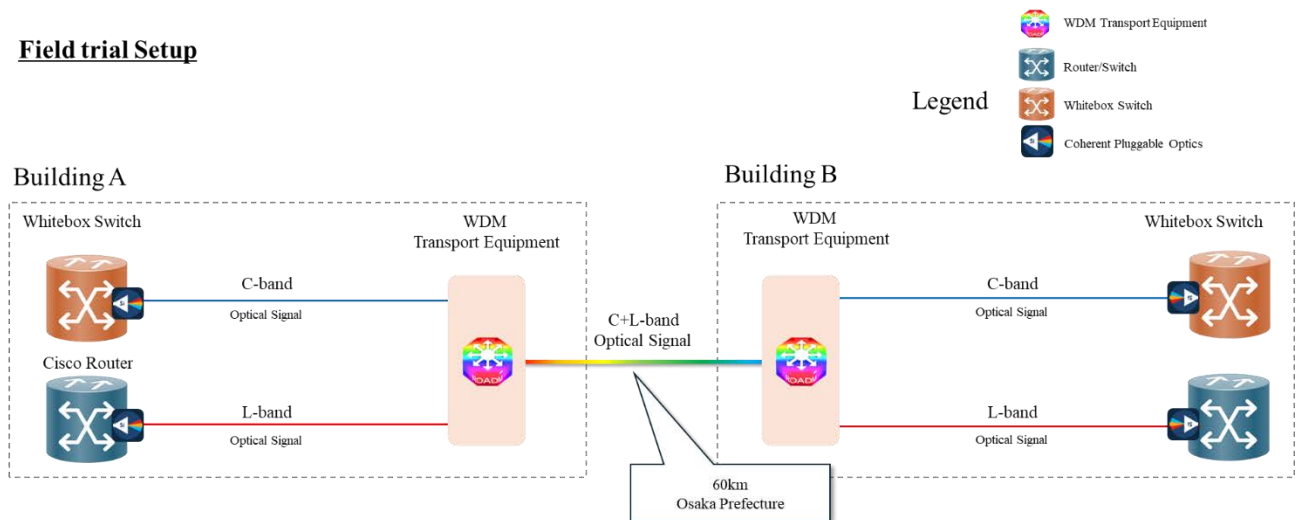
Realizing a Sustainable Network through the integration of IP and Optical transport:

We demonstrated the creation of an energy-efficient, footprint-saving, and stable communication network. This configuration integrates IP and optical transport optimizing both network performance and sustainability.

Evaluation of Transport Characteristics on Existing Optical Fiber Infrastructure:

Our evaluation involved a thorough assessment of transport quality and optical parameters, such as Optical Signal-to-Noise Ratio (OSNR), across both C-band and L-band using the existing fiber infrastructure. The results confirmed sufficient optical reach and robust performance between locations.

Field trial Setup



Roles of Each Company

The roles of each company in this initiative are as follows:

NTT West

- Implementation of the field environment and execution of demonstration trials
- Verification of network configuration using coherent pluggable optics

Cisco

- Provision of RON devices
- Support for network optimization using RON Technology

Future Developments

NTT West will continue to actively evaluate the applicability of the latest technologies and study their implementation, and will collaborate with a wide range of partners, including Cisco, to advance network architecture and efficiency through a converged approach of IP and optical transport to realize low-cost, high-capacity, and sustainable networks.

Cisco is dedicated to driving innovation in architecture to provide solutions tailored to customer needs. This collaboration shows the continued commitment to research and develop the latest technologies that help support sustainable networks with high capacity, low latency, low power consumption and low operational load.

*1) Coherent pluggable optics: An optical transceiver technology that achieves long-distance and high-capacity optical transport by utilizing advanced Coherent ASIC. Its compact size allows for router installation, enabling low power consumption and footprint-saving operation compared to chassis-type optical modules such as transponders.

*2) IOWN (Innovative Optical and Wireless Network): An initiative for networks and information processing infrastructure including terminals that can provide high-speed, high-capacity communication utilizing innovative technology focused on optics, as well as tremendous computational resources. (<https://www.rd.ntt/e/iown/>)

Contact

R&D Center, Technology and Innovation Department
Digital Transformation and Innovation Division
Nippon Telegraph and Telephone West Corporation
MAIL: info-ns-rdc@west.ntt.co.jp

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Please note that it may be subject to change.