FUJITSU

shaping tomorrow with you

High-speed networks for research and education

Scientific and academic research places very high demands on communications network infrastructure. Research and education networks transport vast amounts of data to support activities such as advanced mathematical, environmental, demographic, and atmospheric modeling. Therefore, networks that serve the needs of universities, teaching hospitals and research agencies must provide the highest possible transport speeds with negligible downtime and data loss. An additional pressure point is that of cost, since many Research and Educational (R&E) entities are facing serious budgetary constraints. Whether operated by an individual entity, or by a consortium as a Point of Presence (PoP), low total cost of ownership is an essential aspect of an R&E network. Additionally, it is essential that R&E networks are flexible and easy to scale in response to growing and changing needs.

Enhancing an existing R&E metro network for 100G transport

A major regional optical network provider was seeking to enhance its existing network to prepare for and ultimately support the emerging generation of 100G equipment. The network exists to support data-intensive scientific modeling, exploration and discovery, and is in use by multiple campuses with large-scale bandwidth needs for a diverse range of nationally respected academic departments including biology, engineering, and computer science. The network also supports the connectivity needs of multiple governmental research agencies. The ability for this network to support 100G transport therefore has major, direct benefits that enhance scientific progress.

As a key service provider in the R&E network infrastructure, this network provider possesses a high degree of experience and expertise that enables it to implement leading-edge technology successfully. The provider wanted to create an enduring, collaborative partnership with a vendor, both to enhance to 100G its peering connections with other providers, and to improve its management plane and control plane infrastructure.

Fujitsu platforms for R&E applications

- FLASHWAVE® 9500 Packet Optical Networking Platform
- FLASHWAVE CDS Packet Optical Networking Platform
- FLASHWAVE 7500 Metro/Regional Multiservice ROADM Platform
- FLASHWAVE 7210 Micro Packet Optical Networking Platform
- NETSMART® 1500 Management System
- NETSMART 2000 Planning & Design Tool

Application objectives:

The provider's key objectives for the deployment project were:

- Explore ways to make optimal uses of both optical and electrical signaling.
- Implement automatic provisioning and flexible, dynamic bandwidth adjustments using ROADMs, photonic cross-connects, and Wavelength-Selectable Switching (WSS).
- Perform advanced signal quality and link status monitoring.
- Implement transport and transmission mesh networks that are robust and secure with self-monitoring and self-managing capabilities.
- Develop new design methods and principles to create a more flexible, dynamic, interoperable network environment.

Fujitsu services for R&E applications

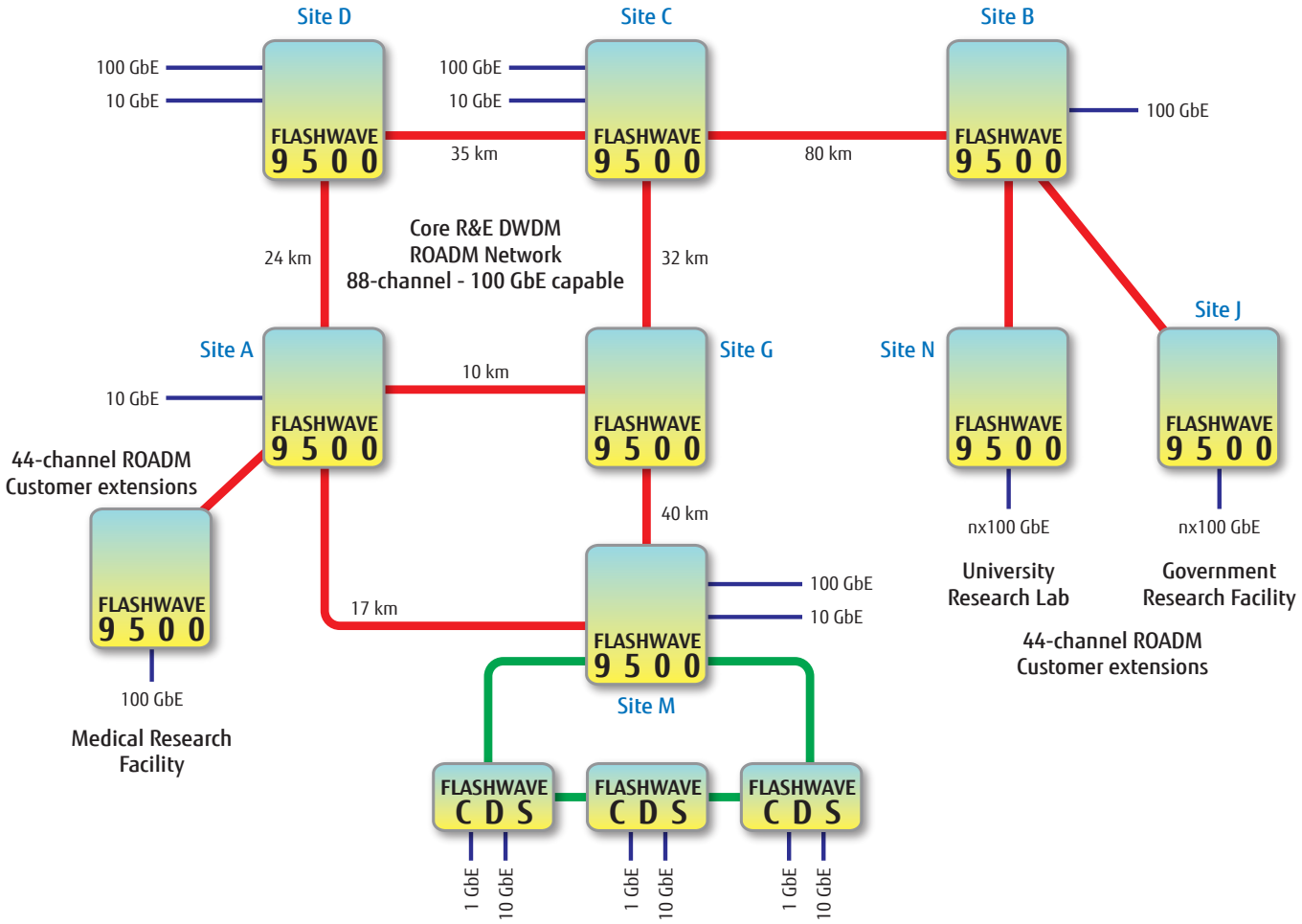
- Network design and planning
- Network deployment and testing
- Master network integration
- Fiber recovery
- Ongoing maintenance and support

The Fujitsu Solution

Fujitsu worked with the provider to design a 10G & 100G Research and Education transport network, with multidegree ROADM technology for dedicated 100G connections to research and other facilities. Focused on the FLASHWAVE 9500 Packet Optical Networking Platform (Packet ONP), this network enabled the customer to implement the latest packet networking technology on a fully 100G-capable architecture. The network also incorporated the FLASHWAVE CDS Packet ONP as a cost-effective way to service entities with lower-speed connection needs.

The end result was a mesh core Dense Wavelength-Division Multiplexing (DWDM) ROADM network that interconnected multiple sites. The network provides 8-degree connectivity with 88 wavelengths, and is scalable from 10G to 100G.

Mesh core DWDM network



Mesh core DWDM network for regional R&E consortium

The FLASHWAVE 9500 Packet ONP solution provides a core R&E network supporting:

- Multidegree hubbing
- 88-Channel 50 Ghz DWDM
- 10G to 100G wavelengths

A universal switch fabric allows for a converged network, enabling TDM and packet transport to the FLASHWAVE 9500. The FLASHWAVE CDS allows for packet transport extensions to labs and research facilities, with 10G access to the core network. The FLASHWAVE CDS supports Link Aggregation (LAG) and <50 ms G.8031 Ethernet Linear Protection Switching.

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