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What is Open ROADM

The **Open ROADM Multi Source Agreement (MSA)** defines interoperability specifications for Reconfigurable Optical Add/Drop Multiplexers (ROADM). Included are the ROADM switches as well as transponders and pluggable optics. Specifications consist of both optical interoperability as well as YANG data models available at OpenROADM.org. Multi-vendor Open ROADM compliant equipment is integrated into the same network solution controlled by the **open source Transport PCE (TPCE) controller**.

SC 23 Demonstrations

This collaborative effort showcases functionalities and multi-vendor interoperability features in an optical network testbed that makes use of interconnected Open ROADM compliant equipment including ROADM switches, 100G switchponders (SPDR), 100G transponders (TPDR), 400G transponders, 200G/300G/400G muxponders (MPDR), and CFP2-DCO and QSFP-DD 400G pluggable devices. Our Open ROADM Testbed also demonstrates:

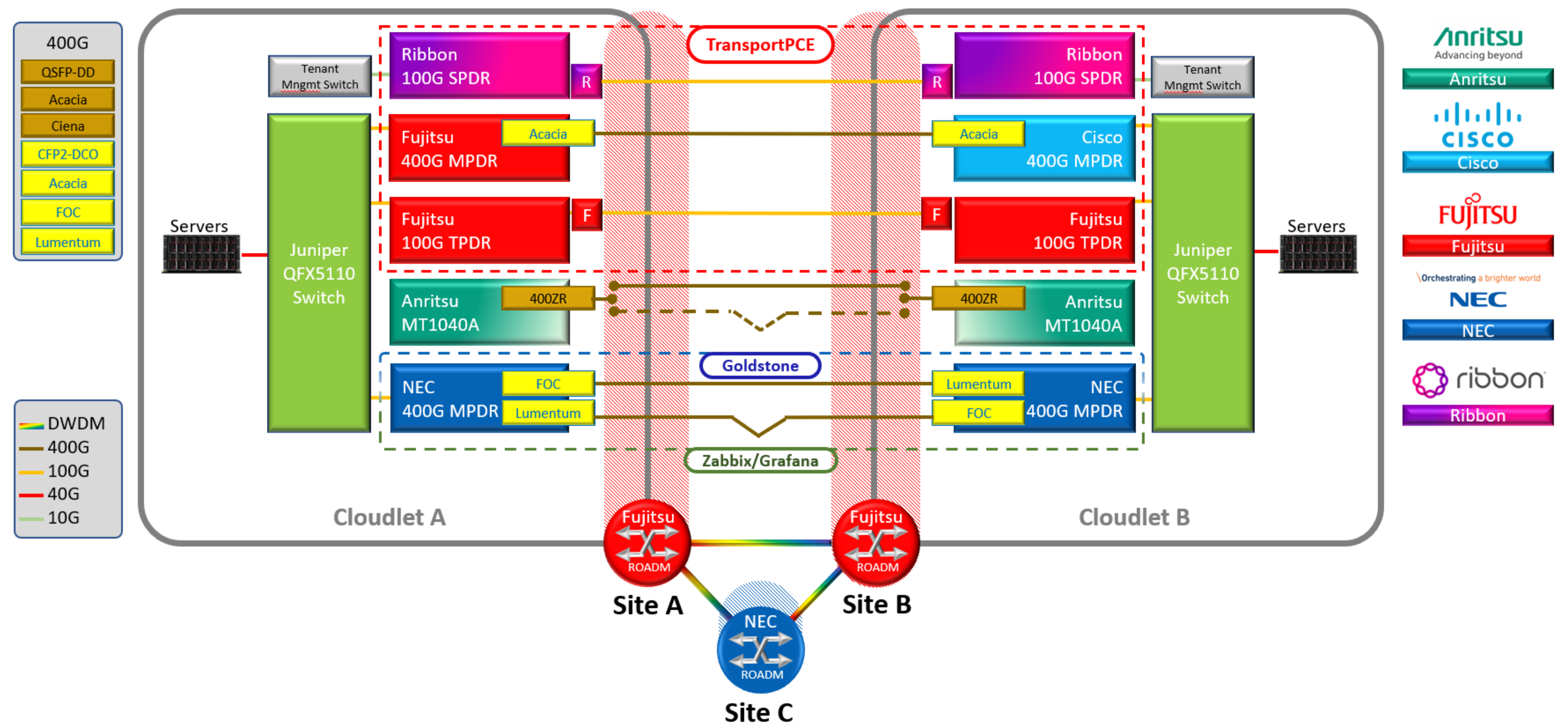
- An open optical transponder architecture empowered by remote management agent
- Real-time end-to-end collection of channel physical and packet level parameters across the Open ROADM testbed obtained using 400ZR modules
- Interoperability of CFP2-DCO 400G devices from three Original Equipment Manufacturers (OEMs)
- Various multi-layer network monitoring techniques for both optical and data packet transport layers

Interoperable CFP2-DCO 400G Devices

CFP2-DCO pluggable transceivers make use of digital coherent optical signals and are designed for line-side trunk DWDM data center interconnect (DCI), metro carrier, and regional/long haul applications. We demonstrate Open ROADM compliant and interoperable CFP2-DCO 400G modules from three OEMs.



SC 23: UT Dallas Booth #881 – Open ROADM Testbed

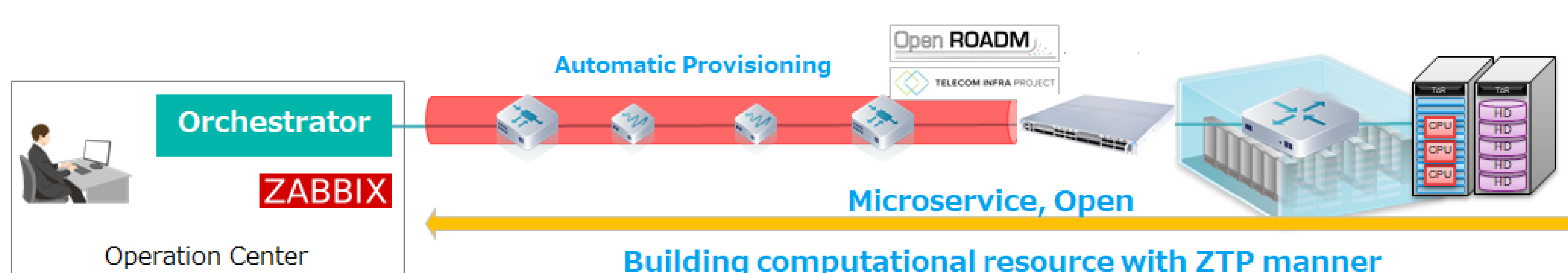


Plug & Play Data Center with Open Optical Transponder and Remote Management Agent in Collaboration with IOWN GF

- Data center interconnection (DCI) operators can quickly provide high-capacity optical paths for users (e.g., cloud service providers) to connect their sites. This solution requires technology and architectures that allow users and DCI network operators to cooperatively achieve fast optical path provisioning independent of transceiver's implementation and characteristics.
- We propose an optical wavelength path provisioning scheme with an open optical transponder and a remote management agent (RMA). By using open optical transport devices, users achieve interoperability while avoiding vendor lock-in. In addition, RMA can automatically provide an optimal optical path according to the transceiver and carrier network characteristics with little effort.

This demo concurrently features:

- TIP Requirements Compliant Silver Badge in compliance with TIP Phoenix and MUST (more than 160 test items have been validated)
- Hardware and software disaggregation with multi-vendor and multi-generation transceivers
- Open ROADM MSA compliant CFP2-DCO 400G devices
- Containerized applications using Kubernetes



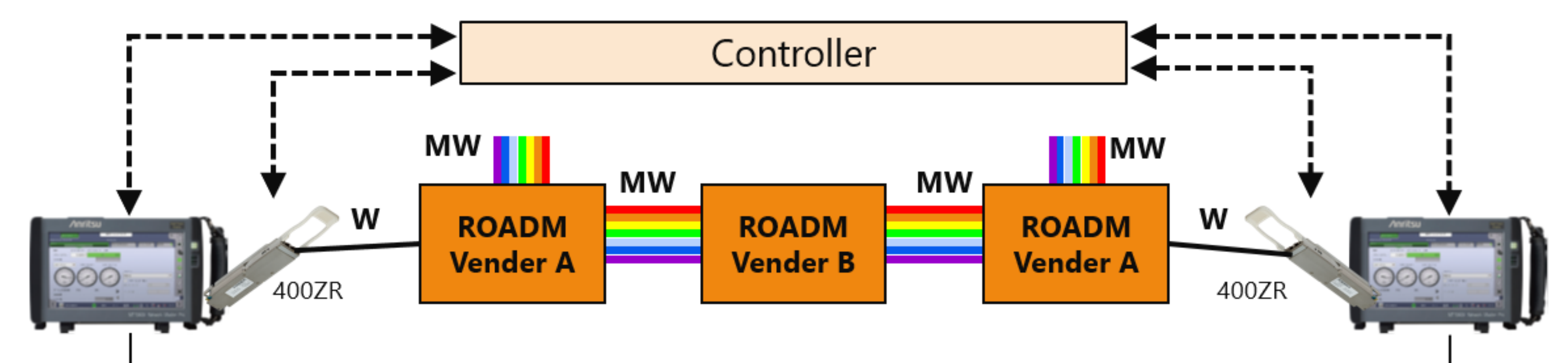
Real-time Network Performance Metrics

Commercial instrument allows operators to test and monitor multi-vendor optical paths end-to-end in real time. It generates and sends data packets to the multi-vendor optical paths through a 400ZR module and monitors and measures throughput, frame loss, and service disruption time during optical wavelength switching. It monitors physical metrics such as Rx Power, OSNR, SOP/ROC in real time as well.



Examples of collected data

By synchronizing with GNSS or 1PPS, the MT1040A can measure one-way latency with a 5-nanosecond resolution by time-stamping every packet at a 400G line rate. In this demonstration, the MT1040A is operated by a controller that performs the orchestration using the NETCONF protocol to achieve automated telemetry.



Both MT1040As time synchronize with GNSS (distant) or 1PPS (local)