2012 OIF Worldwide Interoperability Demo
Enabling High-Speed Dynamic Services

Collaboration and Innovation. At Light Speed.
About the OIF

Mission: To foster the development and deployment of interoperable products and services for data switching and routing using optical networking technologies

The OIF was the first industry group to bring together professionals from the data and optical worlds

Our 100+ member companies represent the entire industry ecosystem:

- Carriers and network users
- Component and systems vendors
- Testing and software companies

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Market Drivers for Interoperable Networks

Market Trend/Needs
Demand for high-speed, flexible, resilient transport services - regionally and globally

Challenges
Deliver end-to-end services across multiple network domains
Multi-layer transport technologies

Competition

The Need
Interoperable networks that can support cost-effective dynamic bandwidth services - on a global scale
On-demand services are provisioned, based on ASON/GMPLS control plane functions

- Multi-domain
- Multi-layer
- Multi-technology

The Vision – Seamless Interworking
OIF Worldwide Interoperability Demonstration

End-to-end provisioning of dynamic Ethernet Private Line (EPL) services over Optical Transport Network (OTN) using OIF UNI 2.0 and E-NNI 2.0

Data plane interoperability testing of Ethernet and OTN

Hosted by four major Carriers, supported by seven leading vendors

Testing completed in Carrier labs January - March 2012


On-Demand Ethernet Services over OTN
Putting the Pieces Together
OIF Implementation Agreements and Interoperability Demos

OIF Implementation Agreements

2001
SUPERCOMM
Draft UNI 1.0 signaling

2002
OFC
Draft E-NNI 1.0 signaling + routing

2003
SUPERCOMM
Draft E-NNI 1.0 SONET/SDH + EoS data plane

2004
SUPERCOMM
Draft EPL over SONET/SDH + EVPL data plane

2005
ECOC
EPL over SONET/SDH + BW mod

2006
Worldwide
EVPL over transport + restoration

2007

2008

2009

2010

2011

2012

OFC-NFOEC
Ethernet services over OTNv3

OIF Networking Interoperability Demonstrations
Ethernet over OTN Demo Features

Client Services
- Full/partial rate
  - 1 GbE
  - 10 GbE
- Adaptation
  - GMP
  - GFP

Optical Transport
- Optical Data Unit
- Multiplexing Hierarchy
- Optical Transport Unit

Dynamic Intelligence
- Management Functions
  - Monitoring
  - Supervision
  - Protection
- Control
  - Multi-domain
  - Multi-vendor
- Control Plane
  - Multi-domain dynamic provisioning

Scope of interoperability demo

Dynamic and Efficient Transport of Ethernet Services
Multi-layer Control Plane Example
Ethernet Services over OTN

Control Plane Layering

Data Plane Layering

Ethernet Virtual Connection (EVC)
Optical Data Unit (ODUk)

Each Node Supports Specific Layers
Detailed Network Topology 2012

MTS1 → MTS3 → ALU2 → ALU1 → ALU4 → ALU3 → MTS2 → TLB3 → TLB1 → CNA1 → CNA2 → EXFO

MTS4 → MTS1 → ALU2 → ALU1 → ALU4 → ALU3 → MTS2 → TLB3 → TLB1 → CNA1 → CNA2 → EXFO

UNI-C: Inter-lab E-NNI

Data Plane only

Verizon

Orange

KDDI

ADV2 → ADV1 → MAR5 → ALU1 → MAR1 → CNA2 → EXFO

ADV3 → ADV4 → MAR5 → ALU1 → MAR1 → CNA2 → EXFO

Mar3 → MAR4 → EXFO

HUA1 → HUA2 → MAR3 → MAR2 → HUA3

Inter-lab E-NNI

Data Plane only

Verizon

Orange

KDDI

Inter-lab E-NNI

Data Plane only
Examples of Connection Setups
Examples of Connection Setups
Examples of Connection Setups
Worldwide Interoperability
Practical Test Cases

Network Environment
- Multi-vendor and multi-domain networks with ASON/ GMPLS-enabled nodes and OTN transport
- Interconnected via an OIF control plane with inter-domain links and supported by a global SCN

Technical Features in Worldwide Demonstration
- UNI 2.0 and E-NNI 2.0 testing for EPL services over OTN
- Ethernet over OTN data plane - adaptation, multiplexing
- Draft GMPLS extensions for OTN hierarchy
- Multi-layer and OTN extensions to E-NNI 2.0
- Control plane security
- Intra-domain service level interworking
Benefits of OIF Ethernet over OTN Demo

Shows vendor and carrier commitment to interoperability

Eases system integration of different vendor solutions

Technical lessons are fed back into standards

Gives carriers a firsthand look at the latest OTN standards, products and features

Important stepping stone toward operationalizing the technology
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