OIF Interoperability Evaluations and Demonstrations from Carrier’s Perspective

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Carrier Challenges

Deliver end-to-end services across multiple network domains
- On national scale
- Worldwide

Multi-layer transport technologies
- For optimized transport and switching solution

Competition
- Flexibility
- Cost efficiency

Interoperability
On-demand services are provisioned, based on ASON/GMPLS control plane functions.

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

The Vision – Seamless Interworking

- Domains can use either management or control plane internally.
- Control plane topology can differ from transport plane topology.
- Transport technology and topology can differ in each domain.
Putting the Pieces Together
OIF Implementation Agreements and Interoperability Demos

**OIF Implementation Agreements**

- **2001**: UNI 1.0 signaling
- **2002**: UNI 1.0r2/E-NNI 1.0 signaling
- **2003**: E-NNI 1.0 routing
- **2004**: UNI 2.0 signaling
- **2005**: ASON/GMPLS Interworking
- **2006**: E-NNI 2.0 signaling
- **2007**: E-NNI 2.0 routing
- **2008**: EPL over SONET/SDH + BW mod
- **2009**: Worldwide EVPL over transport + restoration
- **2010**: OFC-NFOEC Ethernet services over OTNv3
- **2011**: SUPERCOMM Draft UNI 1.0 signaling
- **2012**: OFC Draft E-NNI 1.0 signaling + routing

**OIF Networking Interoperability Demonstrations**

- **SUPERCOMM**: Draft E-NNI 1.0 SONET/SDH + EoS data plane
- **OFC**: Draft EPL over SONET/SDH + EVPL data plane
- **ECOC**: EPL over SONET/SDH + BW mod
Interoperability Evaluations and Demonstrations

Are a major step beyond specifications!

- Shows commitment of vendors and carriers to these new functions
- Prove of concept of the specifications - show if and how their implementations work
- Aligns the interpretations of specifications and standards
- Provides most valuable feedback to the standardization community
- Is the first step towards deployment

Experimental Basis for Seamless Interworking
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 from Asia, Europe and the USA, supported by seven leading vendors
Testing completed in Carrier labs January - March 2012
Ethernet over OTN Demo Features

**Client Services**
- Full/partial rate
  - 1 GbE
  - 10 GbE

**Optical Transport**
- Adaptation
  - GMP
  - GFP
- 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
OIF Global Topology 2012
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 Signaling Control Network (SCN)

Technical Features in Worldwide Demonstration

- UNI 2.0 and E-NNI 2.0 testing for EPL services over OTN
- Pre-standard GMPLS extensions for OTN hierarchy
- Multi-layer extensions to E-NNI 2.0
- Ethernet over OTN data plane - adaptation, multiplexing
- Control plane security
- Intra-domain service level interworking
Multi-layer Control Plane Example
Ethernet Services over OTN

Each Node only needs to Support Specific Layers
Ethernet over OTN Test Examples
Collaboration and Innovation. At Light Speed.
OIF Booth #713