Accelerating the Deployment of Transport SDN - OIF at Work

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Outline

Current Transport Networks
New Technology
SDN Improves Transport Network Control
SDN related work in OIF
Summary
Current Transport Networks ... 1/2

Current Optical and transport networks:
- have many manual processes
- expensive to manage
- suffer from very long provisioning times
Management-based control
- **Dependent on Communications Infrastructure**
  - Link failures limit ability to control NEs
- **Scaling Limitations**
  - Overloaded Communications Infrastructure
  - Overloaded Connection rerouting
- Carriers define network behaviors

NE-based control
- NE-vendors define network behaviors
  - Problems with carrier differentiation
  - Dependent on Health of Control Protocols
New Technology

SDN and virtualization promise:
- simplifying optical transport network control
- rapid provisioning/offering of new service
- programmability of control of optical transport networks resources
- improvement of performance vs cost of optical switches
- centralized network-wide management and control
- increased service availability
SDN improves transport control

Eliminate “One-size-fits-all” solutions

- NE-behaviors may not match carrier requirements
- Example
  - Combined Reroute and Protection

Programmability enables carrier requirements to be met
Eliminate “One-size-fits-all” solutions

Multi-layer Control without omniscient NE

- Mixed network: Router, ROADM and Packet-Optical Transport Platform (P-OTP)
- Ships-in-the-night control plane operation
- Ignores layer transition points
Eliminate “One-size-fits-all” solutions

Multi-layer Control without omniscient NE

- Without multi-layer graph, routing cannot choose optimal route
- Requires Routers to understand, signal non-packet layers

SDN improves transport control

Simplifies multi-layer control
Eliminate “One-size-fits-all” solutions
Multi-layer Control without omniscient NE
Homogeneous behaviors in Heterogeneous networks

- Control Plane implementations not all the same
- Multi-domain services: least-common denominator
- One logical controller delivers consistent behaviors

Consistency reduces carrier operations costs
SDN improves transport control

Eliminate “One-size-fits-all” solutions
Multi-layer Control without omniscient NE
Homogeneous behaviors in Heterogeneous networks

Application awareness of network capabilities
  - Existing Control Planes are “write-only”
  - Request connections without any awareness of network
  - Business Applications need detail for services available

Match carrier services with application needs
OIF activities to guide Transport SDN

- Carrier requirements development
- SDN For Transport Framework document
- Recently a new project “Programmable Virtual Transport Network Services Specification” was agreed
- Demonstration/testing of SDN
Carrier Requirements

- Requirements on Transport Networks in SDN Architectures
  - Document is based on contributions of major carriers worldwide
  - Comprises requirements on Transport SDN
    - Orchestrator (transport network relevant part)
    - Control and management planes
    - Data plane
  - Being used as guidance within OIF but also communicated to other SDO and forums
It analyzes the functional components required for a controller providing SDN in a Transport network.

It analyzes the interfaces required for SDN for Transport.
Goal: Seamless Interworking

On-demand services are provisioned using ASON control functions

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

Domains can use Network Management, SDN or distributed control plane internally

Domains can use different technologies internally

No 1:1 relation
Summary

**SDN has great promise to improve transport control**

- Programmability
- Simplified multi-layer control
- Common behaviors in Heterogeneous NE deployments
- Application Awareness

**OIF is providing guidance to the SDN Ecosystem**

- Carrier Requirements
- Framework Document
- Programmable Virtual Transport Network Services Specification
- Demonstrations in Carriers labs
Thank you for your kind attention!

Carrier Requirements Document

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