Transport SDN: 
The What, How and the Future!

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Transport SDN Panel
Agenda Topics

What is transport SDN?

Use-cases

Transport SDN demonstration

Architecture and Standards
What is Transport SDN?

Control of Optical Transport networks using OpenFlow

Network elements expose the switching, cross-connect and flow aggregation capability

- L0 and L1 switching and cross-connects
- Hybrid packet-optical switching and aggregation

Panel discussion today will expose multiple facets of this new direction
Transport SDN Block Architecture

Network Control Layer

Network Infrastructure Layer

Applications

Northbound Interface

SDN Controller

SDN Client

Network Virtualization

OFw and Ofc

OFw: OpenFlow Wire
OFc: OpenFlow Config
Agenda Topics

What is transport SDN?

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Transport SDN demonstration

Architecture and Standards
R&E network design trends driven by ‘Big-data’ Flows…

- Buying Circuit Services
- Lease Dark Fiber
- Multiple 10G
- (Multiple) 100G
- IP Dialtone
- Steer ‘Big Data’ flows
- Regional Footprint
- Global, Federated Multi-domain
…drives new network architectures (1)

- [Dynamic] Optical Bypass
  - Separation of large flows, from L2/MPLS circuits to L1 circuits
  - Traditionally has been very complicated, vendor dependent and not-interoperable

ARCHSTONE project DOE
...drives new network architectures (2)

- Packet-Optical Integration driving layer collapse
  - Packet switching “marries” Optical transport nodes
    - thanks to merchant silicon
  - LH Optics “marries” core routers
    - thanks to coherent technology and optical integration
…drives new network architectures (3)

- No uniform way to manage or create multi-vendor, multi-layer networks or multi-domain optical bypass
  - Packet and Optical devices managed in totally different ways
  - Multi-vendor networks are islands
  - No global topological visibility
    - GMPLS and vendor-specific hacks needed in current approach
SDN Controller communicating with OTS via OpenFlow extensions
Bandwidth on Demand application for Big Data RDMA transport
3 physical transport path options (with varying latencies)
Implicit & explicit provisioning of 10GbE/40GbE services demonstrated
Community has taken it on to build Standards

Open Network Foundation has formalized a Open Transport Working Group
• Participation from many transport, optical and router vendors

OIF has formed a ‘Carrier SDN’ group
• To discuss carrier requirements for SDN

Other conversations and standards body co-ordination in place
Why Transport SDN?

Automation
- Centralized management applications aka OSCARS

Scaling
- End-to-end service delivery
- Works for IP and non-IP protocols

Virtualization
- Multi-layer abstracted to a single end-to-end connection