Transport SDN - Clearing the Roadblocks to Wide-scale Commercial

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Changing Role of Transport Networks

• **A new kind of business customer**
  – Using both private and public clouds
  – Elastic Compute and storage requires an elastic network with on demand services

• **A new kind of Consumer**
  – Living in the cloud
  – Applications are hosted in the cloud
  – Shifting from download to streaming
  – News events and new applications load the network in new ways
  – Multi device and multiscreen, any time anywhere
Changing Role of Transport Networks

• **A new kind of service Provider**
  – Supplies SaaS, IaaS, PaaS
  – Elastic compute and storage
  – Multi-tenant

• **A new network is needed that supports**
  – Bandwidth on demand to match compute/storage on demand technology
  – Multi-tenant
  – Higher Utilization and greater efficiency
  – Faster service deployment
Why Does Transport Need SDN?

• Optical and transport networks continue to be difficult and expensive to manage, with many manual processes and very long provisioning times.

• SDN and virtualization have the promise of simplifying optical transport network control, adding management flexibility, and allowing the rapid development of new service offerings by enabling programmatic control of optical transport networks and equipment.

• Can also reduce the cost of optical switches by moving control and management planes from embedded processors to general-purpose COTS hardware and virtualized software.

• Utilize centralized network-wide management and control to drive efficiency and speed.
What Do Carriers Need from SDN? (1/2)

- COTS Hardware and Software for economic efficiency
  - High performance, high volume, lower cost COTS HW
  - Software licensing models that are cost-effective for both vendors and providers
  - Large competitive development community and open systems
- Resource (processing, storage and network) virtualization for elasticity and aggregation
  - SDN must operate in concert with IP/MPLS/GMPLS network-based L1/L2/L3 VPNs
  - SDN must also operate in alternative networking environments (e.g., overlays)
  - Orchestration for applications, services & networks
  - Tools to make all this operational – addressing all aspects of the lifecycle
What Do Carriers Need from SDN? (2/2)

- Standardization for all aspects of a software defined network
  - For example, OpenFlow™ in ONF; OpenDayLight, OpenStack initiative, IETF SDN efforts
  - Coordination with ETSI NFV
  - Role of SDOs and OpenSource activities

- Decoupling of topology, traffic and inter-layer dependencies
  - Switching needs to be implemented dynamically at lowest possible network layer and/or as close to the edge to achieve scaling and cost targets
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
Challenges

• Operational simplicity
  • On-board new clients rapidly

• Differentiated service delivery
  • Automate resource allocation on the fly

• Scalability
  • Support X transactions per hour

• Security
  • Service isolation and authentication per client

• Continuous Availability
  • Disaster avoidance / recovery

• Current transport business model
• Managing industry Standards and OpenSource activities
OIF Role and Expectations

• Carrier SDN requirements
• SDN Framework and functional requirements
• Meaningful demo and testing in carrier environment showing
  – Status of technology
  – Interfaces and interoperability
  – Operation tools needed
  – Pertinent use cases
  – Technology and protocol gap analysis
Summary

• SDN has great promise to improve transport control
  – Programmability
    • Ability to deliver new behaviors not (yet) considered by standards, vendors, …
  – Simplified multi-layer control
  – Common behaviors in heterogeneous NE deployments
  – Application awareness

• OIF is providing guidance to accelerate deployment
  – Use cases and architecture
  – Carrier requirements
  – Framework document
  – Testing and Demonstrations
    • Multi-vendor, Multi-carrier
    • Identify gaps
Thank You

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