

Transport SDN at OIF – Assuring a Seamless Evolution to Interoperable Transport Networks of the Future

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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 Carriers Are Asking For (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

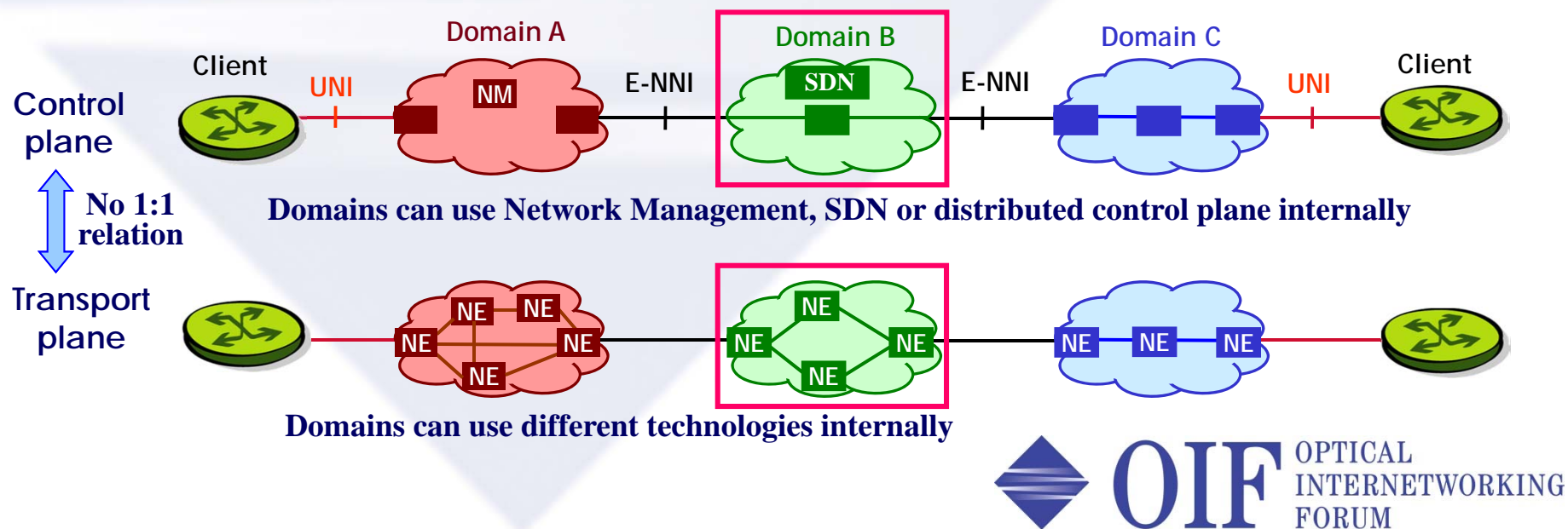
What Carriers Are Asking For (2/2)

- **Standardization for all aspects of a software defined network**
 - For example, OpenFlow™ In ONF; OpenDayLight, OpenStack initiative, IETF SDN efforts
 - Coordination with ETSI NFV
- **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

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Goal: Seamless Interworking

- On-demand services are provisioned using ASON control functions
 - Multi-domain
 - Multi-layer
 - Multi-technology



Challenges

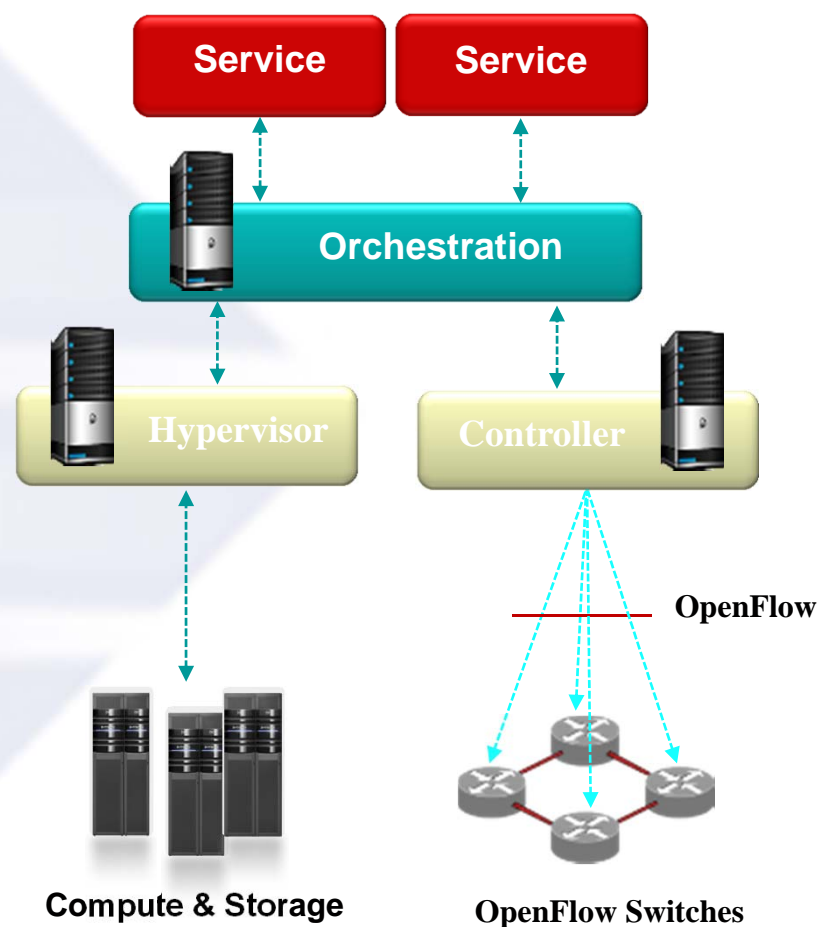
- **Operational simplicity**
 - **On-board new clients rapidly**
- **Differentiated service delivery**
 - **Automate resource allocation on the fly**
- **Scalability**
 - **Support X transactions per hour**
- **Security**
 - **Service isolation and authentication per client**
- **Continuous Availability**
 - **Disaster avoidance / recovery**
- **Current transport business model**

Programmability and Application Awareness

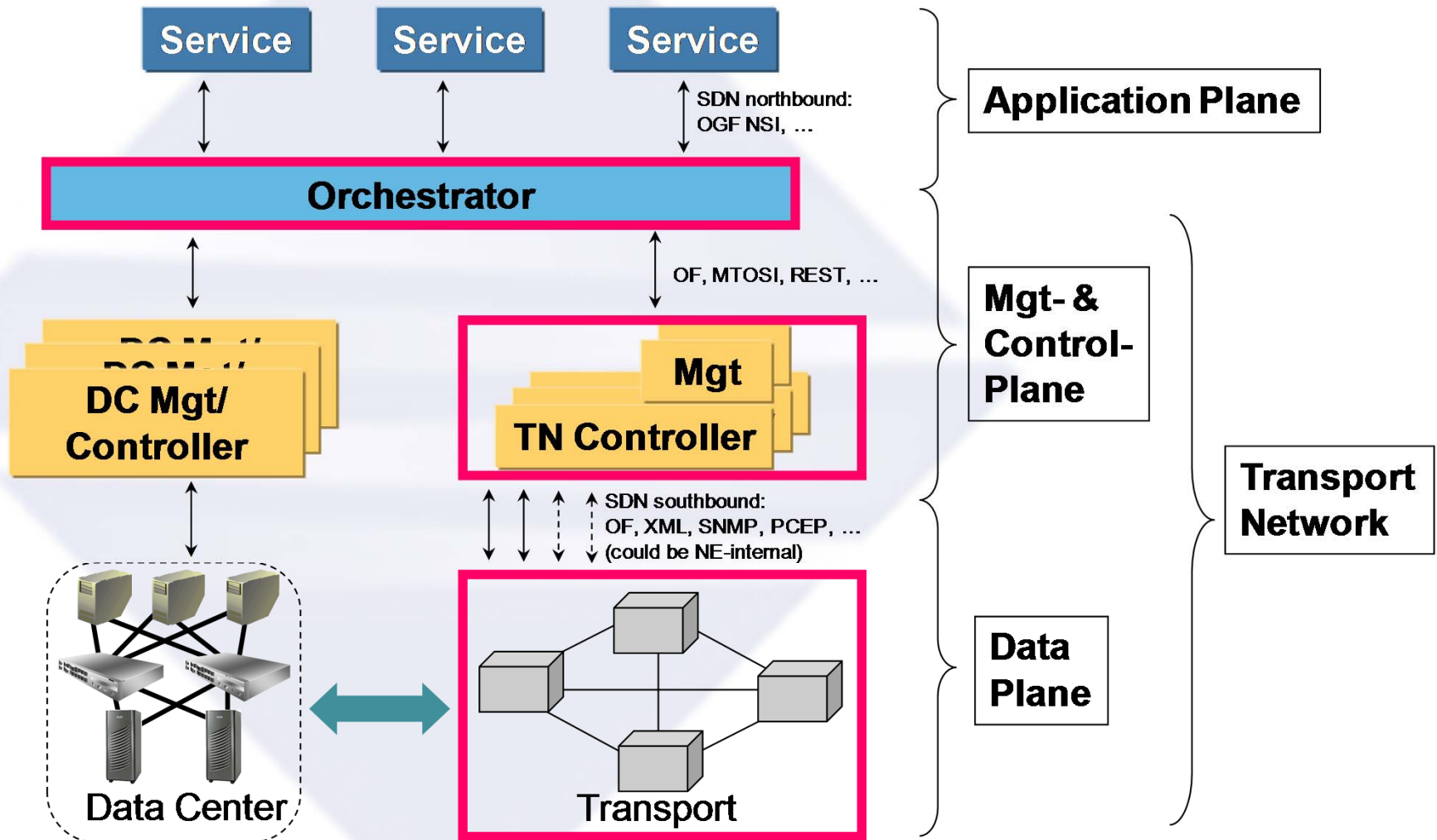
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OIF Role and Expectations

- Carrier SDN requirements
- Meaningful demo and testing in carrier environment showing
 - Status of technology
 - Interfaces and interoperability
 - Operation tools needed
 - Pertinent use cases



SDN Reference Architecture Components of Transport SDN



Carrier 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

Programmable Virtual Transport Network Services

- Project started 1Q14 to specify Virtual Network Services (VNS)
- VNS, aka network slicing, is a potential key driver for deployment of SDN in transport networks
- VNS is provided by slicing the network, dividing the underlying network resources, and presenting them to the customer or application as a Virtual Network (VN)
- OIF will look at potential classification of VNS depending on the customer or application needs for varying levels of control of their VN resources
- Expected output
 - IA specifying attributes and characteristics of Programmable Virtual Transport Network Services
 - Specifications shall be protocol and technology agnostic
 - VNS invocation/management/teardown procedure specifications
 - Extensions to existing API, if needed

Joint OIF/ONF Global Transport SDN Demo

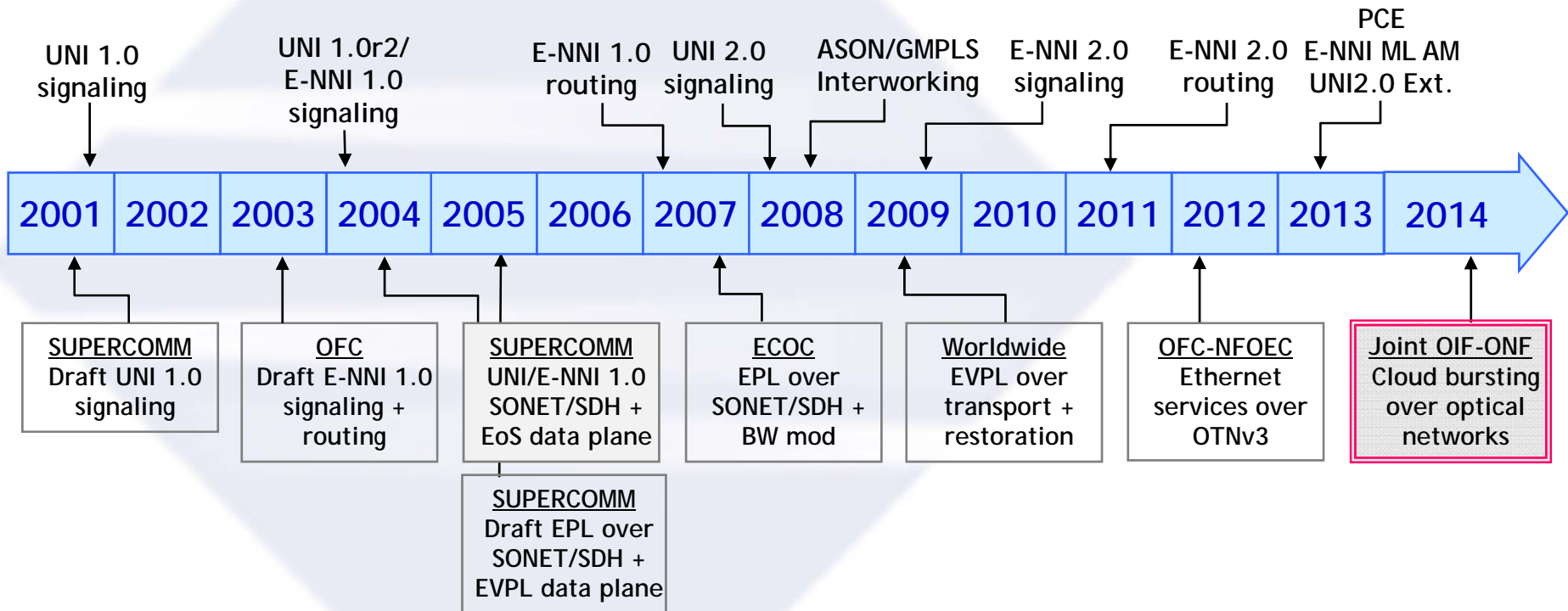
- **Application: Cloud bursting over optical networks**
 - Short lived, high-capacity between data centers
 - OTN connections created via central interface
 - Ethernet service over OTN as the dataplane
- **Protocol Features: Subset OT WG Extensions (ONF Lead)**
 - CDPI and CVNI – level of interoperability tbd
 - Experimental encoding of extensions
- **Additional features: Controller NBIs (OIF Lead)**
 - Network application interfaces (Service Request, Topology)
- **5 Carriers: China Mobile, China Telecom, TELUS, Verizon**
- **9 Vendors : ADVA, Alcatel-Lucent, Ciena, Coriant, FiberHome, Fujitsu, Huawei Technologies Co., Ltd, NEC Corporation of America and ZTE**

Joint OIF/ONF Global Transport SDN Demo

- **Demo Results Read-out Events**
 - **Oct 7:** Verizon USA – Waltham, MA USA (invitation-only)
 - **Oct 14-15:** Layer 123 SDN & OpenFlow World Congress – Dusseldorf, Germany (registered attendees)
 - **Oct 27:** China Telecom – Beijing, China (invitation only)
- **White Paper – available on our web site early October**
- **Results to be liaised to industry SDOs**
- **For more info:**
 - http://www.oiforum.com/public/Global_Transport_SDN_Demo_2014.html

Putting the Pieces Together

OIF Implementation Agreements



OIF Networking Interoperability Demonstrations

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**
 - **Demonstrations**

Thank You

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