Stepwise development of ONOS controlled Open Disaggregated Transport Networks

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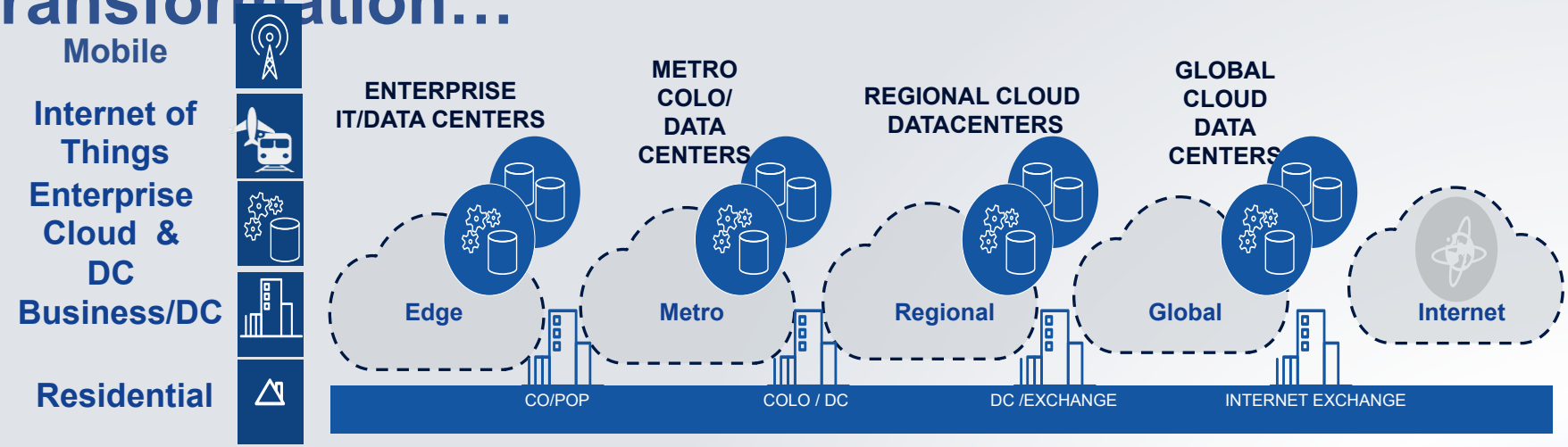
Networks are in the middle of a massive transformation…



CSP ICP MNO CNP ENT DSP

« Optical networking is transforming and is expanding everywhere »

… towards Automation & Abstraction

Virtualization

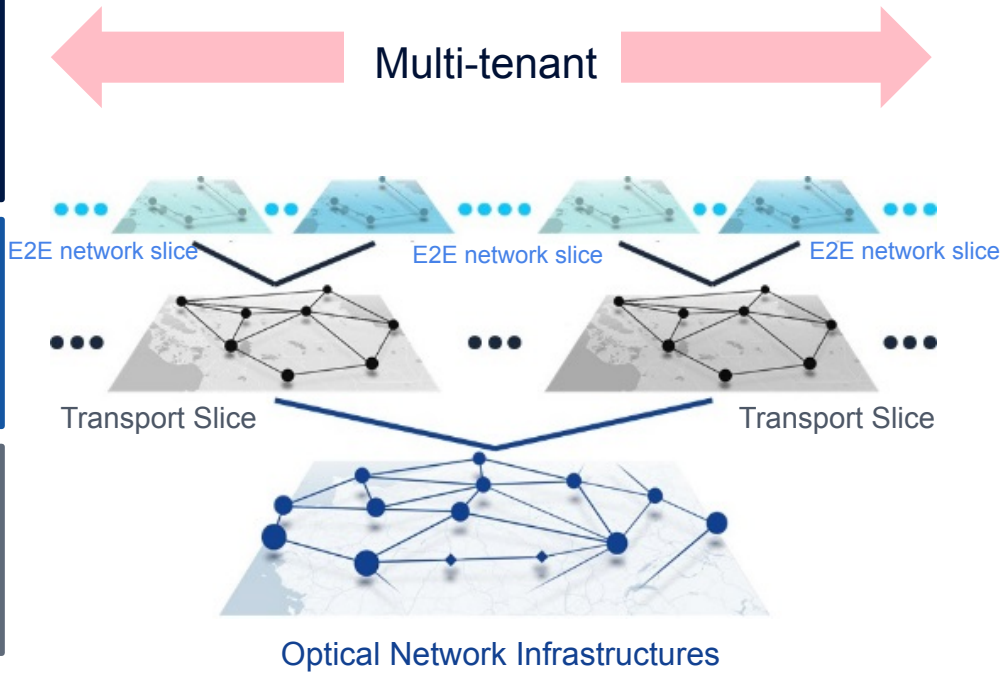
Optical Channels controlled as Services

Hierarchical

End-to-end service-enabled relationships

Consumable

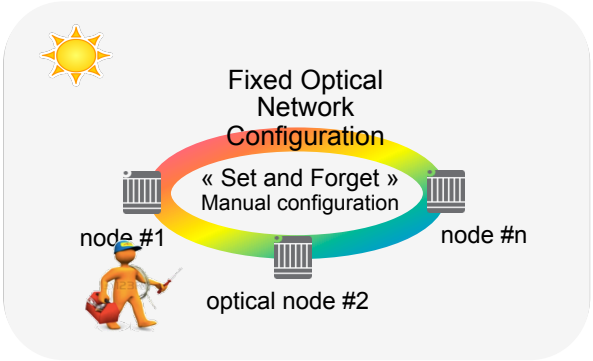
Automated deployment, fulfillment & assurance



How can Control Platforms support Transport Network Transformation?...

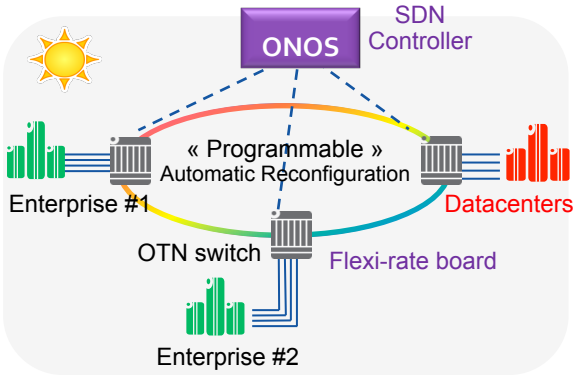
Towards Software Defined Optical Channels

TODAY

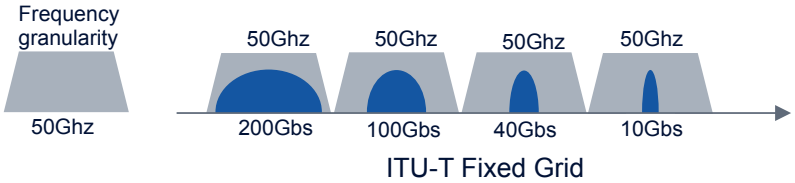


VS.

COMING SOLUTIONS

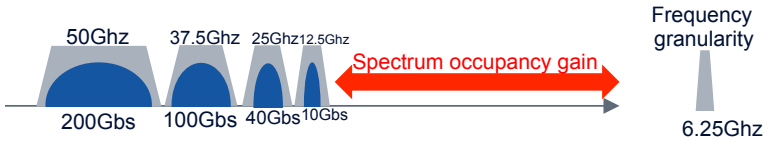


Optical channel configuration never changed
Guaranteed setting with large margins
Deployment of services in months
Single Vendor Optical Systems



ITU-T Fixed Grid

Define/try and continuously adjust configuration
Setting with just-required performance
Fast delivery of optical channels on application demand
Multi Vendor Optical Systems



Flexible ITU Grid

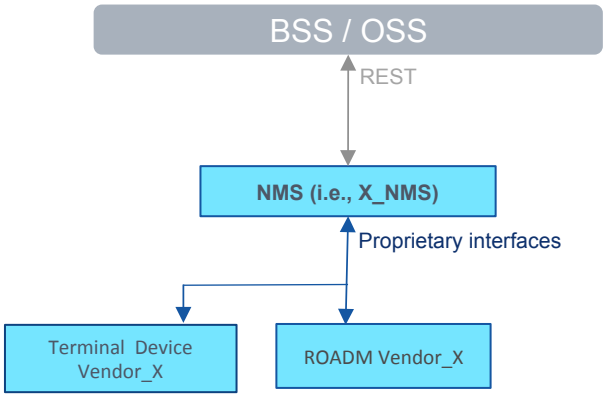
NOKIA

Bell Labs

From where do Operators start …

… opening and unleashing their Transport Network infrastructures?

Deployed (now)

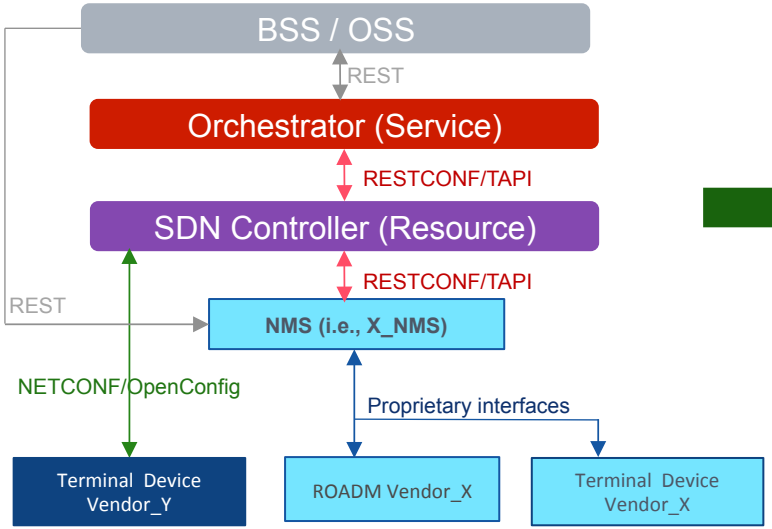


No Disaggregated – Proprietary

From Partially to Fully Disaggregated Transport Network infrastructures

Open-Source SDN framework based Network Control Platforms

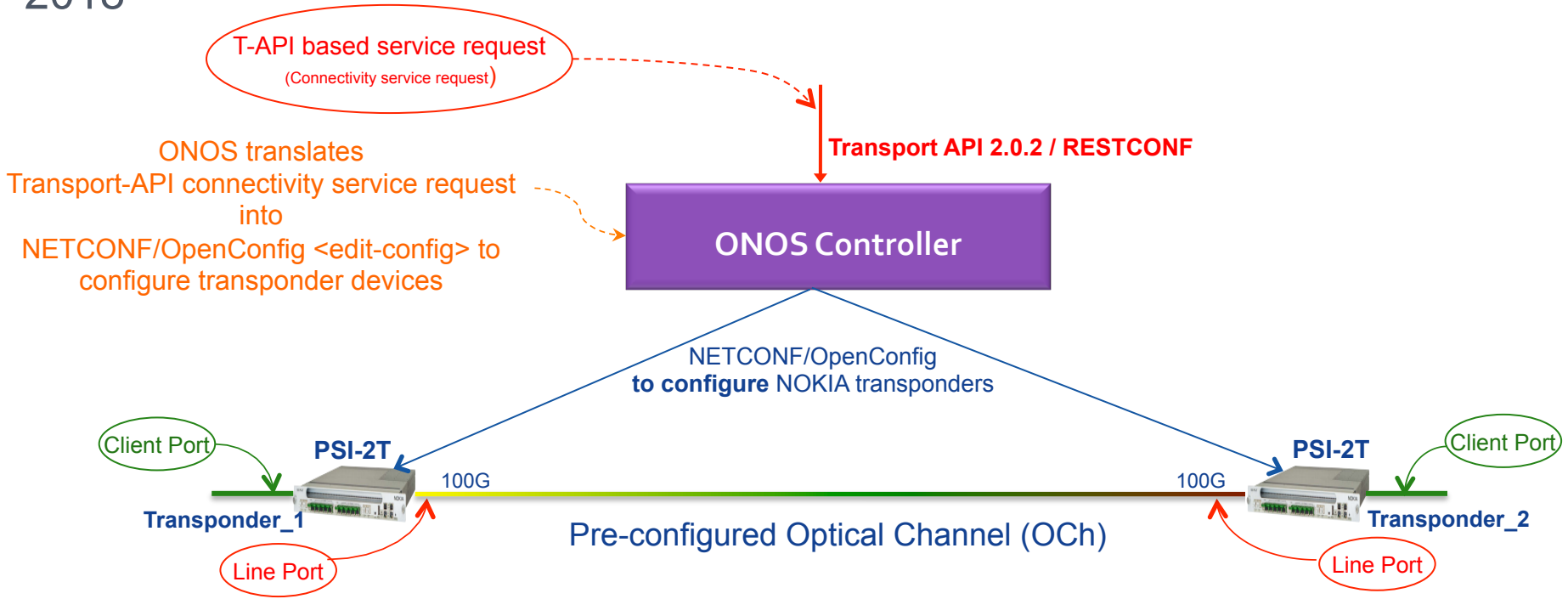
Brownfield deployment (short term)



Partially Disaggregated

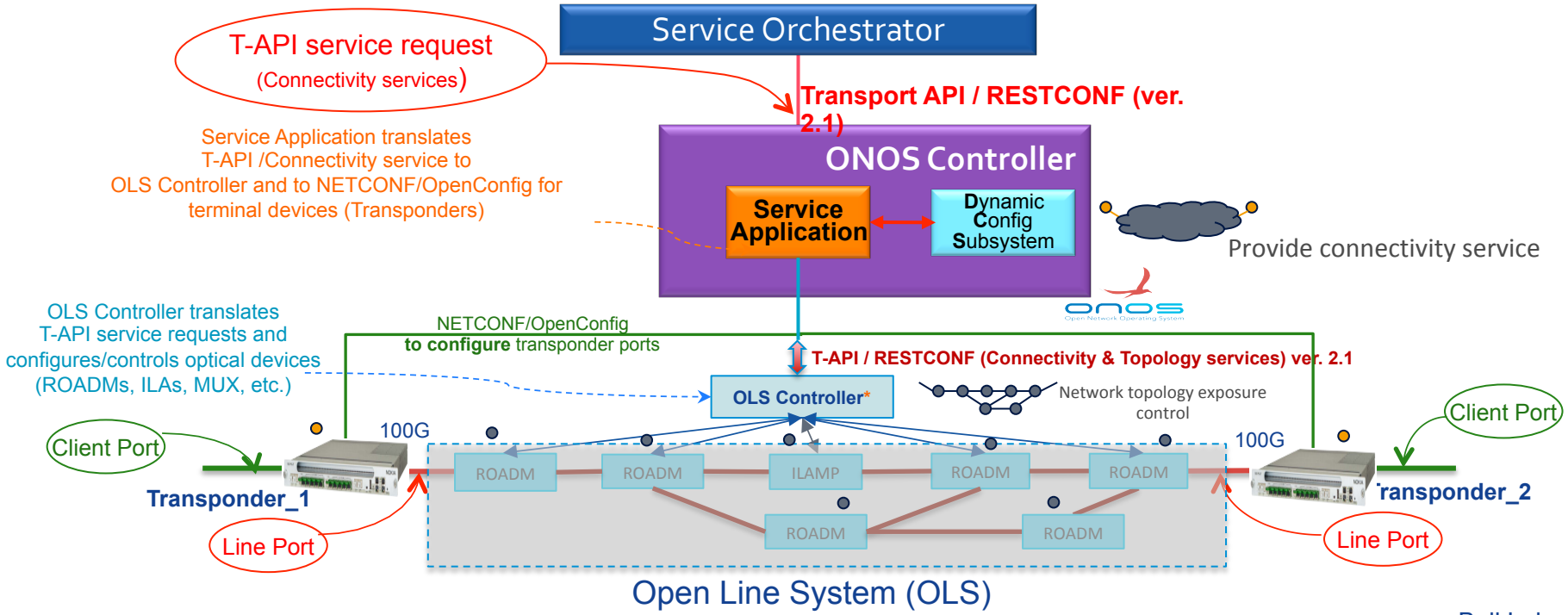
Configuration & Controlled of Pairs of Transponders – ODTN Phase 1.0

Integration and 1st demonstration at Telefónica lab completed – August 2018



Partially Open Disaggregated Network Control Platform Architecture

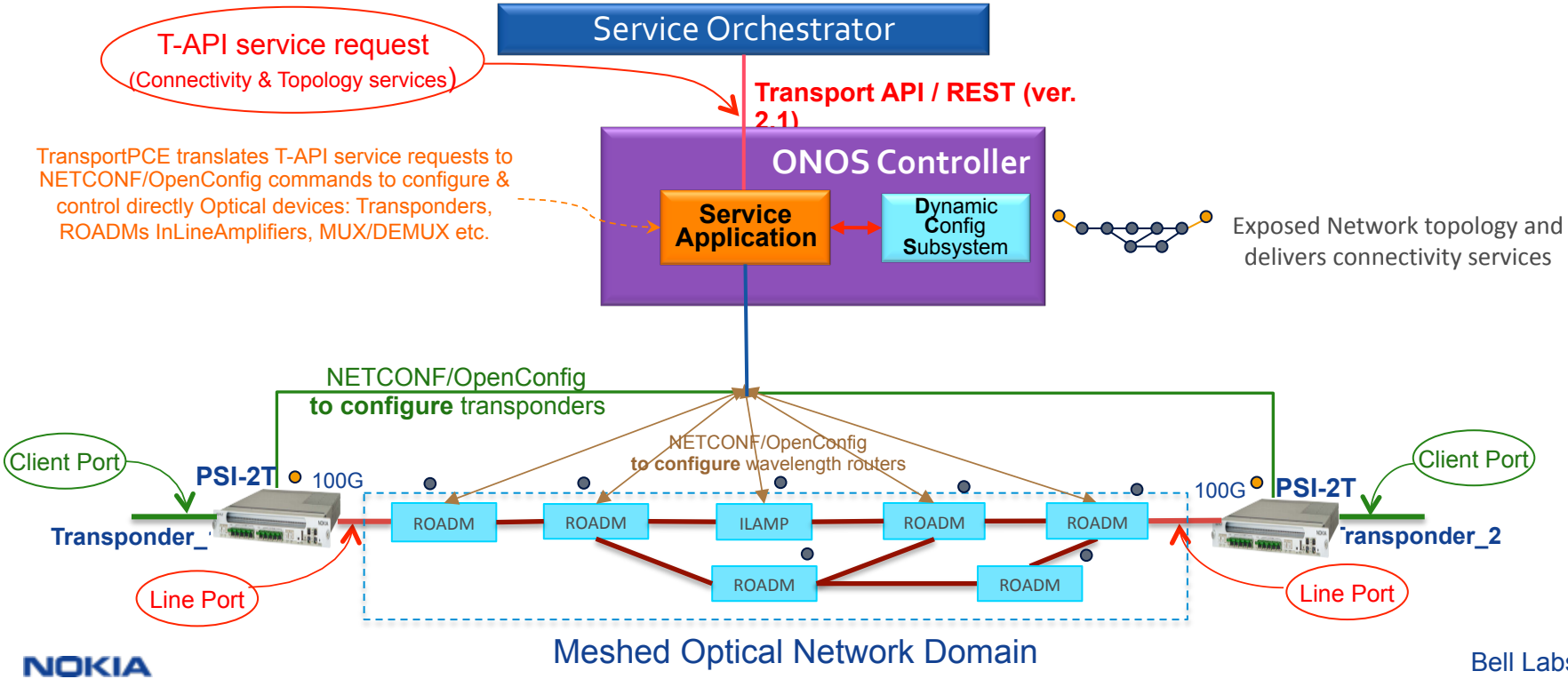
Brownfield deployment - ODTN Project Phase 1.5*



* On going …

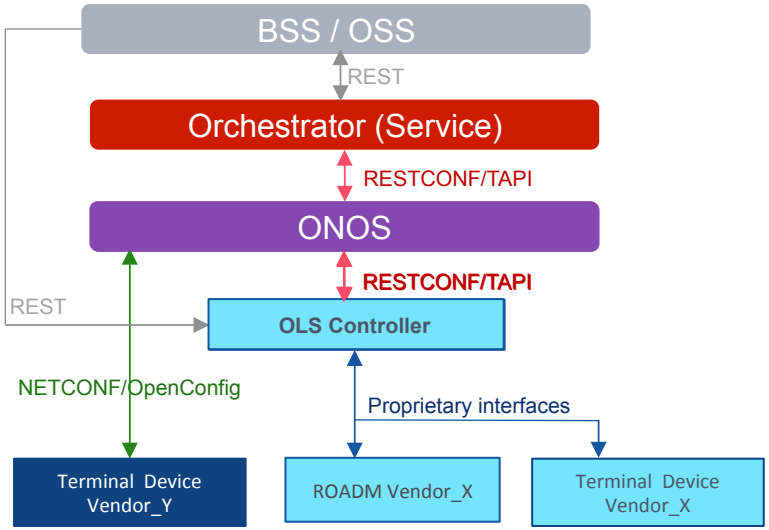
Fully Open Disaggregated Network Control Platform Architecture

Greenfield deployment – ODTN Phase 2.0



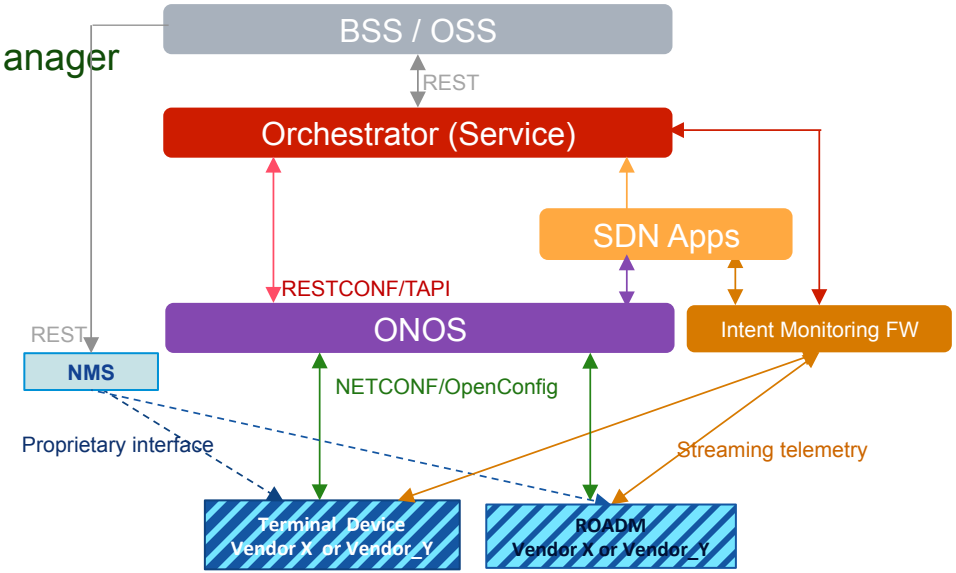
What need to be considered/studied in ONOS Software
Next steps on ODTN Phase 1.5

- Brownfield Deployments – ODTN Phase 1.5
  - TAPI for ONOS South Bound Interface
  - ONOS Controller / OLS Controller exchange sequences for Optical Channel provisioning



What need to be considered/studied in ONOS Software
After ODTN Phase 1.5

- Greenfield Deployments – ODTN Phase 2.0
  - OpenConfig model extensions
    - Optical device and link discovery / auto-discovery
  - Optical Channel abstraction in ONOS Topology Manager
    - TE attributes must be defined and then added
      - From IETF/I2RS, TAPI 2.1+ extensions, etc.
      - First attributes: Power, OSNR, CD, PMD, etc.
  - Optical channel feasibility computation:
    - How are Physical impairments used?
    - Which Physical Simulation Engine(s)?
  - And more …



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- **NOKIA IP/Optical Networks colleagues,**
- **SENDATE CELTIC-Plus Project**
- **ONF ODTN Project members …**

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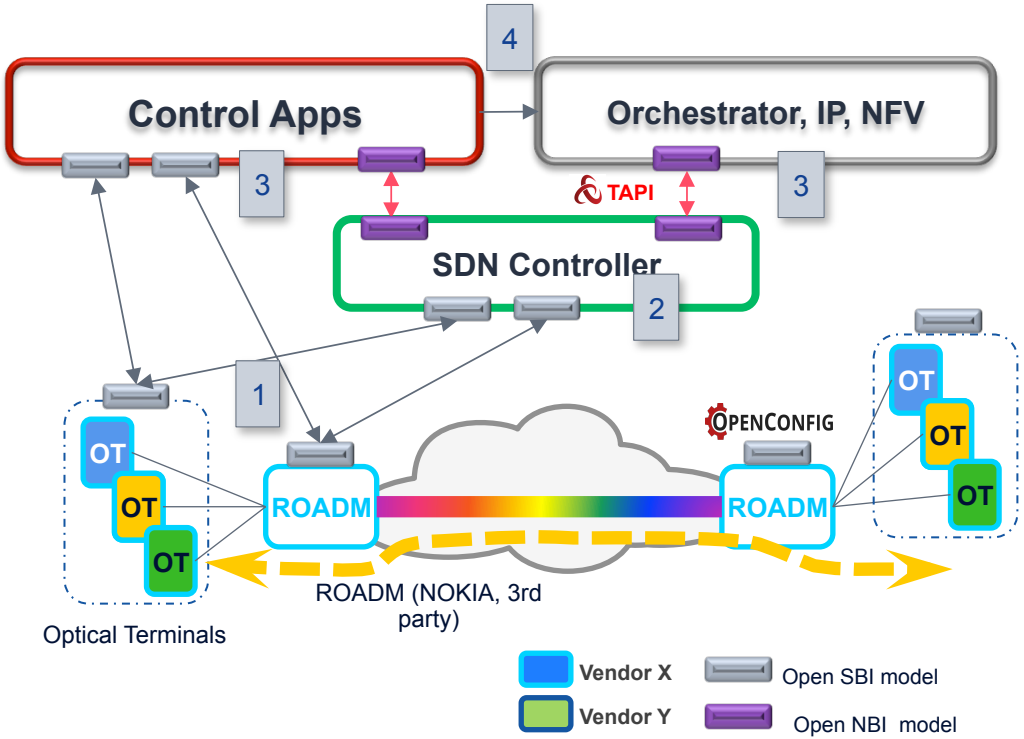
Comprehensive Network Control approach for Open Line Systems



1. Control Agents on Devices
   - NETCONF, gRPC,
   - OpenConfig models

2. SDN Controller (Customized)
   - ONOS-based platform
   - TAPI NBI and NETCONF SBI

3. Control Apps and Orchestration
   - Assurance, e2e coordination
   - Service Management & Deployment

4. System Integration
   - Integration, Performance validation
   - Troubleshooting , management, inventory


Shaping the future of technology to transform the human experience
Future Network Control Platforms for Open Transport Control & Configuration
NOKIA