

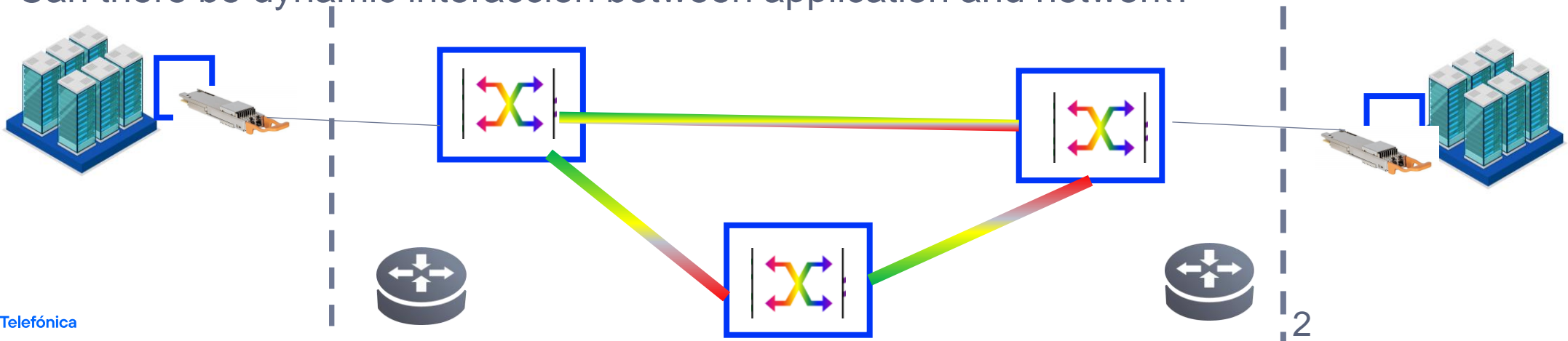
Enabling Inter-DC AI-Networking with Service provider optical slicing and programmable pluggables

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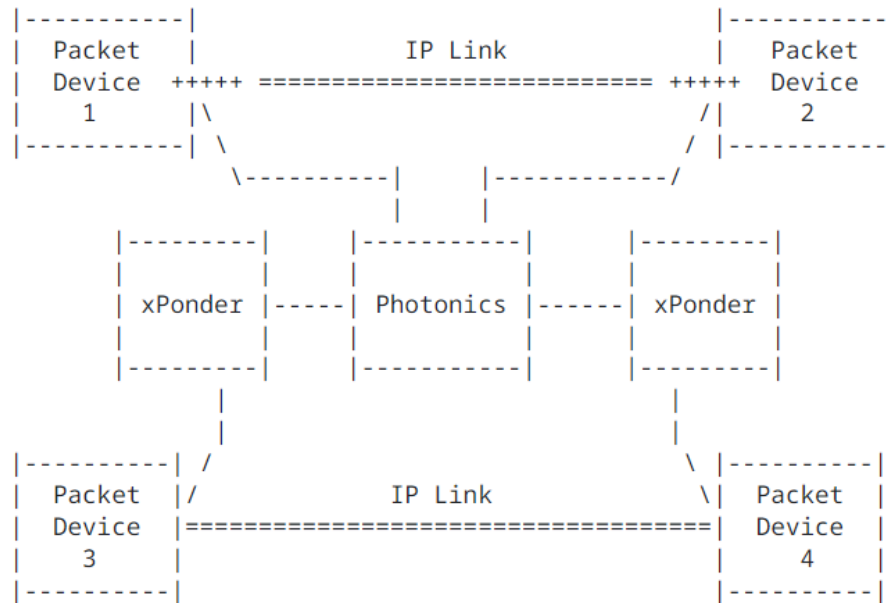
Motivation

- **Coherent** pluggable technology is **mature**, widely used for DCI (<100 km) over dedicated fibers
- Longer reach versions are tested in lab, field trials made, ready to come into operator's networks
- Network Operators are targeting to have an end-to-end SDN control management of the full network. The control of the new DWDM pluggables in the Routers is also included
- Connectivity: Traditionally, network operators offer packet based VPN connectivity (L3VPN, L2VPN, now EVPN), fixed capacity services, dark fiber..
- Can operators provide **advanced optical inter-DC connectivity** that supports flexible AI workloads?
- Can there be dynamic interaction between application and network?

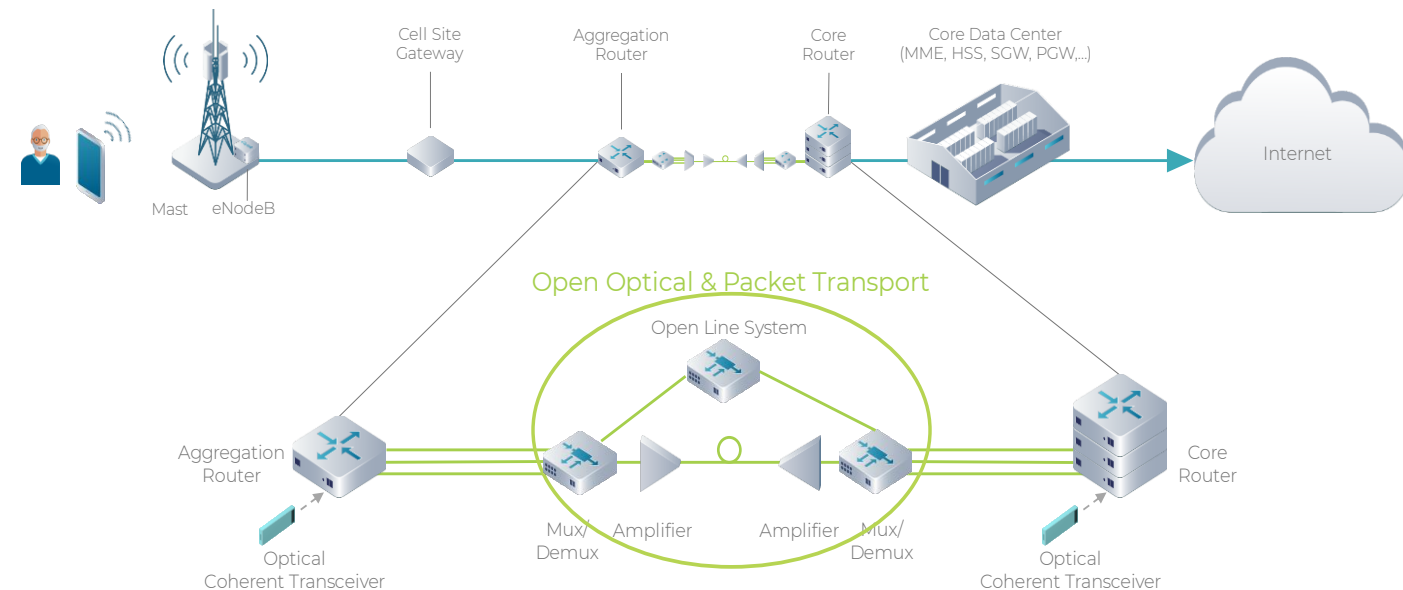


IP over DWDM with coherent pluggables

- Placing this small form factor pluggable in a device with packet functions reduce network cost, power consumption and footprint

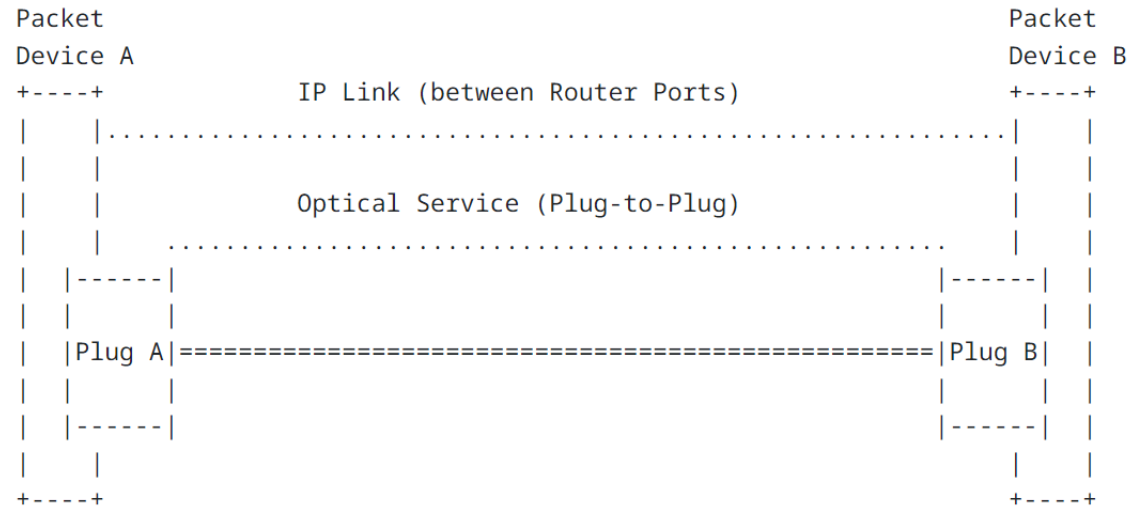


Optical Network: Photonics + pluggables + xPonder



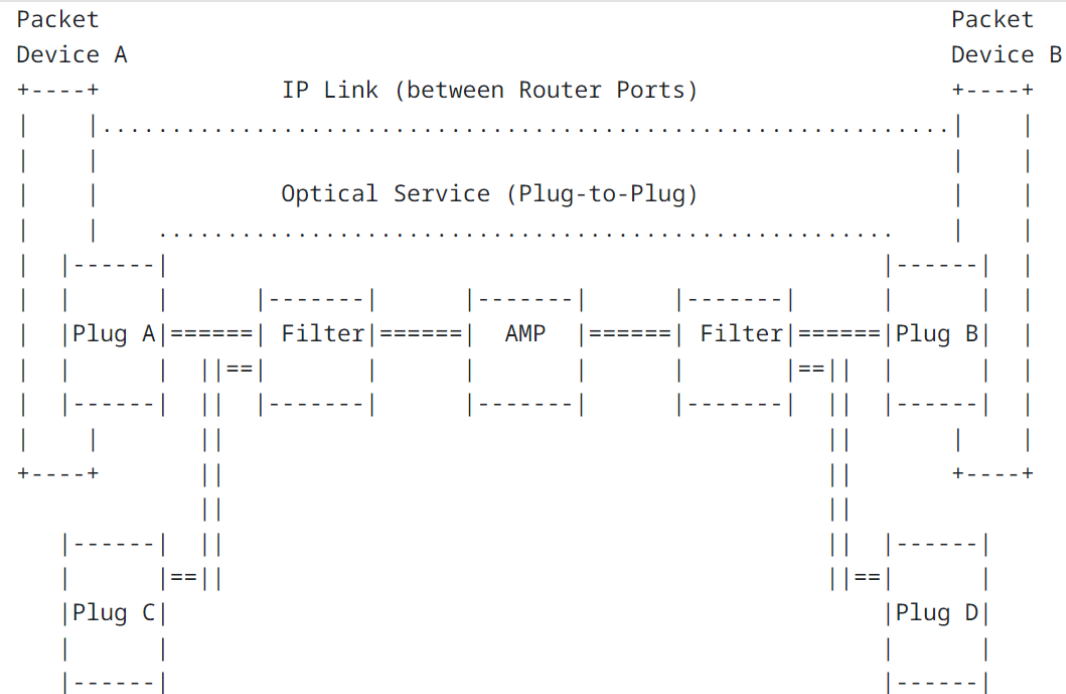
- Data centers are today the main consumers of high speed programmable pluggables

Inter-DC connectivity via dark fiber



- Short distances (up to 100 KM), no amplification, no protection
- Simple to manage
- DC gateway to DC gateway
- Server to server

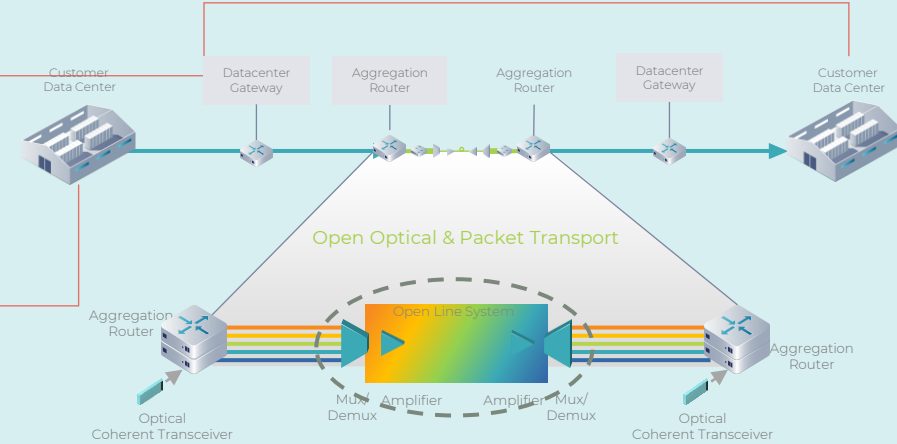
High capacity point to point over shared fiber



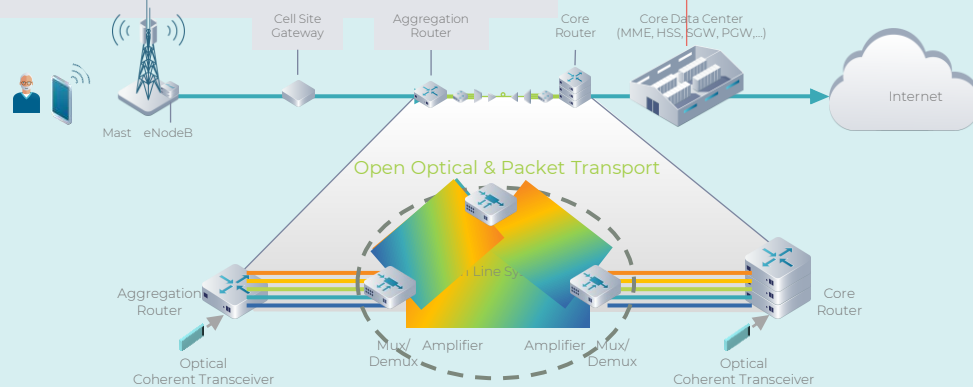
- Multiple connections can be bundled
- Still dedicated fiber for the inter-dc connection
- Can be used for server-server connection between DCs

Deployment scenarios over shared operator network

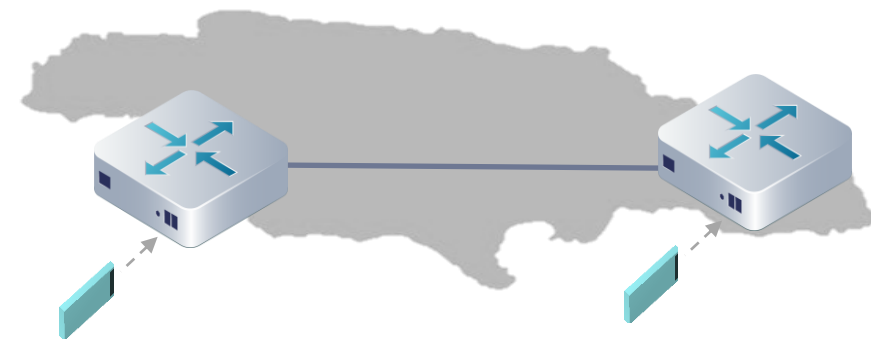
Data Center Interconnection



Metro ROADM Networks



Long-Haul National/International Networks



How to build flexible connectivity?

- **Operators are building SDN Control and Management architectures**
 - Yang based control, network service models, customer service models
- **Consolidation towards Network Slice as the advanced connectivity “intent” of network consumers**
 - See TEAS WG work on slicing
 - Custom connectivity can be requested
 - SLOs/SLEs
 - Connectivity matrix
- **Optical slicing**
 - Offer optical resources to end users
- **Scheduling connectivity**
 - From fixed bandwidth to scheduled bandwidth
- **Higher level APIs: e.g. CAMARA**
 - Designed for consumers with NO telco expertse

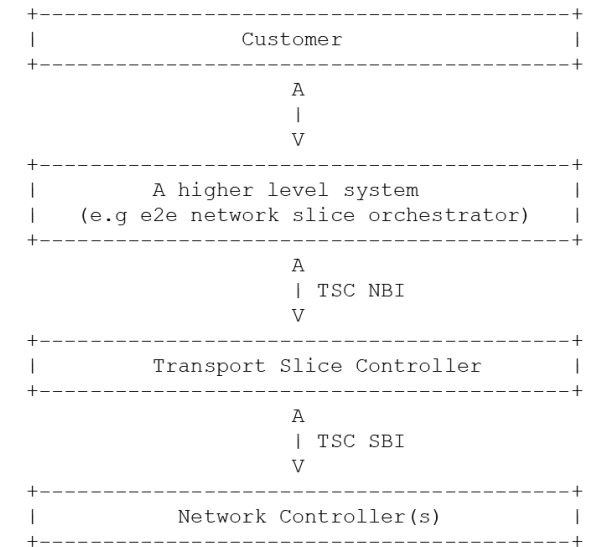
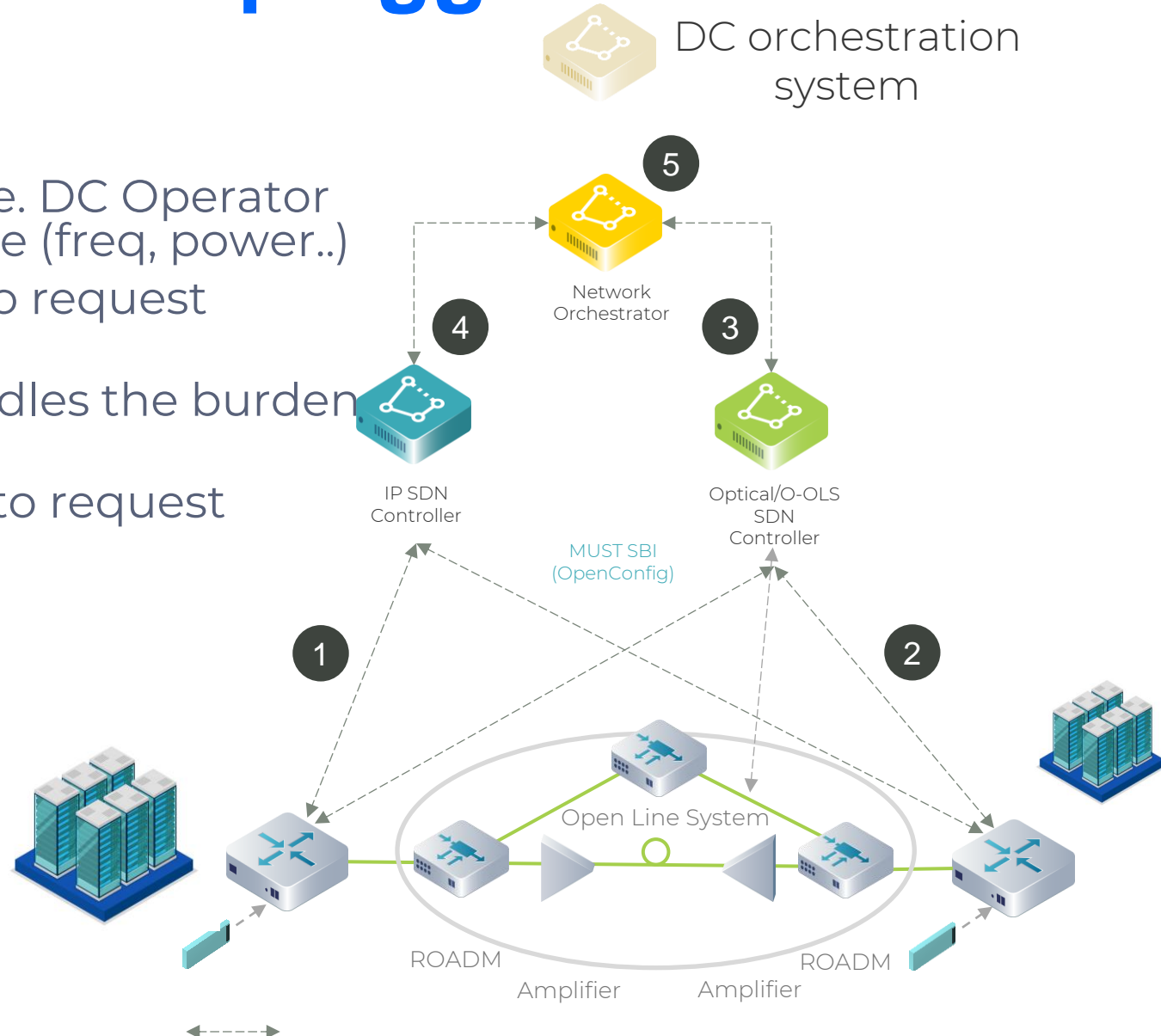


Figure 3: Interface of Transport Slice Controller

Inter-DC connectivity with pluggables

- **Several Control options:**

- Operator offers “spectrum” service. DC Operator in charge of configuring pluggable (freq, power..)
- Operator offers API to customer to request packet connectivity
 - manages pluggables and handles the burden of the optical connectivity
- Operator offerst API to customer to request Optical connectivity





PROTEUS  **6G**

Programmable Reconfigurable Optical Transport
for Efficiently offering Unconstrained Services in 6G