DCI
Opening up Optical Networking

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Overview

- Challenges and network evolution strategy
- Reduce cost of provisioning capacity on transmission layer – Current
- Reduce cost of provisioning capacity on transmission layer – Proposed
- Reduce cost of provisioning capacity on transmission layer – Proposed DCI deployment 2018-2020
- Data Center Interconnect (DCI) equipment
- Trial on LON01 to BRU
- Future - Open line System
- Reduce cost of provisioning capacity on transmission layer – GEANT cost profile DCI vs do nothing
- Challenges

Challenges and network evolution strategy

- Address scalability/cost on transmission layer

- Address scalability/cost on IP/MPLS layer

With a growth rate of 64% as seen in 2015 -> 2016 traffic will be 140 times in 10 years

- Increase modularity – address vendor locking

To address these challenges we need to optimise the network architecture and take maximum advantage of the current *disruptive* trends

# Reduce cost of provisioning capacity on transmission layer - current

Current architecture
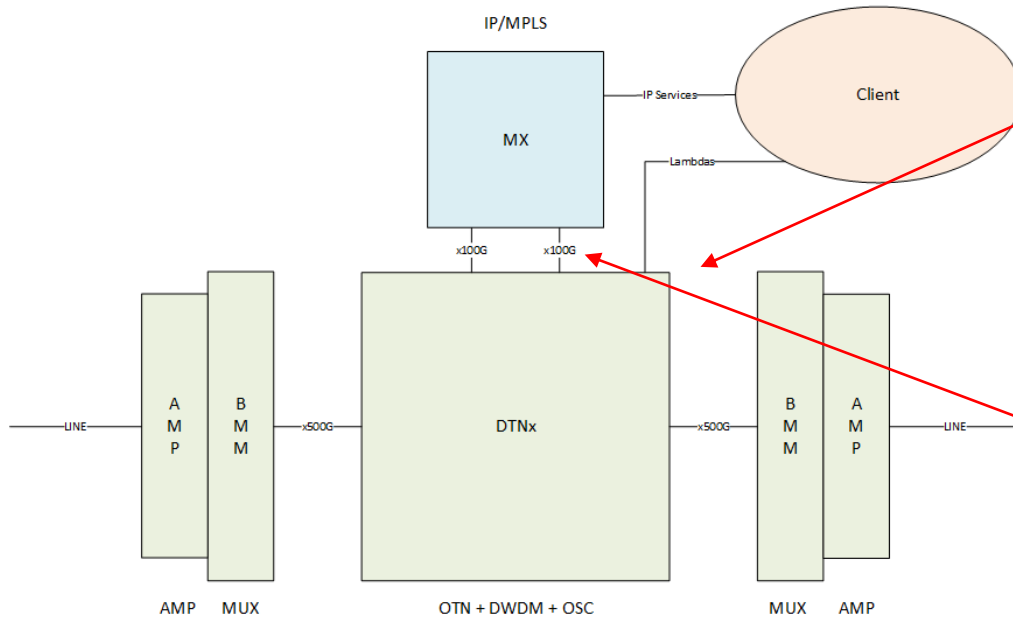
Problems with current architecture:

- DTNx based OTN layer highly expensive
- DTNx chassis running out of slots in central PoPs.
- OTN useful for protection switching and multihop but traffic is 70% unprotected.
- OTN chassis are DC powered full rack while DCI are AC powered 1RU
- Proliferation of IP/MPLS cross connects to OTN

Reduce cost of provisioning capacity on transmission layer - proposed

DCI integrated solution
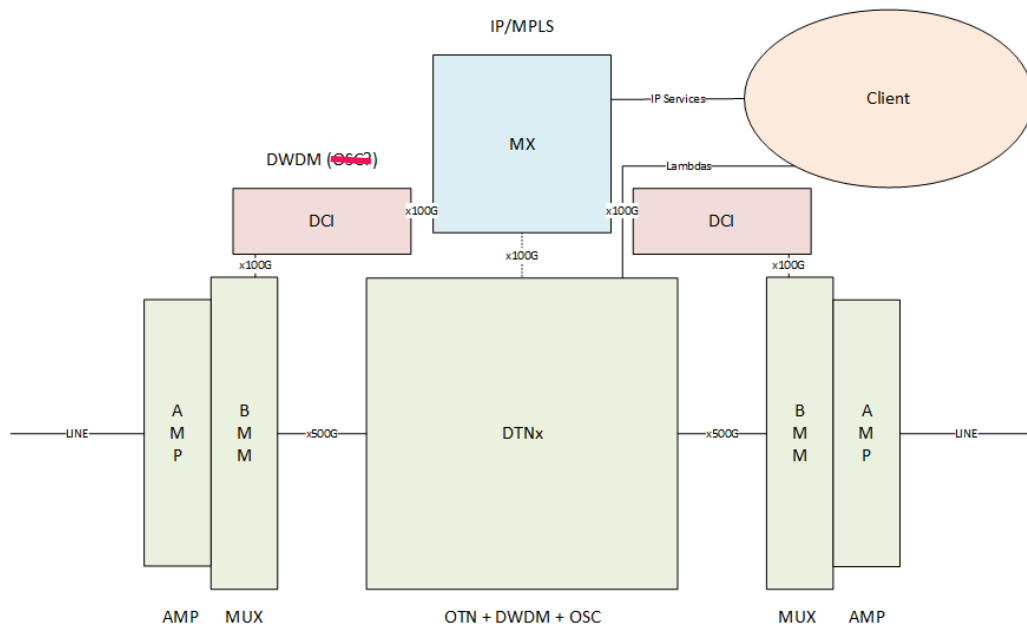
Proposed solution

- Use DCI to provision bandwidth for high capacity IP/MPLS trunks.

- DCIs are up to 10x cheaper than DTNx.

- Keep DTNx for link management and lambda provisioning greatly simplifying DCI role and minimising risks.

- Integration of DCI allows for growth offset and generate enough spares to allow to cease spending on DTNx platform.

- DCI are AC (770W) powered 1RU (Rack Unit)

- DCIs can be re-used after line system re-procurement predicted for 2020/2021

Reduce cost of provisioning capacity on transmission layer – Proposed DCI deployment 2018-2020

Step 3
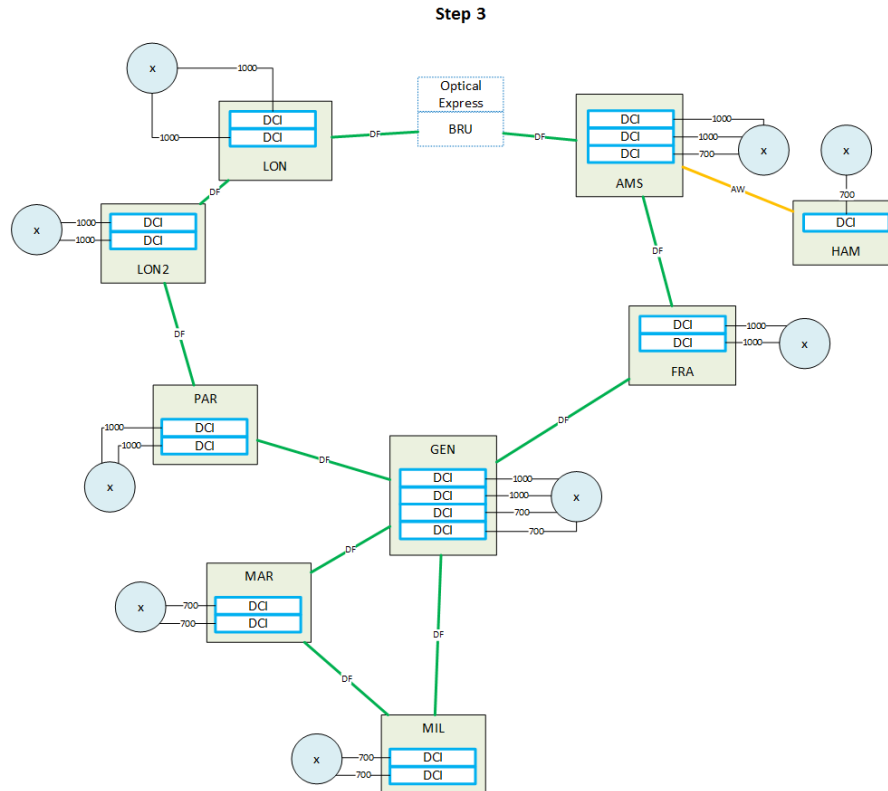
DCI deployment plan (2021 view)

- Proposed solution of 14 DCI boxes to be deployed between 2018 and 2019 to offset capacity growth on DTNXs

- Further 6 boxes to be added in 2020 on MIL-GEN-MAR links if growth requires

- Use Short Range (SR) interfaces between DCI and MXs to minimise cross connect costs.

- After a procurement process CORIANT Groove G30 has been selected as the DCI for GÉANT.

- 8QAM modulation (100G) expected to work on all links (1.2Tbps max throughput per DCI).
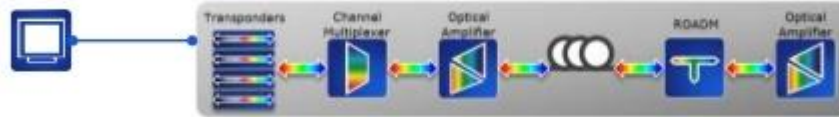
Coriant Groove G30 DCI Platform

USB Port

System LEDs

Management Ports

4x single-slots
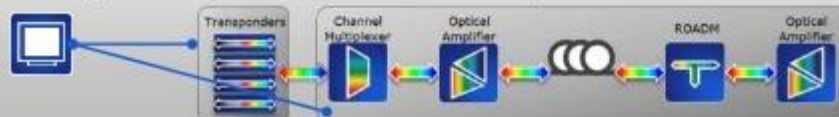
1RU

Future - Open line System

Disaggregation

- No Disaggregation: Entire transport network acts as one element

- Fully Disaggregated: Everything is a separate network element

- Partially: Transponding is one element, OOLS is second.

Today

Future

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Partly disaggregated line system architecture allows for use of third party transponders on line system by defining a DEMARC at the MUX. This allows for best in breed selection of transponder and avoid vendor locking both financially and in terms of innovation curve.
This also enable better infrastructure sharing by lowering the cost of sharing capacity over fibre.

Reduce cost of provisioning capacity on transmission layer – GEANT cost profile DCI vs Infinera

Cumulative cost Infinera only vs DCI
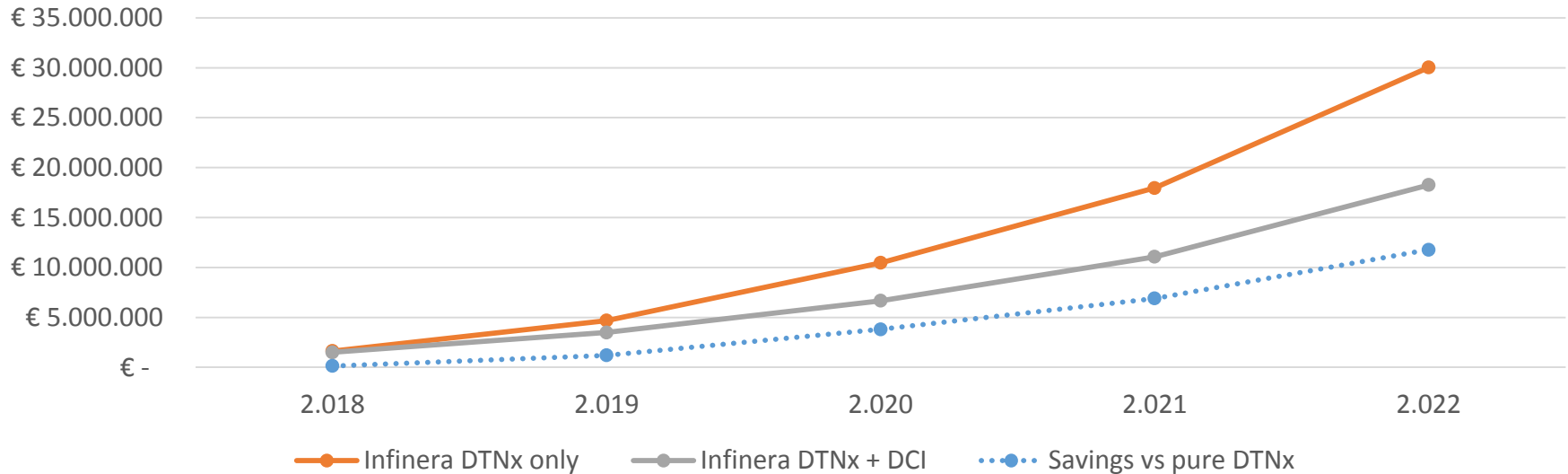
- Cost includes additional spending and additional maintenance, but not current maintenance.
- Growth rate 50% IP/MPLS 12% Lambdas

Challenges

Challenges (mid term DCI solution)

- Need to manage new technology from third party – DCIs

- Infinera DNA has no support for alien waves – does not see them

How we address them (mid term)

- Full vendor NMS for DCI management to provide visibility of DCI network.

- Training will be provided, create new procedures, incident response, correlation of services and alarms.

- Simple initial DCI configuration, only GÉANT own IP trunks to be moved to DCIs

- Progressive rollout of DCIs with rollback option as Infinera DTNx capacity will still be available if major problems are seen during the deployment.

- DTNx + DNA will still be fully in place to provide link management and operations, administration and management (OAM) of GEANT transmission network.

Thank you

Questions???

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