



Antitrust Guidelines

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Prior to any and all meetings of TIP, or subgroups thereof, the Participants and any other attendees in that meeting should be reminded of their obligation to comply with these guidelines.

Adherence to TIP's Organizational Documents

- TIP has adopted policies and procedures (“Organizational Documents”) that all Participants are required to abide by pursuant to their Participation Agreements with TIP.
- The Organizational Documents may be accessed at <https://telecominfraproject.com/organizational-documents/>
- These policies and procedures apply to Project Group activities and the development of work product such as Specifications, Software, and Documentation.
- Participants should review the applicable Organizational Documents prior to participating in any Project Group activity or work product development effort.

TIP IPR Policy

All TIP Project Group meetings are subject to the TIP Intellectual Property Policy. Participants are deemed Contributors as subject to the obligations regarding Deliverables and licensing as set forth in the TIP IPR Policy. All individuals participating in a Project Group are encouraged on an ongoing basis to review the TIP IPR Policy at https://telecominfraproject.com/wp-content/uploads/sites/12/TIP-Document-IPR-Policy-May_BODapproved.pdf

Agenda

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Welcome & Introduction to TIP | Attilio Zani (TIP)

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Introduction to Open Optical & Packet Transport (OOPT) Project Group | Víctor López Álvarez (Telefónica)

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TIP Overview & Update

Attilio Zani – TIP Executive Director

WHAT IS TIP?

Founded in 2016

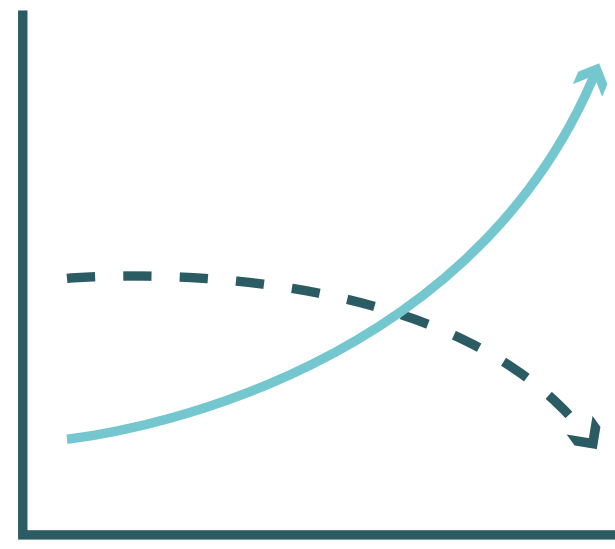
Telecom Infra Project (TIP) is a collaborative community accelerating and transforming the way telecom infrastructure is created, taken to market, and deployed.

Together We Build, Test & Deploy.

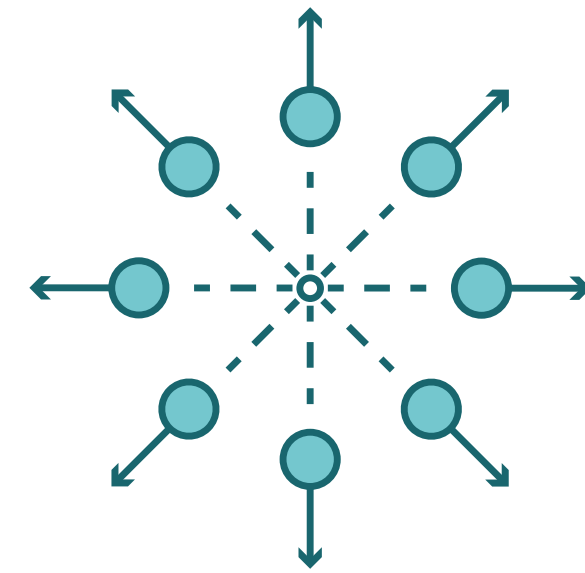


WHY DOES TIP EXIST?

To accelerate Innovation



Global data consumption predicted to rise annually by 47% over the next few years. Meanwhile, **mobile ARPUs** are falling.



28.5B Networked devices and connections (mobile & fixed) expected in 2020



Over half of the world's population, still do not have basic access to the internet.



Of those connected, **many can't enjoy rich Internet experiences** due to bandwidth and latency limitations.

Sources: GSMA Report: Delivering the Digital Revolution, February 2018; Cisco VNI Forecast 2017-2020; Broadband Commission For Sustainable Development, 2017 State of Broadband

TELECOM INFRA PROJECT

500+ Members

Aricent

accenture

airtel

ADVA[™]
Optical Networking

ALTIOSTAR

altran

axiata

Aviat
NETWORKS

BaiCells

Blu Wireless

BT

CableLabs[®]

CERAGON

China
unicom 中国联通

COMMSCOPE[®]

ciena

DATACOM

DELL Technologies

DELTA

T . .

Edge-core
NETWORKS

exaware

Infinera

intel

Lime
microsystems

JUNIPER
NETWORKS

MAVENIR

metaswitch

MTN

MTL
everyone everywhere

NEC

NRAN[™]
WIRELESS

NOKIA

NEXIUS

NTT

ONF

orange[™]

paloalto
NETWORKS[®]

Parallel
WIRELESS

Qualcomm

Radisys

Rakuten

SAMSUNG
SAMSUNG RESEARCH AMERICA

Siklu

Sprint

SK telecom

STC

swisscom

ufiSpace

TATA

Tech
Mahindra

Telia Company

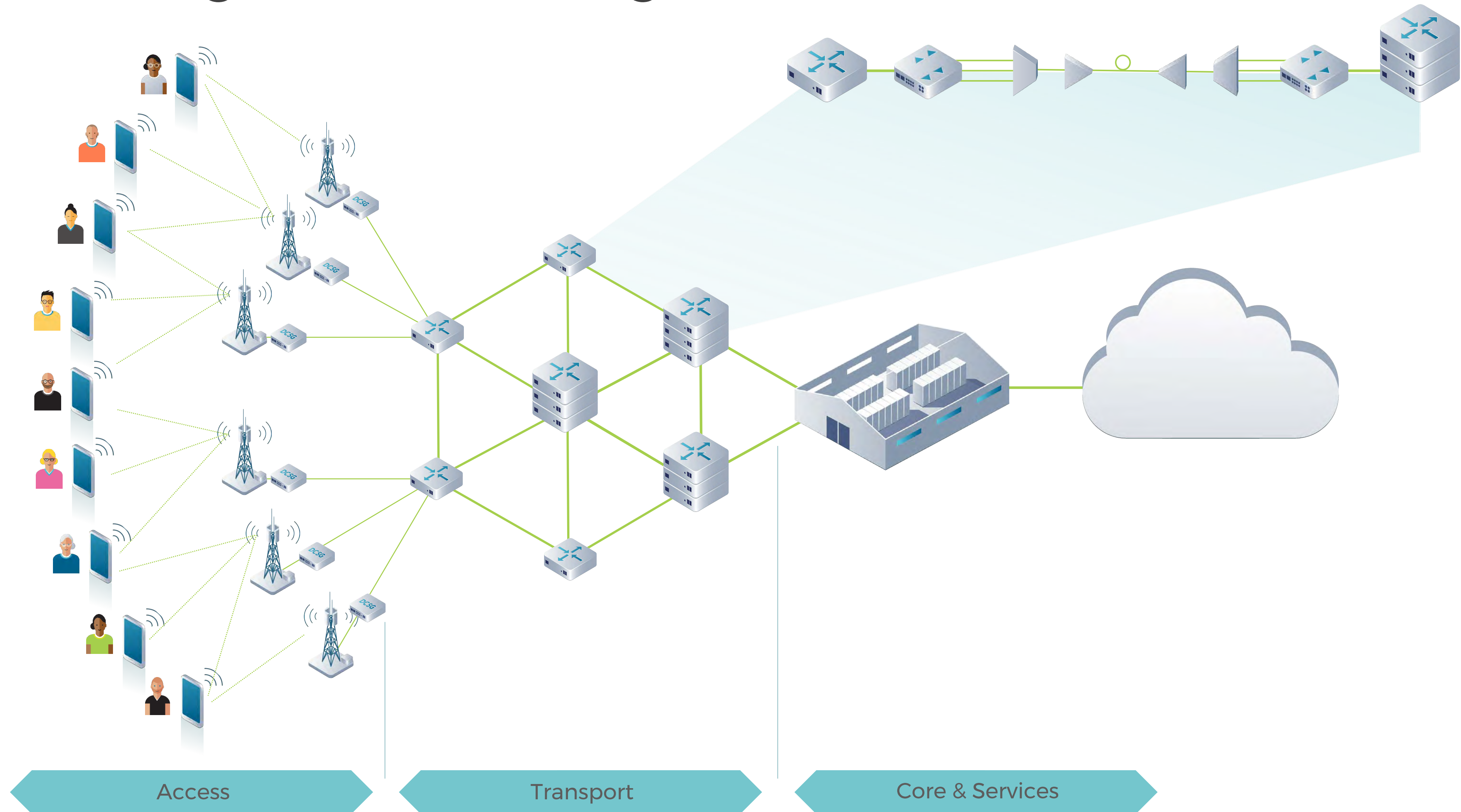
Telefonica

TIM

VIAXI

vodafone

TIP IS PROVIDING A broad range of technologies

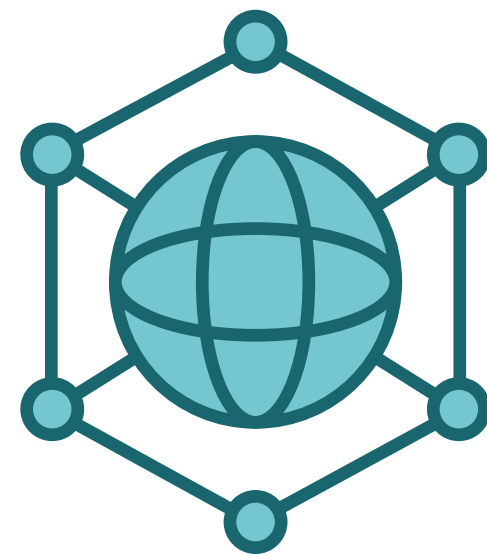


TIP IS CONNECTING A diverse community



SERVICE PROVIDERS

Satellite ISPs
MNOs MSOs

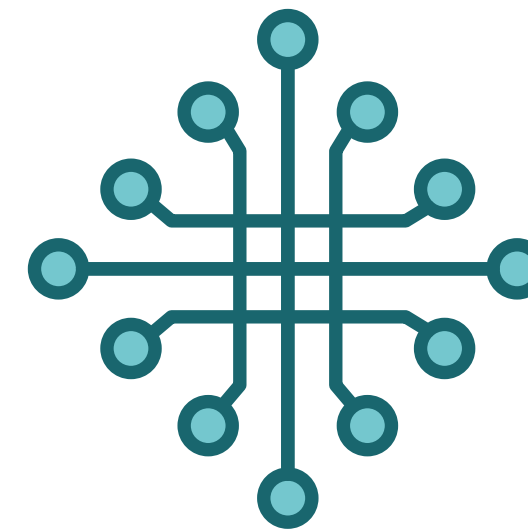


TECHNOLOGY PARTNERS

Established &
Smaller OEMs

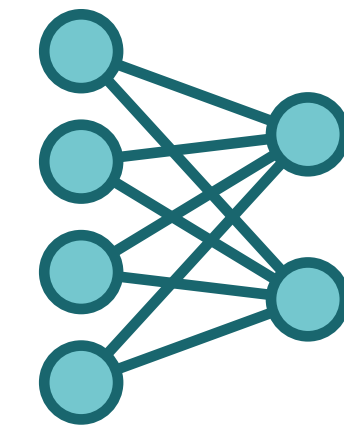
Startups

Research Institutes



SYSTEM INTEGRATORS

Professional
Integrators



CONNECTIVITY STAKEHOLDERS

Municipalities Enterprise
Internet Companies

TIP IS Generating Momentum

Recent activities and Announcements

New Liaison Agreements:

- **O-RAN Alliance** and **TIP** are announcing a liaison agreement.
- **TIP** and the **GSMA** have signed an understanding that will help drive share service provider requirements from the GSMA into TIP Project Group work streams
- TIP has reached agreements with the [OpenStack Foundation \(OSF\)](#), and the [OpenAirInterface Software Alliance \(OSA\)](#) to jointly explore collaboration areas on the newly formed [Open Core Network Project Group](#) and leverage each organization's expertise and resources to accelerate progress towards a converged open core network implementation.

Global Updates:

- **Indosat Ooredoo** and **Smartfren** will conduct the first OpenRAN field trials in the APAC region
- **KDDI** will be opening the first TIP Community Lab in Japan
- **Deutsche Telekom** is expanding its current TIP Community Lab and launching a European Open Test and Integration Center.
- **Vodafone has now launched trials in Mozambique and the Democratic Republic of the Congo** as anticipated and is progressing with trials in the UK and Ireland.

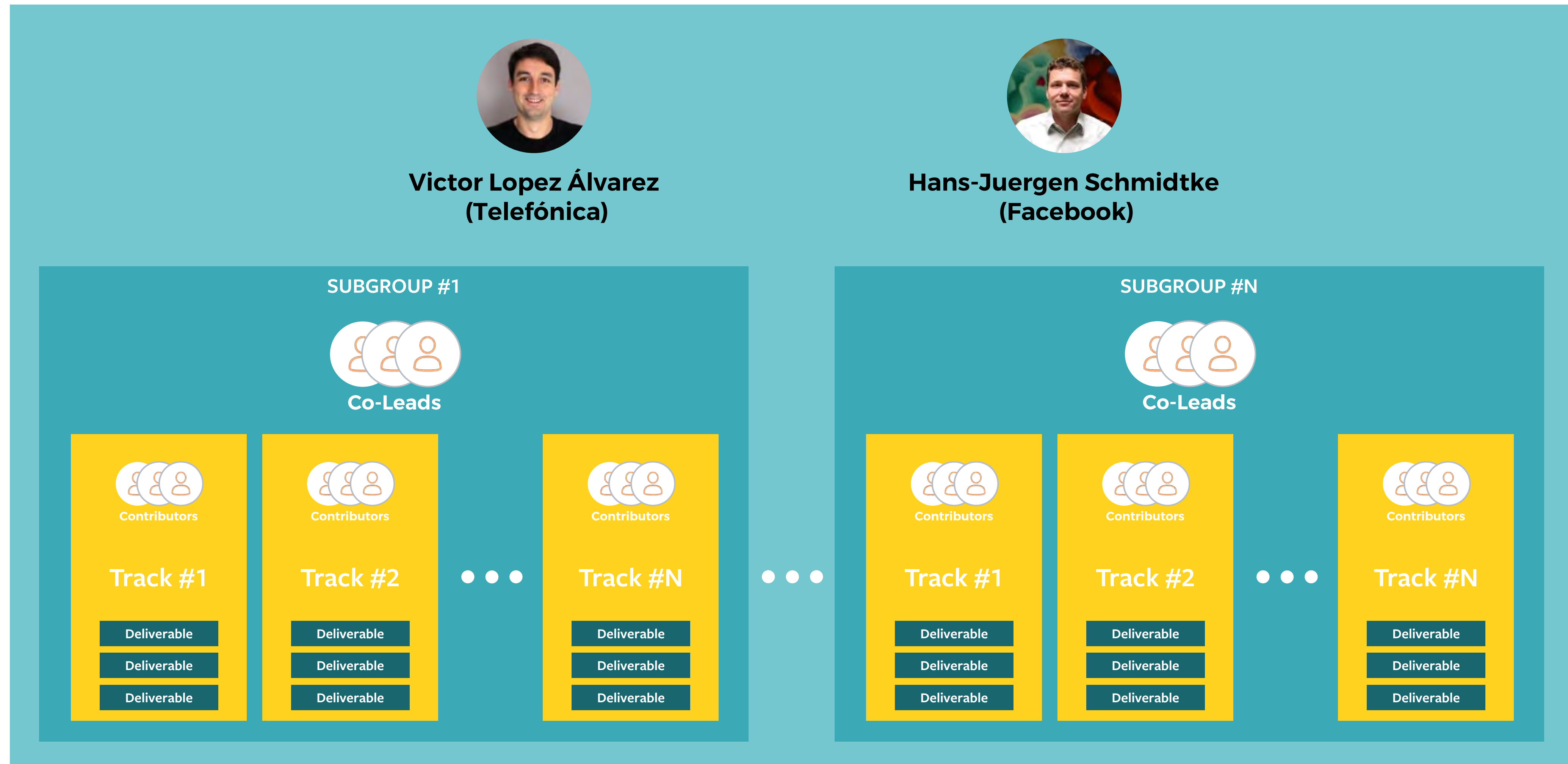
Open Optical & Packet Transport

Víctor López – Telefónica (OOPT Co-Chair)

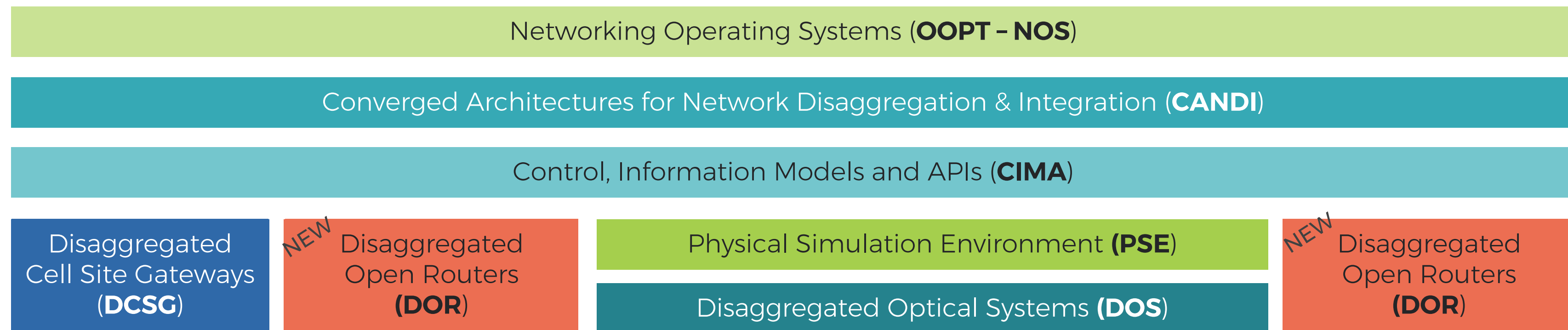
Open Optical & Packet Transport Project Group Mission

Our goal is to accelerate innovation
in optical and IP networks
and ultimately help operators
provide better connectivity for communities
all around the world

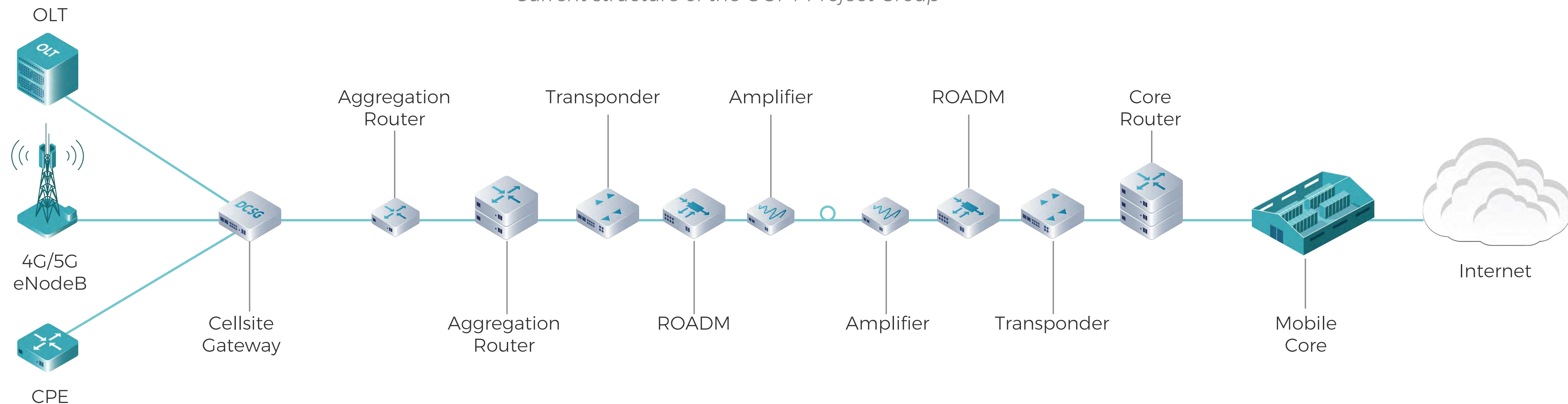
Open Optical & Packet Transport Project Group Structure



Open Optical & Packet Transport Project Group Structure



Current structure of the OOPT Project Group

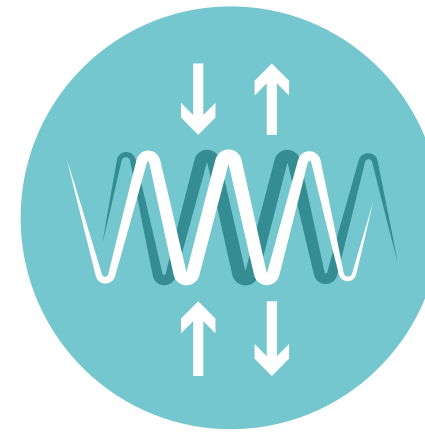


Open Optical & Packet Transport

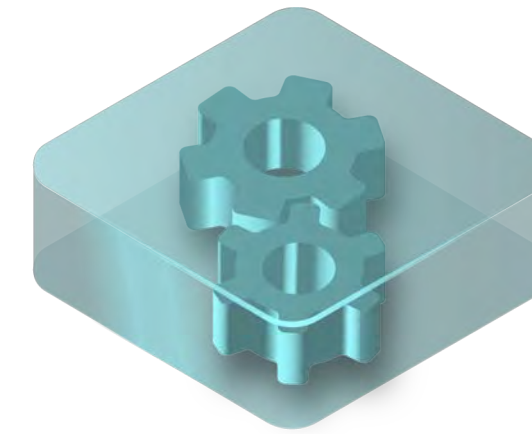
OOPT TECHNOLOGIES



GNPy



TAI



OOPT-NOS
Goldstone



DCSG



CASSINI



PHOENIX



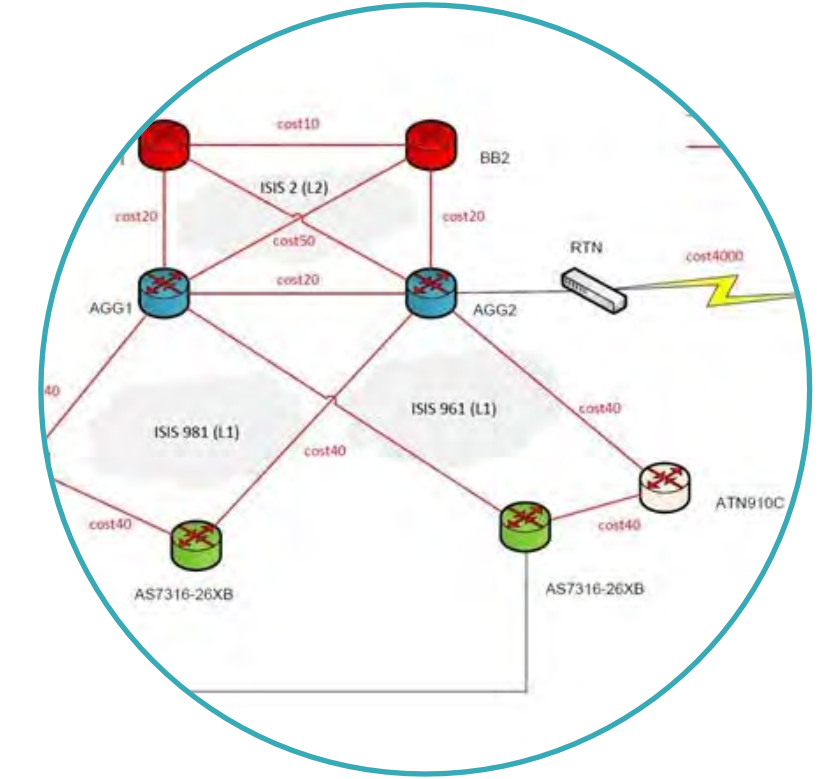
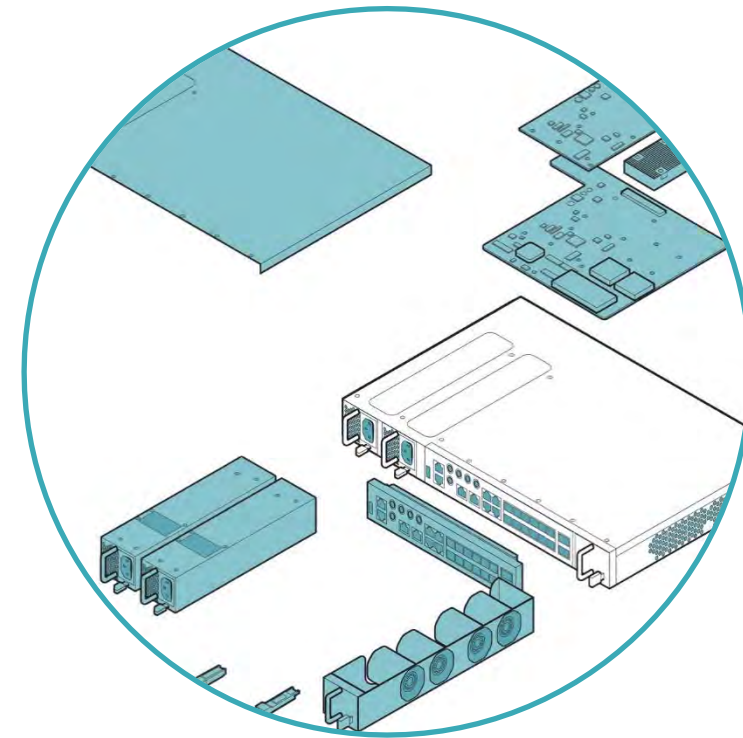
GALILEO

Disaggregated Cell Site Gateways (DCSG)

José Antonio Gómez – Vodafone

João Gabriel Evangelista Aleixo - TIM Brasil

DCSG Timeline



Idea & Specification

FEBRUARY-JULY 2018

- MWC#18: Project Group launched
- June-July: Specs created and delivered by Vodafone, Telefónica, TIM, Orange and BT.
- Initial engagements with vendors

Design & Build

SEPTEMBER 2018 – FEBRUARY 2019

- First prototypes announced
- RFI to evaluate potential compliant solutions & vendors.
- 3 HW and 3 SW shortlisted
- Demo's in MWC#19

Lab Testing & Trials

APRIL-DECEMBER 2019

- Joint testing Vodafone, Telefónica, TIM of shortlisted Solutions. Phase 1 capability focus
- Other operators start testing
- TIP community labs, Plugfests

Evolution & What's next

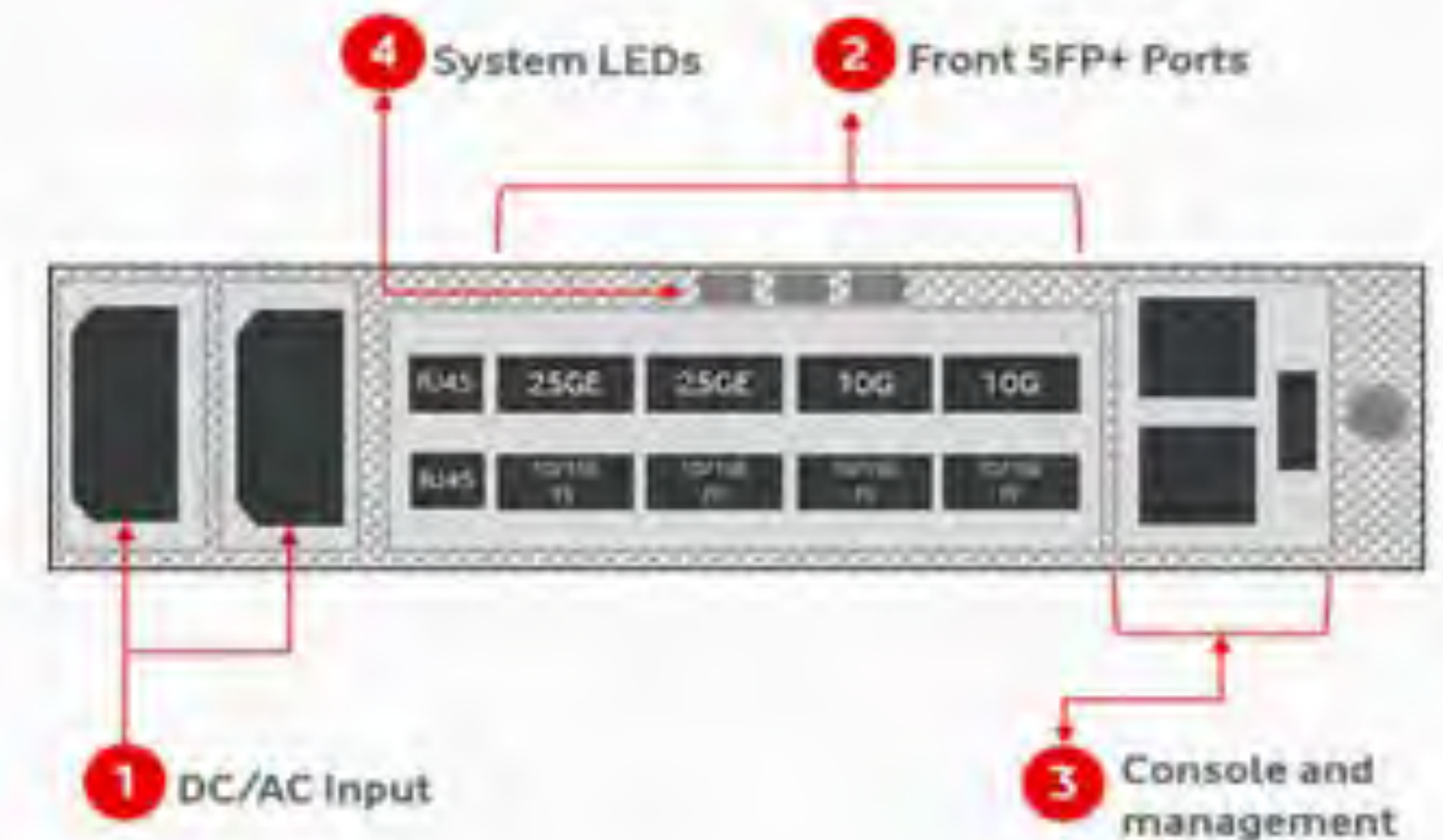
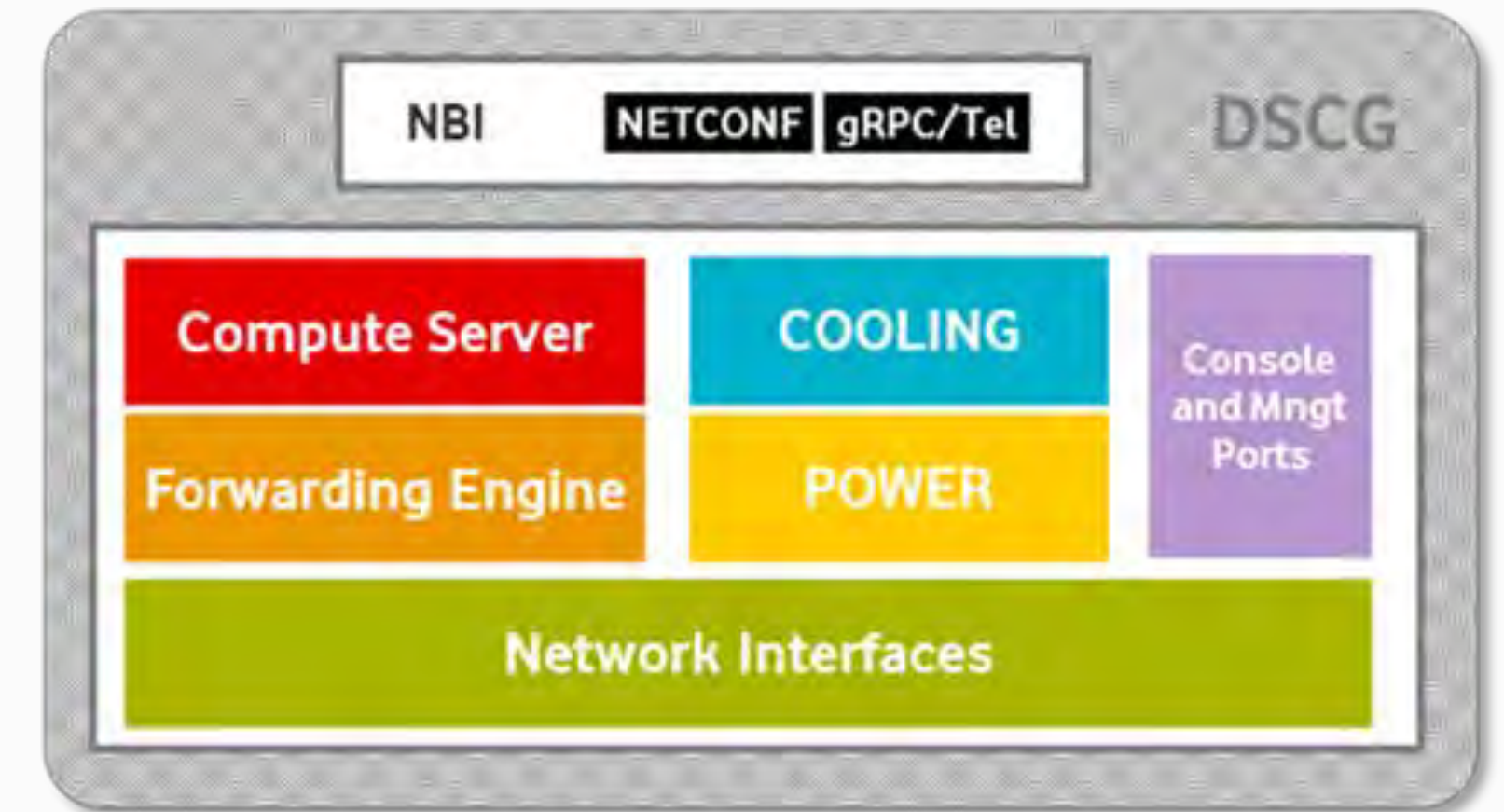
2020

- Operators moving to Live Network trial Projects
- And deployments
- Working on new capabilities
- Testing solutions as they become available

Idea & Specification

Joint effort by operator community

- Cell site router function (BSW) + Aggregation scenarios and Enterprise services (PESW)
- HW & SW disaggregated, with standard API's for SDN control
- Timesync in combination with SyncE for 4G+ and 5G support

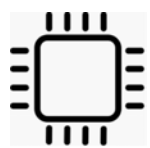


Design and Build

Assessing and fostering a DCSG ecosystem



DCSG RFI with 20+ vendors shortlisting 3 HW and 3 SW vendors



Two reference HW models, based on Broadcom Qumran family (UX & AX)



HW & SW integration started as HW variants were becoming available



Testing phase 1 started with available prototypes



Increased project traction across operator & vendor community



By TIP Summit 19 several HW & SW solutions became GA



Edge-core
NETWORKS

ALPHA
Alpha Networks Inc.

DELTA

ADVA
Optical Networking

VOLTA
Networks

ipinfusion



Infinera

DELTA

ufiSpace

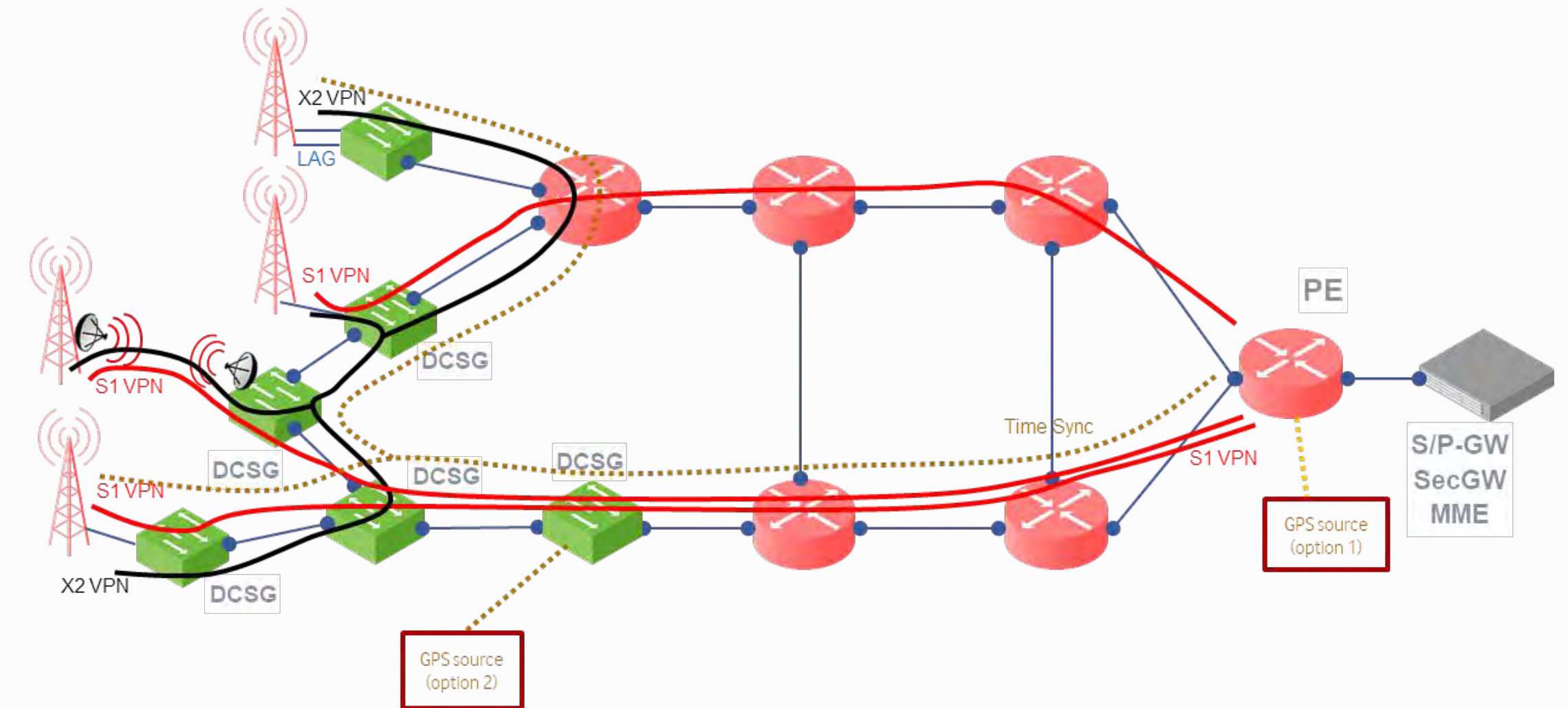
ADVA
Optical Networking

Edge-core
NETWORKS

Lab Testing & Trials

Reference test scenario & trial projects

- Phase 1 Testing - Mobile access/aggregation capabilities for 4G & 5G
- Additional capabilities to be validated in 2020
- Several initiatives running around the globe



Evolution & What's next

Capabilities roadmap & Deployments

- DCSG Summit - Feb' 20:
 - SW/HW roadmap evolution for 2020:
 - ZTP extended
 - Standard API's for SDN control
 - Segment Routing roadmap
 - IPv6
 - EVPN
- Telefonica Deployments in Germany & Ecuador
- Other announcements expected in coming months



Disaggregated Optical Systems (DOS)

Johan Hortas - Telia Company

DOS update

March 2020

1

Phoenix (Apollo), Specification approved by technical board. Detailed plan, including a collaborative RFI committed by the team, OOPT members to be invited to pre-RFI call during April.

2

Galileo collaboration with OOPT NOS team to intergrade hardware platform

3

Cassini IP Infusion announced GA of their OCNOS, Field trials starting in Africa, Ongoing commercial deployments in Latin America

Disaggregated Optical Systems (DOS) Cassini

Jeff Catlin – Edgecore Networks
Jose Miguel Guzman – Whitestack

Cassini Overview and Update

Open Optical Packet Transponder
TIP Contribution 11/7/2017

E d g e - c o r e
NETWORKS



4 x Optical Module Slots

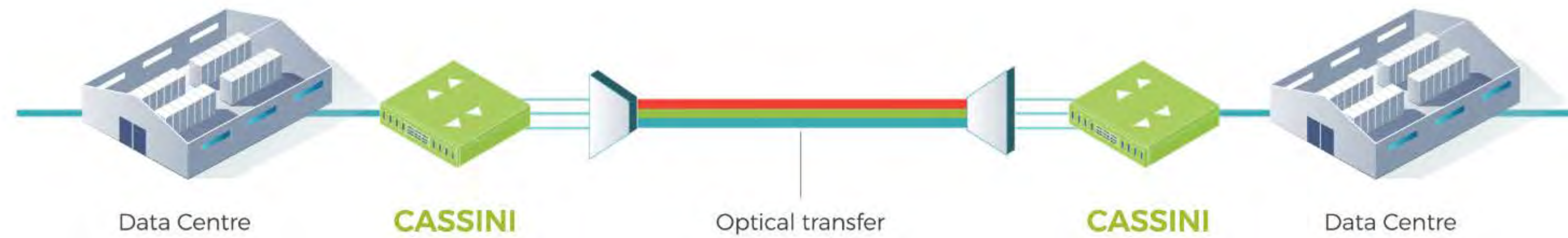
16 x Standard QSFP28 Ports

4 x Optical Module Slots

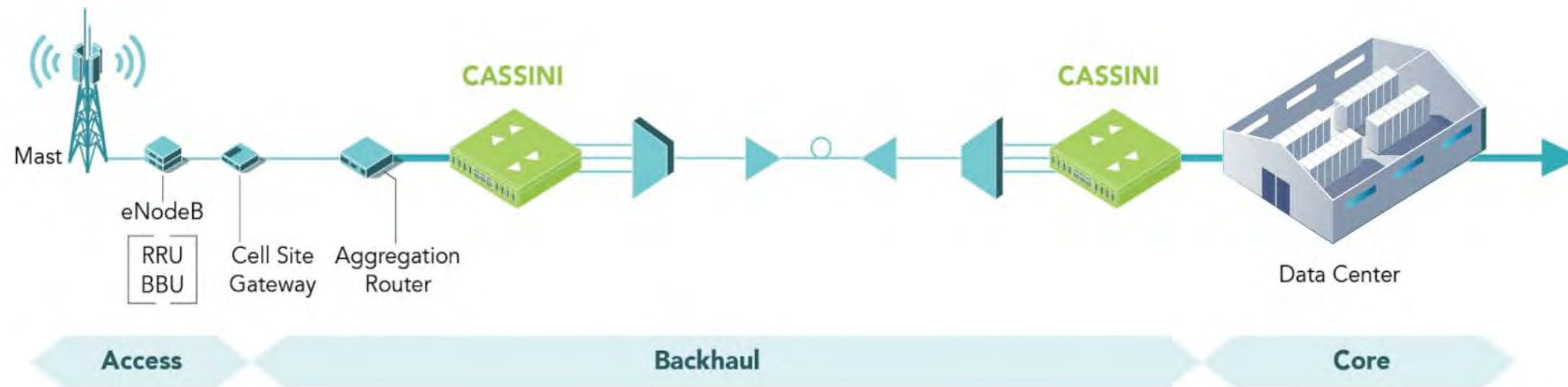
- Sixteen standard 100G QSFP28 ports
- Eight optical module slots
 - ACO Carrier Module with DSP
 - DCO Carrier Module with MACsec
 - Dual QSFP28 Module with MACsec

Cassini Use Cases

Data Center Interconnect



Service Provider Backhaul



Cassini Overview

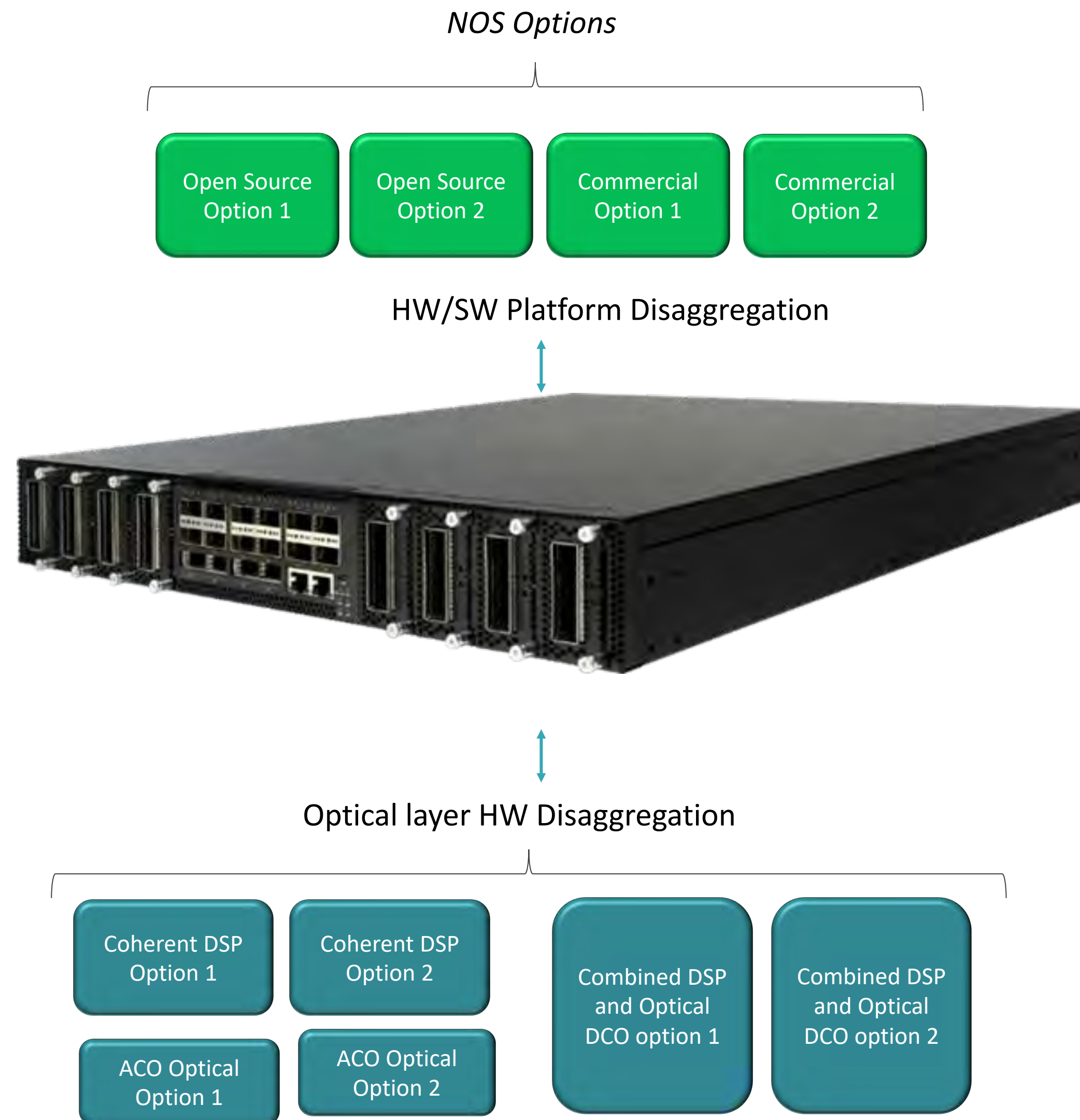
Cassini Benefits

1 Freedom - Free from traditional vendor lock-in

2 Innovation - Ability for innovation at the Software and Hardware level

3 Control - Ability for users to control the technologies and functions that operate their Networks

Cassini Overview



Cassini Provides
disaggregation between the
hardware and NOS and also
in the optical layer

Cassini Ecosystem

NOS



Hardware and Software Platform Disaggregation



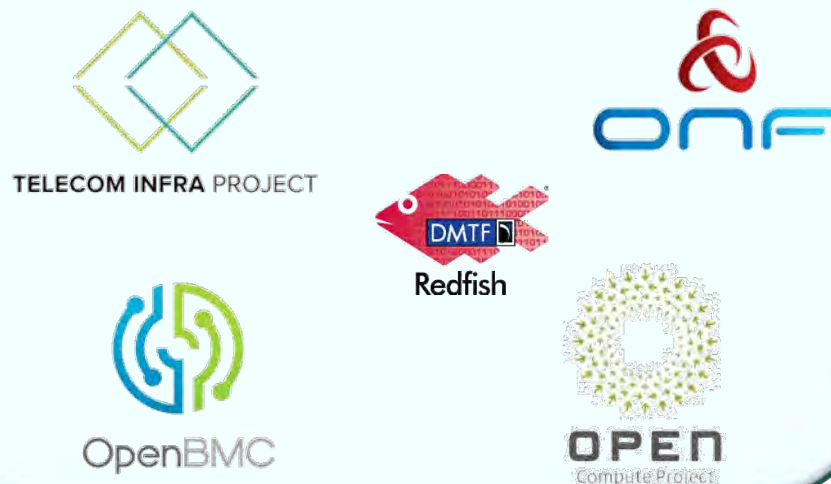
Optical Disaggregation



Integration



Communities



Optical

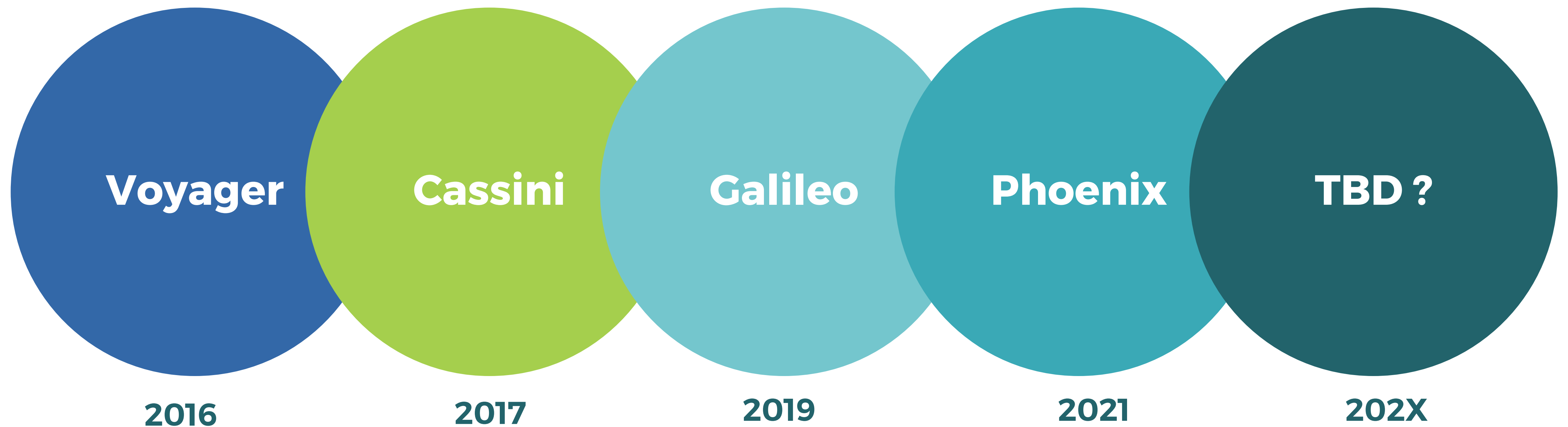


Cassini Activity



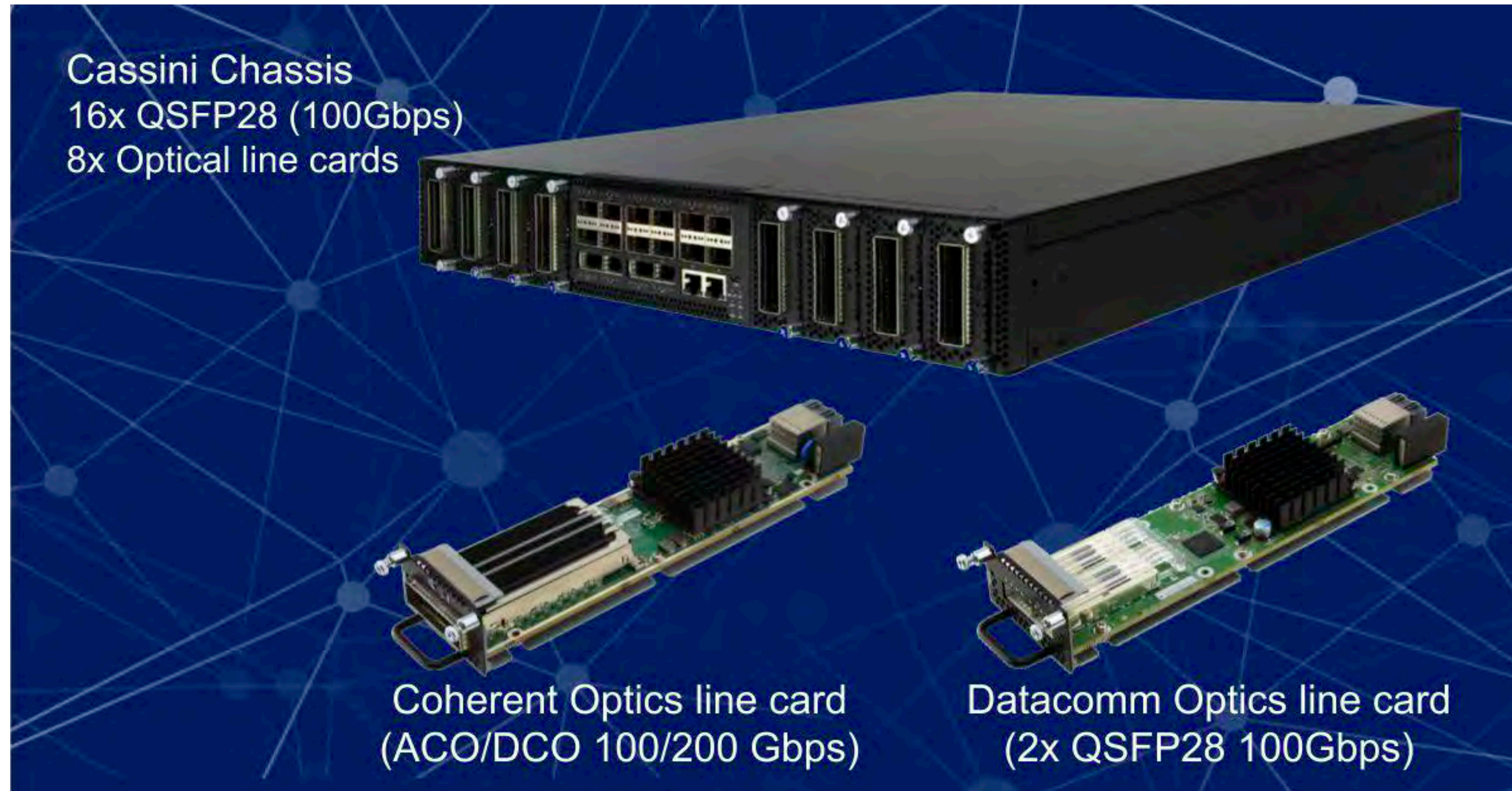
Open Optical Transponder

Evolving over time...



Cassini in Real Networks

Use cases leveraging combined Optics/L2/L3



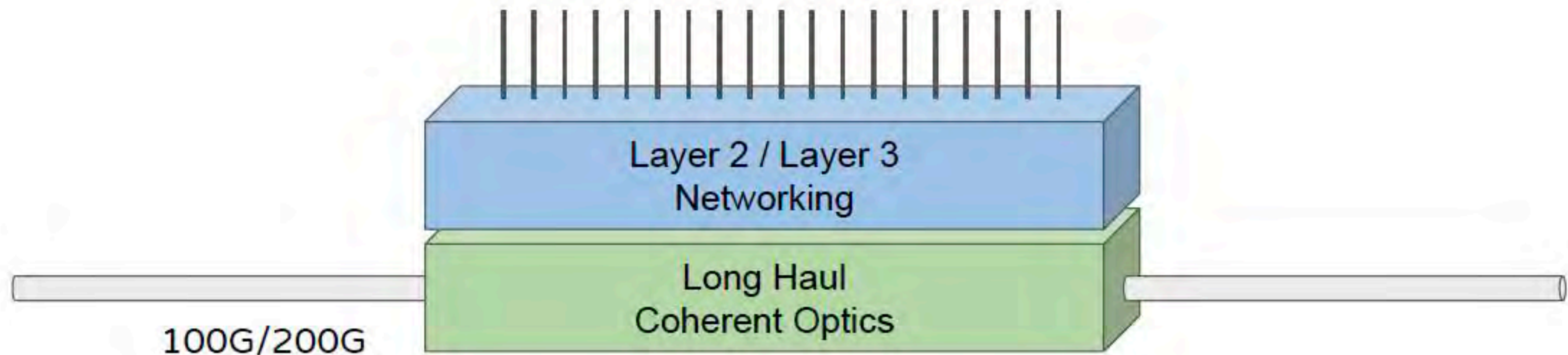
Cassini in Real Networks

Combining two (disconnected) worlds

New network operators are collapsing layers, in the same boxes, to:

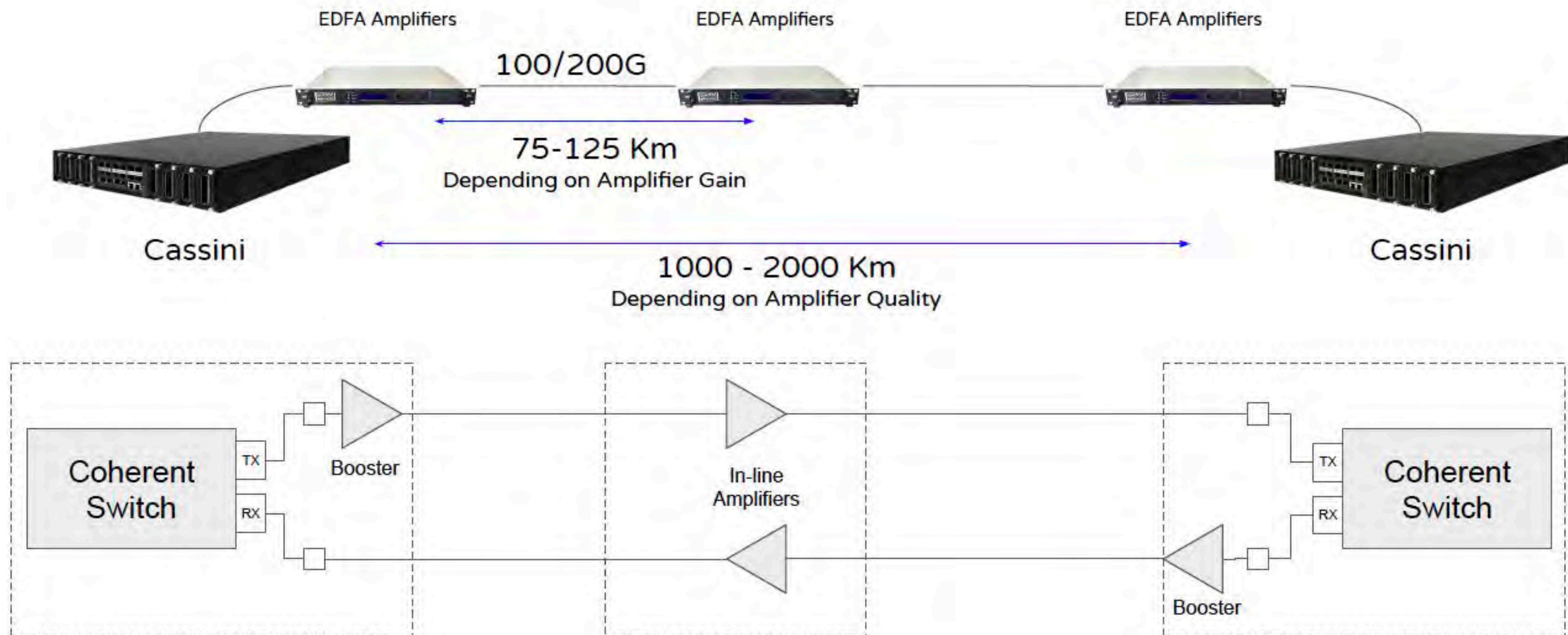
- Reduce Cost
- Simplify Network
- Optimize Traffic decisions

Soon, traditional carriers would adopt this model, too.



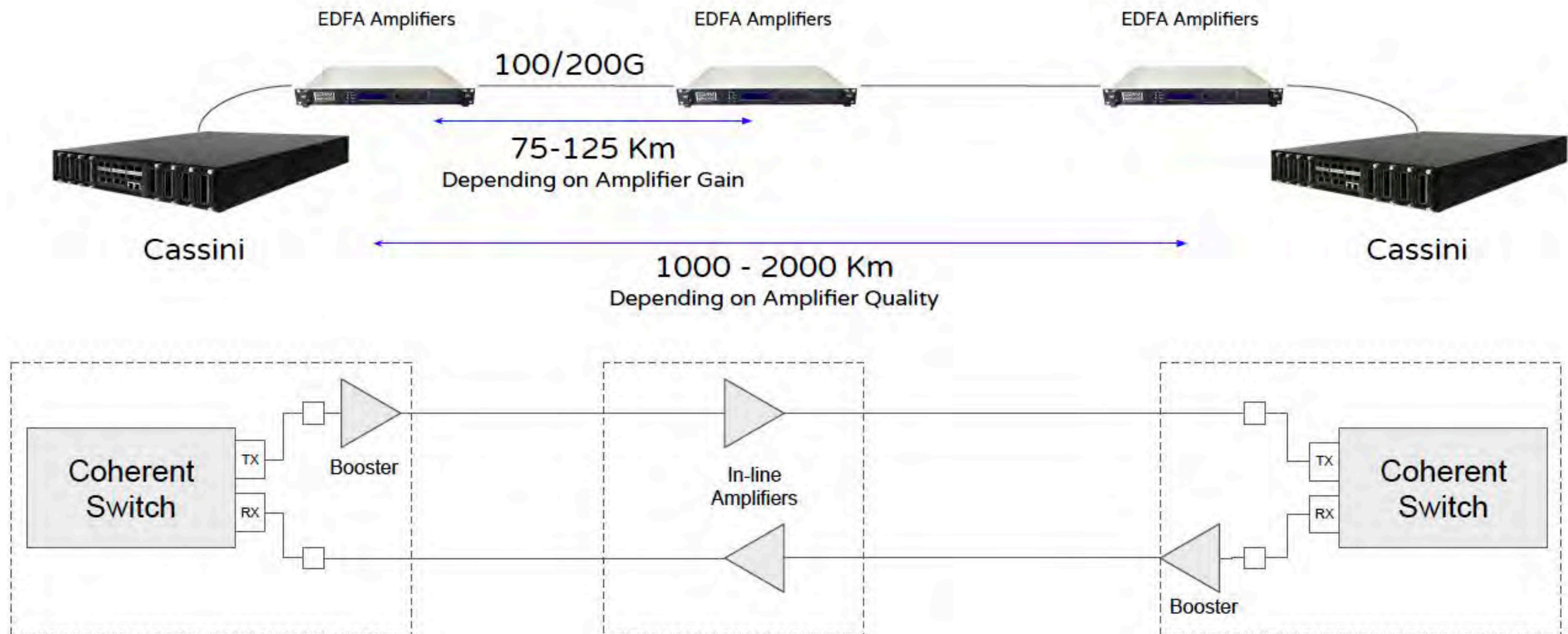
Cassini in Real Networks

A Simple IP transport network, with commodity Amplifiers



Cassini in Real Networks

A Simple IP transport network, with commodity Amplifiers



Cassini in Real Networks

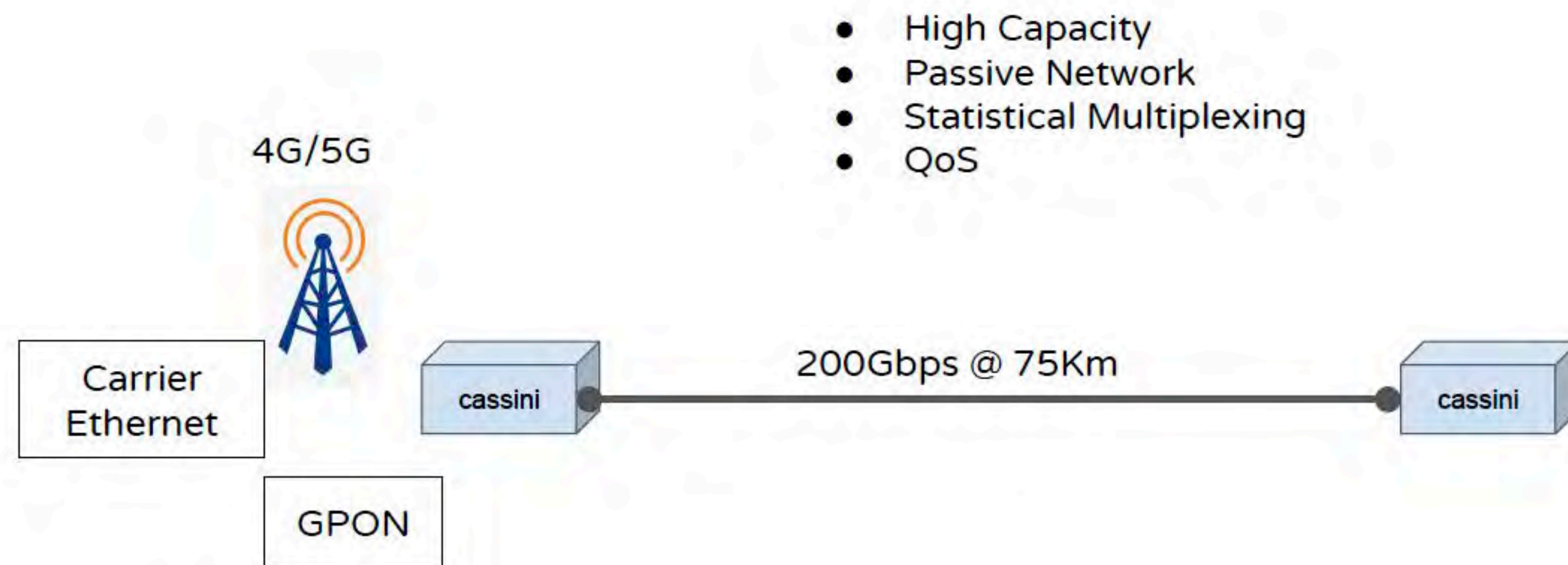
Increasing capacity, with commodity MUX/DMUX



Cassini in Real Networks

Mobile/Fixed Backhaul @200 Gbps

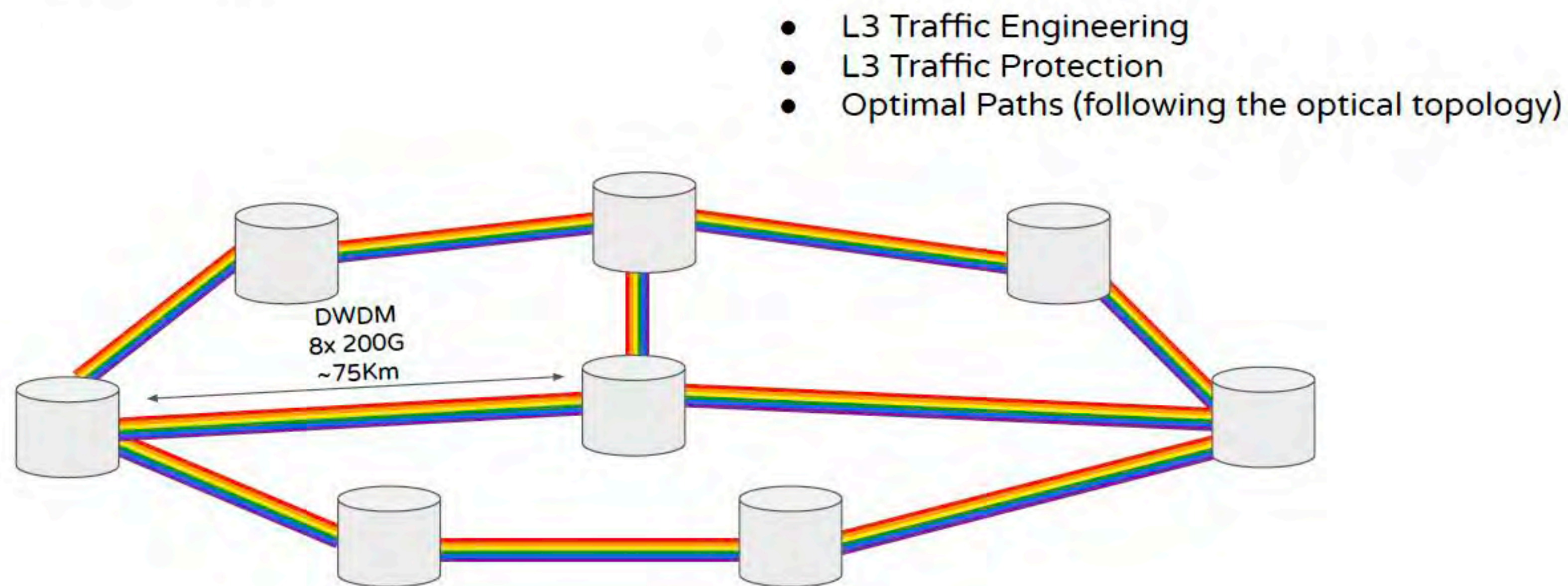
Backhaul for convergent access, combining in a single box, multiple services



Cassini in Real Networks

Regional IP Backbone using Dark fiber

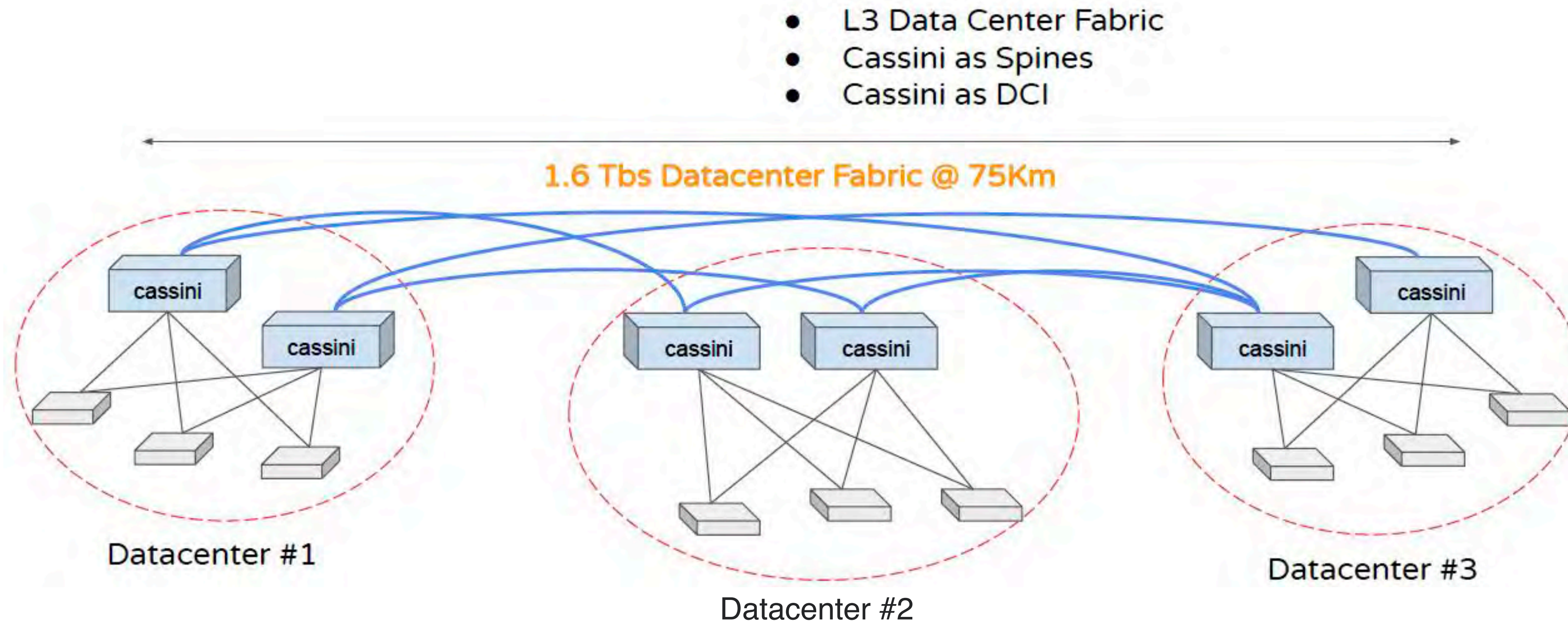
A network of IP routers (advanced L2/L3), for distributing traffic across a region, with max distances of ~75 Km in a passive network.



Cassini in Real Networks

Metro Data center Interconnect - Combined Spine/Metro role

Cassini can combine Spine roles, with Metro Optics roles, providing a distributed data center fabric, within a metro area.

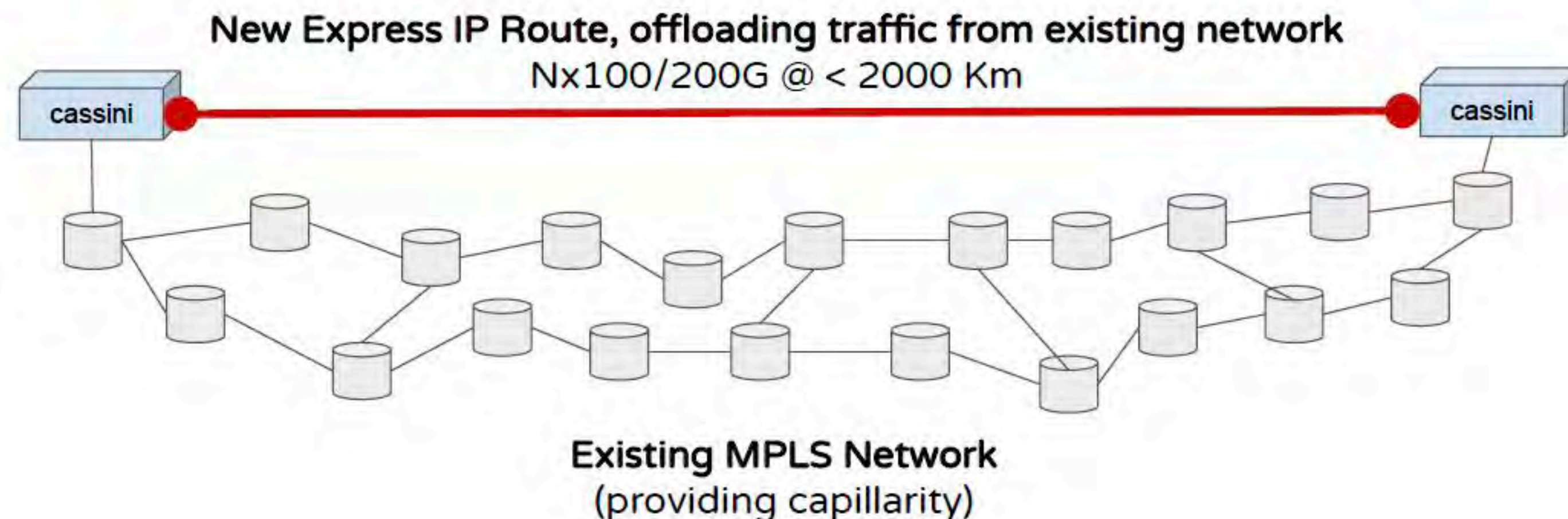


Cassini in Real Networks

Long-Haul Internet Offload - Creating 200G express lanes

Offload traffic from MPLS, by creating express (point-to-point) lanes, at N x 100/200G, upto ~2,000 Km, by using commodity EDFA amplifiers.

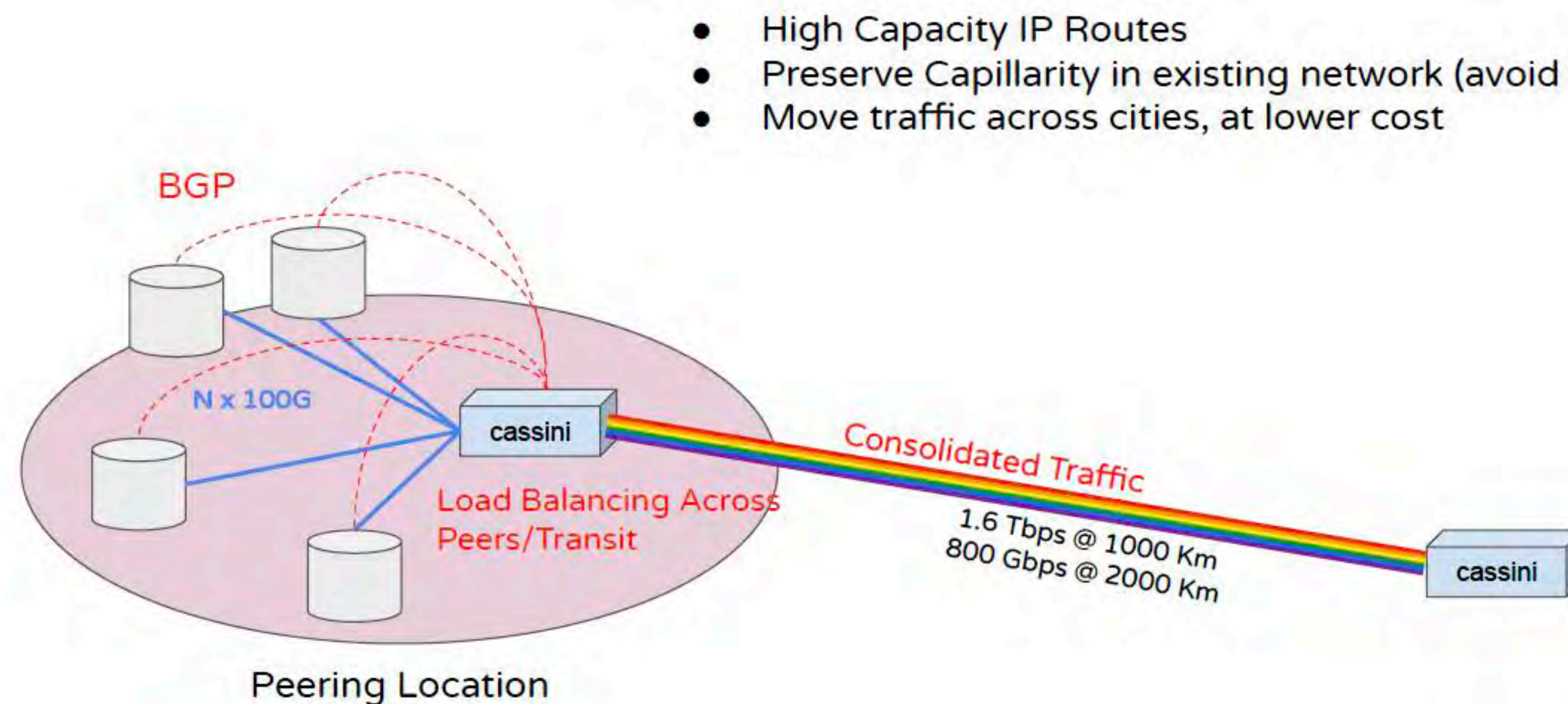
- High Capacity IP Routes
- Preserve Capillarity in existing network (avoid expansion)
- Move traffic across cities, at lower cost



Cassini in Real Networks

IP (BGP4) Peering - The perfect POP, at remote IXP locations

Offload traffic from MPLS, by creating express (point-to-point) lanes, at N x 100/200G, upto ~2,000 Km, by using commodity EDFA amplifiers.



Disaggregated Optical Systems (DOS) Phoenix

Anders Lindgren – Telia Company

Phoenix

TIP OOPT Project Group

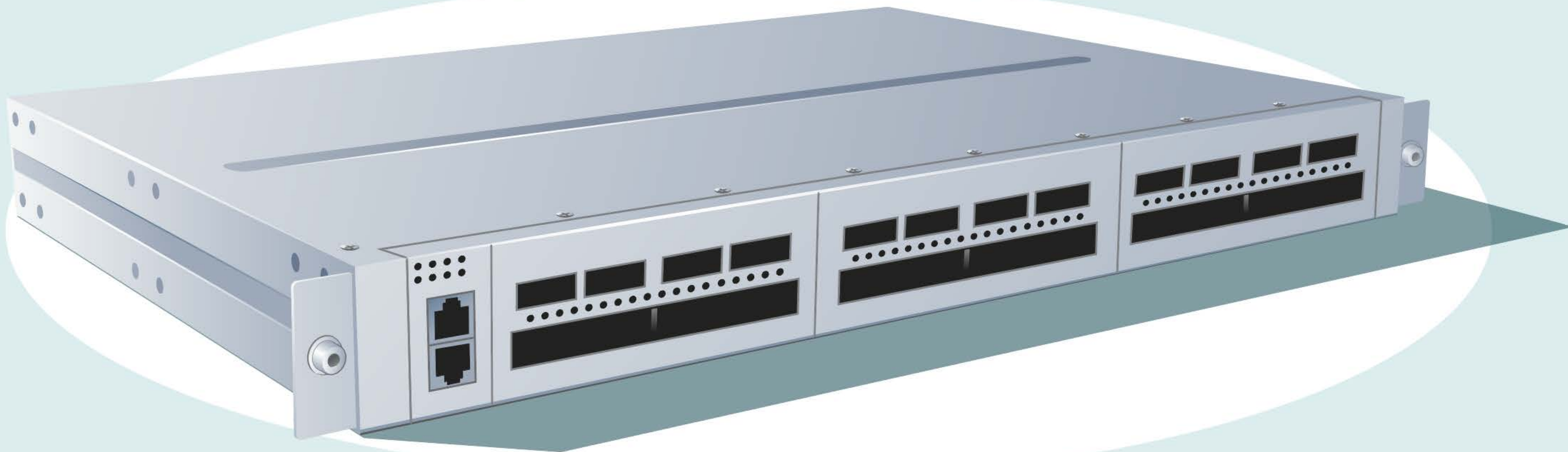
Our goal:

- To introduce the industry's first 400G White-box Optical transponder/muxponder with an open specification.

Our deliverables:

- Technical specification
- Device prototypes
- Lab and field trials
- Product General Availability





Low Power
Consumption

Open APIs

ZTP Capable

Modular/PAYG



High Performance
Optical Components

High Speed
Interfaces (400G)

Reduce Footprint

2019-early 2020 Timeline



IDEA

June 2019

The idea stage for Phoenix started in Summer 2019 with discussions between TIP and different operators within TIP.



ANNOUNCING

November 2019

- Requirements and a preliminary time plan were agreed in October 2019 between the operators.
- Phoenix was announced in an open session in TIP Summit in Amsterdam.



SPEC

Nov 2019- Feb 2020

- The technical specification was prepared Nov-Dec 2019.
- Approval by BoD December 2020.
- TIP OOPT 60 days IPR (InterPartiesReview) => approval in February 2020.



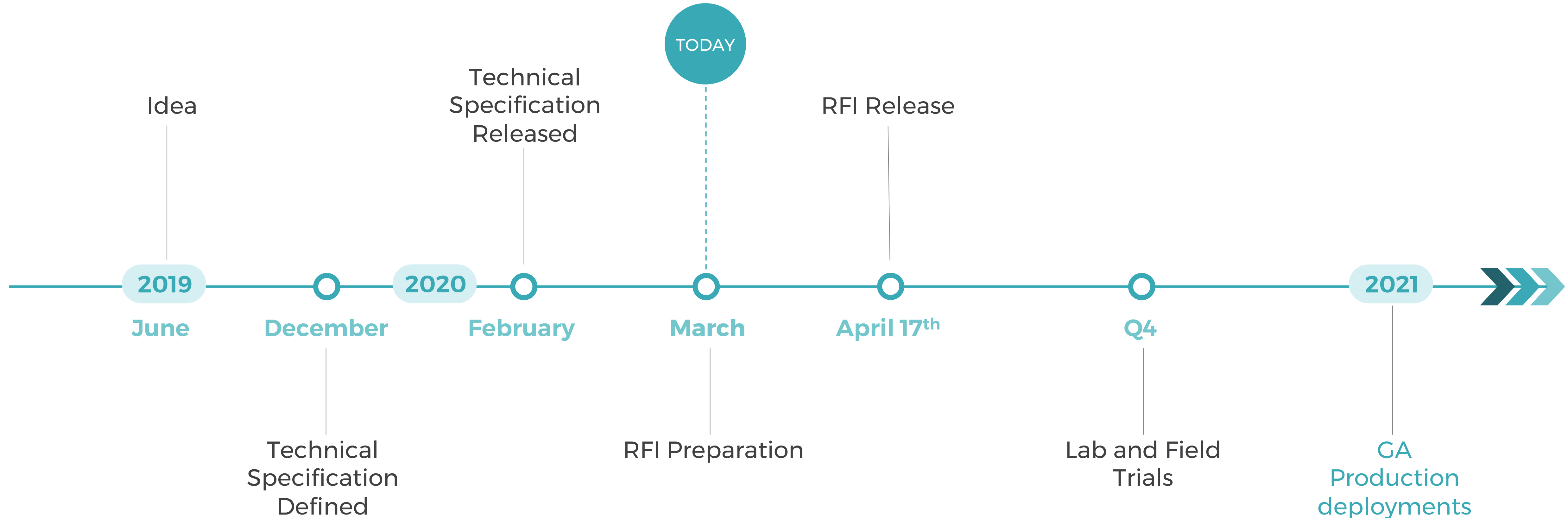
PLANNING

February 2020

- Phoenix planning workshop in Madrid: Project planning, prioritisation, roadmap etc.
- Participants: DT, NTT, Telefonica, Telia, TIP, Vodafone

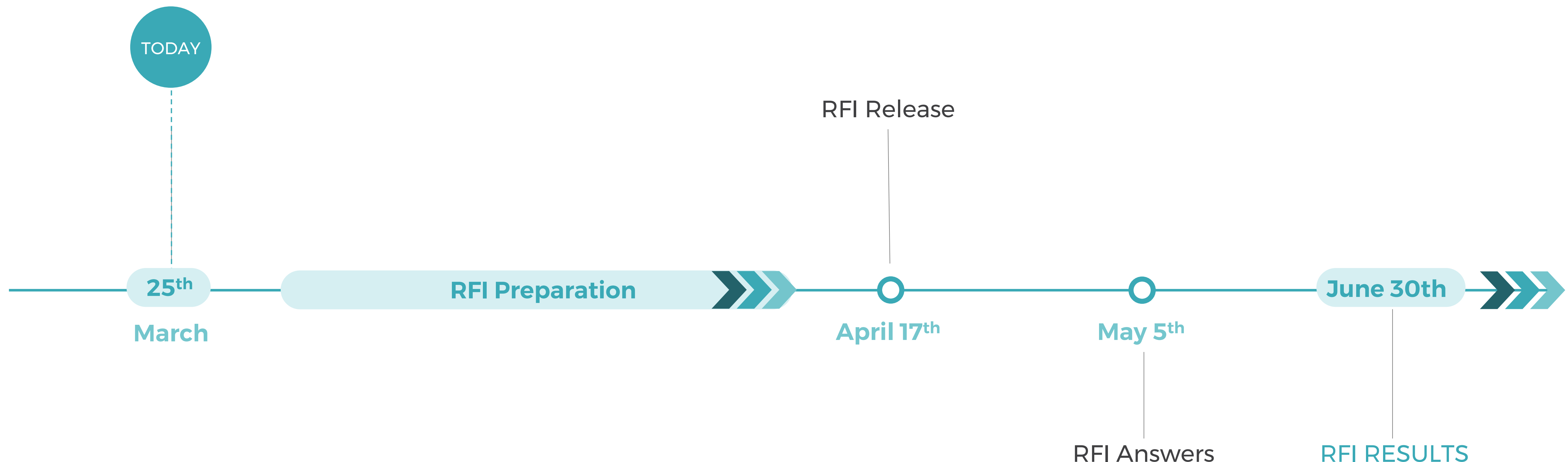
Phoenix Roadmap

Phoenix follows the same successful concept as DCSCG has implemented. This includes idea/concept, technical spec, RFI process, device prototypes, lab and field trials, general availability and deployment. Next step the RFI phase will be initiated.



Phoenix Near Term Activities

The near-term activities starts with a specification and alignment session for the HW and SW vendors in the beginning of April. Preparation for an RFI has started and will be ongoing to the middle of April when the RFI will be sent out to HW and SW vendors. We expect the answers the second week of May. Due to the on-going virus situation we are now planning to announce the results of the RFI in a webinar in the end of June.



Phoenix Targets 2020

Summary

- 1 Finalize and present results of RFI by end of June.
- 2 Perform Phoenix lab trials during fall 2020.
- 3 Perform Phoenix field trials during winter 2020.

Disaggregated Open Routers (DOR)

Disaggregated Open Routers Structure



Kenji Kumaki
KDDI



Eva Rossi
VODAFONE

**Backbone/Core
Routers**



Contributors

Aggregation Routers



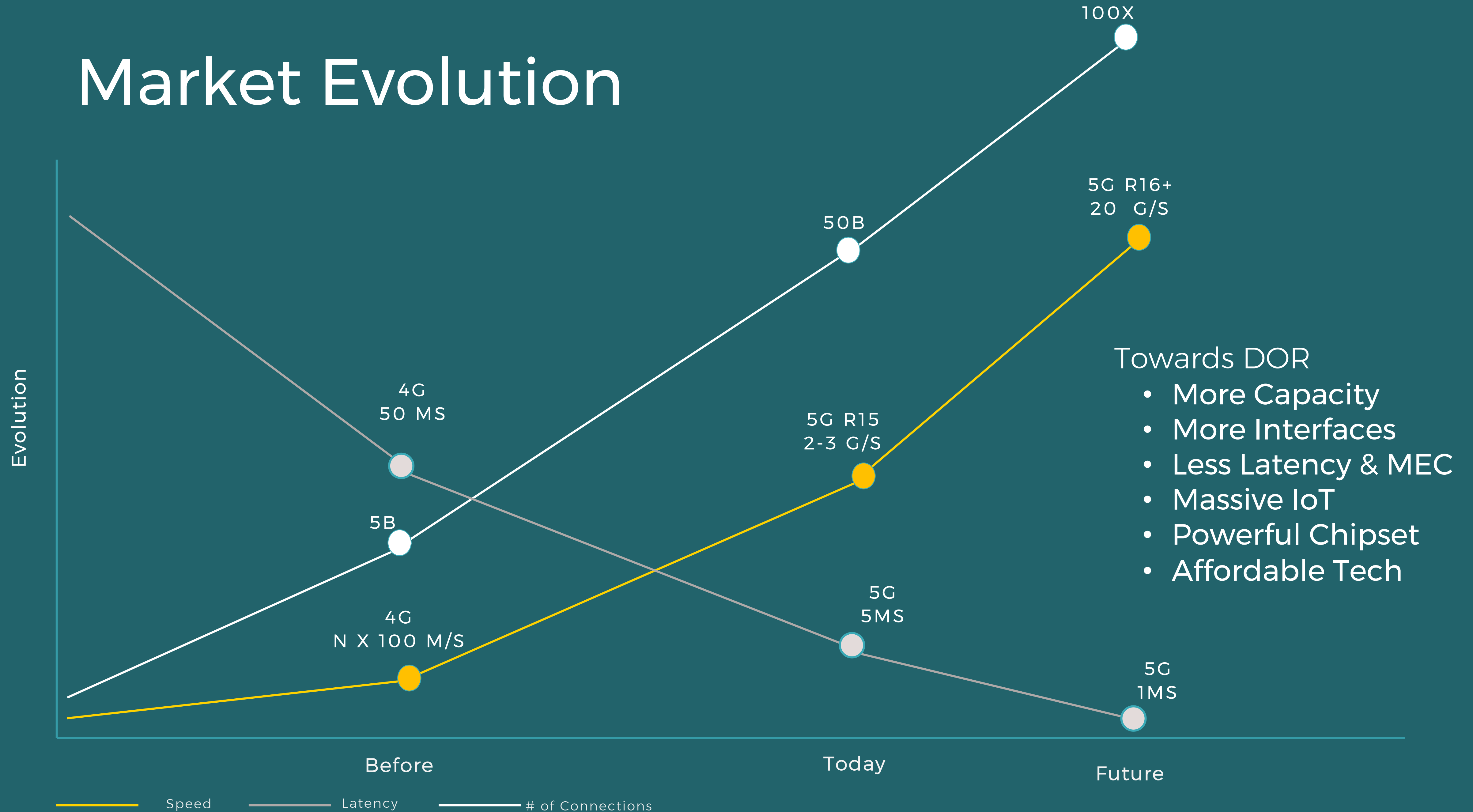
Contributors

Open BNGs



Contributors

Market Evolution



DOR Areas of Interest



TIP MVP FOR DOR

DISAGGREGATED
SOLUTIONS

CLOS BASED

P4

DWDM
INTERFACES

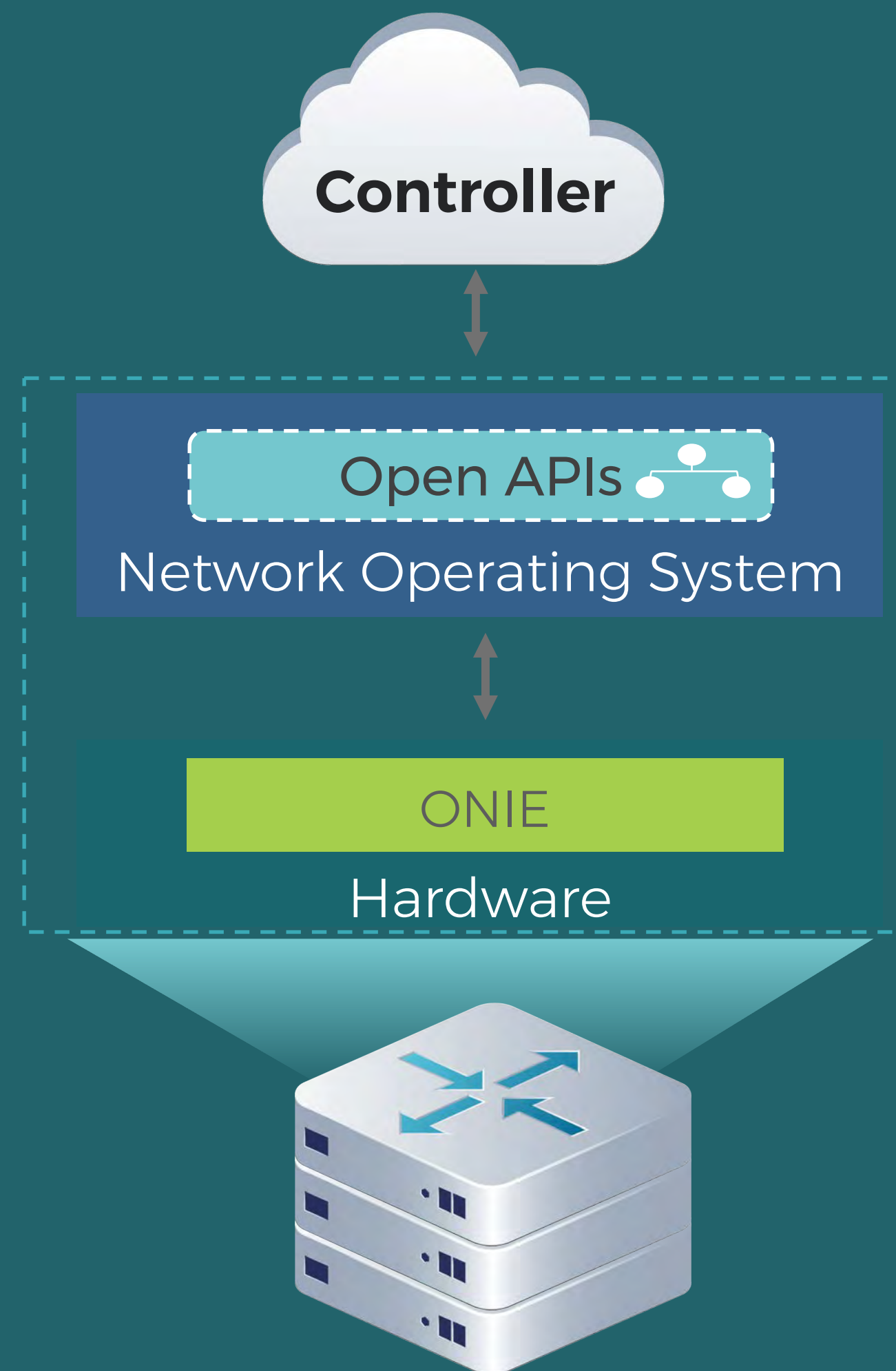
MEC

D-BNG

...

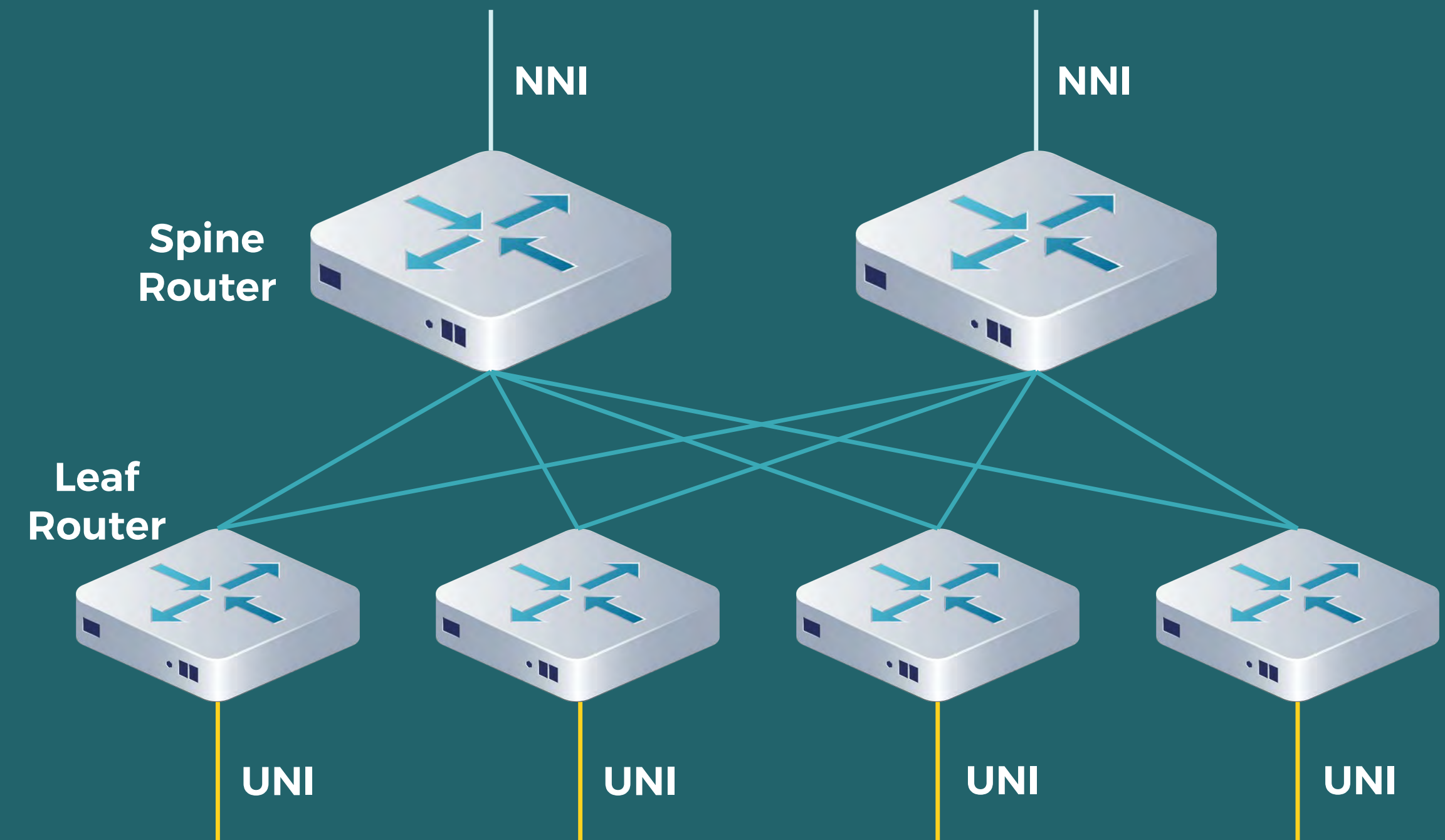
Disaggregation and Openness

Decoupling SW & HW



Why Clos-Based Architecture?

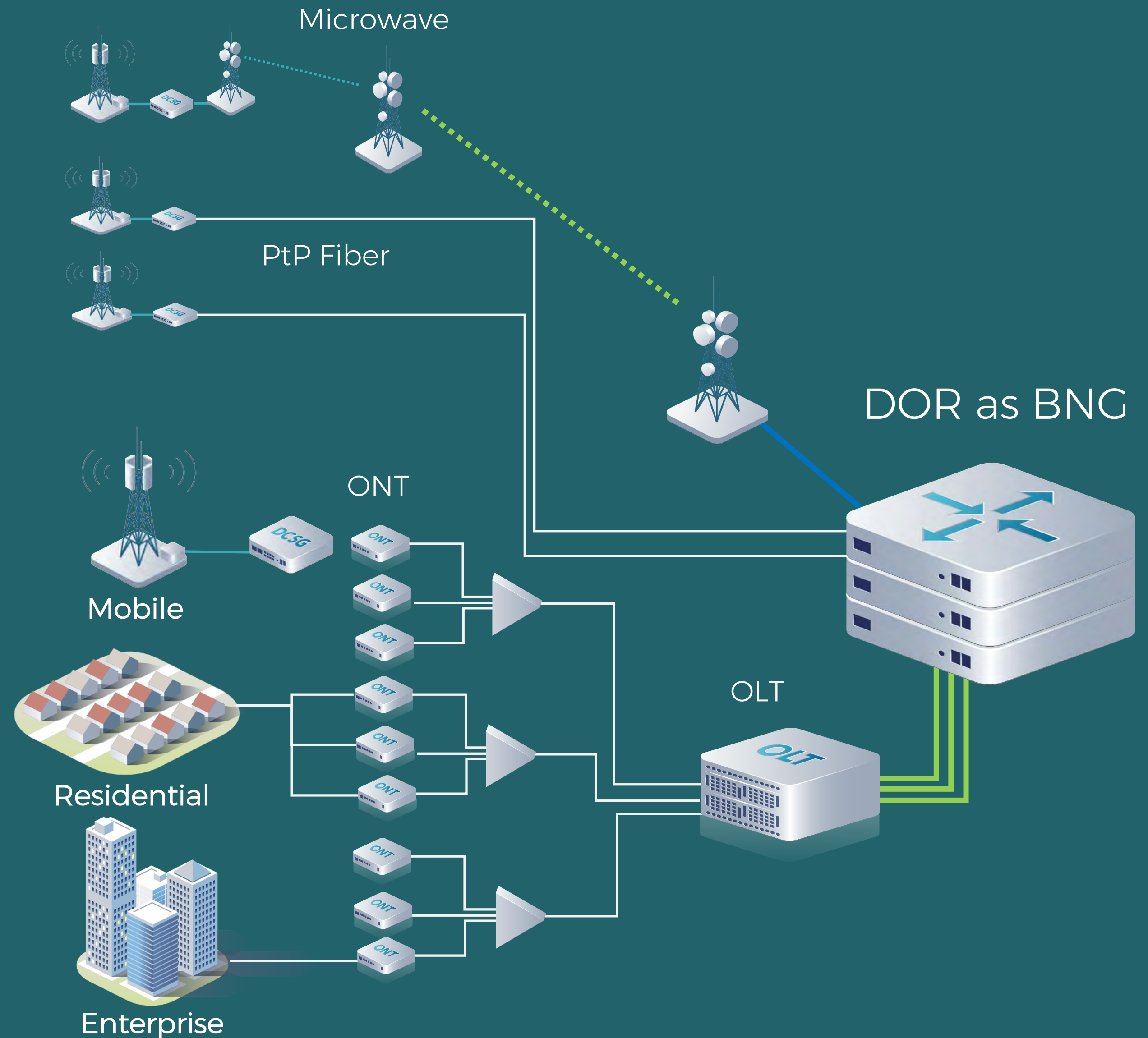
- **Scaling Efficiently** in a Pay As You Grow model : start small and increment 1-2U at a time
- **Increased Agility** in physical deployment & scaling-out : More Spines to increase BW & More Leaves to increase interfaces
- **Deterministic latency** : with a fixed # of hops
- **High performance** : High BW with variable over-subscription 1:1 to N:1
- **High Availability**
 - Path redundancy with multipath thanks to ECMP
 - Very small “blast radius” upon failures in the network (e.g. In case of SW issue in CP , SW reboot of 1 node in a Clos Topology instead of turning a full chassis down)
 - Fallback during HW or SW Migration from legacy to a new version with Bag-On-A- side



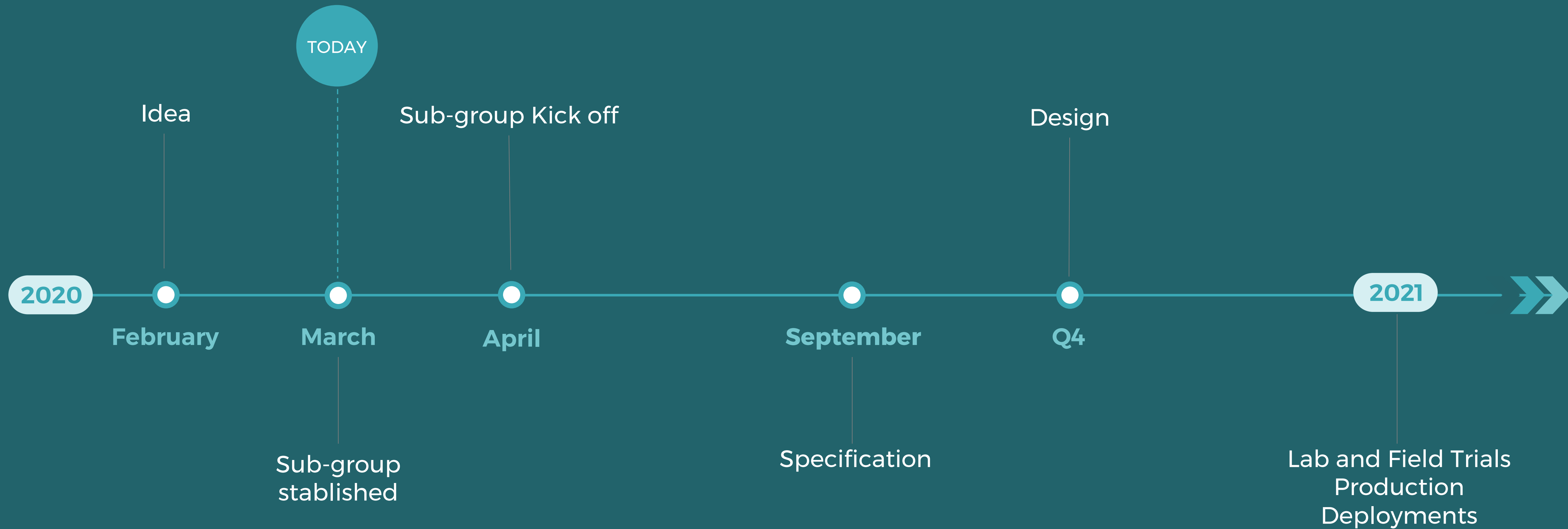
Distributed BNG DOR Solution

Add BNG functions to DOR :

- **AAA**
- **Policy**
- **Session control**
- **Subscriber management**
- **Billing**
- **Lawful interception**



Timeline



Physical Simulation Environment (PSE)

Gert Grammel (Juniper)

Gabriele Galimberti (Cisco)

Physical Simulation Environment

Our Mission:

- Build an end-to-end simulation framework for optical planning in multi-vendor networks.

Our Deliverables:

- Software Code
- Application Samples
- Lab and Field Trials
- REST-API for integration in Controllers

PSE Use Cases

“Digital self” of the optical Network

The enabler of Network Analytics

Network Design

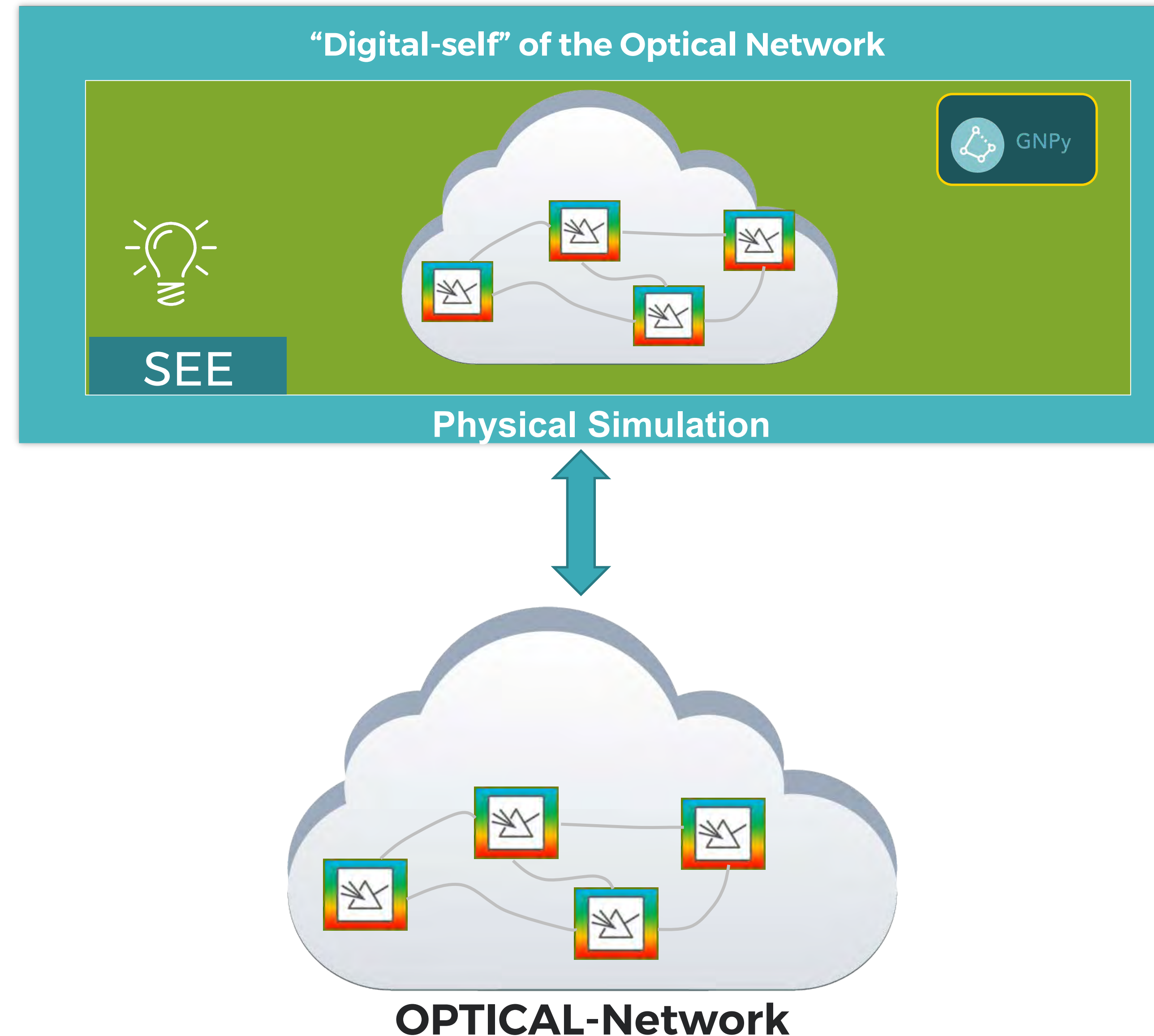
How to auto-design network?

How to determine optimum settings

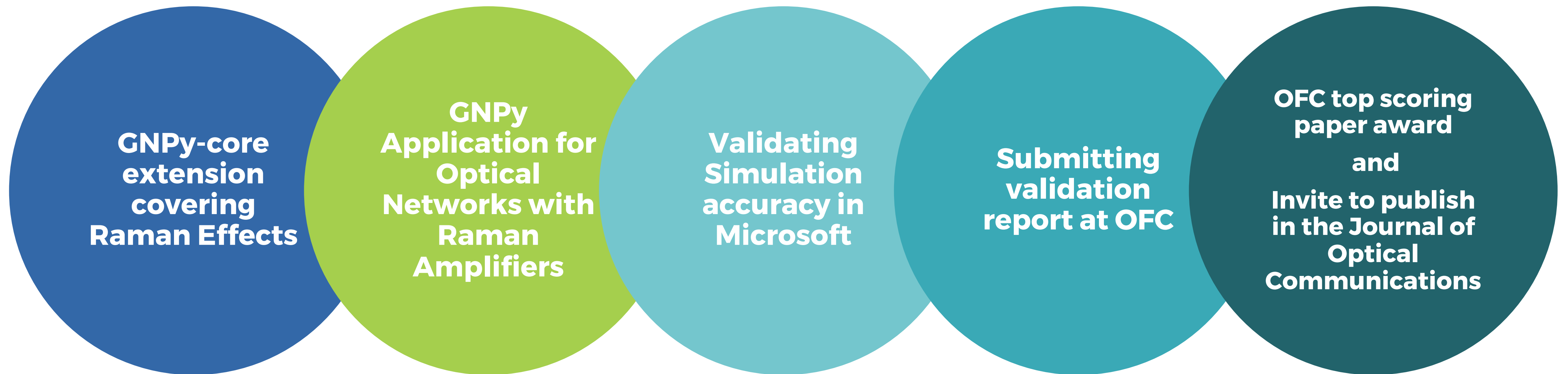
Network Operations

What if path is unfeasible?

What if node x deteriorates?



2019 Achievements



2019 Timeline



Requirements

Dec 2018

Carrier survey on GNPpy evolution:

- Include Raman Amplification
- evolve GNPpy as PCE controller



Implementation

Aug 2019

- GNPpy-core implementation covering Raman effects
- GNPpy application extended to simulate Raman links



Trial

Oct 2019

- Validate simulated performance data against existing Network @ Microsoft
- Implementing GNPpy based PCE in ONOS



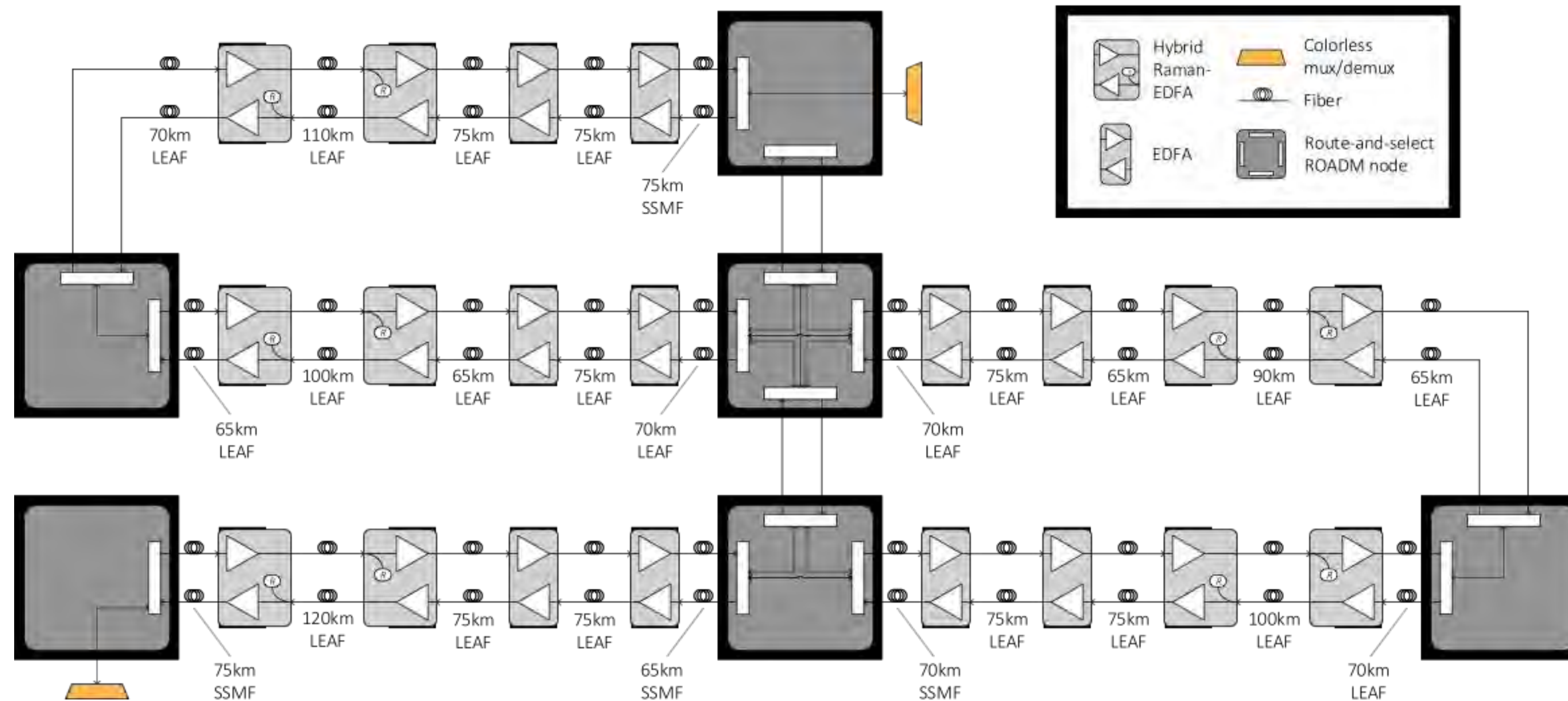
Demonstration

Nov 2019

TIP-Summit

- Validation Report
- Demonstration: GNPpy based PCE

Microsoft Testbed

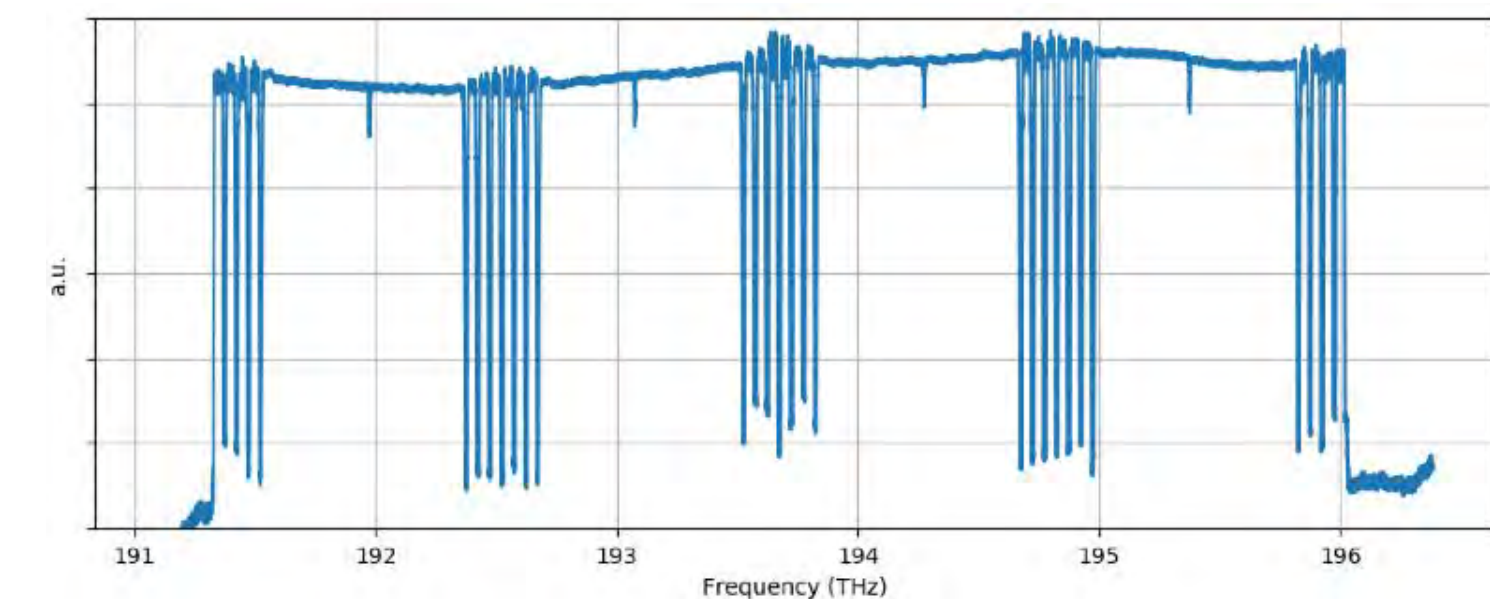


Tested in each direction:

PM-16QAM (400G) at 400 km, 800 km and 1200 km

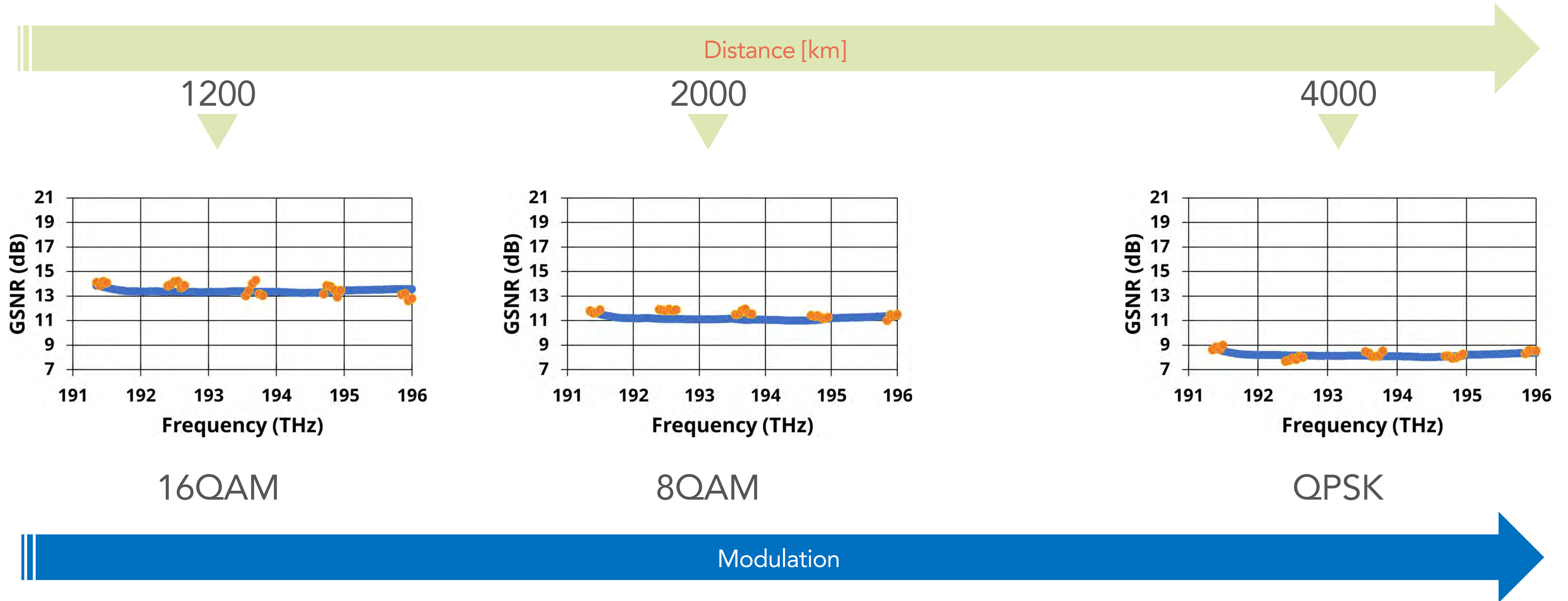
PM-8QAM (200G) at 400 km, 800 km, 1200 km, 1600 km and 2000 km

PM-QPSK (100G) at 2000 km and 4000 km,



GNPy Measurement results

Measured
Simulated



2020 Highlight

First Commercial use of GNPpy to

Simplify the bidding process

Provide insight into network
bottlenecks

Challenge design decisions

Benchmark vendor proposals

Accelerate turn-around time

Orange steps towards open optical networks with GNPpy

Mar 11, 2020

[Tweet](#) [LinkedIn](#)

Optical transport networks are built on transmission system equipment sold as turn-key solutions, a situation that requires buying vendor specific design tools. This is one of the main blocking point to interoperate optical equipment because vendor proprietary design tools cannot model other vendors' solutions. Openness and interoperability of optical transport network being key issues for Orange, Orange decided to contribute to GNPpy and successfully implemented it for its networks.

GNPpy (Gaussian Noise model in Python) is an **open source** software tool developed in the framework of Telecom Infra Project. It is a **game changer** software, meaning that vendor specific and proprietary designs are no longer the rule and this is being achieved thanks to large Orange contributions. **Started only one year ago, GNPpy has already set an industry reference on a subject that used to be hidden and not negotiable.**

GNPpy algorithms and models are open and have been experimentally validated by Orange and other community members and can help to fairly compare vendors' solutions: this is a unique feature that vendors' tools fail to support. Moreover, GNPpy gives autonomy with respect to supplier's tools and responses. It is used for planning, what if studies, procurement and purchasing process (Requests For Proposal, RFP) preparation and analysis as well as for network automation.

First success stories in Orange

- Orange teams adopted GNPpy for their planning and studies. GNPpy is becoming a key asset to gain autonomy with respect to vendors designs. **"Having a third party tool enables us to quickly have answers on day to day problems, avoiding long delays of vendor's answers"** says Christian Gacon, Vice president, Wireline Networks and Infrastructure, Orange.
- Orange used GNPpy during recent RFPs. GNPpy templates were imposed to bidders to standardize their responses and build the library of equipment. The same basis of analysis was then performed with GNPpy **to fairly benchmark equipment performance.**

Orange also exploited GNPpy for the **West African backbone project** to benchmark and challenge bidders' design. "Thanks to GNPpy we were able to challenge (very quickly) initial proposals and to obtain a better optimized network design during the consultation process," says Ghislain Guillochon, technical project manager.

GNPpy is also a good candidate for automation solutions. It was recently integrated in the Transport PCE opensource controller led and contributed by Orange in the framework of Open Daylight, and demonstrated on an **ONOS** open source controller demo at TIP summit 2019.

Next steps

Orange is well positioned to leverage on GNPpy capabilities: from the laboratory end to end tests over 2000km of fiber, to the data scientific analysis and finally into the simulation tool supporting our affiliates. This optical expertise is a key asset for the 'softwarization' and automation of our networks.

Learn more about the Open Optical and Packet Transport Project Group here: <https://tip.flywheelstaging.com/oopt/>.

Summary

What's up next for the PSE Team?



March 2020

- OFC Demo of GNPpy



June 2020

- Speed-up and simplify GNPpy integration as PCE



Sept 2020

- Proof-of-concept: Brownfield simulation of a deployed in-service network
- Model improvements for Flex grid and 400G



November 2020

- Presentation of 2020 Results
- Venue to be selected

Control, Information, Models & APIs (CIMA)

Harald Bock - Infinera

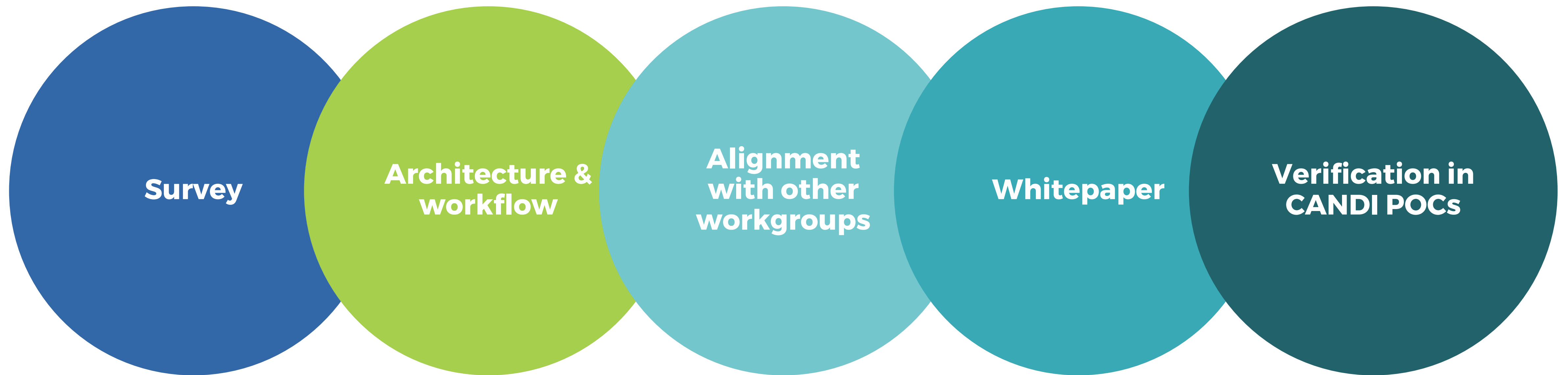
Stephan Neidlinger - ADVA

Control, Information Models & APIs

Outlook:

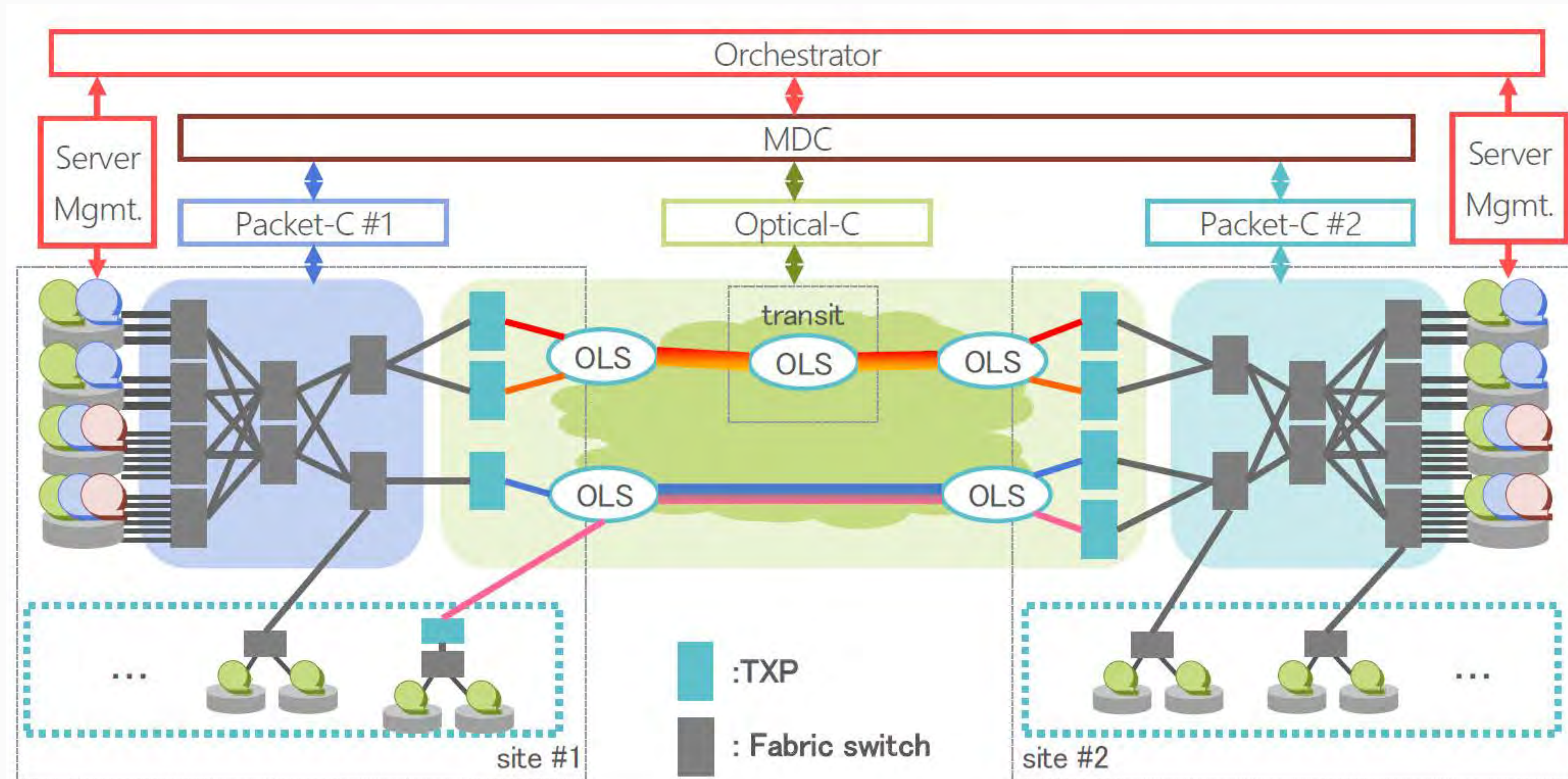
- Approach
- Architecture
- Workflow
- Whitepaper
- Plan and Milestones

CIMA approach



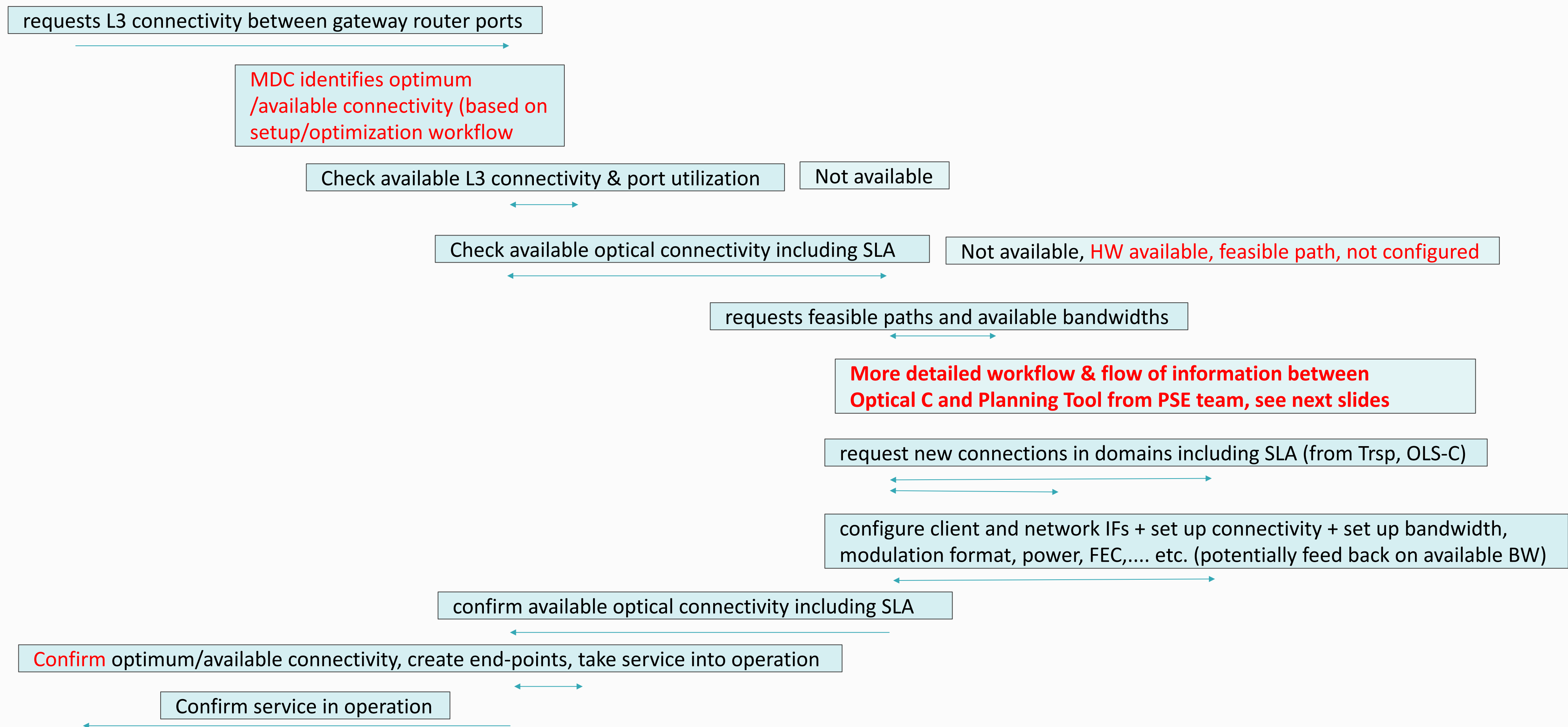
SDN Architecture

Based on CANDI input



SDN basic workflow

Workflow sub-case 3: L3 request, required optical capacity is not yet set up/commissioned



Whitepaper

Outline

- Introduction and overview
- Network architecture and use cases
- Control, information models and APIs
- Workflows
- APIs
- Outlook and further work

2020 Plan and Milestones



Whitepaper
DCI use case

JUNE 2020



New workflows
DCSG, DOR, ...

SEPTEMBER 2020



CANDI
PoC

DECEMBER 2020



2nd
Whitepaper

2021

Converged Architectures for Network Disaggregate & Integration (CANDI)

Oscar González de Dios - Telefónica

Hirotaoka Yoshioka - NTT

Motivation for CANDI: Current Issues of Packet and Optical technology

Vendor lock-in has been causing the delay of service launch and limitation of service variation for operators

Packet Transport

Many function in black-box by single vendor

→ Tight coupling among Capacity/features/operation

→ Lock-in by router capability



Optical Transport

Vertically integrated by Single vendor

→ Tight coupling between Terminal device and Line-system or ROADM

→ Lifetimes are different

What is CANDI?

Use-case oriented technology by disaggregated open optical and packet transport networks

Goals

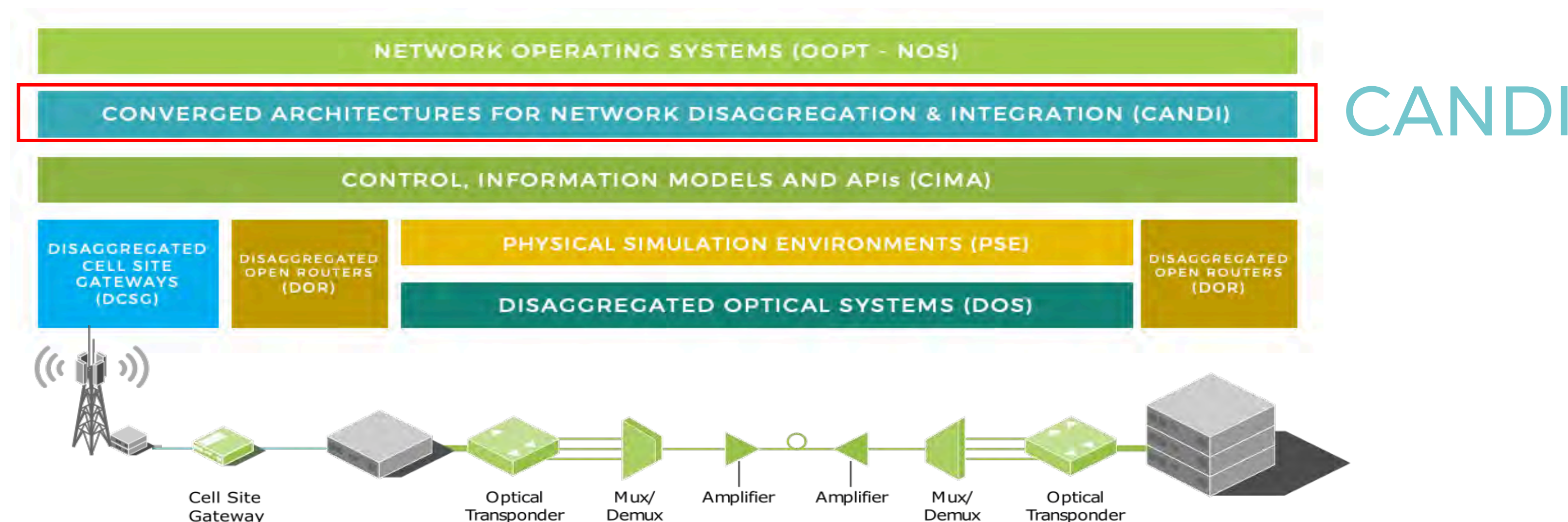
- **Achieve efficient IP & Optical network**
- **Flexible feature allocation** on IP & Optical network

Mission

- **Define operator-led use cases and architectures** for open packet/optical networks
- **Perform E2E Demo & practical Test** including OOPT WGs results
- **Promote to fulfill missing parts**, if any.

Deliverables

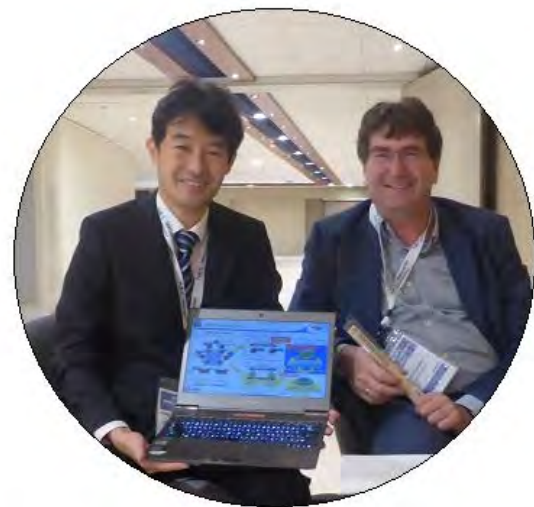
- **Use Case Definitions**
- E2E Architecture Specification and workflows (in collaboration with other OOPT groups)
- Configurations & E2E Test Results
- **Whitepapers**
- **OOPT Architecture Lab (New!)**



CANDI's use cases include the OOPT ecosystem:

CANDI's history:

Established in 2018 and started 5 operators' discussion



October 2017

Proposed
Disaggregated Router
from **NTT** to TIP in TIP
session at SDN NFV World
congress 2017



October 2018

Establishment of CANDI
toward IP & Optical
architecture by
Telefonica and **NTT**
- Announced in TIP
Summit'18 -



October 2019

First PoC in Madrid
announced at SDN/NFV
World Congress 2019
And TIP Summit'19



Jun 2020

Toward second PoC
will be announced in Jun

CANDI Control Architecture: Building on Standards

CANDI relies on a hierarchical control architecture with Open Standard Interfaces from different SDOs



IETF: L2SM, Restconf,
Netconf

L2SM as the Standard
interface for requesting a
L2 Network service

ONF: T-TAPI

Transport API to interact
with optical controller and
with OLS Controller

Openconfig device models

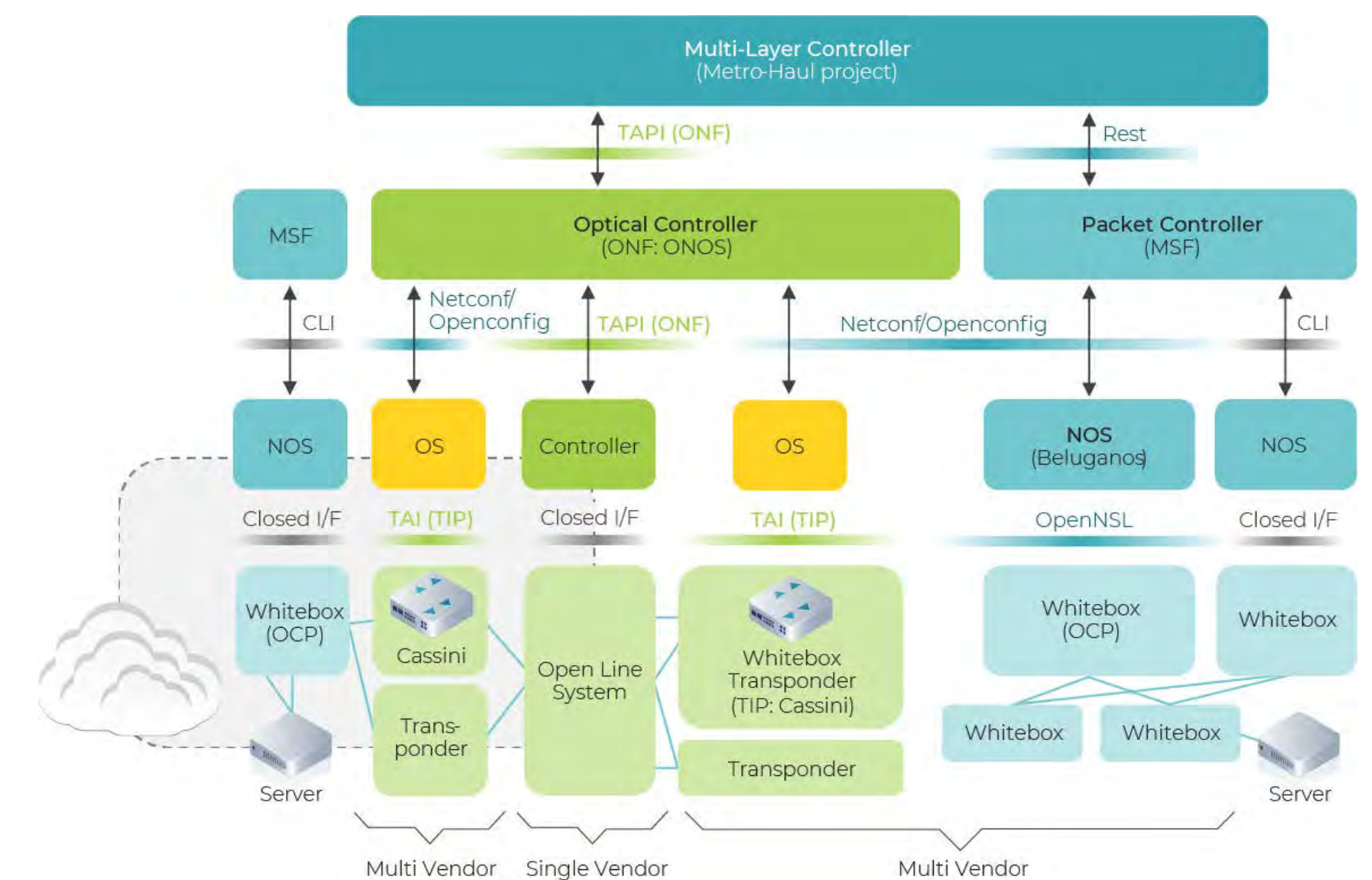
Netconf+Openconfig to
configure open terminals
and whiteboxes

CANDI recent work:

IP & Optical converged architecture

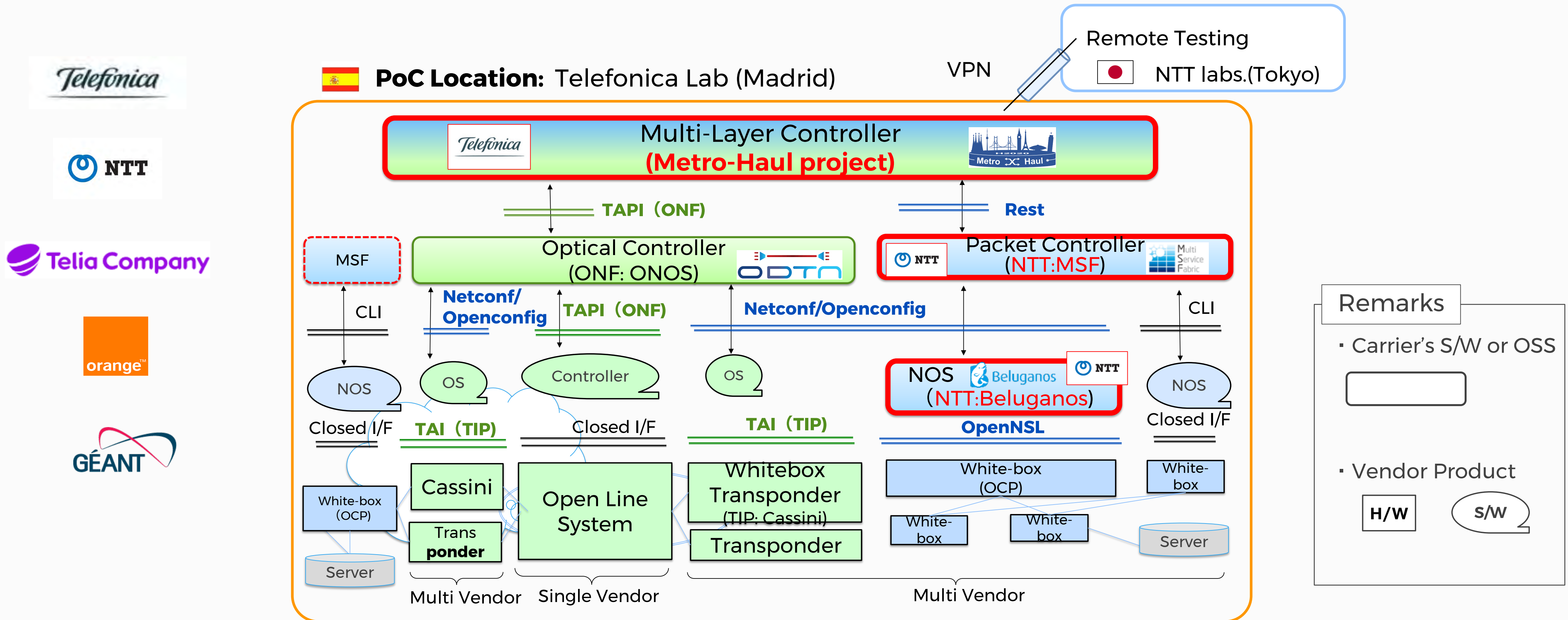
Toward enabling operators' E2E use-cases

1. White-paper of First PoC in Madrid
2. Expansion of members & activities
3. Proposal of providing use cases to the OOPT WGs
4. Proposal of OOPT Architecture Lab



CANDI First PoC and White paper

Achieved in Madrid in Oc. and published white paper by 5 operators and ONF in Jan.



[White paper on OOPT site] https://cdn.brandfolder.io/D8DI15S7/as/q43vmp-30aaqg-3sbb3u/CANDI_1st_experimental_demonstration-Telecom_Infra_Project.pdf

Expansion of CANDI

New operator and expansion to new area of use-case

Telefonica

NTT

Telia Company

orange™

GÉANT

Tomorrow, Together
KDDI New

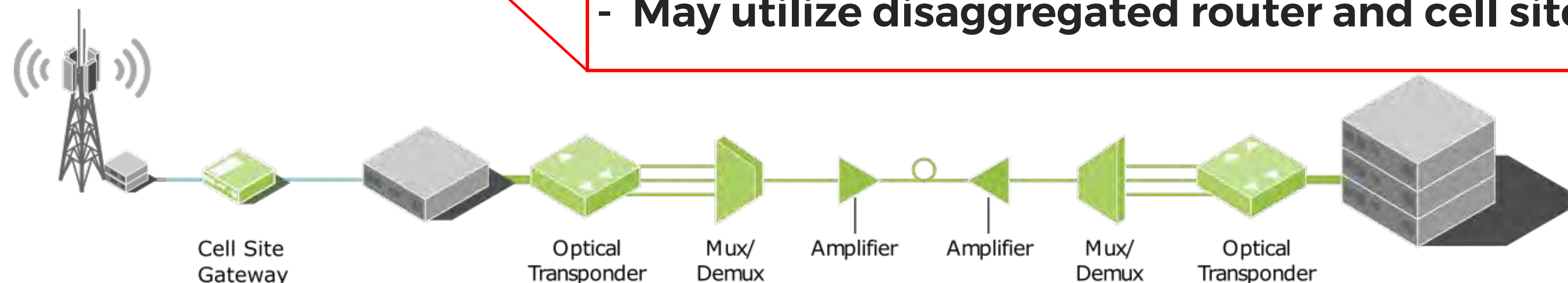
First Target

- E2E provisioning of IP&Opt to DCI
- Limited interoperability among different vendors' whitebox NOSs and Transponders



Next Target for 2020

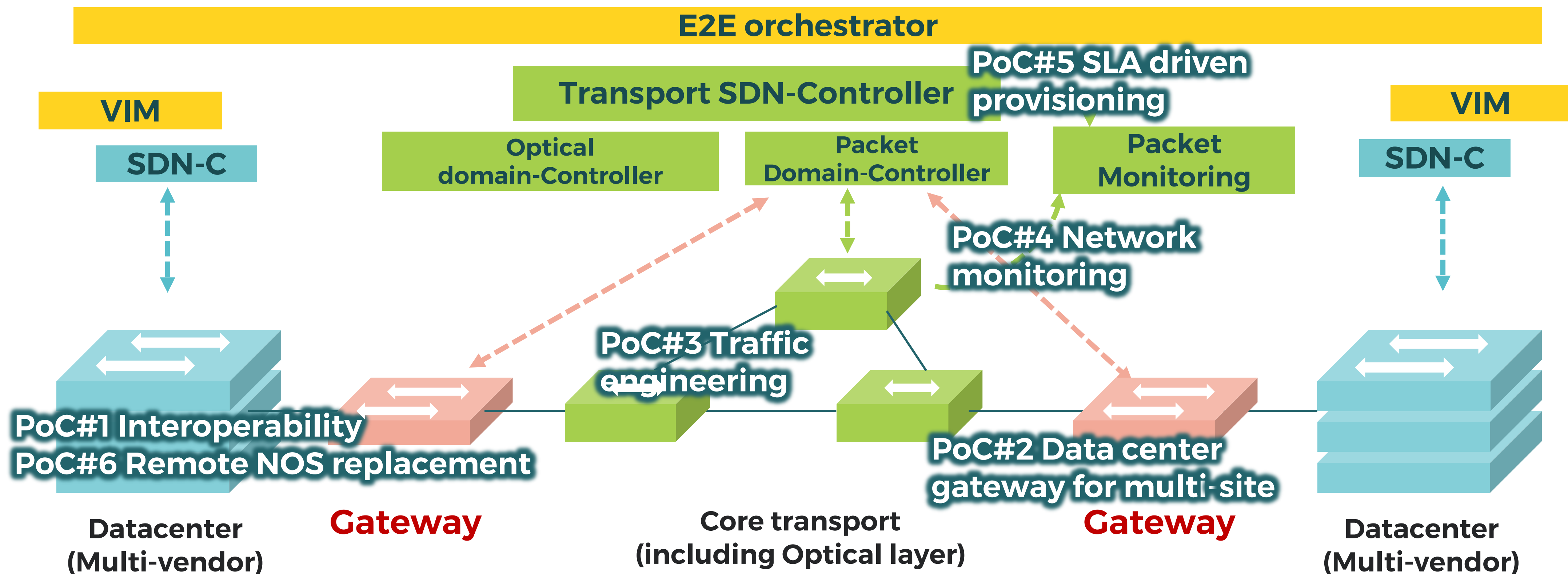
- E2E provisioning to DCI and WAN in addition
- Independent IP provisioning between WAN and DCI-GW,
- Monitoring and Adjustment of provisioning to IP WAN
- Optical automatic negotiation between OLS and various Transponders w/ GNPpy (PSE)
- Enabling vendors' interoperability for partial replacement and migration in service of whitebox switch, NOS and Transponder
- May utilize disaggregated router and cell site gateway



CANDI use-cases (Packet)

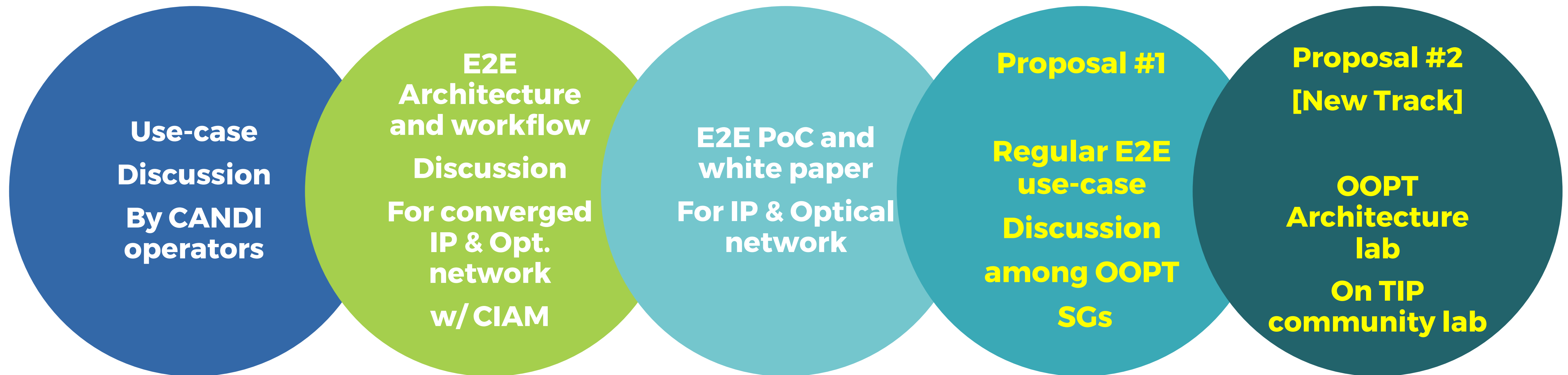
Expanded Packet test cases to achieve original use-cases

- PoC#1 to 5 will prove the current "Provisioning use case"(UC#1)
- PoC#6 will prove "Node replacement/migration use case"(UC#4,5)



CANDI activities

Proposal of regular use-case discussion among OOPT SGs
and new track in addition to use-case & E2E Architecture



Regular E2E use-case Discussion: Open to OOPT!!

Date:

15th April, Wednesday

Time:

Slot1: 9:00 to 11:00 CST / 16:00 – 18:00 JST

Slot2: 15:00 to 17:00 CST / 8:00 – 10:00 PST (22:00-24:00 JST)

Draft Topic:

- 1. Current use-case introduction regarding E2E solution converged IP & Optical**
- 2. CANDI optical use-cases applying to Phoenix (e.g.)**
- 3. Others**

Eligible Members:

Any members from OOPT SGs with motivation to collaborate with CANDI

→ Please access to CANDI co-leads or TIP OOPT staff, we will send invitation soon

Conclusion

Messages from CANDI

1

CANDI is enhancing seed-oriented technology and expected vendors regarding Packet & Optical.

2

OOPT WGs members, Feel free to access us and Join the E2E use-case discussion!

3

CANDI is preparing a proposal of OOPT Architecture lab, in order to perform end-to-end tests

OOPT NOS

Kingston Selvaraj - PaIC Networks

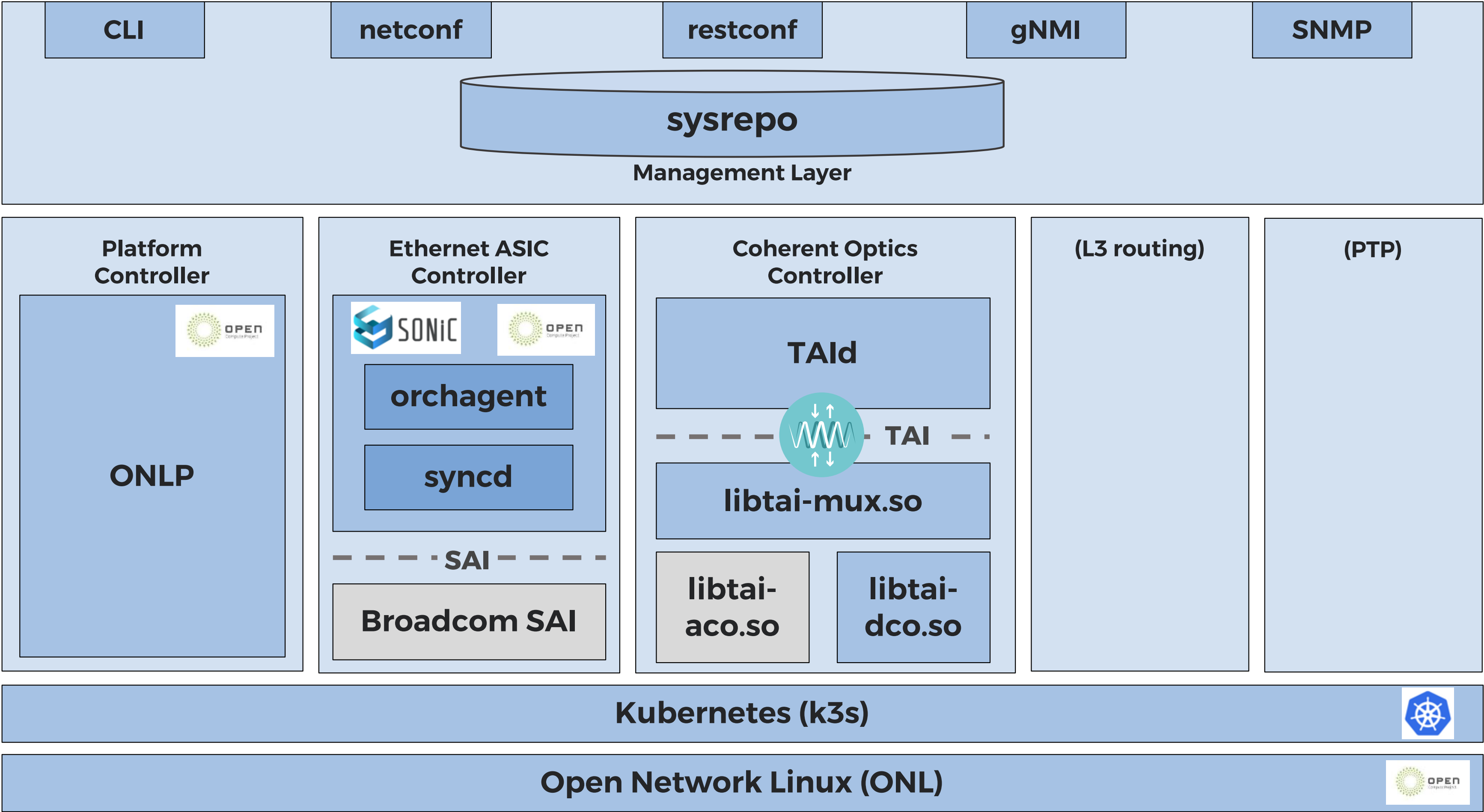
GOLDSTONE

- The first deliverable of OOPT-NOS subgroup
 - open source NOS for TIP OOPT hardware
 - initial hardware target : Edgecore Cassini
- open sourcing status
 - NTT Electronics is signing the software CLA
 - It should be open sourced within this month
- github URL
 - <https://github.com/Telecominfraproject/goldstone>

GOLDSTONE Architecture

oss

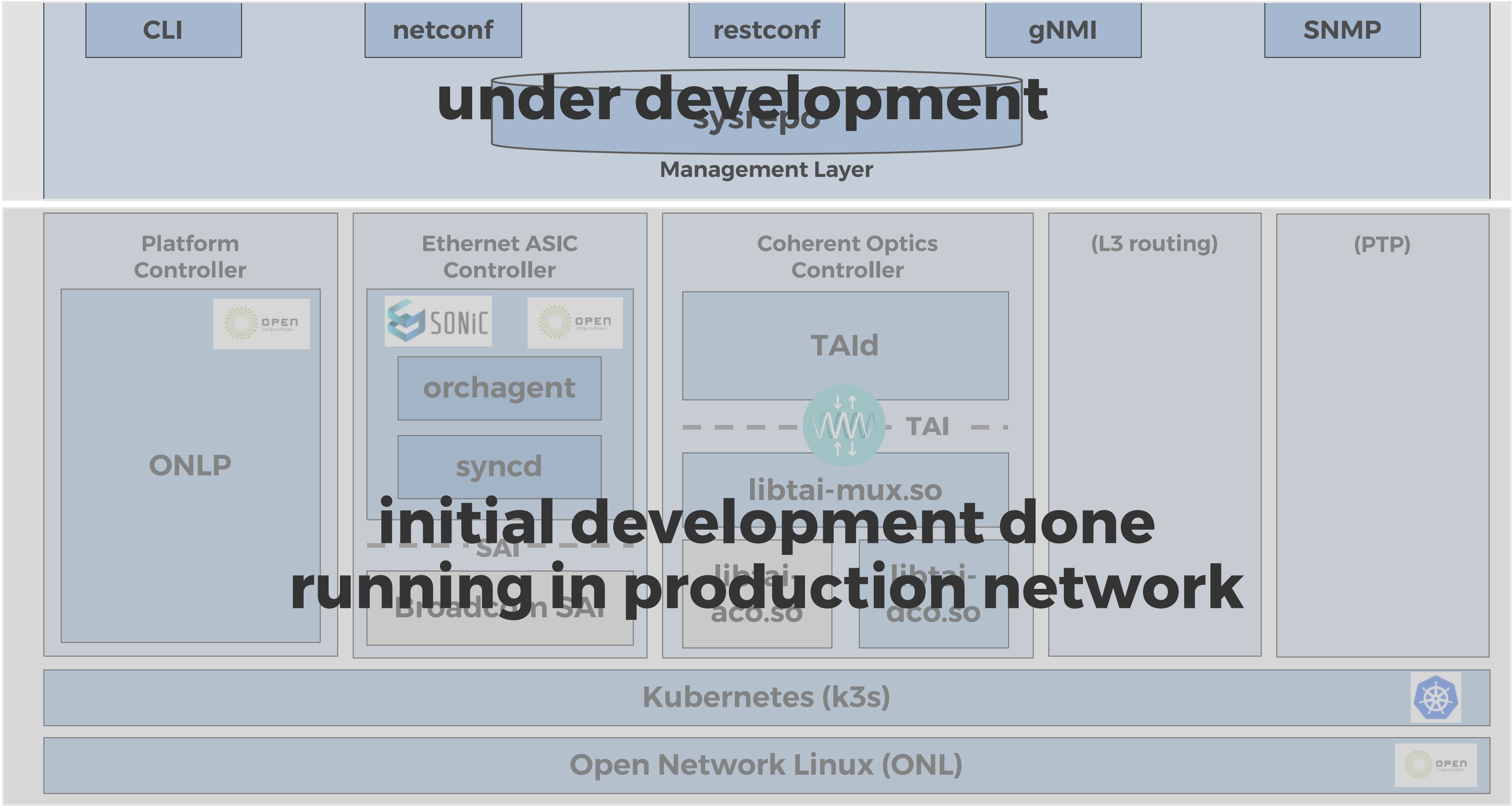
binary



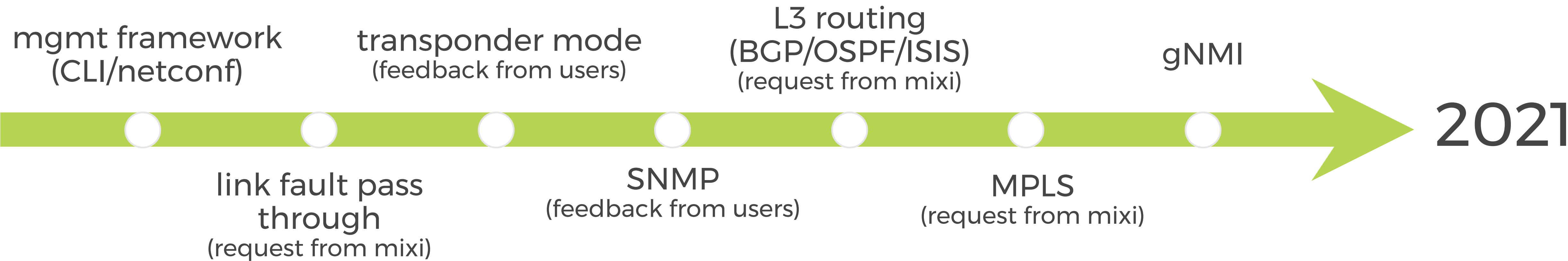
GOLDSTONE Architecture

oss

binary



Roadmap



Work with us

- We welcome
 - pull requests
 - feature request
 - new hardware support request
 - test item proposal
 - lab/field trial request
- Direct communication between end operators and developers can shorten the time of feature implementation and reduce needless feature development

The background is composed of several overlapping geometric shapes. A large, dark teal shape is the central focus, with a medium blue shape to its left and a light blue shape to its right. In the bottom left corner, there is a bright orange shape. The text "Collaborate With Us" is centered horizontally across the middle of the image, overlaid on the dark teal shape.

Collaborate With Us

Collaborate with us

BECOME A MEMBER

<https://telecominfraproject.com/apply-for-membership/>

JOIN A PROJECT GROUP

<https://telecominfraproject.com/project-groups/>

HOST A COMMUNITY LAB

<https://telecominfraproject.com/clabs>

HOST A TEAC STARTUP ACCELERATOR

<https://telecominfraproject.com/teac>



TIP IS BUILDING
Community

Take your place at the
table and build with us.



Thank You

Learn more at telecominfraproject.com



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