

Rewriting the FTTx playbook with Open and Disaggregated Approach

September 30, 2020

Sponsored by



Today's Presenters



Sterling Perrin

Principal Analyst – Optical Networking & Transport
Heavy Reading



Palash Bose

Product Management Head – Access Solutions
STL



Saurabh Chattopadhyay

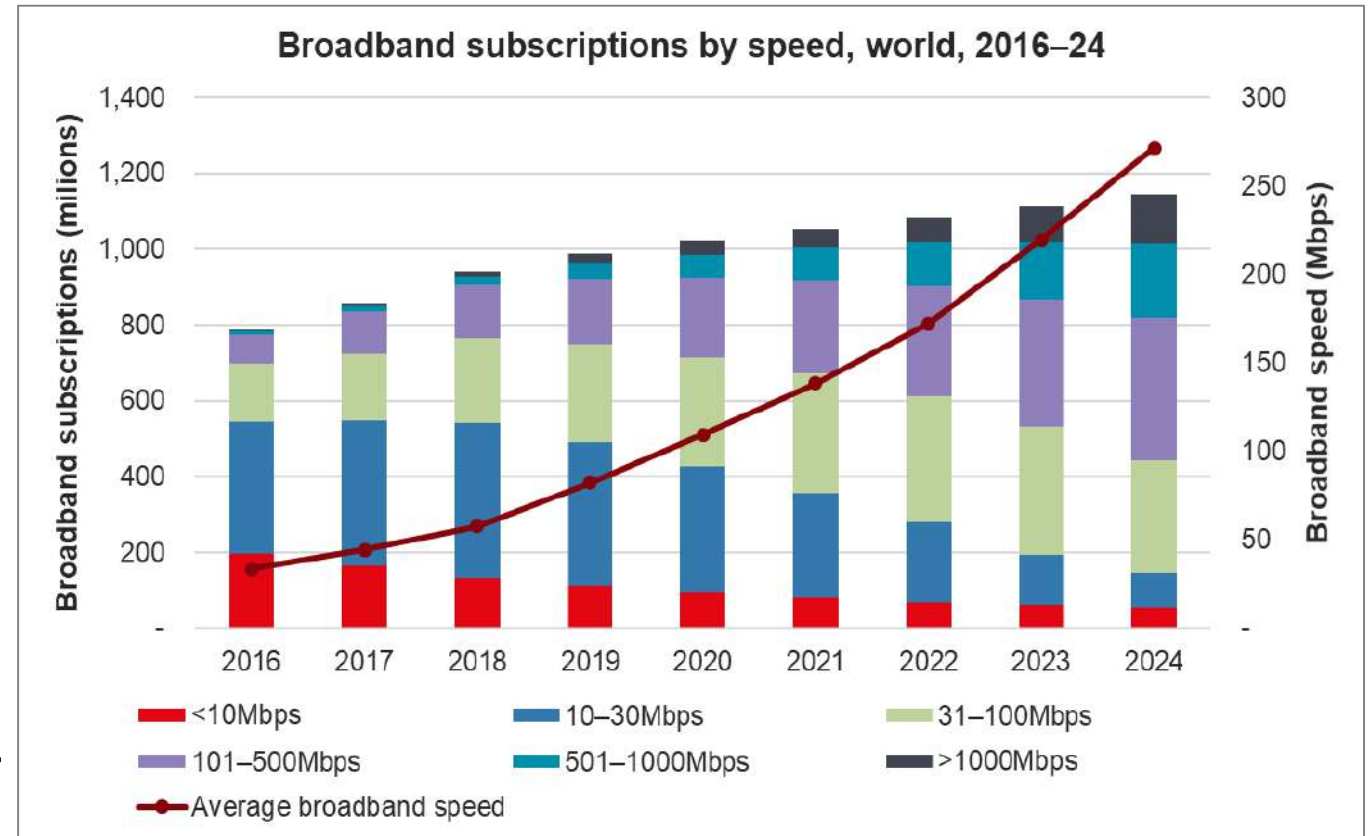
Engineering Head – Access Solutions
STL

Agenda

- Introduction
- Business drivers for Programmable FTTx
- Transition to Programmable FTTx
- Design principle & architecture
- Deployment scenarios
- Questions & Answers

Good News: Broadband Data Demand Keeps Rising

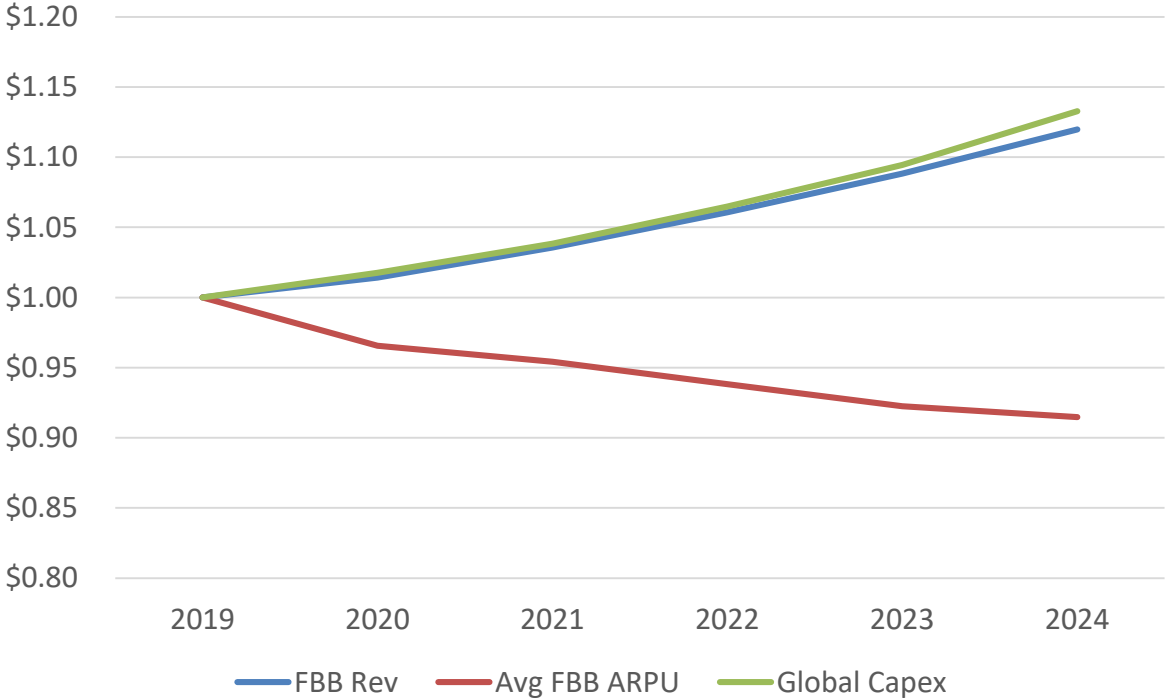
- Global broadband subscription growth will slow but average broadband speeds will rise sharply:
 - Global average broadband rate to increase 540% between 2017 and 2024
 - Average broadband rate in 2024 to exceed 270 Mbit/s
- Broadband data rates in some developed regions will be much higher than global averages:
 - Hong Kong to hit 460 Mbit/s by 2024



Source: Ovum, *Consumer Broadband Subscription and Revenue*
Forecast: 2019–24, 2020

Bad News: Revenue Trends Don't Match Broadband Demand

Normalized Global Fixed BB Revenue, FBB ARPU, and Global Capex: 2019-2024



Source: Ovum Communications Provider Revenue & Capex Forecast: 2019–24 and Cisco VNI, 2019

Q: Please rank the following priorities for your network

Network Priority	Overall Rank
Adding to top-line revenue	1
Meeting demand for bandwidth growth	2
Protecting network infrastructure	3

N=81
 Score is a weighted calculation, where items ranked first are given a higher weight
 Source: Heavy Reading

Disaggregation Defined

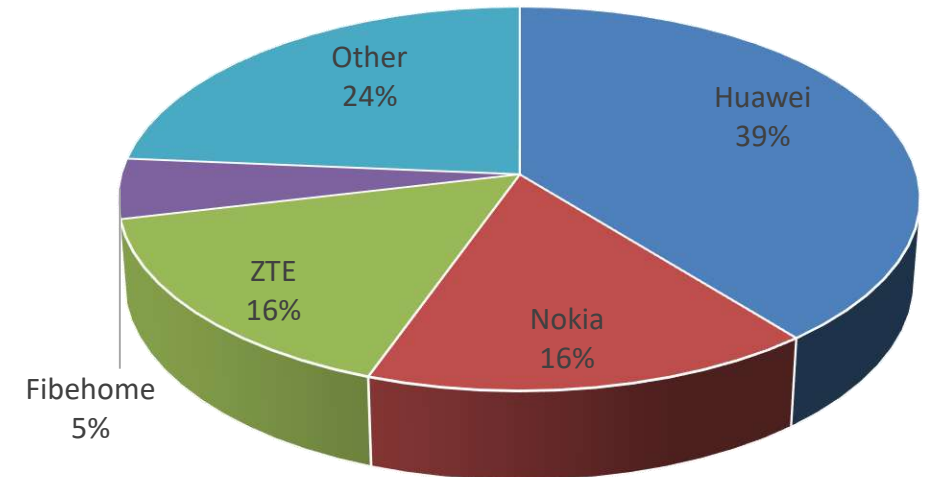
- The separation of networking equipment into **functional components** and allowing each component to be individually deployed:
 - Encompasses separation of software OS from underlying hardware
 - Requires open APIs to enable SDN control
- Degrees of disaggregation exist
 - Vertical vs. horizontal disaggregation
 - Not one size fits all in the market
- **White Box** is a specific subset of disaggregation that requires open spec hardware produced by contract manufacturers
 - White box has its own benefits and challenges



Operators Look to Open and Disaggregated Networks

- Break vendor-proprietary lock-in
- Reduce network costs
- Offer new services and monetization opportunities
- Enable faster innovation with diverse ecosystem

Global Fixed Broadband Vendor Share, 2019



N=\$9.1 Billion
Source: Omdia, 2020

Industry Support for Open Fixed and Mobile Access Networks



- SDN-Enabled Broadband Access (SEBA) reference design
- Virtual OLT Hardware Abstraction (VOLTHA)



- Open Broadband-Broadband Access Abstraction (OB-BBA)



- Operator Defined Next Generation RAN Architecture and Interfaces



- OpenRAN
- Open Optical & Packet Transport

Major and Growing Tier 1 Operator Support:



We integrate digital networks for our customers



Core Business

Customer Segments



Telcos



Cloud Co.



Citizen Networks



Large Enterprises

End-to-End Solutions

opticonn
Optical Connectivity

LEAD 360°
Fibre Deployment

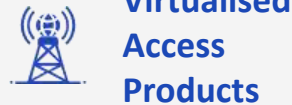
FTTx mantra
One Solution. Countless Opportunities
FTTx Access Network

netmode
Network Modernisation

Portfolio Offerings



Optical Interconnect Products



Virtualised Access Products



Network Software Products



System Integration Services

Unique Capabilities

- Glass Preform
- Optical Interconnect
- Optical and Speciality Cables
- Optical Fibre

- Programmable FTTx
- Virtualised RAN
- RAN Intelligent Controller
- Orchestrator

- Telecom Billing Operations Software
- Monetisation and Engagement Software

- Network Design Services
- Fibre Rollout Services
- Network O&M Services
- Data Centre Network
- Private Enterprise Network

Industry trends and Operator challenges - FTTx



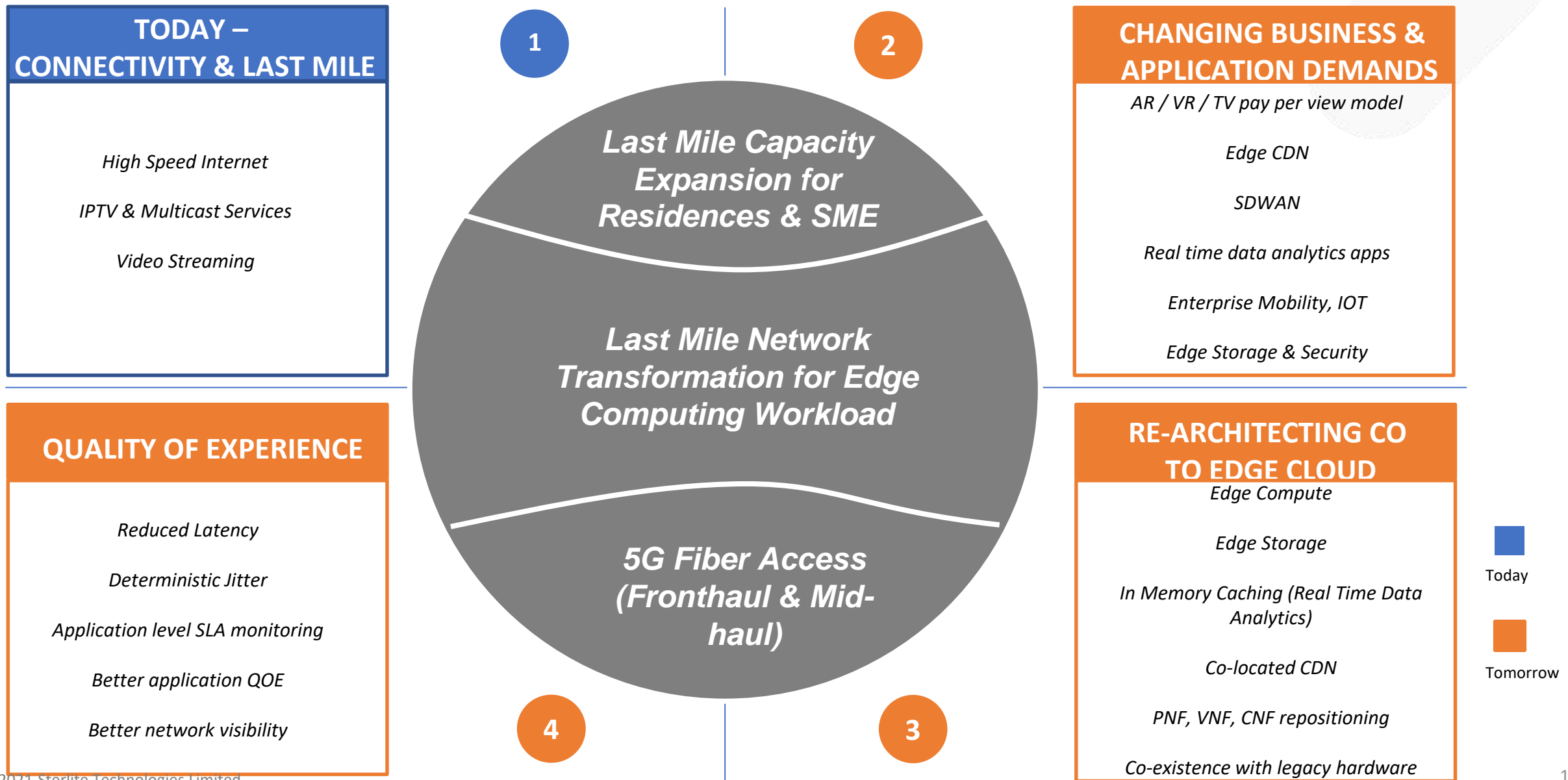
Trends

- Demand Growth faster than revenues
- Technology convergence for open technologies, tools as alternatives to proprietary technology
- Value generated by OTTs, Cloud players and ecosystem players

Challenges

- How much to invest for increasing demand - fatter pipes, networking services
- What is the right architecture, also how easy is it to deploy
- Finding the sweet spot for value creation with lower capex and opex investment and execution of right architecture

Programmable FTTx business drivers



Poll Question 1

Which are the 2 main motivators for operators to deploy Open and Disaggregated FTTx?

a) Better TCO

b) Enable faster innovation with diverse ecosystem

c) Ability to launch new services on the fly

d) Open source based software

Application centric software defined architecture

DISAGGREGATION

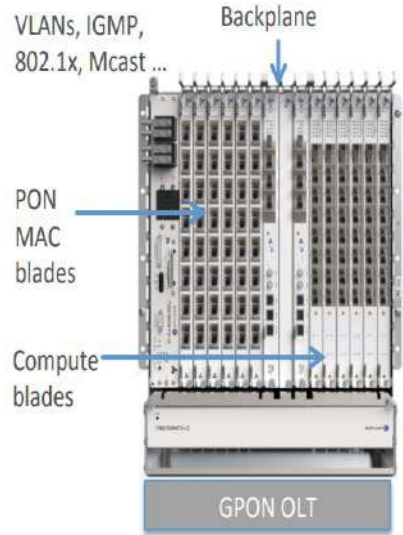
- Platform based – CUPS, Control Plane Convergence
- Lego Blocks – Silicon, Hardware, Software
- Control functions in software, automation
- Lower barriers to experimentation

SOFTWARE ENABLED

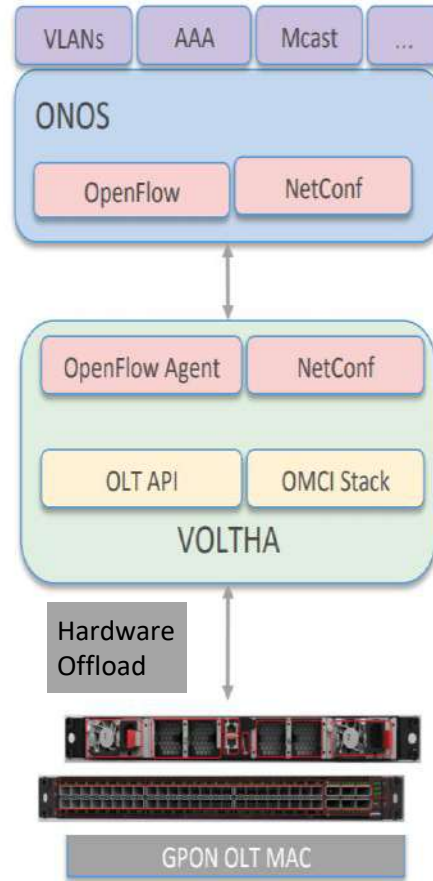
- WebScale Data Center Software model
- Devops based approach – feature deployment and testing
- Third Party software & hardware integration
- Latency sensitive workload positioning

Transition to cloud native pFTTx

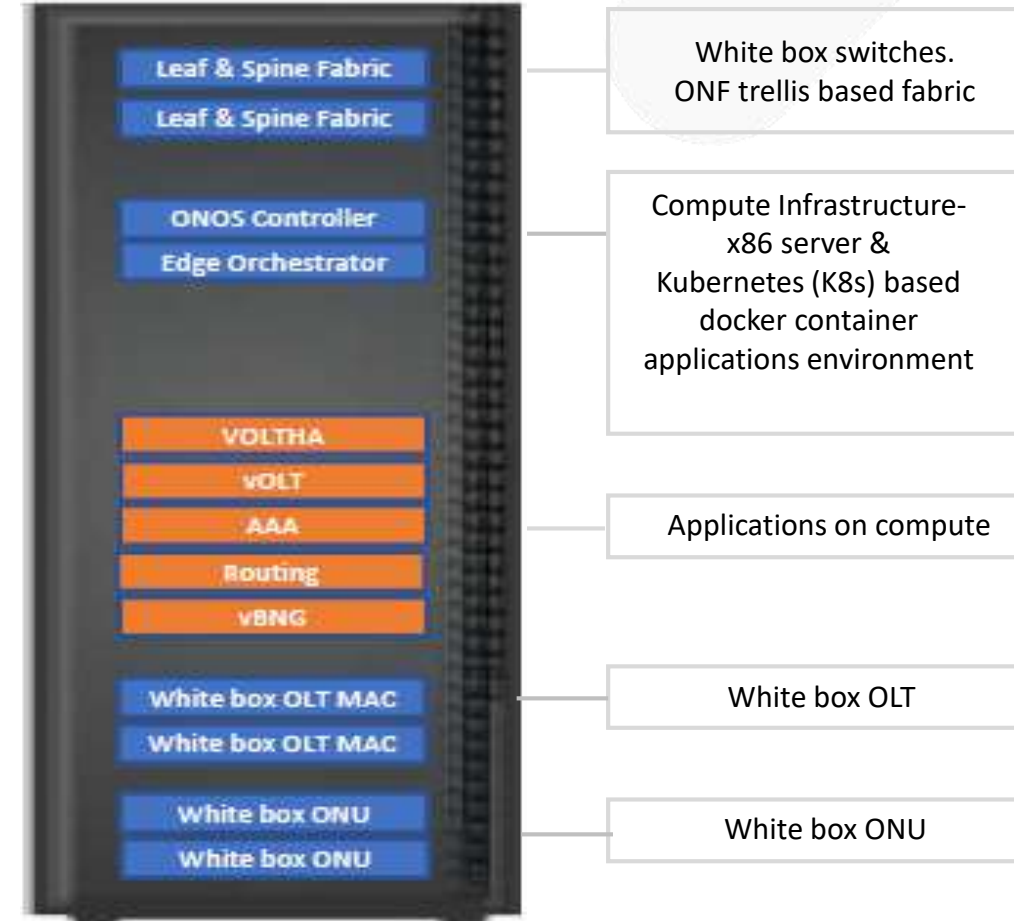
Traditional OLT



ONF SEBA defined reference design



pFTTx



ONOS	FTTx controller
vOLTHA	PON hardware abstraction layer
vOLT/vONU	Virtualized applications
Edge Orchestrator	Orchestration & backend management
AAA	Subscriber authentication through AAA, DHCP apps

SEBA – Software Enabled Broadband Access
ONF – Open Networking Foundation



Programmable FTTx design principle:

100% Programmable Virtualized Open Disaggregated Solutions

P Programmable

O Open

D Disaggregated

S Solutions

Chipset, Hardware, Software



PROGRAMMABLE FTTX

Programmable FTTx offerings



vOLTHA

Lower layer Hardware Abstraction

Non Proprietary Protocols

Interoperability

White Box ONU

XGSPON/GPON capacity

pFTTx (SDN) Controller

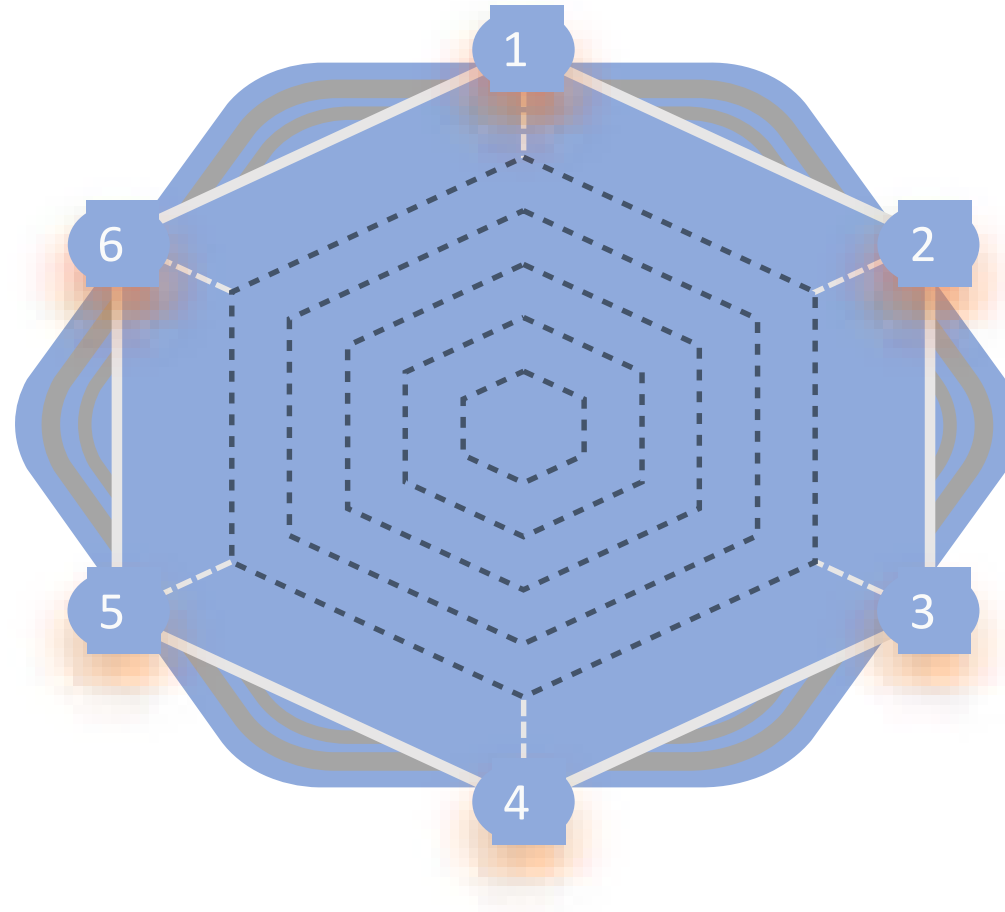
Centralized control plane

Edge Orchestrator

Complete FCAPS

White Box OLT

XGSPON/GPON capacity



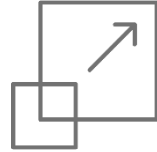
ONF SEBA-RD compliant

TR-101 and TR-156 aligned

pFTTx: Value proposition to network operators



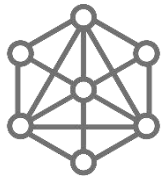
Reduced time to market



Scalability on the fly



Lower TCO with white boxes at edge



Better network control with operators



New revenue streams



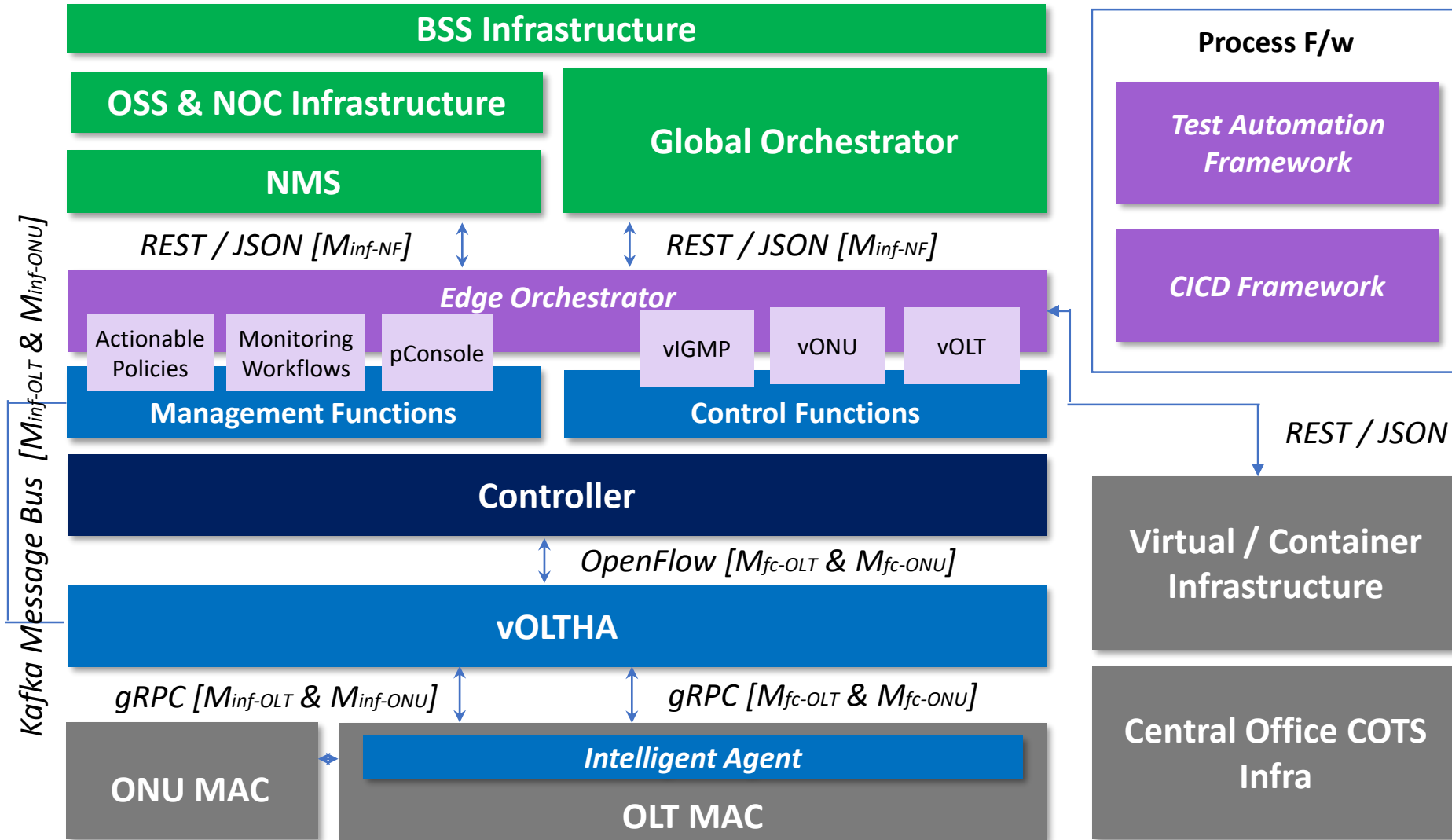
Zero touch provisioning

Poll Question 2

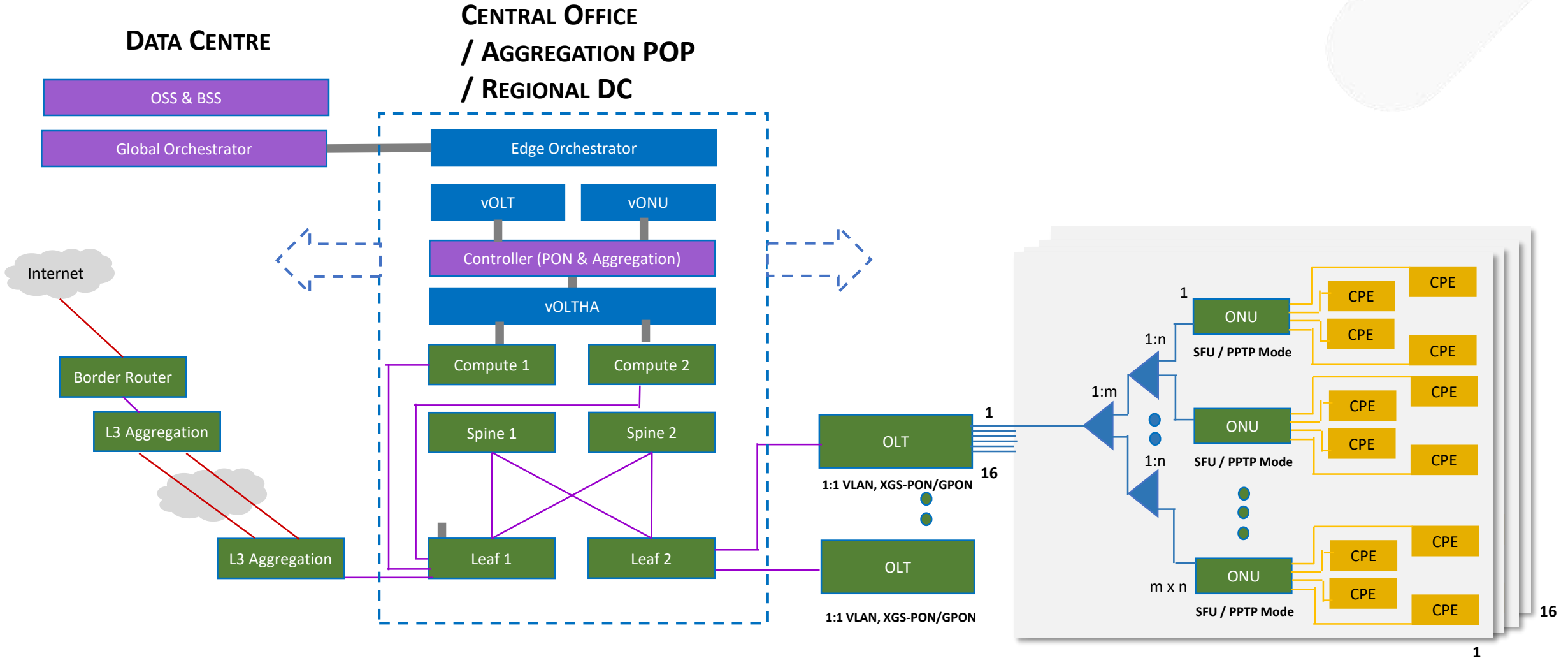
What is operators most significant challenge in transitioning to Open and Disaggregated, Virtualized network?

- a) Too expensive to re-architect
- b) Long term contract with existing vendors
- c) Lack of in-house expertise
- d) Integration with legacy network
- e) None, want to deploy quickly

pFTTx solution stack & cross layer interface specifications

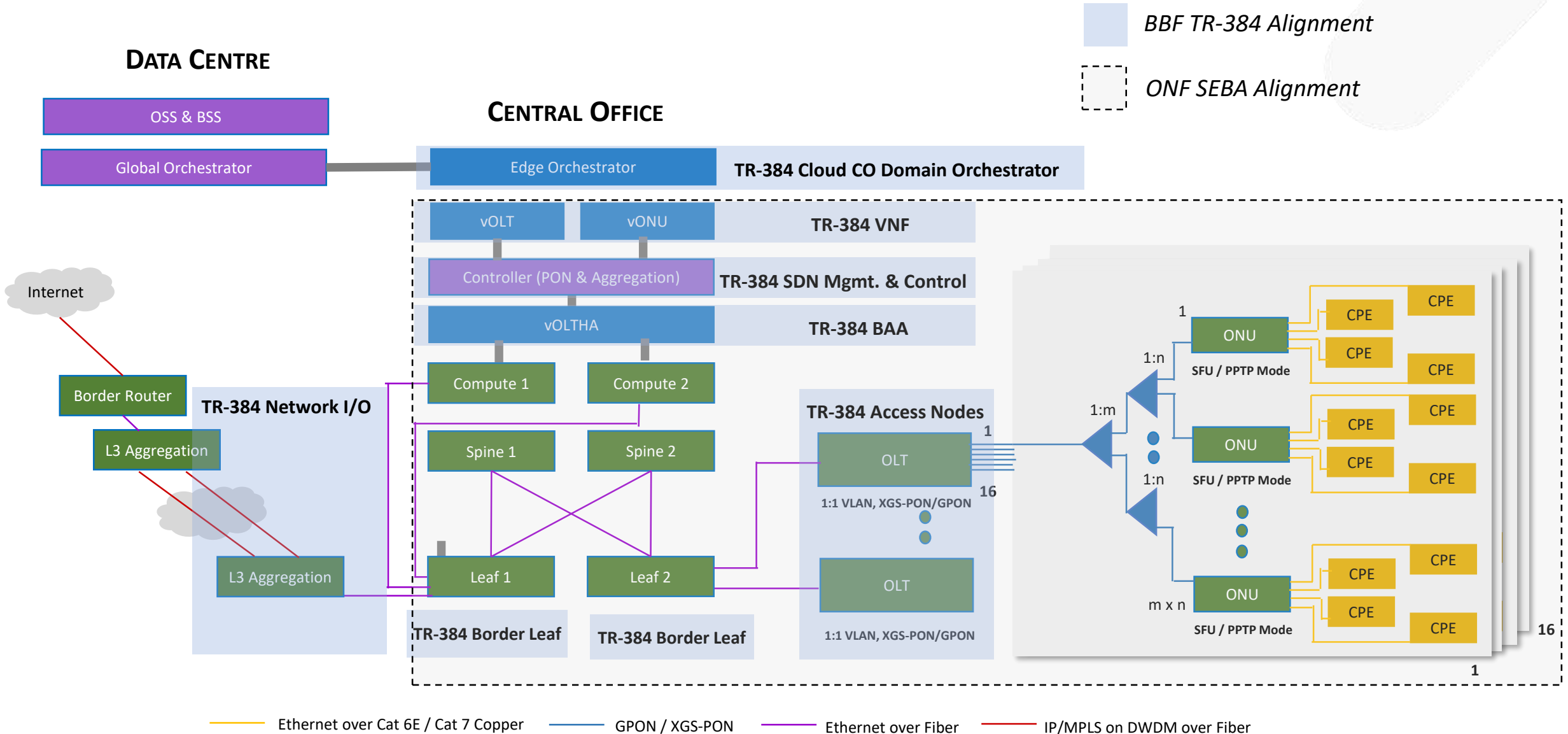


pFTTx: Deployment architecture



— Ethernet over Cat 6E / Cat 7 Copper — GPON / XGS-PON — Ethernet over Fiber — IP/MPLS on DWDM over Fiber

pFTTx deployment In alignment with ONF SEBA & BBF TR-384



pFTTx deployment readiness SNL deployment & outcome



System Outage (SSO)	2 Events / Year
Customer Complain Report Ratio (CCRR)	0.12
Mean Time to Restore Service (MTRS)	2.05 Hrs
Fixed Response Time - Priority 1 & 2 (FRT2)	100%
Fixed Response Time - Priority 3 (FRT3)	85%

pFTTx deployment readiness

Customer scenarios

1

Open & Disaggregated FTTx
for Residence Segment –
for Capacity up to 1 Gbps

2

Open & Disaggregated FTTx
for Multi-vendor ONUs

3

Residence & Enterprise
Hybrid FTTx with Open &
Disaggregated Hybrid PON

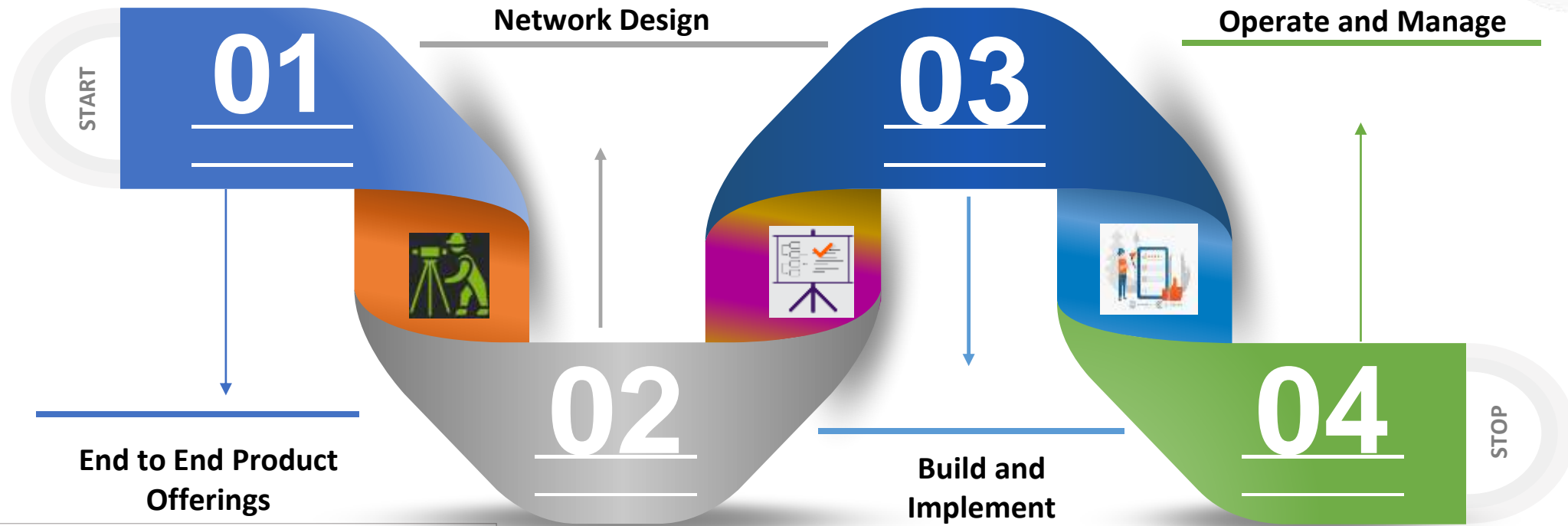
4

SD-WAN converged
Open &
Disaggregated FTTx

FTTx Mantra – STL's end-to-end FTTx offering

STL can provide network architecture and design

- Cable/fiber and passive design
- Active, cloud and virtualization design



STL FTTx Products are end to end –

- Active components (hardware)
- STL Software
- FTTx cable

STL also provides Managed Services

- Build, Operate and Manage
- Processes, Tools and Infrastructure available for operations

Poll question 3

What is the timeline operators are looking to deploy commercial open and disaggregated FTTx/wireline networks?

- a) 6 months
- b) 12 months
- c) 24 months
- d) More than 24 months

- Accelerating ***Field Trials & Deployment*** for complete end-to-end Ecosystem
- Consultative Engagement with Operators to assist ***migrating towards Open and Disaggregated*** Access Network Infrastructure
- ***Continuous Improvement of pFTTx*** Underlay for optimum service delivery of Edge Cloud, IOT and 5G Deployment

The title 'Q&A Session' is centered on the page in a large, white, sans-serif font. The background is a dark blue-tinted photograph of a large audience with many hands raised, suggesting an interactive session.

Q&A Session



beyond tomorrow