Virtualizing the Cable Access Network

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Thursday, Dec. 16, 2021
11:00 am – 12:00 pm ET

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Today's Speakers

Alan Breznick
Cable/Video Practice Leader
Light Reading

Dean Stoneback
Senior Director
Engineering and
Standards, SCTE

Thuy Nguyen
Cable Segment Lead
Network Platforms Group
Intel Corporation

Ben Bekele
Director
Product Management
Cisco

Rob Wilmoth
Chief Architect
Service Provider Team
Red Hat North America

Agenda

- **Light Reading—**Market Overview
- **Intel—**Cable & Broadband Market Trends
- **Cisco**—Considerations & Lessons Learned
- **Red Hat—**Journey to a Microservices Architecture
- **SCTE**—Standards, Programs, Initiatives & More
- **Audience Q&A**

Why Cable Values Virtualization

CableLabs®

OPERATIONS

AUTOMATE

Simplify & Orchestrate

INFRASTRUCTURE

SCALE

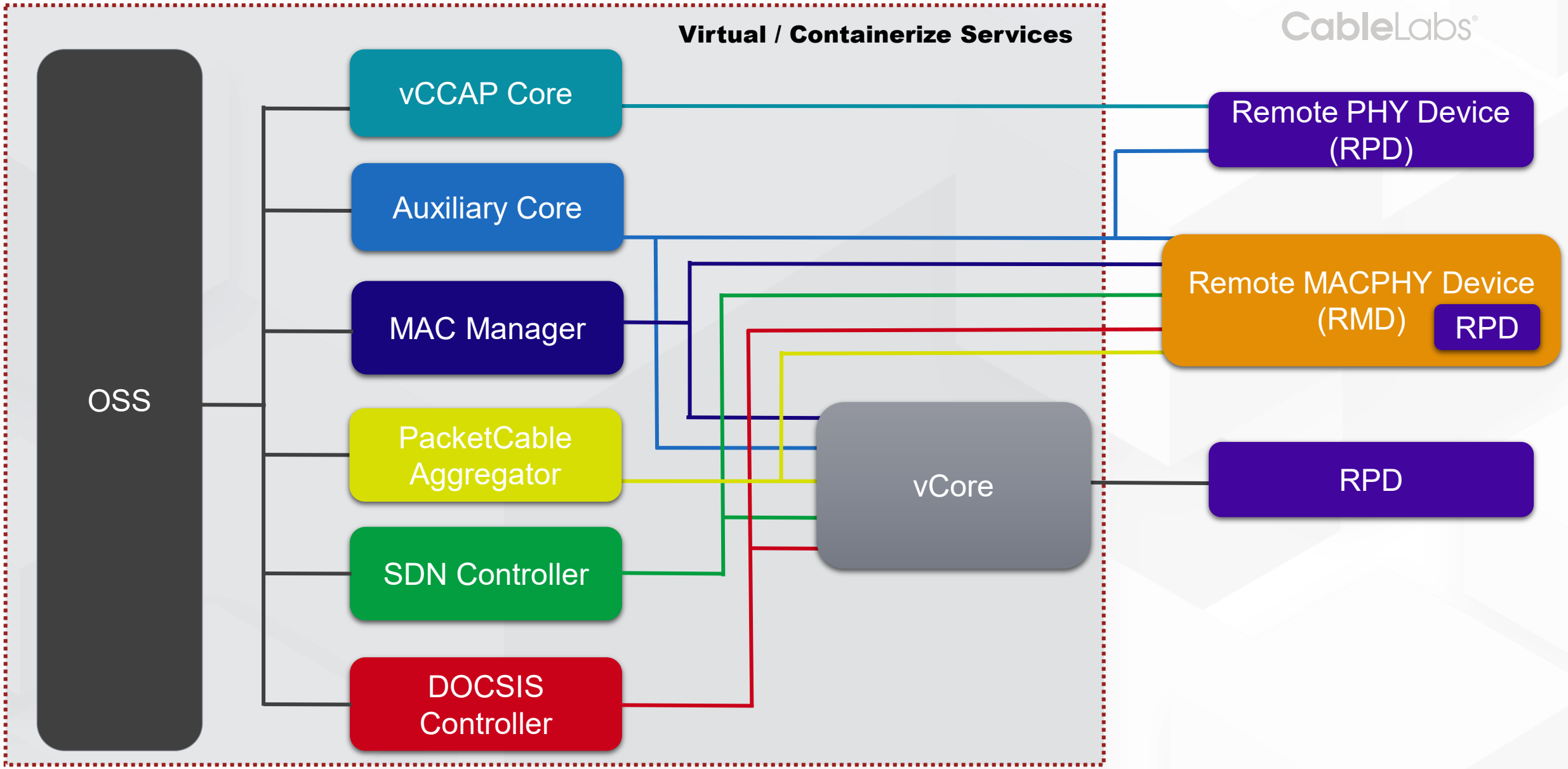
Virtualize, Centralize & Distribute

SERVICES

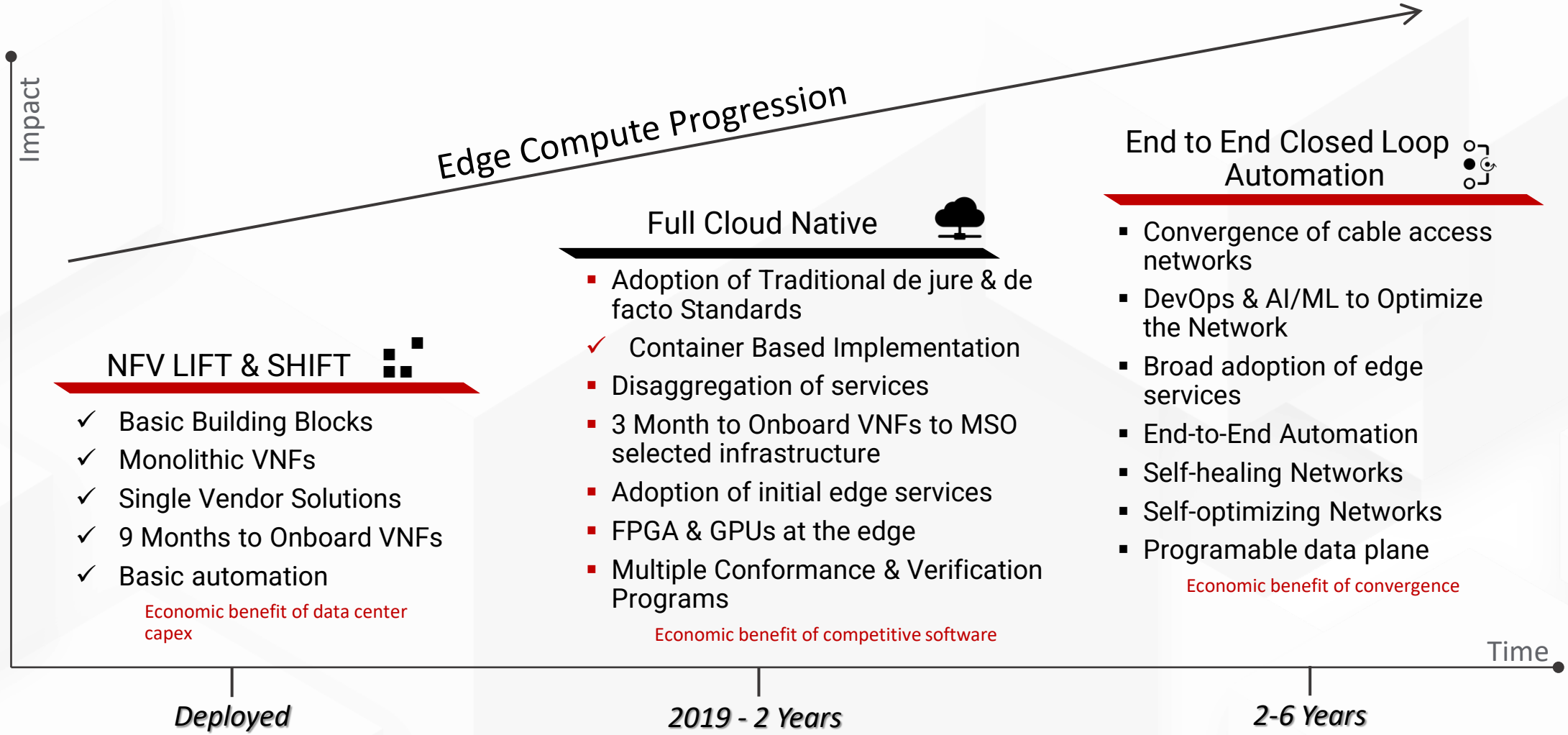
CREATE

Innovation & Agility

Virtualizing DAA with Flexible MAC Architecture (FMA) and RPHY



The Three Waves of Edge



Thuy Nguyen

Cable Segment Lead
Network Platforms Group
Intel Corporation

LightReading Panel
Virtualizing Cable Access Networks

December 16th, 2021

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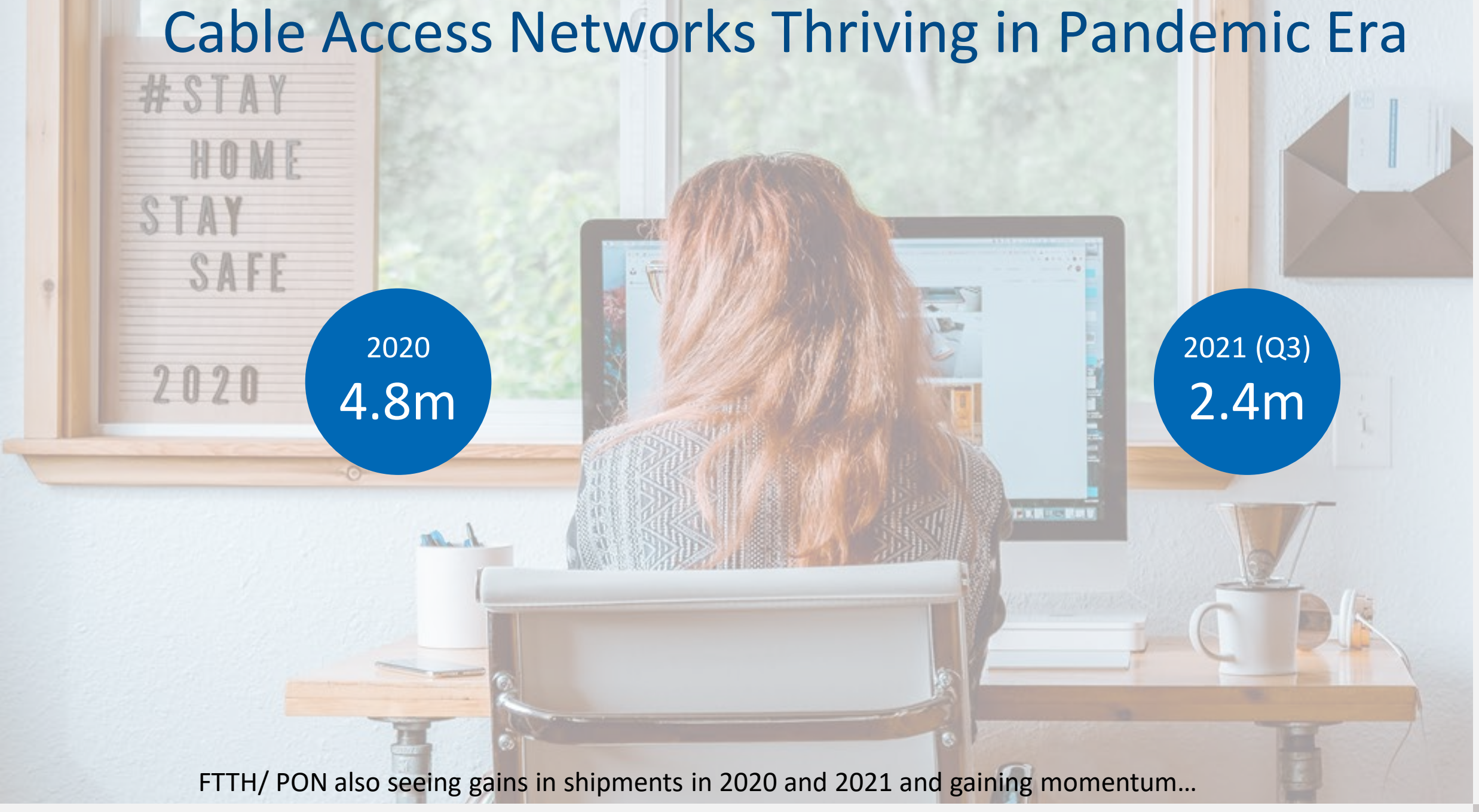
Cable Access Networks Thriving in Pandemic Era

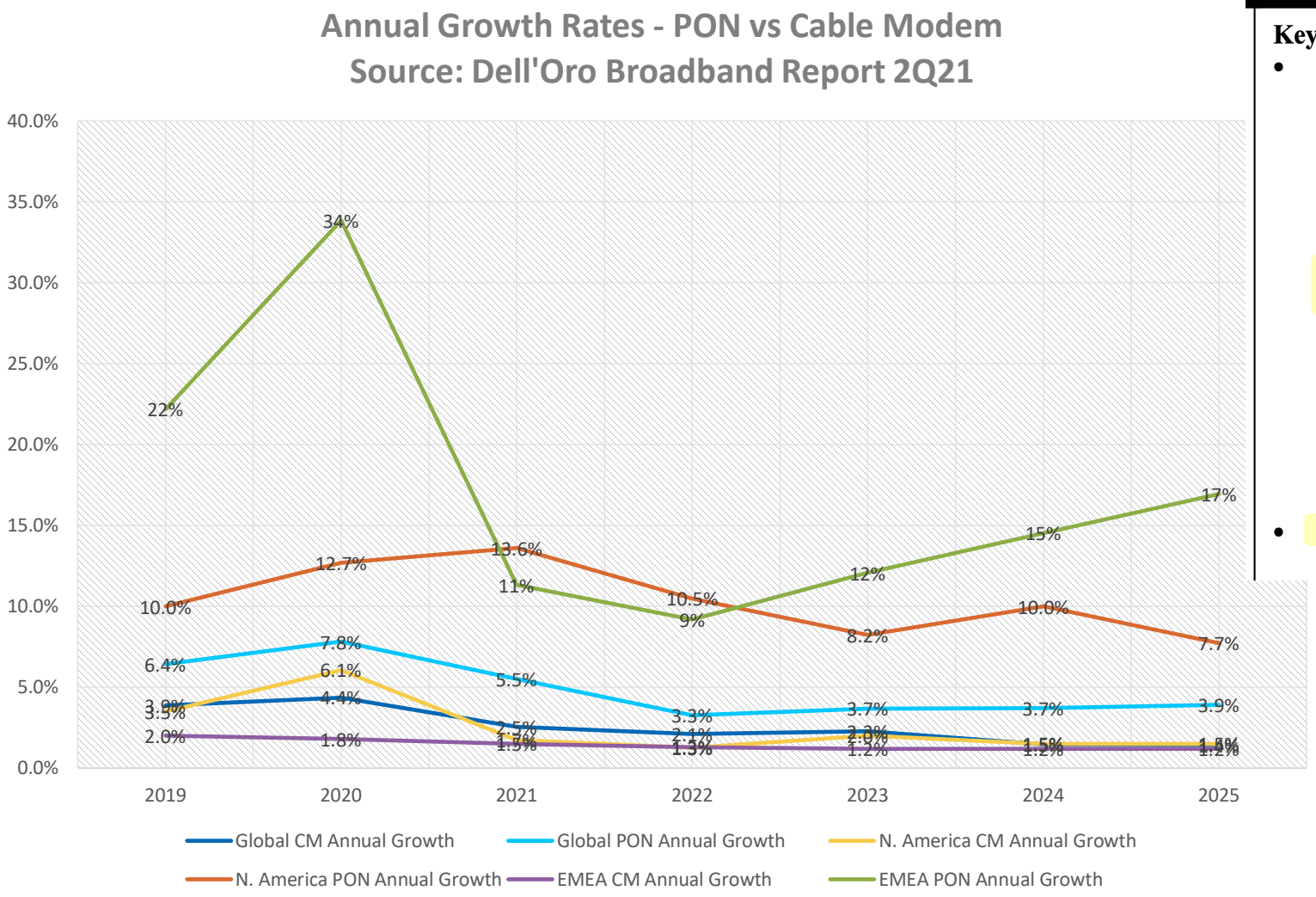


2020
4.8m

2021 (Q3)
2.4m

FTTH/ PON also seeing gains in shipments in 2020 and 2021 and gaining momentum…

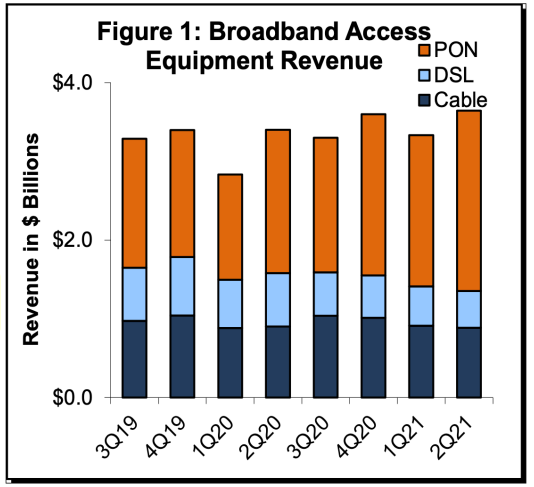
Fiber & Cable Fixed Broadband Subs Growth



DELL'ORO GROUP

Overview

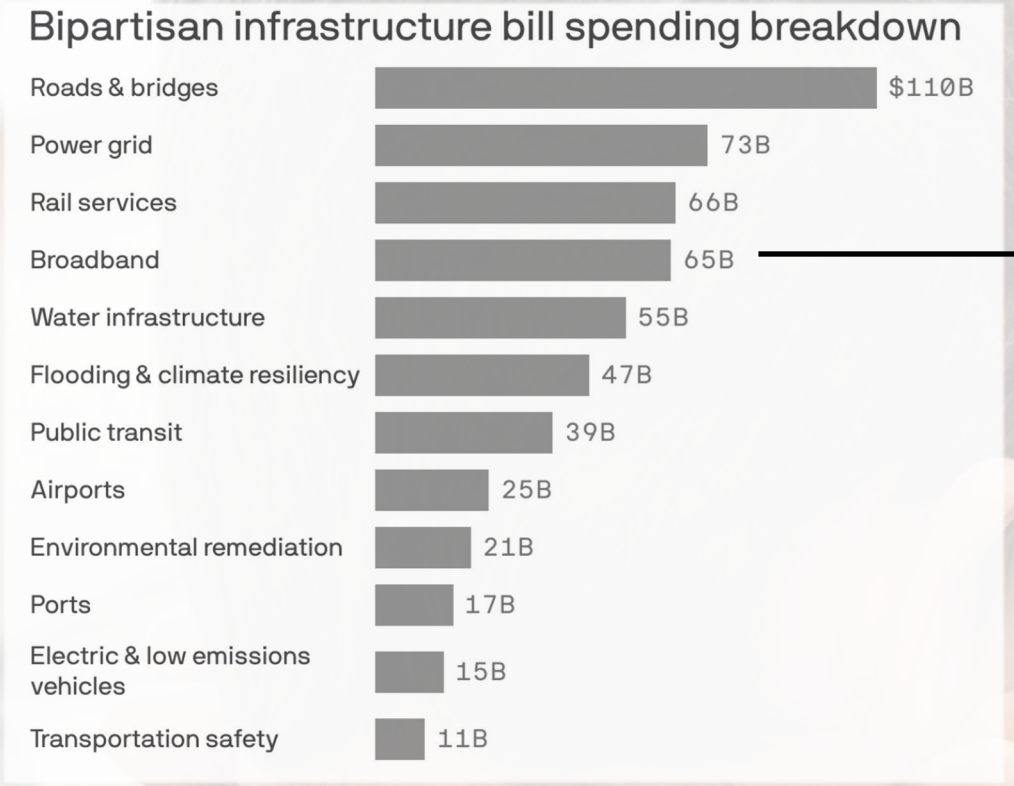
Key Takeaways



- In 2Q21, revenue for Broadband Access equipment (PON + DSL + Cable), including access concentrators and customer premises equipment (CPE), increased 7% year-over-year (Y/Y) to $3.6 B (Figure 1). By technology, demand for PON equipment was up 26% Y/Y; DSL decreased 31% Y/Y; and cable equipment decreased 2% Y/Y. Deployments of PON equipment to support new residential and business fiber expansions continue to exceed expectations. In addition, PON deployments to support 5G transport applications are also increasing on a global basis.
- On a Q/Q basis, total PON (OLT + ONT) revenue jumped 19% during the quarter, though this follows a 6% Q/Q decrease from 4Q20 to 1Q21. The

- PON growth in EMEA and N. America approaching double digits. Global avg is skewed due to APAC
- CM growth is ~2% in N. America & EMEA. Global avg is ~2%

Home Broadband is Deemed Essential



USA: $1.2 Trillion Infrastructure Investment & Jobs Bill

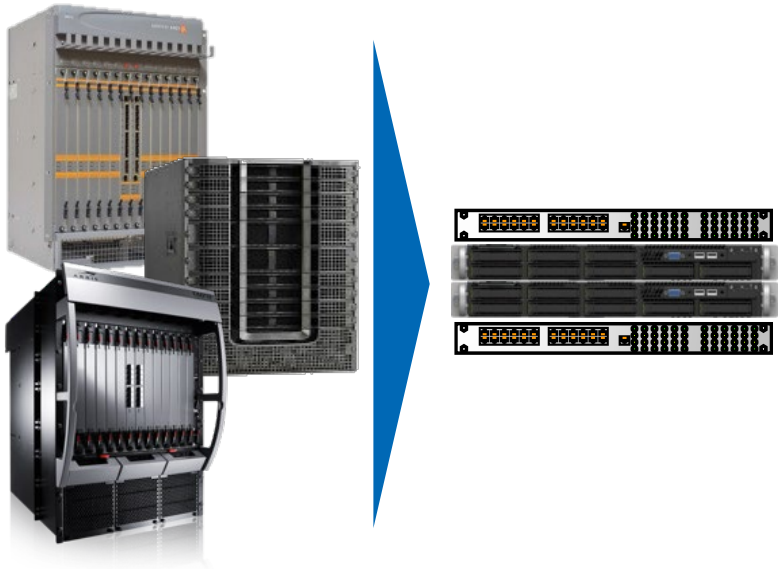
Broadband

- Makes grants to states for broadband deployment **$42.45 BILLION IN FY 2022**
- Creates new "middle mile" competitive grants to facilitate broadband deployment **$1 BILLION OVER FIVE YEARS**
- Creates a new competitive grant program for broadband **$1.25 BILLION OVER FIVE YEARS**
- Extends the Emergency Broadband Benefit program

FCC Definitions for Eligible Broadband Funding:

- Unserved Area: 80% of HHP gets less than **25Mbps downstream**/ 3Mbps upstream
- Underserved Area: 80% of HHP gets less than 100Mbps/ **20Mbps upstream**

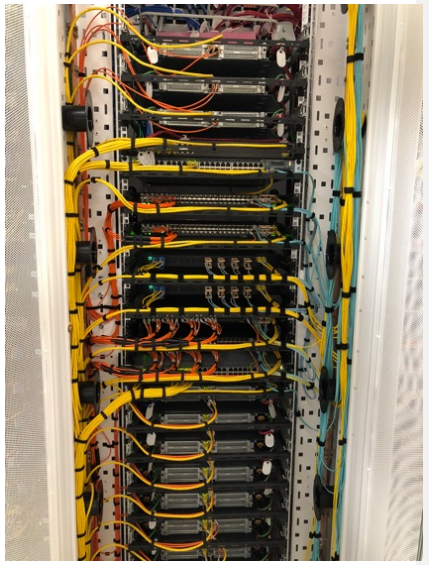
vCMTS Lowers Total Cost of Ownership for MSO's



- 4x less power
- 8x less rack space
- less HW capex $
- 300 Gbps/ server

Legacy: Pod = 96 service groups
5 Racks

x2



vCMTS Pod = 192 service groups
1 Rack

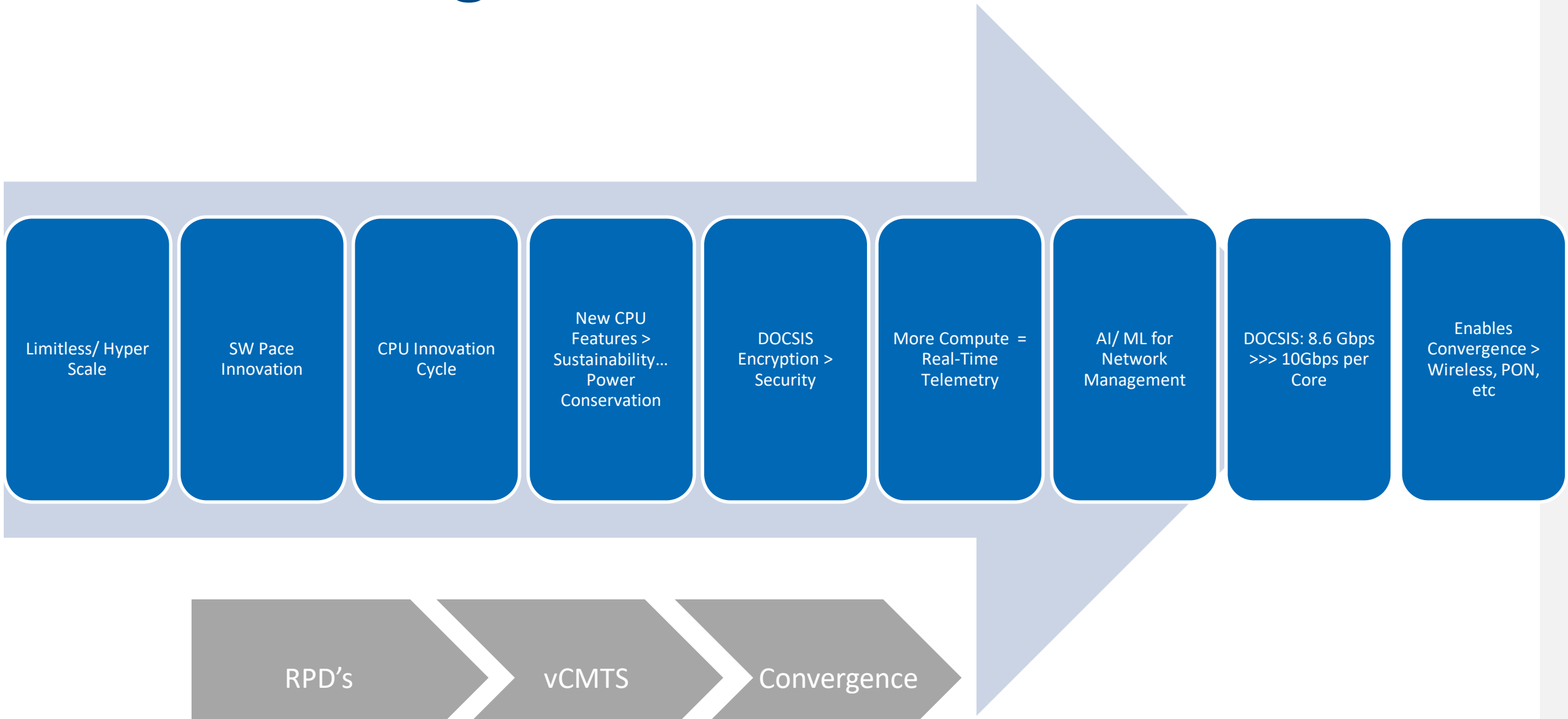
More SG's, Bigger SG's, More Throughput

04/29/2021; David Watson: CEO, Comcast Cable

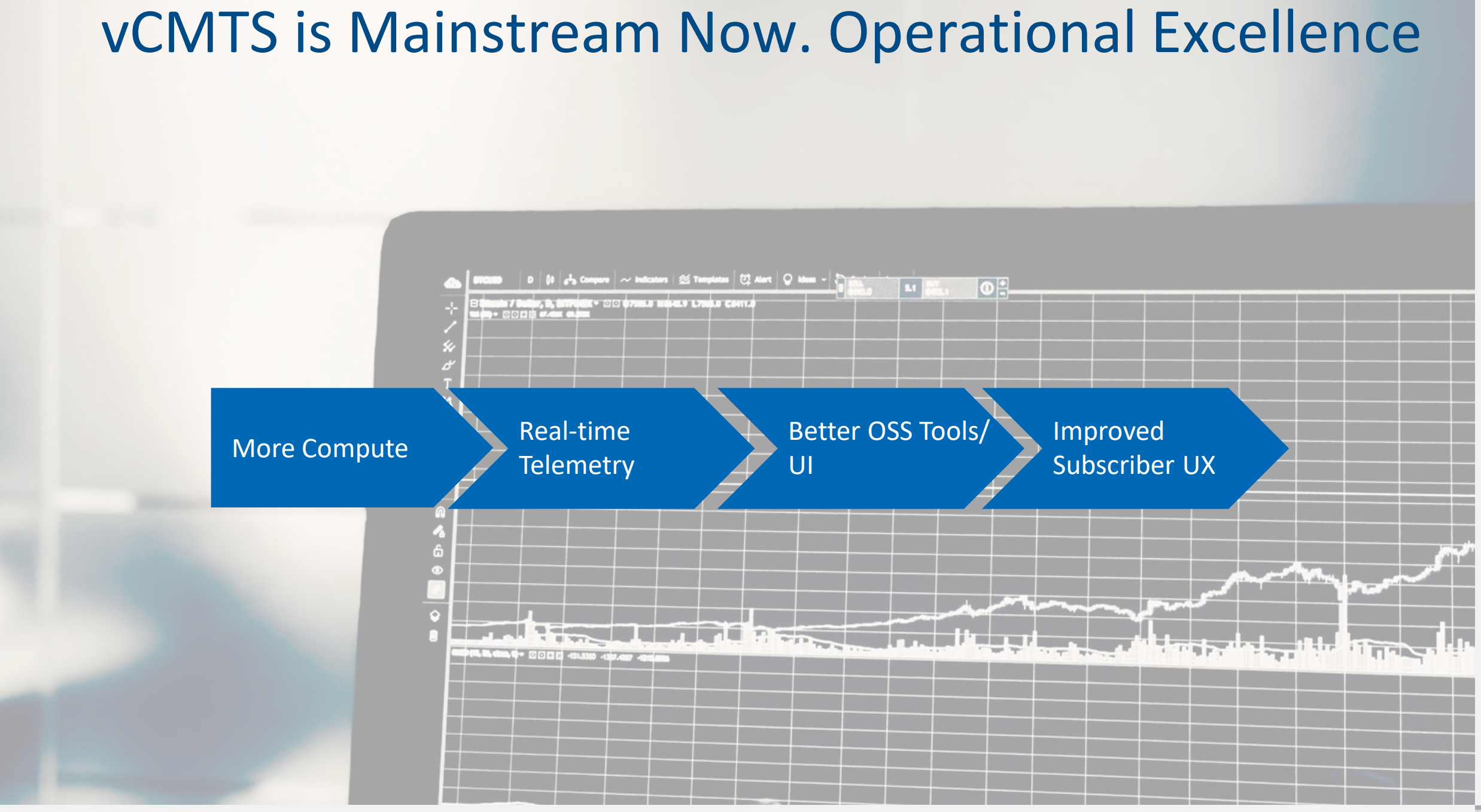
"We constantly invest in the network, this is not something that just happened overnight," Watson continued. "We're making our infrastructure more efficient as we virtualize things like CMTSs, and we're just taking cost out of how we deliver this. Couple that with a great DOCSIS standard, I think we're in a pretty good position."

https://www.fiercetelecom.com/financial/comcast-benefits-from-broadband-boom-q1

A Programmable CMTS Platform



vCMTS is Mainstream Now. Operational Excellence

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Audience Poll I

What is your top motivation for virtualizing your DOCSIS delivery network?

- Reduce cost
- Expand network capacity
- Deliver better service for our broadband subscribers
- Future-proof the network for the next decade
- All of the above

Ben Bekele

Director

Product Management

Cisco

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Virtualizing the Cable Access Network

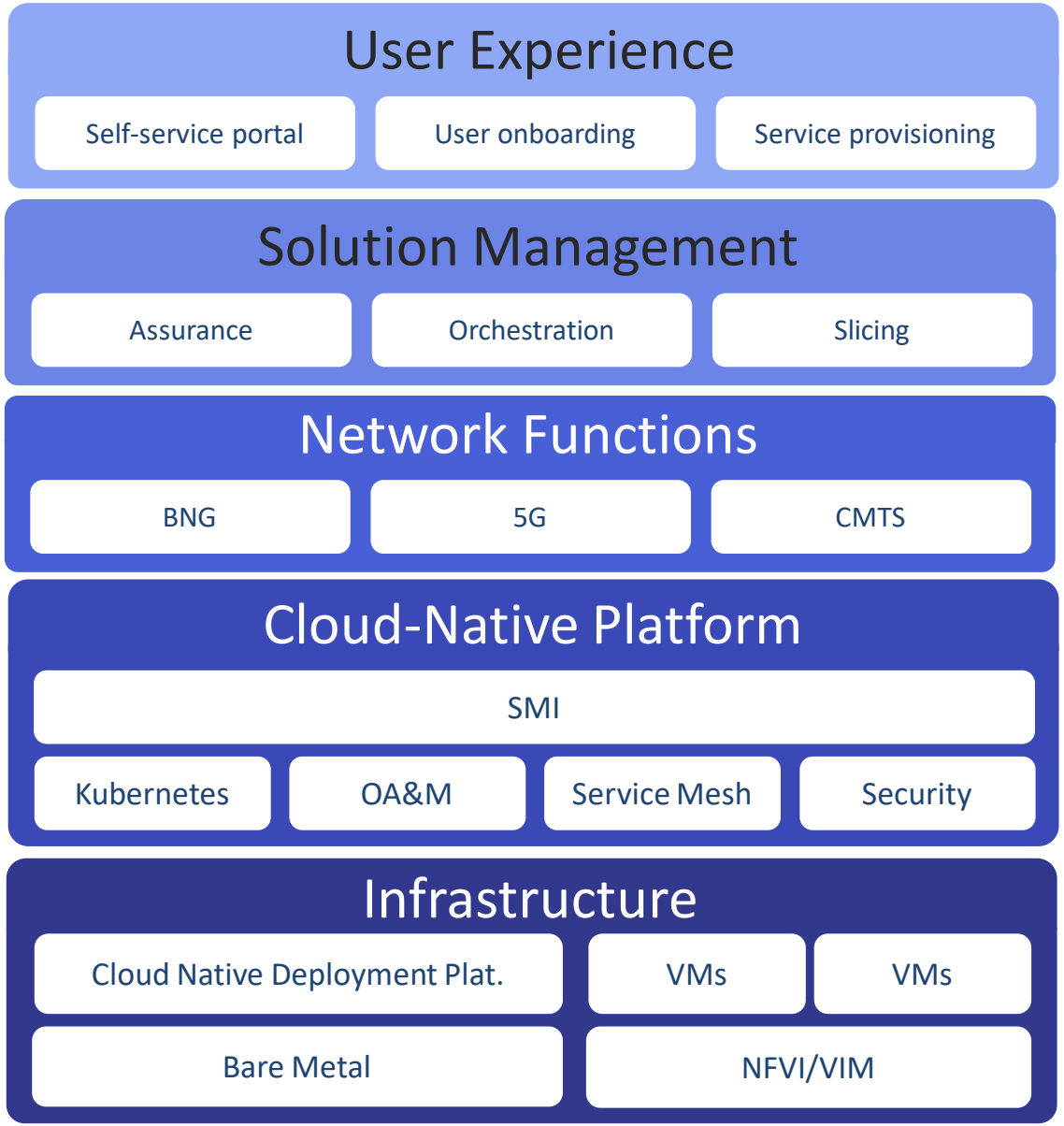
Consideration & Lessons Learned

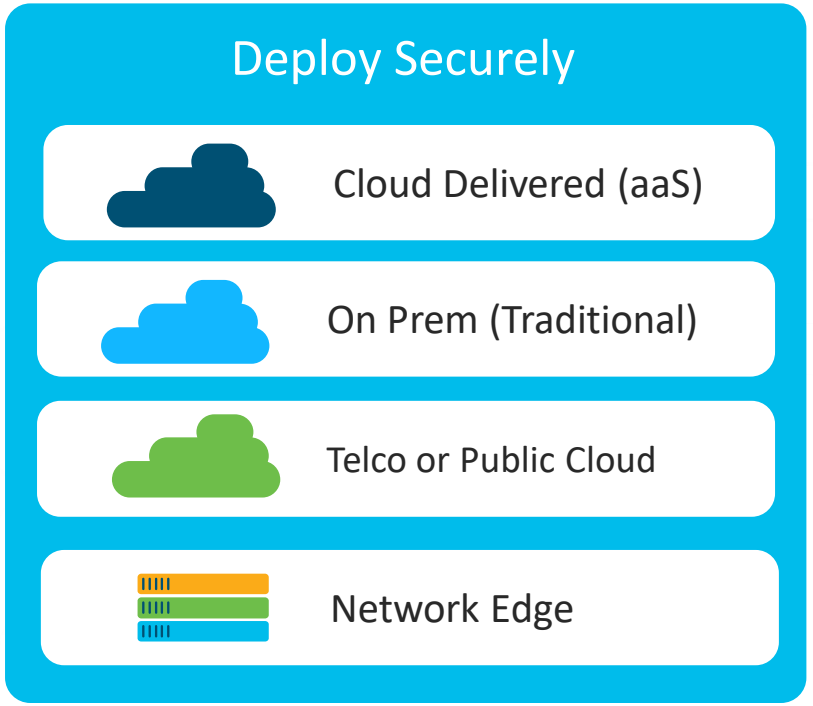
Ben Bekele – Director Of Product Management

December 2021

Cisco, Cable & Mobility BU

Converged Subscriber Services
Cloud Native BNG, 5G,WIFI and vCCAP Core





CCAP Architecture Evolution to vCCAP

	Phase 1 Integrated CMTS	Phase 2 DAA via RPHY	Phase 3 Cloud Native Core
Public Cloud			
Data Center		Ops Hub MP (Smart PHY)	Operations Hub MP MP (Smart PHY)
Hub	Converged cBR-8	Converged cBR-8	vCCAP vCCAP DP +CP Video cBR-8
MEC			
HFC	Analog Node	Digital Node w/ RPD	Digital Node w/ RPD

- **The need to scale**
- **Better noise performance.**
- **Supports return paths above 85 MHz**

- **Better scalability & resiliency**
- **Better economics**
- Better feature velocity

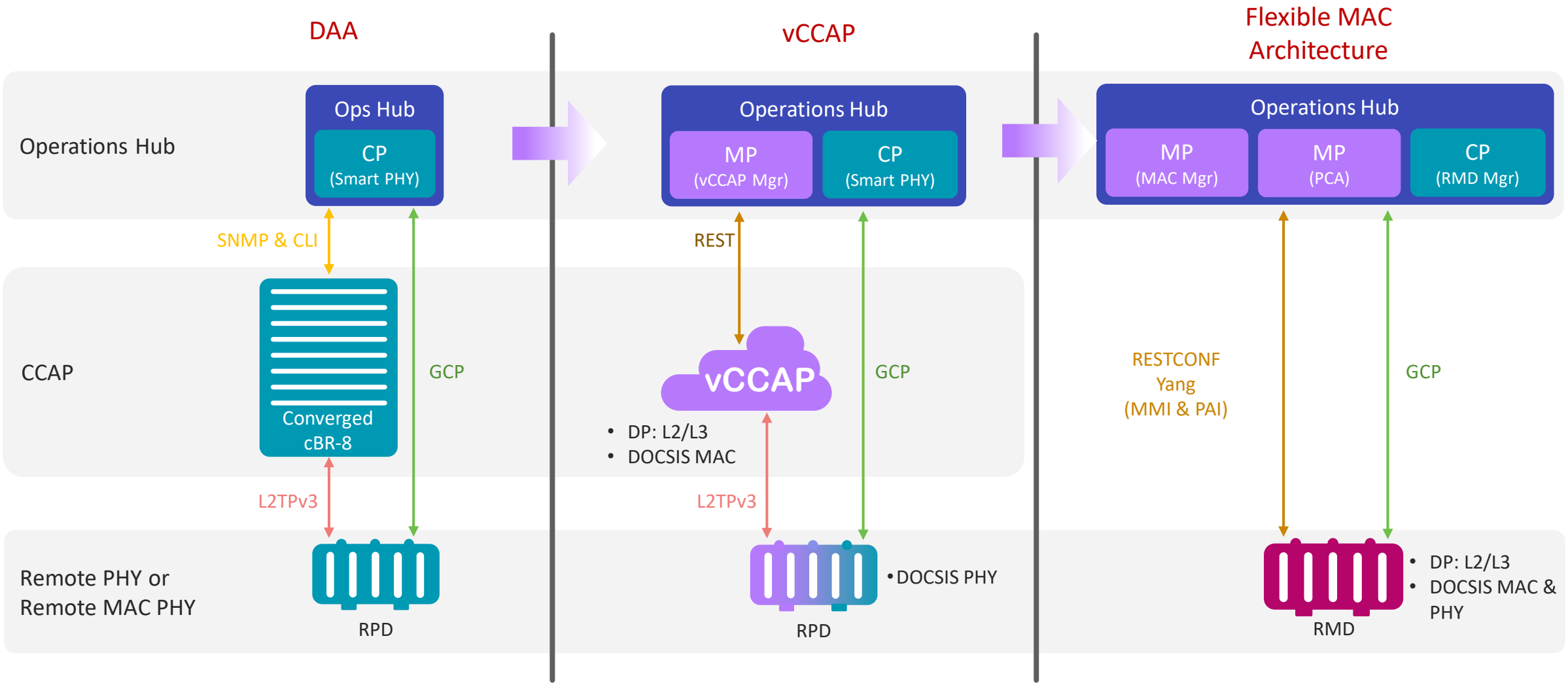
vCCAP Architecture Evolution to Public Cloud

	Phase 4 vCCAP w/ Private Cloud	Phase 5 vCCAP w/ Public Cloud & MEC	Phase 6 As a Service + Multi Cloud
Public Cloud		Operations Hub MP (vCCAP Mgr) MP (Smart PHY)	Operations Hub MP (vCCAP Mgr) CP (vCCAP) MP (Smart PHY)
Data Center	Operations Hub MP (vCCAP Mgr) CP MP (Smart PHY)	vCCAP Control Plane	
Hub	vCCAP Data Plane Video cbR-8	vCCAP Data Plane Video cbR-8	vCCAP Data Plane Video cBR-8
MEC		DP RT Ent* SASE	DP RT Ent SASE AWS, GCP, Azure Edge
HFC	RPD	RMD RPD	RMD RPD
	• **Better MP & CP scalability** • Consolidated Management	• **Economies of scale (Public Cloud)** • MEC & Low latency applications	• Lower upfront Capex • Lack of facilities • Lack of IT expertise

RT – Real Time,
DT- Data Plane, CP- Control Plane

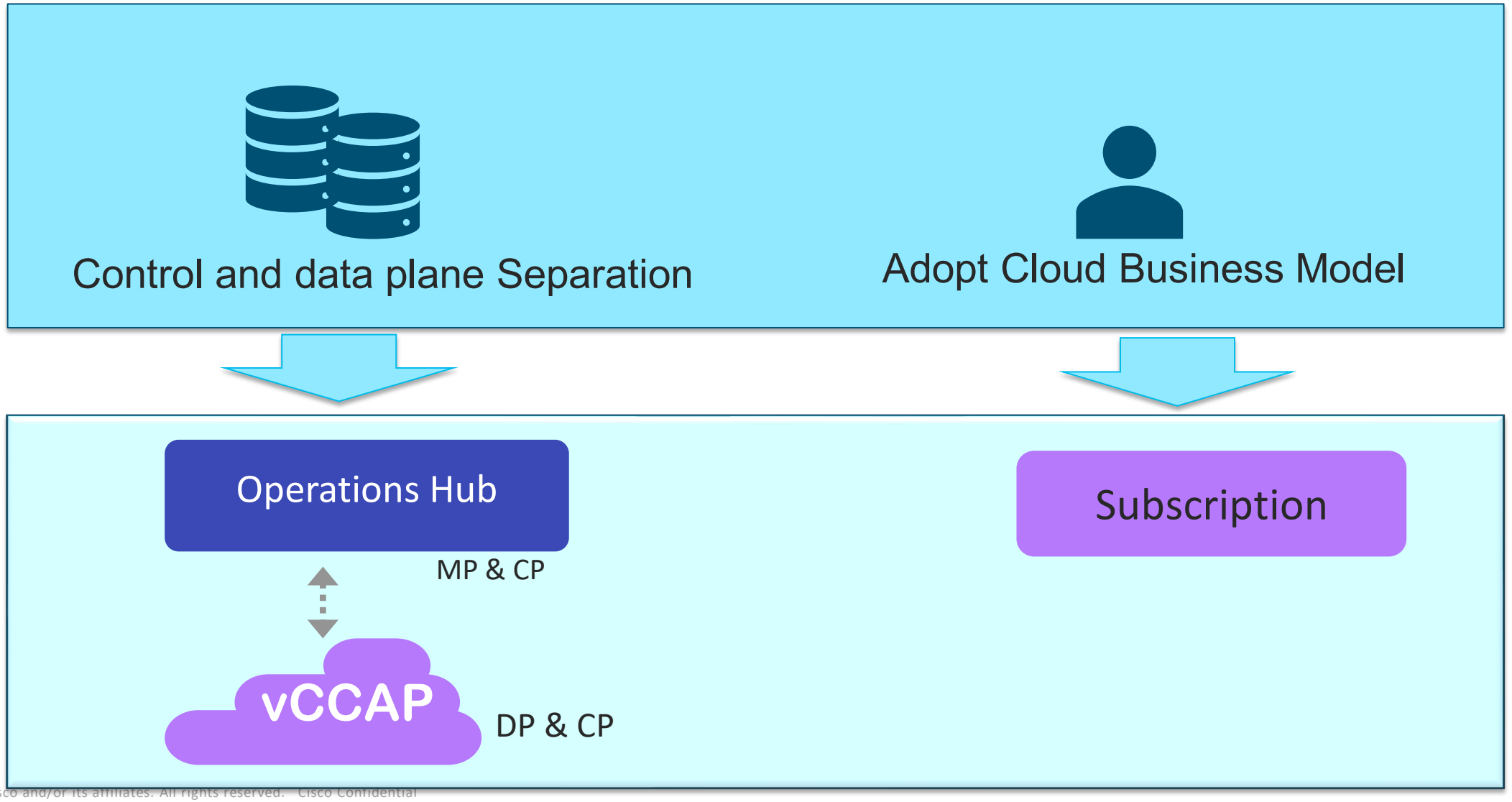
* Business/Enterprise Services

vCCAP Evolution to FMA

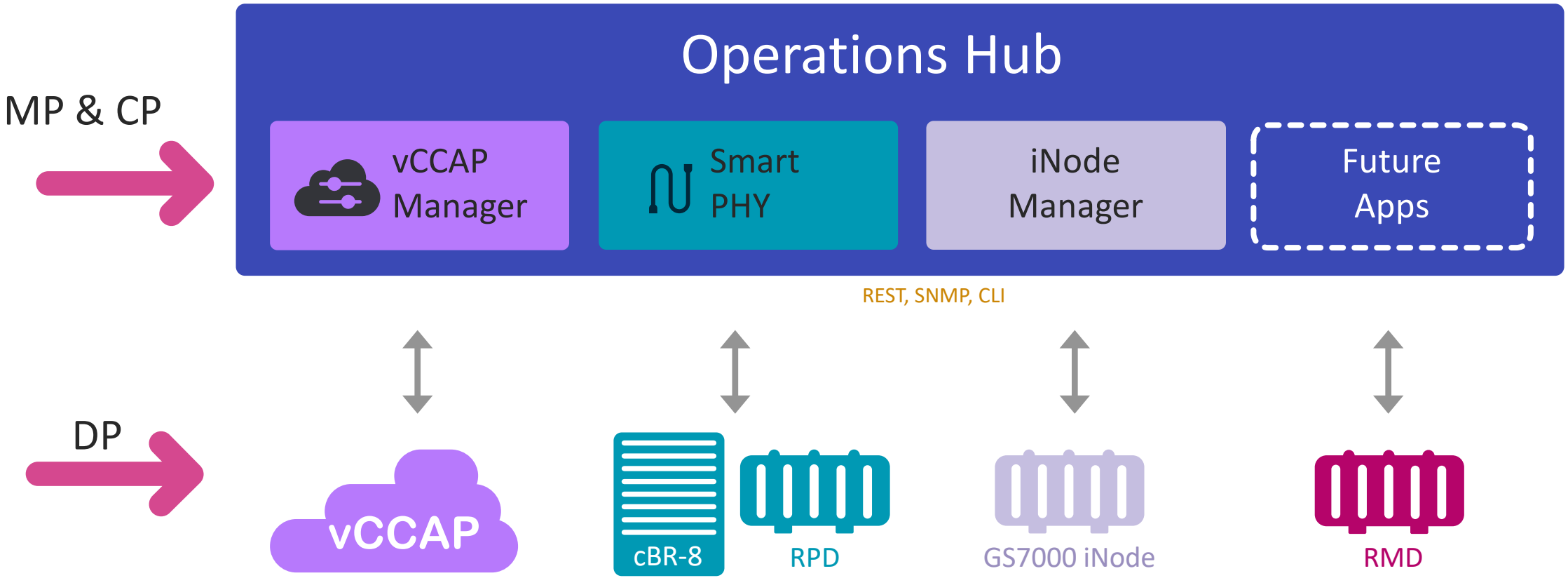


With DAA and vCCAP, you define your Technology, Operational & Organizational framework

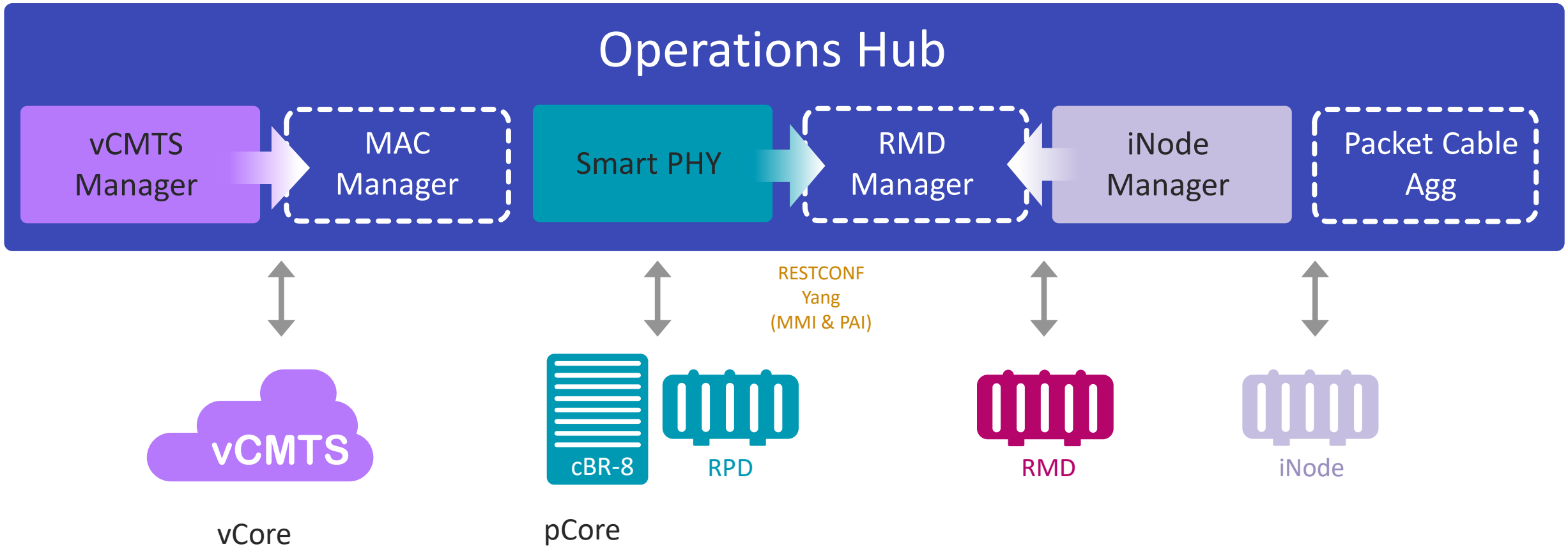
Overall Business Strategy to move to Cloud



Cable DAA Management Ecosystem & Applications

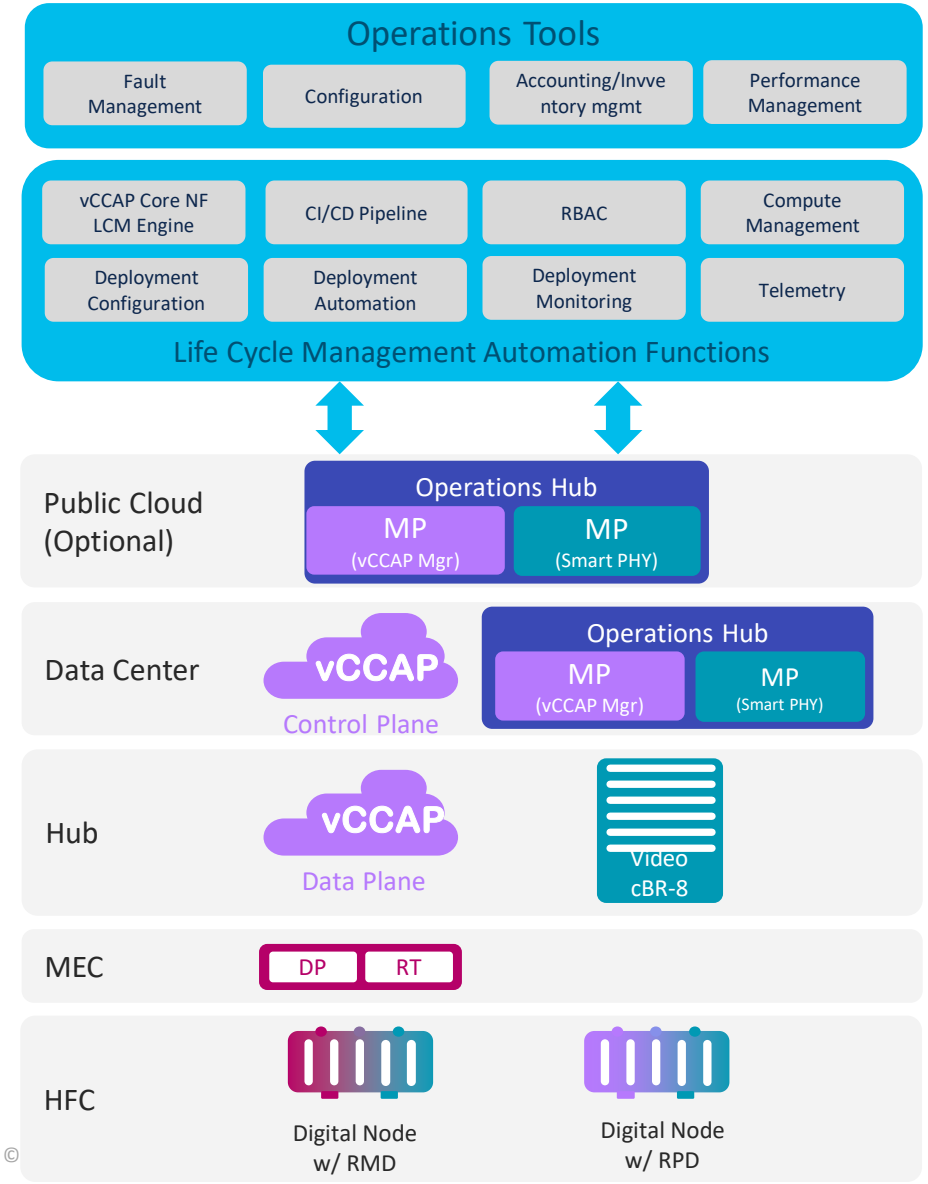


Evolution to FMA Management



Executive Summary

Road to Virtualization and Cloud Operations Model



Operations

Managed Service

- 24/7 Operations & Monitoring
- SLA Management & Reporting
- Performance Management
- Incident Management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Audience Poll II

If you have not yet virtualized your DOCSIS delivery network, what is your top concern?

- Solution maturity (or lack thereof)
- Ecosystem maturity (of lack thereof)
- Higher Total Cost of Ownership
- Engineering & Operations Staff skills gap
- No need; CMTS works fine
- Other

Rob Wilmoth

Chief Architect

Service Provider Team

Red Hat North America

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Virtualizing the Cable Network

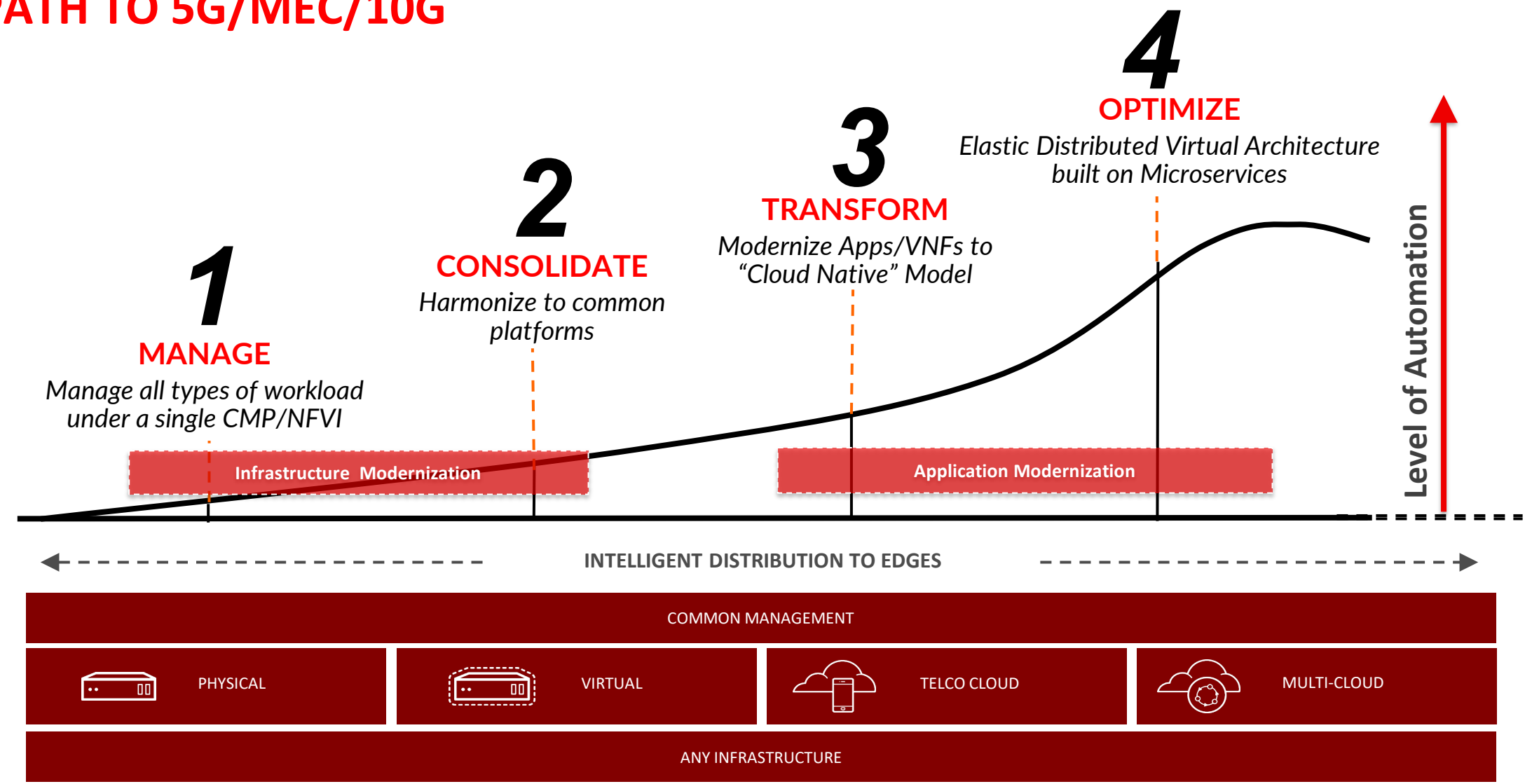
Rob Wilmoth

Chief Architect

Red Hat

Red Hat

JOURNEY TO A MICROSERVICES ARCHITECTURE EVOLUTIONARY PATH TO 5G/MEC/10G



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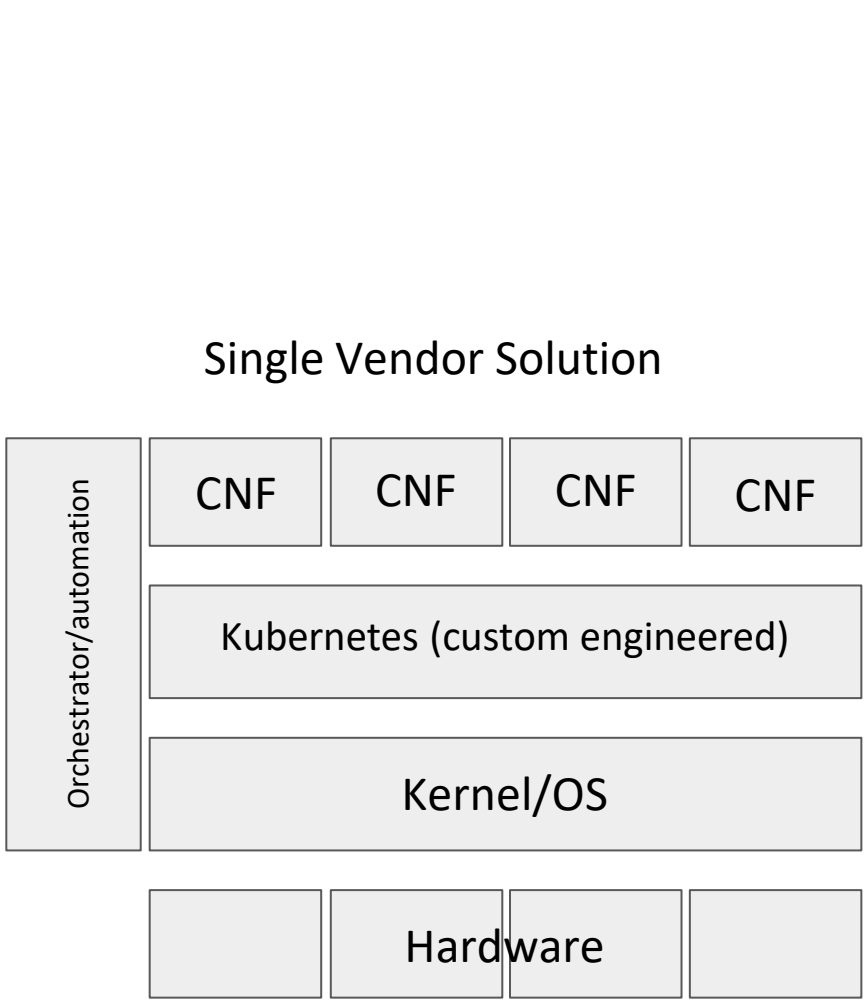
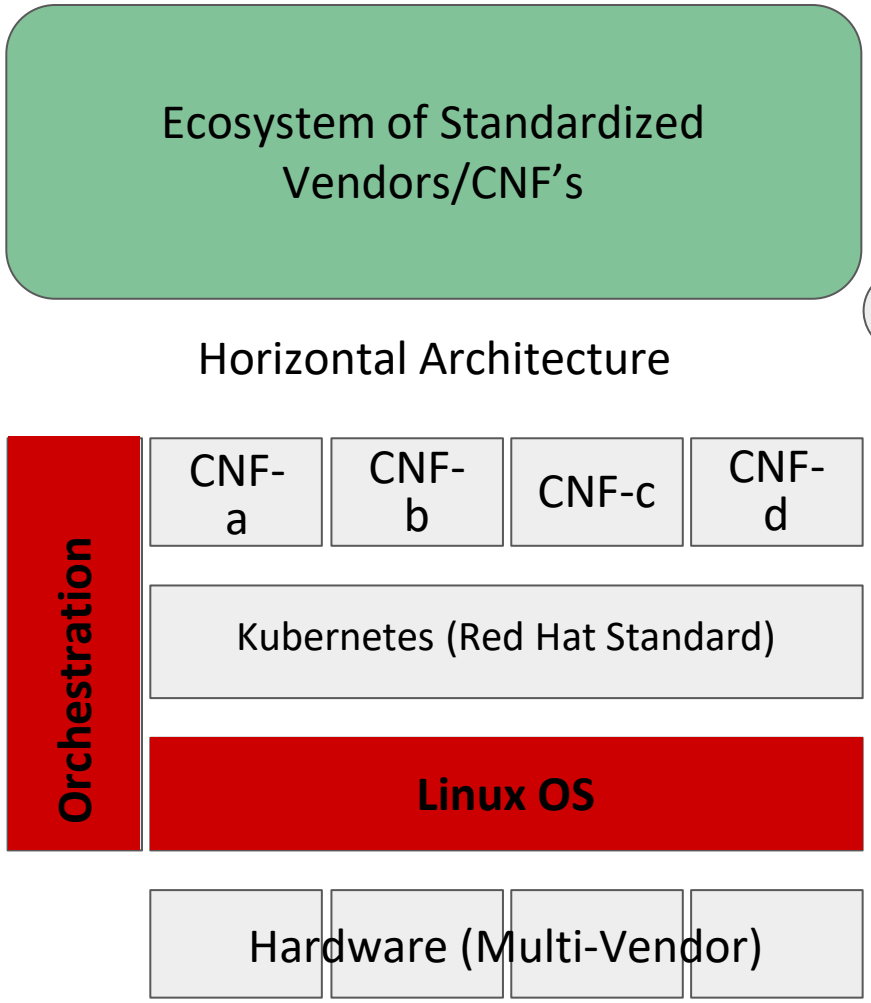
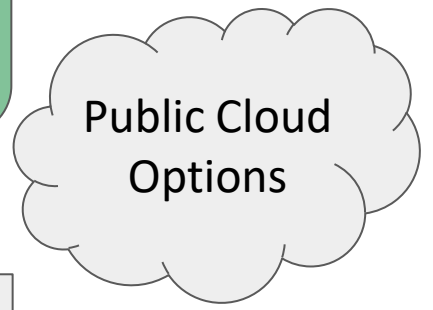
Horizontal Architecture vs Vertical Integration







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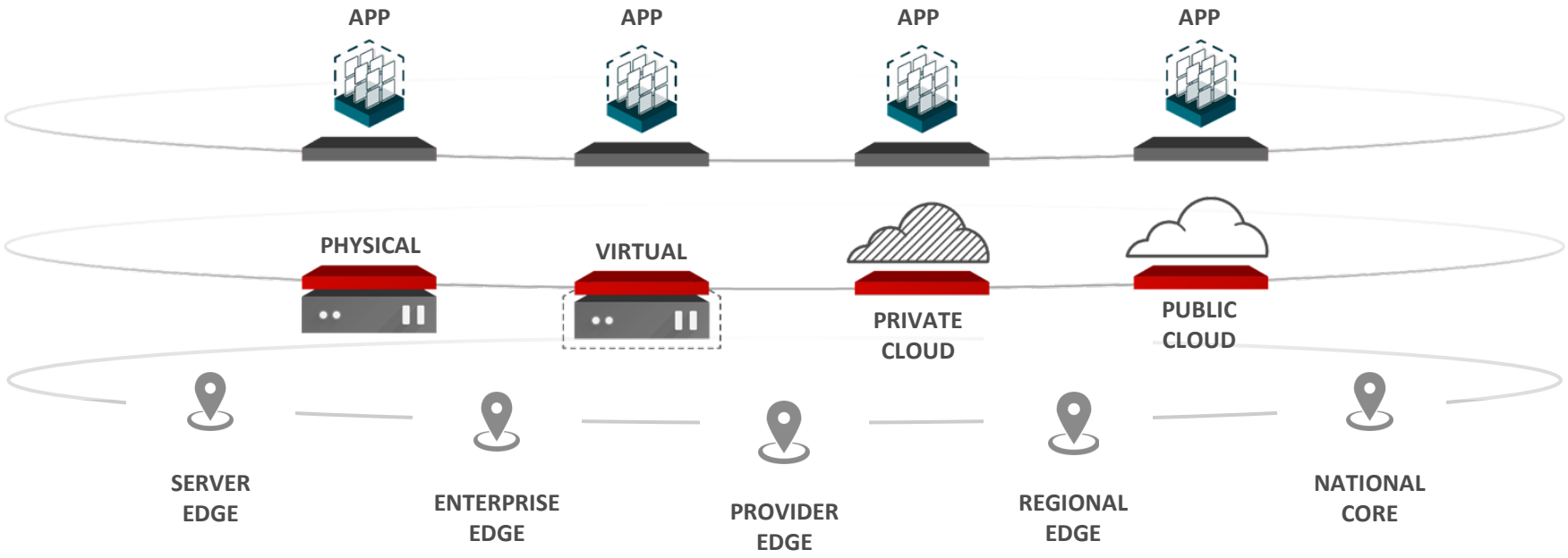
Extending the Open Hybrid Cloud Vision with Edge Computing

Any workload , any footprint , **any location**.



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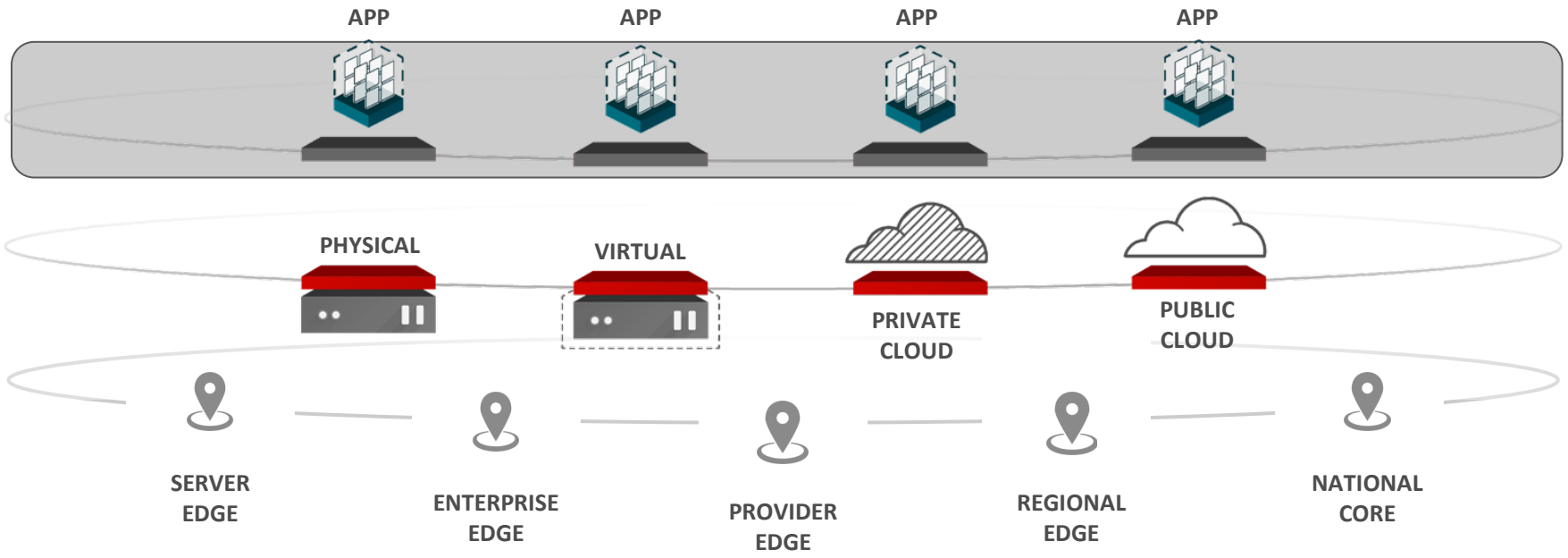
But what about Convergence

Any workload , any footprint , any location, **together**



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Transformation through modernization

People

Cultural change

Process

Automation
Dev Ops
CI / CD

Technology

Kubernetes Containers Microservices

Modern cloud stack

35

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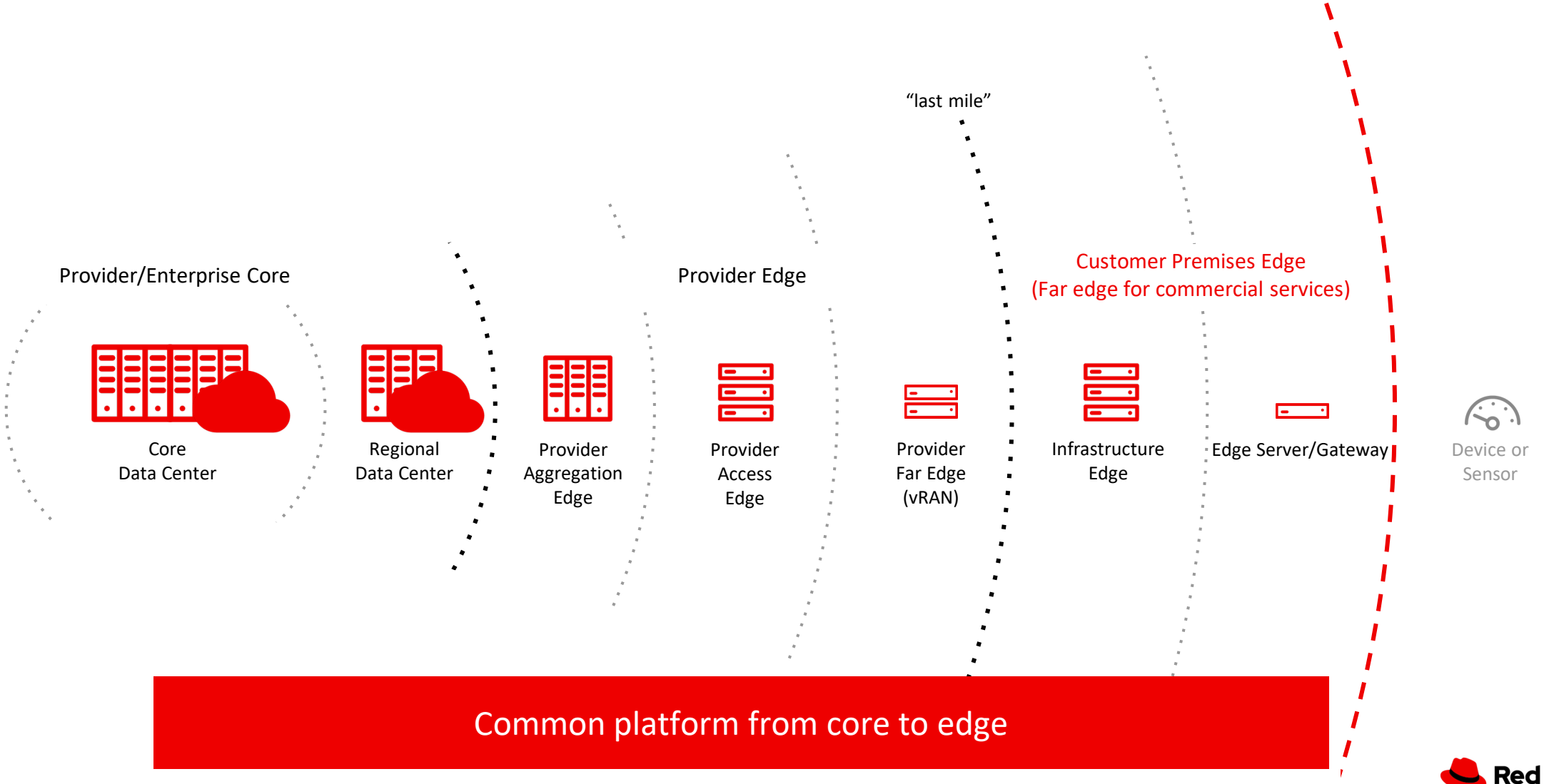
Common platform, management, and processes from core to edge



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How Do We Continue on the Path to Success?

Focus on operator network and back office automation in a way that carries to the edge.

Differentiate the applications and use case, not the platform.

Don’t reinvent functionality of Kubernetes & community.

It won’t be all CNFs anytime soon. Need migration path.
Operator Framework could be the bridge between

- CNFs on Kubernetes
- VNFs on KubeVirt on Kubernetes
- VNFs on OpenStack
- Traditional Stateful bare metal/solid state

Getting involved! Which communities is your organization leveraging as vital to your success?

Thank you

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Red Hat

Dean Stoneback

Senior Director

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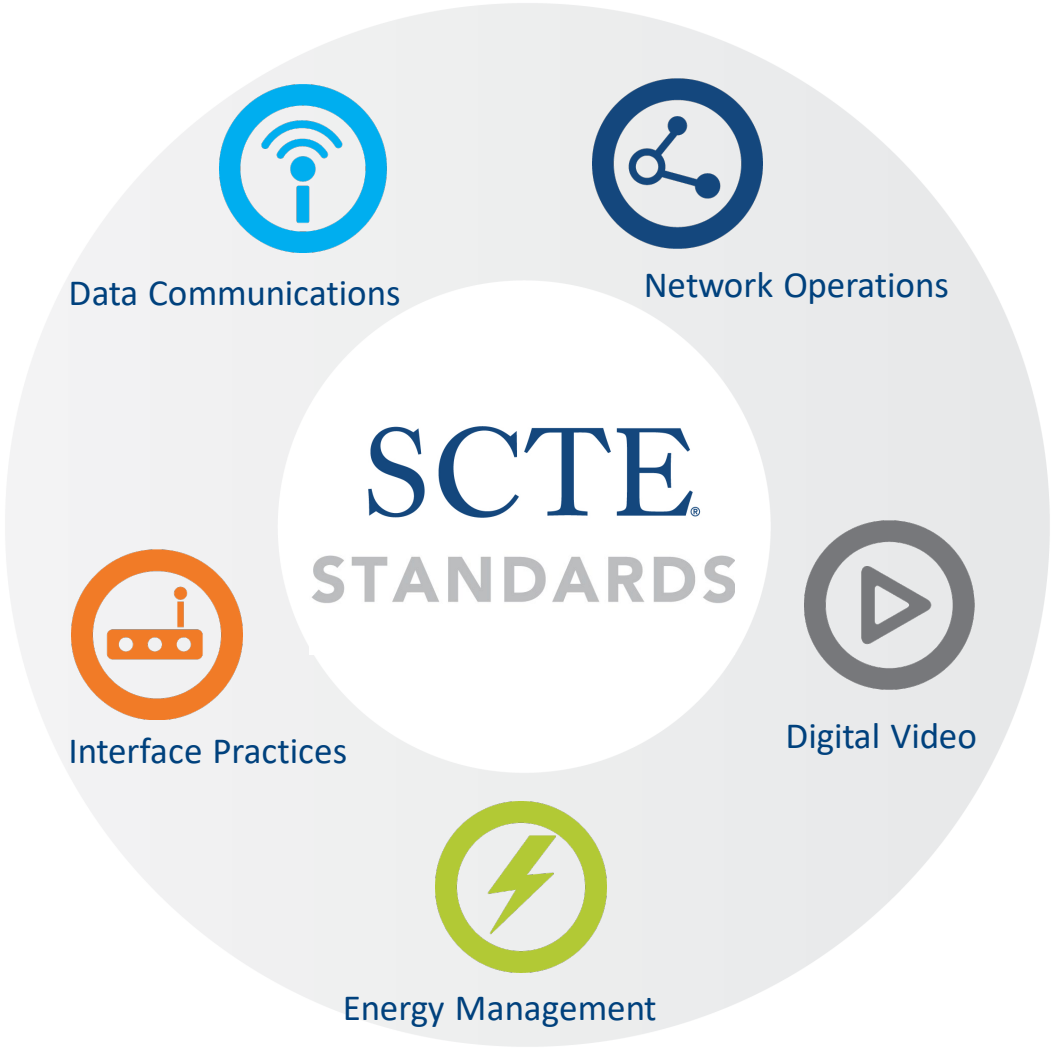
SCTE's Award Winning Standards Are Leading the Cable Telecommunications Industry



THE ONLY ANSI-ACCREDITED program in the cable industry

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STANDARDS RECENTLY RATED IN THE TOP 10 among ANSI-accredited Standards developing orgs.

Organization-based program with **OVER 140** member organizations.

Top service providers and **OVER 1,100** subject matter experts.

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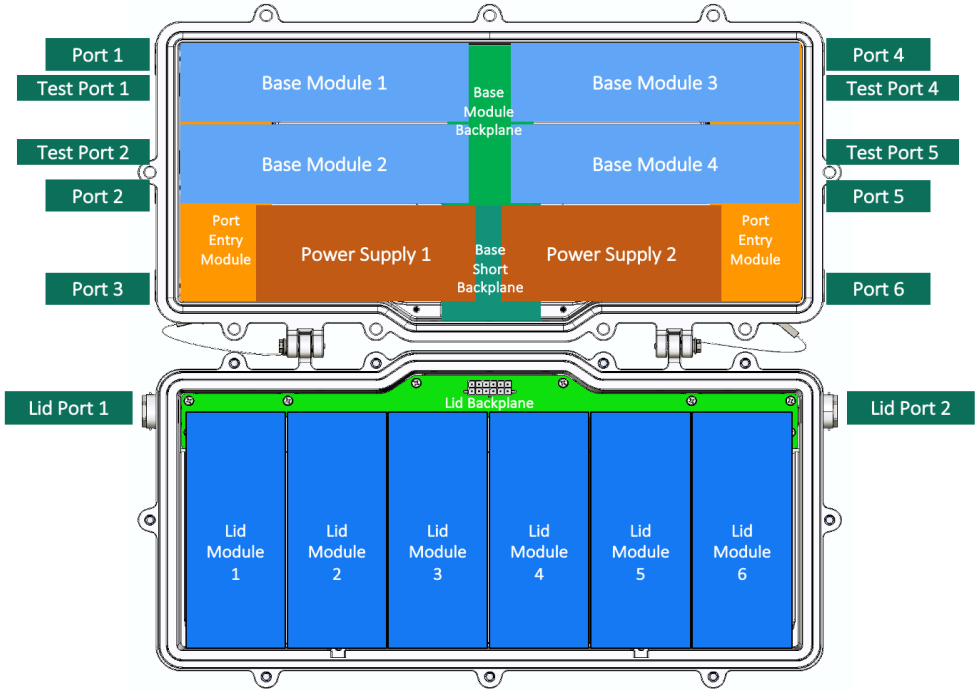
New Generic Access Platform (GAP) Standard

New GAP Standards

- ANSI/SCTE 273-1 2021: Generic Access Platform (GAP) Enclosure Specification
- ANSI/SCTE 273-2 2021: Generic Access Platform (GAP) Modules Specification
- Coming soon: Generic Access Platform (GAP) Systems Integrator Best Practices

Benefits

- Project supported by Charter, Cox, Shaw, and others
- Physical, thermal, mechanical, and electrical interfaces for the internals of a node housing
- Allows OEMs to devote their value-adding efforts to the service-generating modules that reside inside the enclosure
- Any module that is compliant with the GAP specification will be able to coexist with other GAP-compliant modules



New Project for Smart Amplifier Communications

Smart Amps – Being Developed Now – Get Involved

- Defines methods to actively communicate with next-gen amplifiers
  - Applicable for FDD and for FDX amplifiers
  - Applicable for stand-alone amplifiers and for launch amplifiers inside nodes.
- Standardized single information model that is used for all amplifier communications.
  - Will include YANG model for communications with smart broadband amplifiers
- Intended to include all monitoring and control communications with an amplifier
  - Accessed over the HFC control plane
  - Locally via direct wired or wireless connection

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September 19–22, 2022

INTRODUCING THE 2022 PROGRAM CHAIRS:

David Watson

President & CEO, Comcast Cable

Michael Fries

Vice-Chairman & CEO, Liberty Global

Audience Poll Iii

Is your company interested in joining the SCTE Standards Program?

- Yes
- No

Audience Q & A

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Next Months Webinar

Making Cable More Accessible

1/20/2022 11:00 am New York / 8:00 am Los Angeles

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