Tapping Into the Cloud

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Thursday, August 19, 2021
11:00 am – 12:00 pm ET

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Today’s Speakers

Alan Breznick
Cable/Video Practice Leader
Light Reading

Krithika Moorti
GM, Cable & Fixed Broadband Access
Intel

Griffin Ashe
Senior Architect
Service Provider & Edge Computing
Red Hat

Paul Rodrigues
Director, Field Education
SCTE
Agenda

- **Light Reading**—Cable’s virtualization journey
- **Intel**—Economics and components of virtualized CMTSs
- **Red Hat**—Hybrid cloud and edge computing in cable
- **SCTE**—Training, standards & certifications
- **Audience Q&A**
Why Cable is Embracing Virtualization

OPERATIONS
AUTOMATE
Simplify & Orchestrate

INFRASTRUCTURE
SCALE
Virtualize, Centralize & Distribute

SERVICES
CREATE
Innovation & Agility

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The Three Waves of Edge

1. **NFV Lift & Shift**
   - Basic Building Blocks
   - Monolithic VNFs
   - Single Vendor Solutions
   - 9 Months to Onboard VNFs
   - Basic automation

   Economic benefit of data center capex

2. **Full Cloud Native**
   - Adoption of Traditional de jure & de facto Standards
   - Container Based Implementation
   - Disaggregation of services
   - 3 Month to Onboard VNFs to MSO selected infrastructure
   - Adoption of initial edge services
   - FPGA & GPUs at the edge
   - Multiple Conformance & Verification Programs

   Economic benefit of competitive software

3. **End to End Closed Loop Automation**
   - Convergence of cable access networks
   - DevOps & AI/ML to Optimize the Network
   - Broad adoption of edge services
   - End-to-End Automation
   - Self-healing Networks
   - Self-optimizing Networks
   - Programable data plane

   Economic benefit of convergence

Time:
- Deployed
- 2019 - 2 Years
- 2-6 Years
Virtualizing DAA with Flexible MAC Architecture (FMA) and RPHY

- OSS
- SDN Controller
- DOCSIS Controller
- PacketCable Aggregator
- MAC Manager
- Auxiliary Core
- vCCAP Core
- Remote MACPHY Device (RMD)
- Remote PHY Device (RPD)
- vCore
- Virtual / Containerize Services

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Krithika Moorti
GM, Cable & Fixed Broadband Access
Intel
vCMTS Powered By Compute

- Realize Space and Power Savings in the HeadEnd
- Dynamically Scale Solution for Network Needs
- Automate with Intelligent Orchestration and Advanced Telemetry

**CMTS Appliance**
- 100 Gbps Solutions
  - (CMTS + EdgeQAM + Erouter)
  - 77 RU footprint, 11.6 kW

**vCMTS on Intel Servers**
- 1U White Box Switch >1Tbps
- Intel® Xeon® Processors
- Intel® NICs
- (Optional) QAT PCIe Add-In
- 100 Gbps Solution
  - (Does not include EdgeQAM)
  - 5 RU footprint, 1.5 kW*

-HW = Hardware, RU = Rack Unit, Gbps = Gigabits per second, kW = kilowatt

* Remote PHY Device adds 1RU of space + 130W in outside plant.

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Analyzing the Economics of Virtual CMTS

- 92 to 112 SGs
- Space: 77 to 87 RU per CMTS chassis
- Power: 8-12 kW per chassis + cooling
- Throughput: Backplane limited to 100Gbps total
- HW cost: ~$200k+

Do MORE with Less¹
- 12 servers. 528 SG’s.
- 1,174Gbps. 15 RU. 5.8kW.
- 7x Lower HW capital cost*
- 18-23x Less rack space*
- 4-6x Less power consumption*
- Scale as you grow starting at ~$8k per server

HW = Hardware, RU = Rack Unit, Gbps = Gigabits per second, kW = kilowatt

¹ TCO comparative analysis conducted with Tier-1 MSO. Prices for switches and QAT devices derived from Compsource in June of 2019. Server price guidance derived from MSO engineer.
Components of the vCMTS Dataplane

DOCSIS requires cryptography to keep data private in transit
3x16 PCIe Gen 3

**2nd Generation CPU**
- More cache
- More crypto engines
- More Memory Bandwidth
- More IO

**3rd Generation CPU**
- 4x16 PCIe Gen 4
- +33% Lanes
- +45% B/W
- +2 Channels
- + <=42% Cores
- +50%
- 2x
- +11%/Core

**Level 3 Cache**
- Level 3 Cache
- Level 3 Cache
- Level 3 Cache
Software Portability for Flexible MAC Architecture

Same DOCSIS MAC Software may be deployed on Intel® Xeon® Processors for all scenarios - vCMTS on Intel® Xeon® SP or RMD/RMC on Intel® Xeon® D
Audience Poll I

What’s the most challenging thing you face when debugging legacy CMTSs?

• Lack of Telemetry
• Difficulty connecting into modern management system
• Proprietary Management interface
• Lack of modern tools capabilities
Griffin Ashe
Senior Architect
Service Provider & Edge Computing
Hybrid Cloud and Edge Computing in Cable

Griffin Ashe
Lead Architect, Service Provider and Edge Computing
Red Hat
Extending the Open Hybrid Cloud Vision with Edge Computing

Any workload, any footprint, any location.
Network transformation journey

- **Custom hardware** (<2009)
- **Network appliance** (2009)
- **Virtualization** (2011)
- **SDN/NFV**
- **Private cloud with virtual machines** (2015)
- **Private/public cloud** (2020+)
- **Edge computing**

- Monolith application
- Monolith application
- Monolith app with virtual machines
- Scale-out, on-prem VM environments
- Microservices in containers

SDN/NFV
Cable and the Hybrid Cloud

**SIMPLIFY OPERATIONS:** Environments are becoming more distributed and workloads more diverse. Consistent operation tooling is crucial.

**LEVERAGE EXISTING INVESTMENTS:** Legacy infrastructure still widely deployed. How can we best support this going forward?

**PARTNERSHIP ECOSYSTEM:** NEPs, HW/SW suppliers will continue to be strategic partners to cable as the industry moves more cloud native.
Edge Computing Use Cases in Cable

* Data from 2020 Broadband Success Partners Survey
Edge Computing - Cloud Gaming

- Kubernetes + KubeVirt
- VMs running alongside Containers
- GPU Acceleration
- Converged Edge Platform
Thank you

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What best describes the state of your company’s cloud deployment?

- No immediate plans to deploy
- Exploring value to the organization and requirements
- Evaluating technologies and vendors
- Outlining infrastructure plans
- Deployment in process
- Fully deployed
SCTE Training and Certifications

Courses

• Distributed Access Architectures
  • Remote-PHY, Remote MAC-PHY

• Understanding Cloud Computing (CompTIA Cloud Essentials)*
  • Concepts, characteristics and types of cloud services; adoption, cloud computing & security

• Network Specialist (CompTIA Network+)**
  • Networking principals from the LAN to the cloud

• Cyber Security Essentials
  • Topics include cybercrime, security principles, technologies, and procedures used to defend network

*Also available as a certification CLO-002

** Also available as a certification N10-007
• The Network for Your Network

• Succeed with SCTE, a potent force for the technical workforce. Accelerate deployment of technology to drive business results. Exclusive benefits keep professionals like you prepared for technology’s growing sophistication.

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Panel Discussion

• How does the cost of deploying virtualized CMTSs compare with the cost of deploying physical CMTSs? What kinds of savings can be achieved?

• Where does the cable industry stand with testing and deploying virtualized CMTs?

• What trends are you seeing with cloud platforms for enabling edge computing?

• Which cloud technologies are emerging to help the cable ecosystem partners?

• What lessons can cable learn about edge computing from other industries?
Audience Q & A

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Next Months Webinar

Engineering the DOCSIS 4.0 Network (FDX and ESD)

9/23/2021 11:00 am New York / 8:00 am Los Angeles

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