



SCTE CABLE-TEC
EXPO'13
OCTOBER 21-24 / ATLANTA, GA

**COMMON AND UNCOMMON GROUNDS:
A DOCSIS® 3.1 AND EPOC
TECHNOLOGY COMPARISON**

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Introduction

The Question:

- ▶ How will an operator choose between DOCSIS 3.1 and EPoC technologies? Which one is right for a given operator?



Introduction

The Answer

- ▶ “It Depends”
- ▶ We believe this decision will be driven largely by answers to the questions:
 - What is the start state of the network?
 - What is the end goal of the network?
 - How quickly do you want (and/or need) to get there?



Technology Background

The high level stuff you already know

- ▶ DOCSIS 3.1 technology represents the next generation of DOCSIS technology
 - Targeted at providing multi-Gbps services efficiently and cost-effectively
 - Adds a new PHY layer onto the DOCSIS MAC layer, with minimal changes to support the PHY
- ▶ EPoC technology extends EPON from fiber onto coax networks
 - Also targeted at providing multi-Gbps services cost-effectively
 - Adds a coax PHY layer onto an EPON MAC, with minimal changes to support the PHY

- ▶ Startlingly similar...

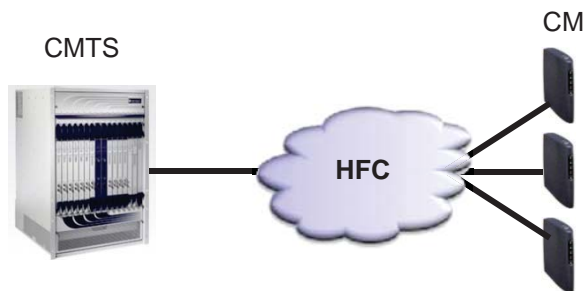


Common Grounds

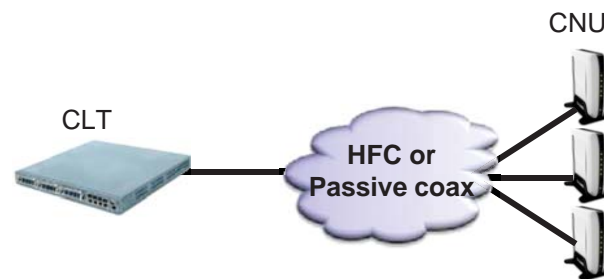
The commonalities go deeper...

► Network topology

- Both are designed for point to multi-point networks
- Both are designed to operate over coax and/or HFC



(a) DOCSIS Network

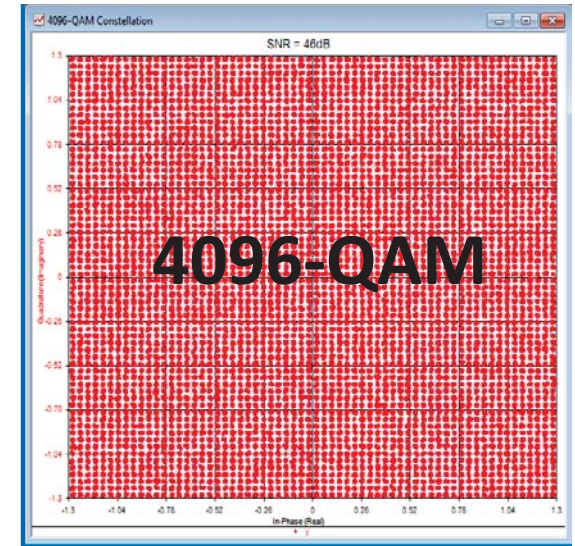


(b) EPoC Network

Common Grounds

And still deeper...

- ▶ Provisioning and Management
 - Through DOCSIS Provisioning of EPON (DPoE™), EPON (and by extension, EPoC) systems can use same back office systems as DOCSIS devices
- ▶ Modulation technology
 - Both use OFDM with the same sub-carrier spacing/symbol period/FFT size options, and 192 MHz downstream “channels”
- ▶ FEC and Modulation orders
 - Both use LDPC FEC codes and support 4096QAM (12 bits/s/Hz)
- ▶ With equal spectrum, expect similar performance



Un-Common Grounds

DOCSIS 3.1 Technology Benefits

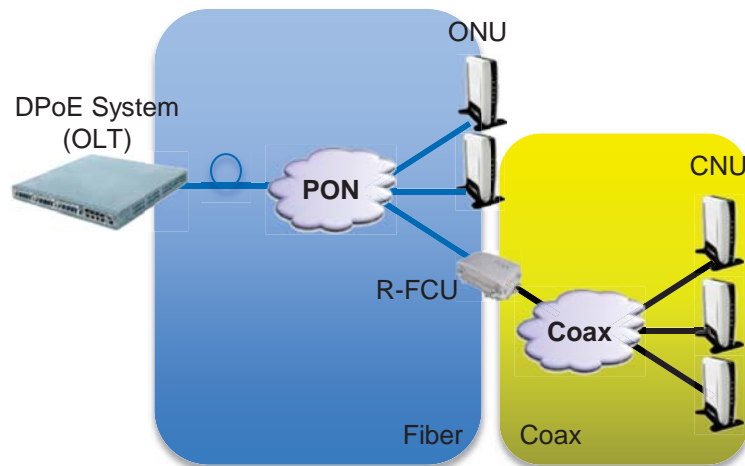
- ▶ **Backward Compatibility**
 - Allows CM and CMTS to be upgraded incrementally, and doesn't require that all devices be replaced
- ▶ **Downstream Channel Bonding**
 - Allows DOCSIS 3.1 devices to use both legacy SC-QAM and OFDM together for increased capacity
 - Allows for incremental spectrum/capacity increases
- ▶ **Upstream Spectrum Sharing**
 - Allows DOCSIS 3.1 devices to coexist with legacy modems, while still bursting up to full capacity of the upstream



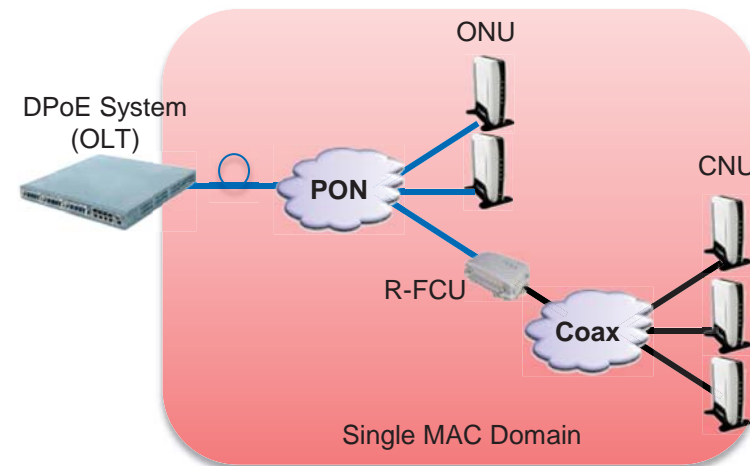
Un-Common Grounds

EPoC Technology Benefits

- ▶ Unified Network for Business Services
 - First time fiber and coax network will have same MAC and QoS
 - Provides consistent service level regardless of connection point



(a) ONUs and CNUs connected to same OLT



(b) Single MAC domain regardless of media

Un-Common Grounds

EPoC Technology Benefits

- ▶ Converged Business and Residential Network
 - One network, one provisioning system, one management system
 - Saves OPEX and CAPEX
- ▶ Migration path for EPON FTTH
 - Deploy EPON for business services, connect residential to EPoC, all using the same OLT
 - If and as market conditions warrant, can start to connect residential customers to fiber services as well, still with the same OLT



Conclusions

What will drive MSO decisions?

- ▶ Conditions that favor selecting a DOCSIS 3.1 solution
 - You already have significant DOCSIS deployments
 - You're looking to incrementally add bandwidth as needed to your existing services
 - You don't expect to need a residential FTTH solution for many years



Conclusions

What will drive MSO decisions?

- ▶ Conditions that favor selecting an EPoC solution
 - You already have deployments of EPON OLTs that you are leveraging for business and/or residential services
 - You want to use a common technology for business and residential services
 - You believe that you will need significant residential fiber sooner rather than later, and want to lay the groundwork



Conclusions

Put another way...

- ▶ Central to the objectives of DOCSIS 3.1 is to defer the need to deploy FTTH as long as possible by providing substantial capacity gains
- ▶ Central to the objectives of EPoC is to permit a converged FTTH (EPON) and HFC network, enabling a smooth migration to FTTH (EPON) in the future
- ▶ Your circumstances, and view of the future, will determine which option best aligns with your needs





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