Backhaul for Distributed Architectures in MSOs

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Agenda

- Architecture Evolution
- DOCSIS EVOLUTION
- Distributed Access Architecture (DAA)
  - Remote PHY (R-PHY)
- MARKET SIZE
- KEY REQUIREMENTS
Service Group Bandwidth Evolution

DOCSIS 3.0
1 Gbps DS
200 MHz US

DOCSIS 3.1
10 Gbps DS
2 Gbps US

FULL DUPLEX DOCSIS
10 Gbps DS
10 Gbps US

Plant must change ***
Classic Cable Core

Outside Plant
RF fiber in
RF coax out

IEEE 802.3, September 2017, Iterim, Beyond 10km SG, Charlotte, NC
Cable Remote PHY

Outside Plant
Digital fiber: in
RF coax: out

DOCSIS MAC
VIDEO MAC
PHY

IEEE 802.3, September 2017, Iterim, Beyond 10km SG, Charlotte, NC
Field Distribution Point

- Generic Cable Node Platforms
- Strand mounted on utility pole
- Typical Size
  - ~ 541 mm Length
  - ~ 295 mm Height
  - ~ 282 mm depth
RPHY Architecture Options

- Option 1: Hub / RPD direct connect
- Option 2: Field router 10 / 25G, pay as you grow
- Option 3: Field Router 100 / 200G, coherent
- Option 4: Muxponder, coherent

Outside Plant
- 5-40 km typical
- 40-80 km necessary for, redundant paths, hub collapse

DWDM
- Current nodes per fiber 8-16
- Future RPDs per fiber 64 - 288
HFC Market Evolution:

Estimate

- DAA Addressable Nodes: **1.2 M**
  - Not including China / India
  - Avg. homes passed / node: 500

- Current Nodes become aggregation points:
  - $\rightarrow$ **1.2 M** backhaul lines
  - 100G+ to distribution point

- Evolution timeframe
  - 10 yr +

- Further Growth Potential: Mobile, business services
Key Requirements

- Distance 40 – 80 km
- Throughput 100 / 200 + G
- Compatible with DWDM infrastructure

Note: Final solutions will operate in outdoor environment -40C to +85C.

Note, CableLabs, a cable consortium, is creating a specification to implement this solution for the MSO space. A collaborative effort should be possible.
Recommendation

• Consider MSO market requirements when forming Study Group objectives.

• This includes:
  • 200 Gb/s 40-80km interface with appropriate support for DWDM systems
  • 100 Gb/s 40-80km interface with appropriate support for DWDM systems
Abbreviations (Cable market specific)

- DAA – Distributed Access Architectures
- DOCSIS – Data Over Cable Service Interface Specification
- HFC – Hybrid Fiber Coaxial (network)
- MSO – Multiservice Operator (cable service provider)
- RF – Radio Frequency
- R-PHY – Remote PHY
THANK YOU