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An Architecture for Distributed EPON Access

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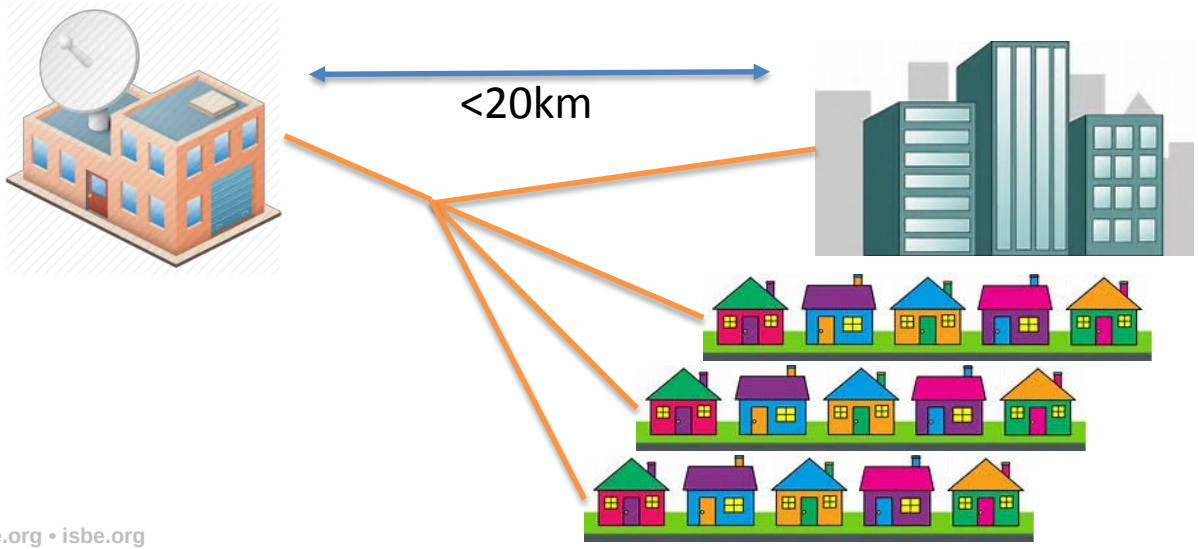
Current PON Technologies and Architectures

Monolithic Application-Specific Chassis

- fine for dense areas located near a hub or headend (that has space and power)
- majority of cable networks do not meet this simple requirement



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How are PONs deployed today?

Headend/Hub < 20km to the farthest subscriber?

- OLT chassis installed in the headend/hub

Headend/Hub >20km, or no resources in the headend/hub?

- OLT Chassis installed in a field-hardened cabinet
- Transport fiber to the nearest headend/hub
- Requires:
    - Cabinet, commercial electrical supply, A/C, backup power, etc.
    - Specialized support resources (field/maintenance-techs are not typically trained for this type of equipment)

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Why are they being deployed that way?

- Until recently the only commercially available solutions were chassis-based solutions

What about remote PON?

- PON extenders are limited in availability and negatively impact PON performance

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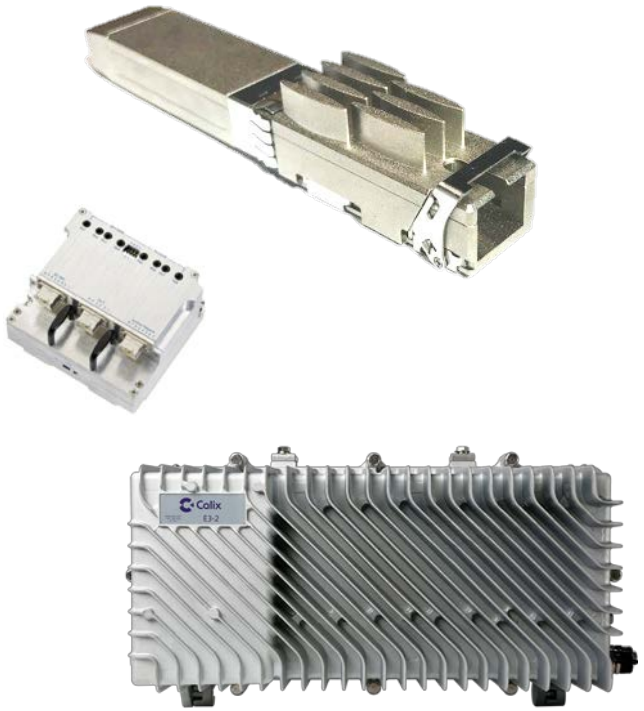
Current Remote OLT Products

Some remote-OLT solutions are emerging:

- Tibit Micro-OLT
- Adtran
- Arris NC2000/NC4000 based OLT
- Calix AXOS E3-2
- Nokia

Architectures are still varied and vendor-specific



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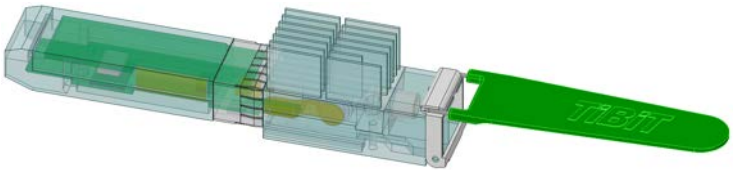

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Architecture to support distributed PON

Primary Goals:

- Use inexpensive minimalist commodity OLT hardware
- Reach beyond 20km from the headend/hub
- Align with popular HFC DAA architectures
- Meet DPoE v2.0 requirements in a distributed format
- Re-Use existing standards and specifications wherever possible
- Enable a migration from current DOCSIS-based provisioning models to other models

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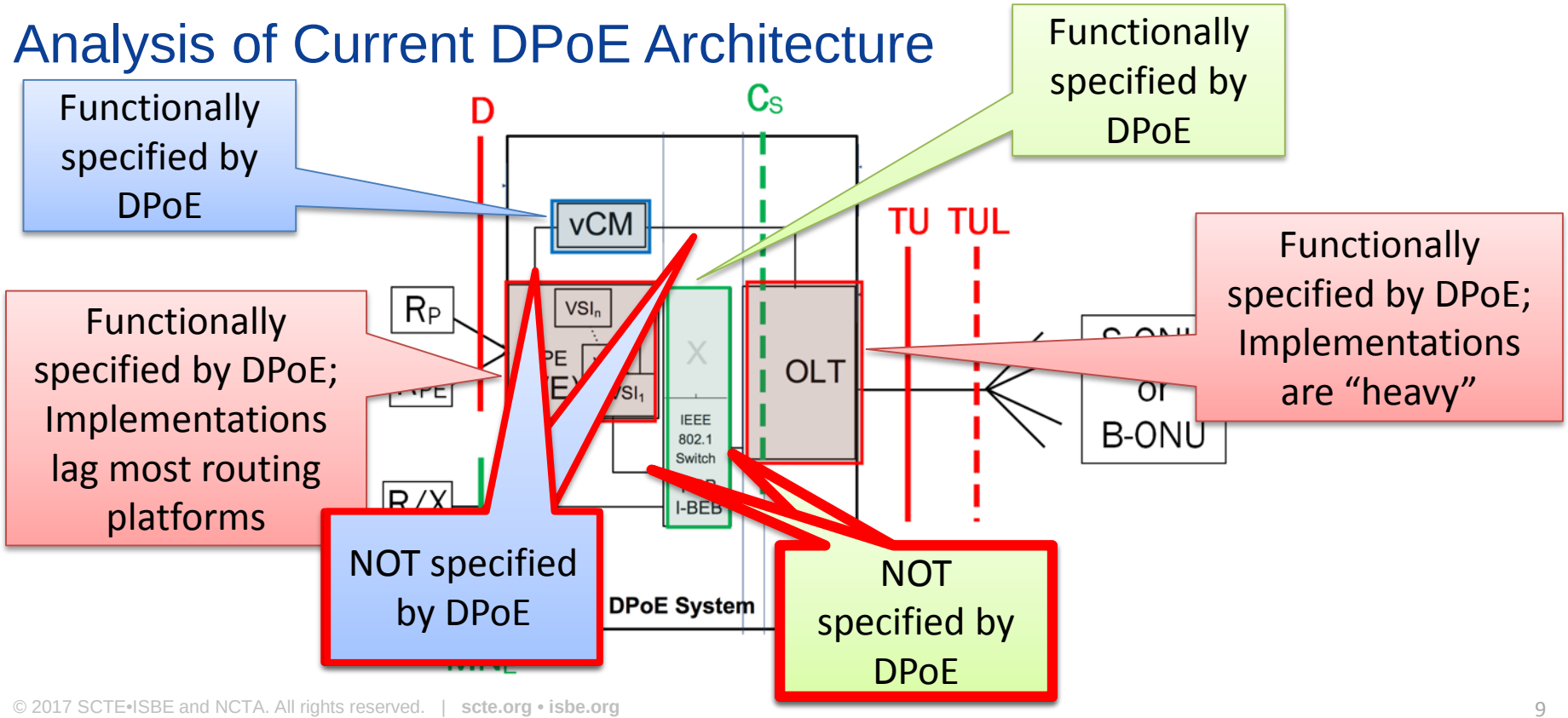
Analysis of Current DPoE Architecture



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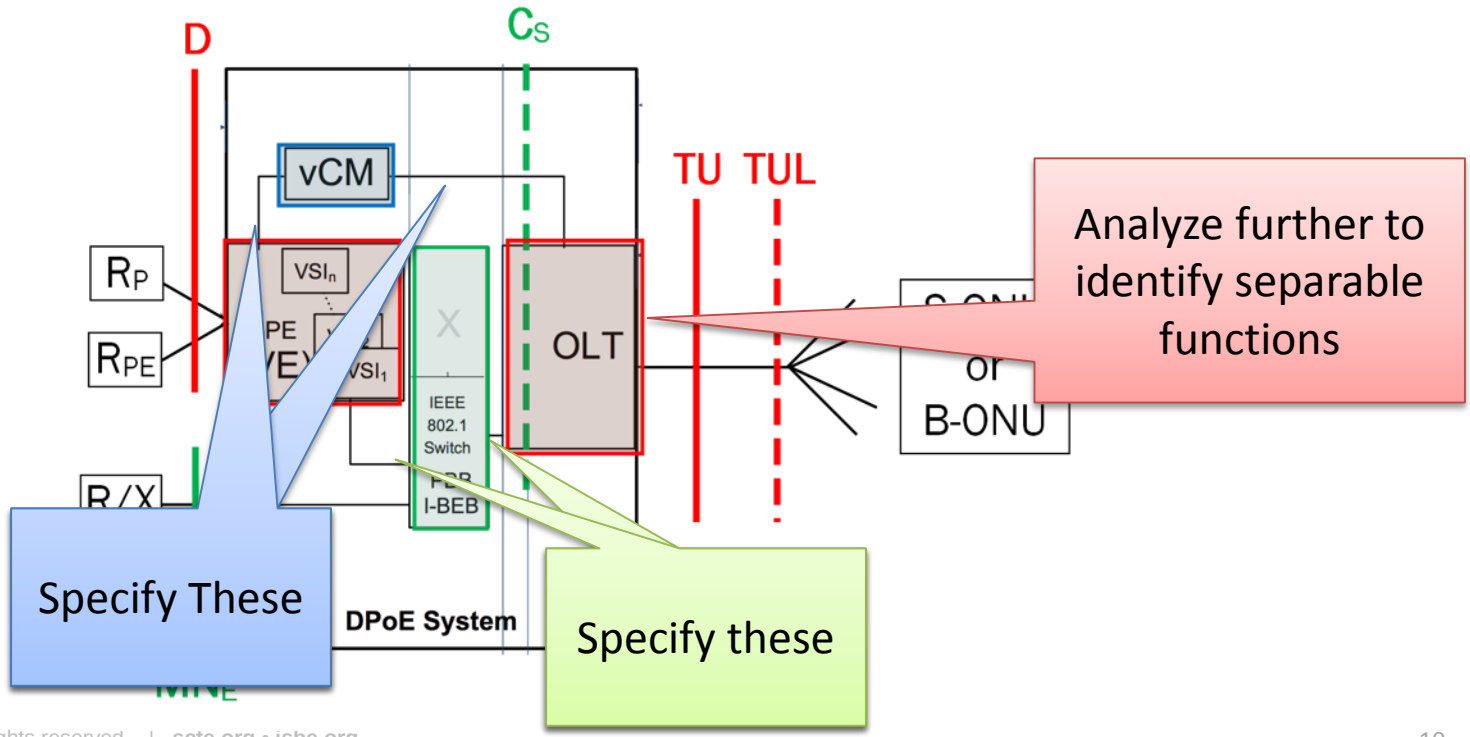
What can we do?



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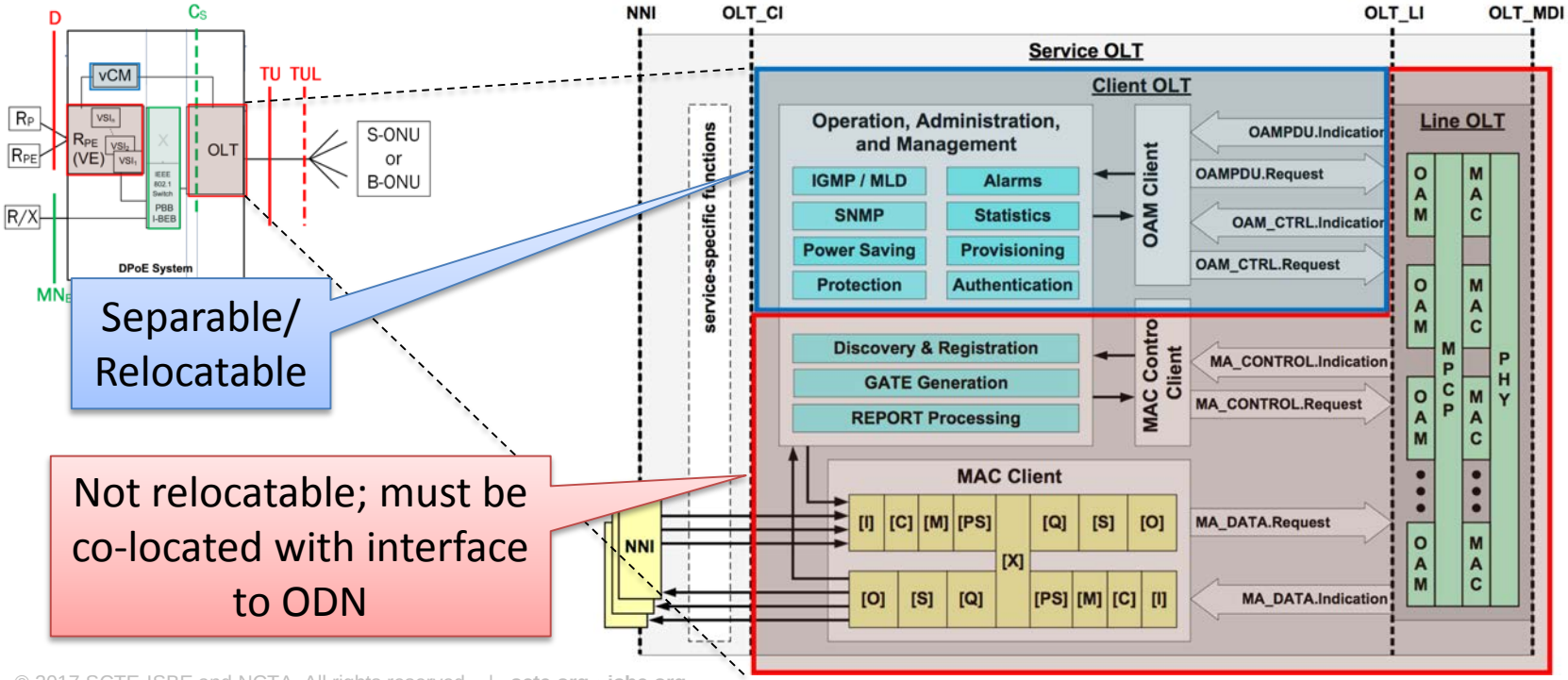
Analysis of OLT – IEEE 1904.1 SIEPON



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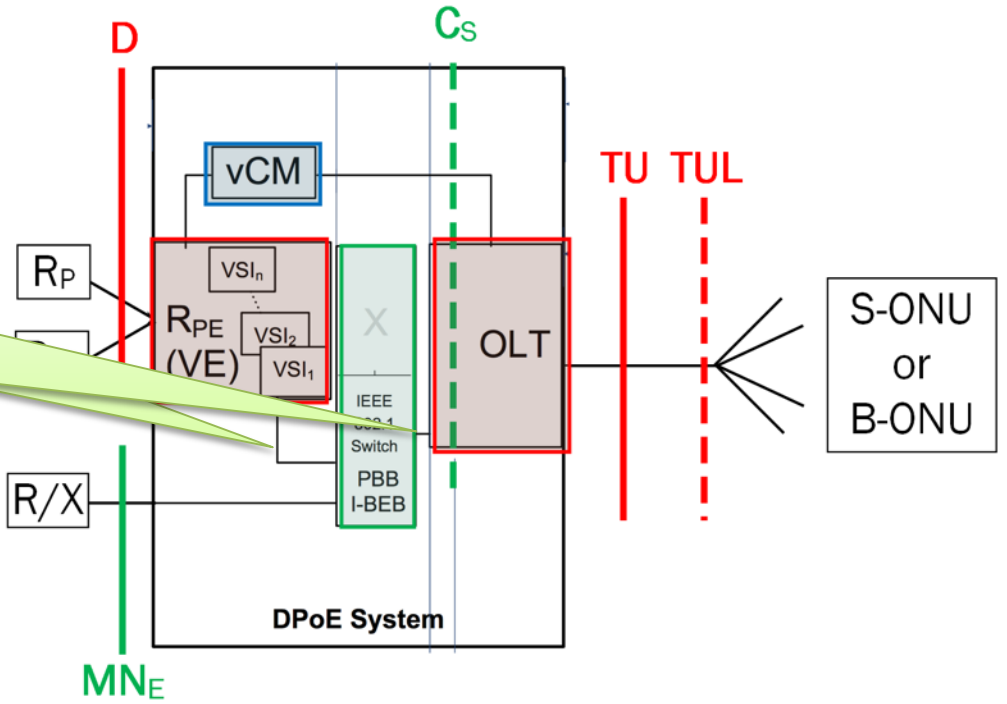
Specify Missing Interfaces

Very similar to
Digital Transport in R-MAC/PHY
and
V interface in BBF TR-200



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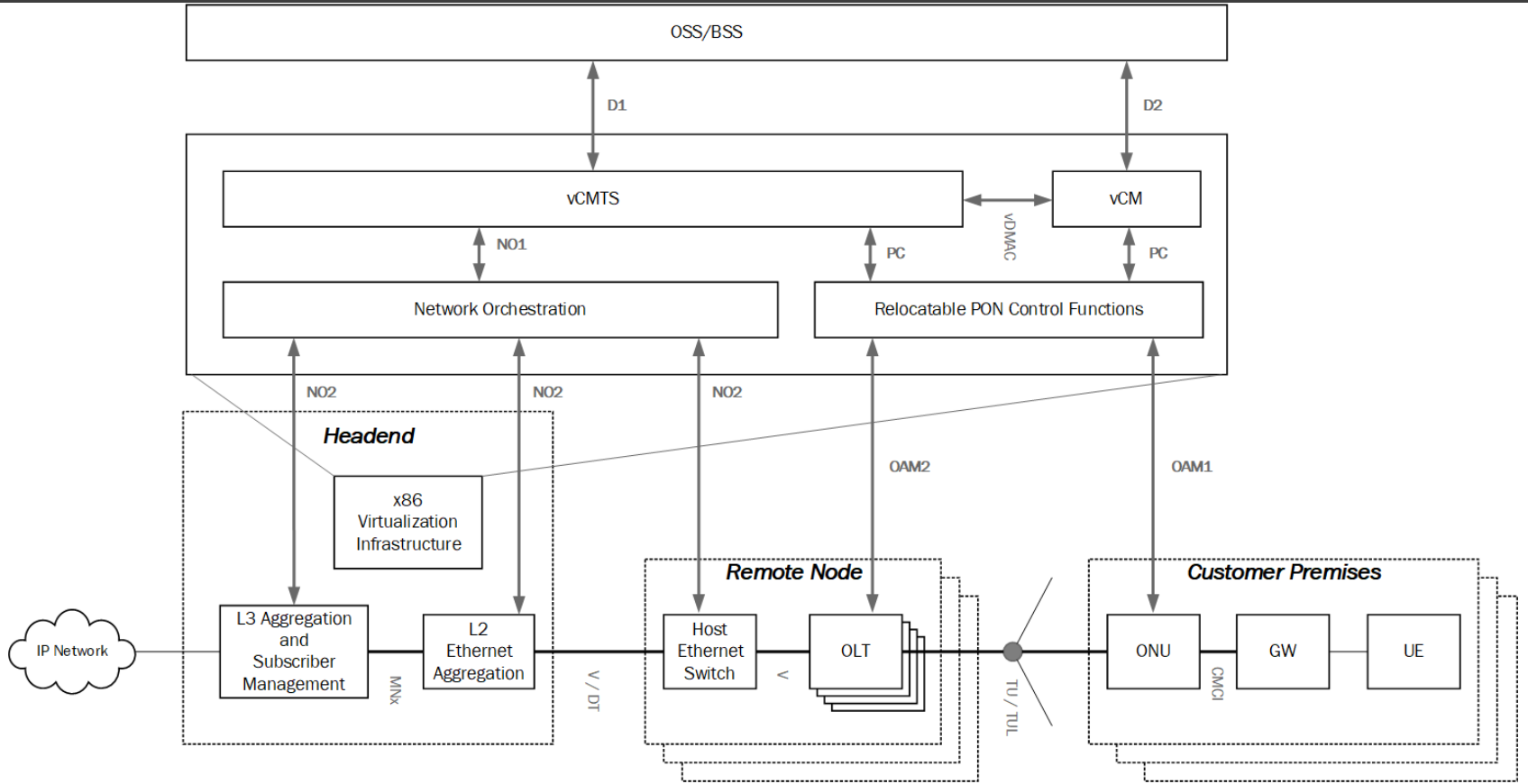
Near-Term Distributed EPON Architecture



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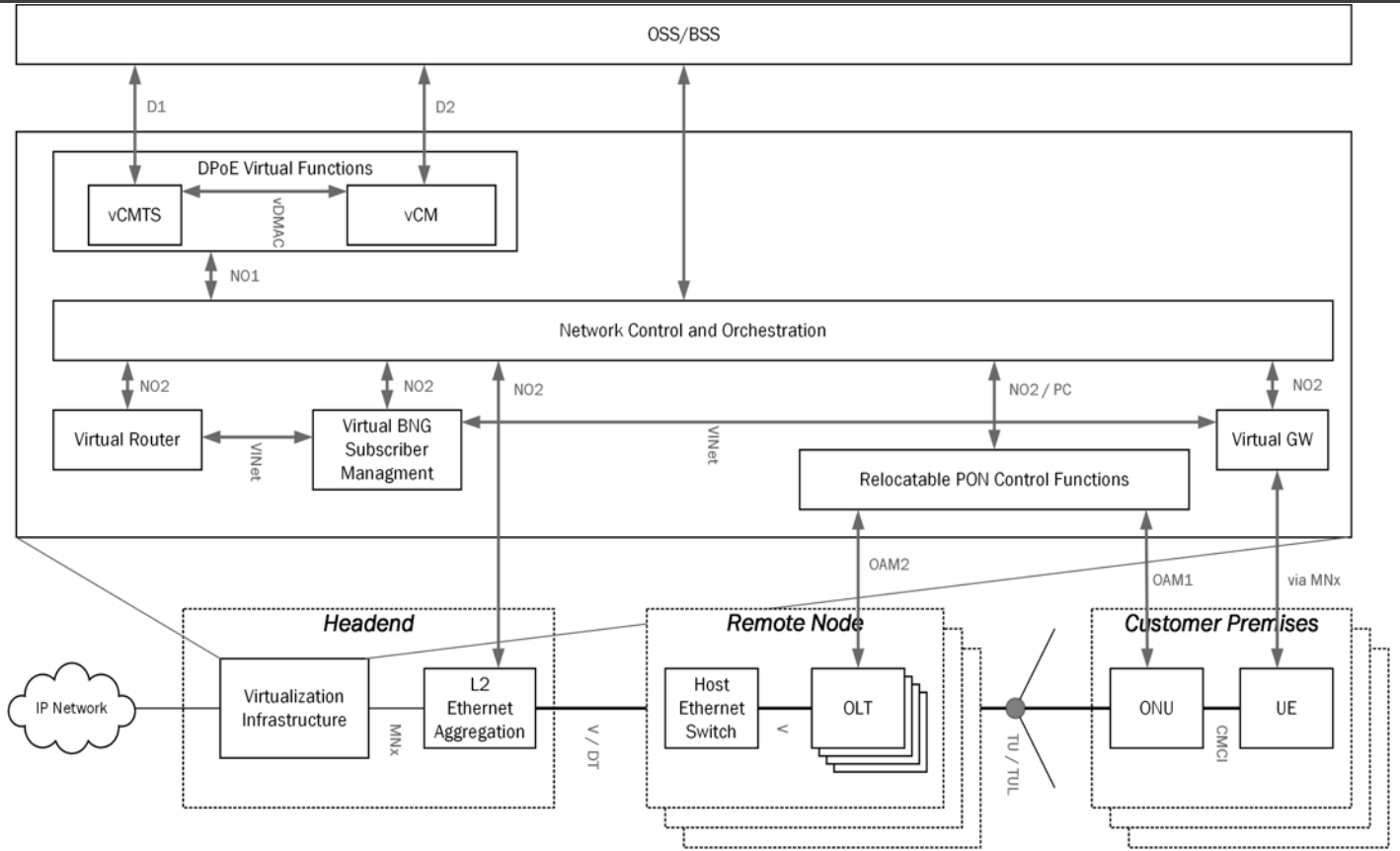
Long-Range Distributed EPON Architecture



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Work to be Done – A Community Effort

- Develop or adopt a Formal Specification for the
  - V or DT interface – Could adopt the TR-200 design, or expand on R-PHY's spec.
  - OAM2 interface – A relatively simple expansion of DPoEv2.0 OAM
  - PC interface – Could adopt OpenFlow or similar NETCONF/YANG
    - Abstract the PON to appear as a switch (as found in CORD's VOLTHA)
- Formalize the split D (D1 and D2) interface – an exercise in DPoEv2.0 MULPI and OSSI
- Complete the IEEE 1904.2 standard
- Adopt Data Models for the OSS/BSS interfaces – work began in VPI Technical Report

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Work to be Done – A Community Effort

- Develop an Open Source implementation of the DPoE Virtual Functions (vCM, vCMTS) and the PON Control functions.
    - Promotes
        - Interoperability
        - Lower Cost
        - Faster time to market

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THANK YOU!

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