

How to Accelerate Cable's ITU-T PON Deployments?

1. Leverage DOCSIS Back Office Systems
2. Residential Services uses layer 3 awareness (just like DOCSIS)
3. Business Services uses layer 2 awareness (just like DOCSIS)
4. Cable OLTs Perform Full Traffic Management (avoids use of BNG entirely)
5. Aggregation Router performs Routing, Lawful Intercept, & L3 DHCP Relay

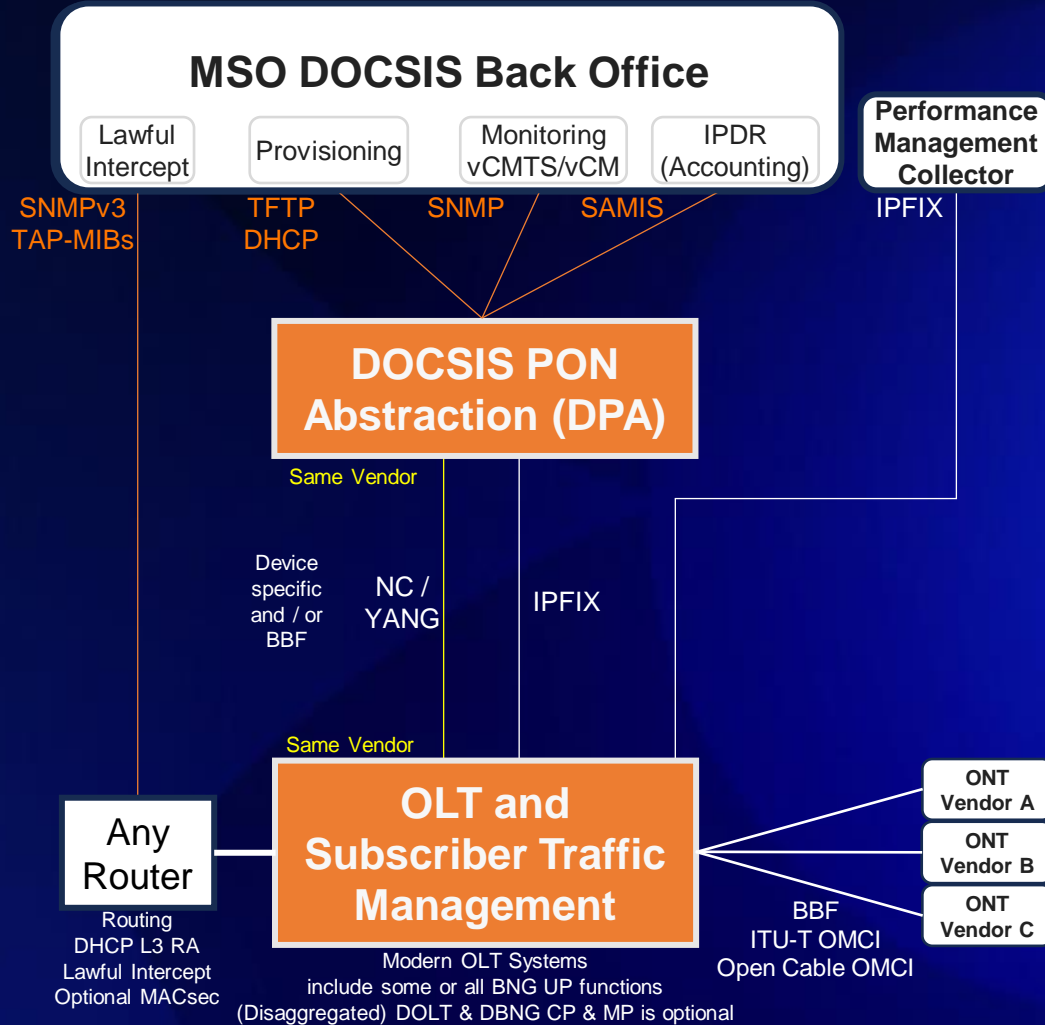
This approach is widely deployed by Cable Operators



ITU-T PON Backoffice Options & Migration

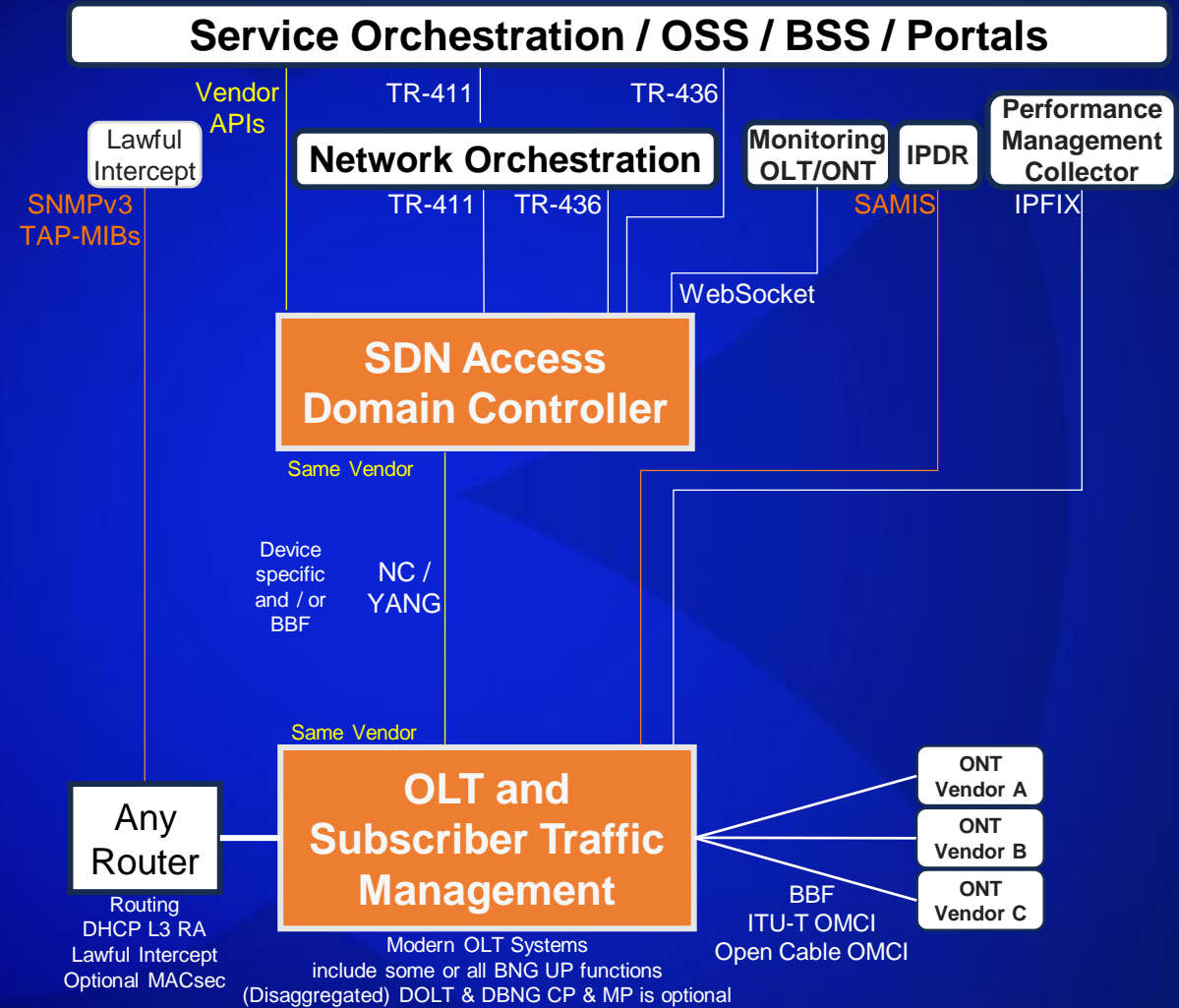
Initial Launch

DOCSIS Back Office with ITU-T PON and OMCI



Migration Planning

New Back Office with Vendor APIs & Std. APIs

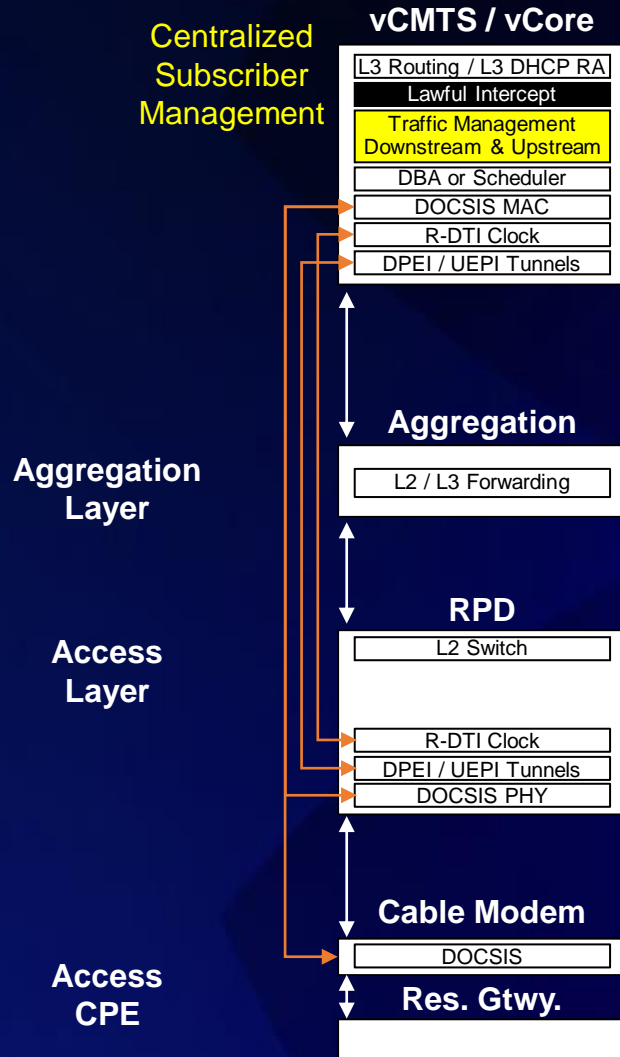


ITU-T PON Transitions from DOCSIS Back Office to BBF Back Office

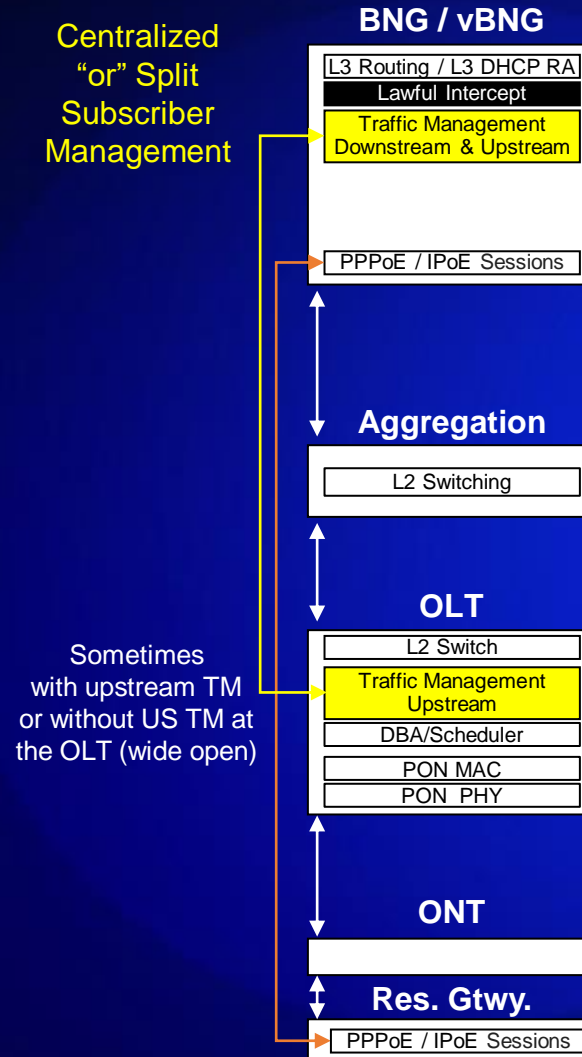


High-Level Architectures DOCSIS & ITU-T PON

Remote PHY with vCMTS



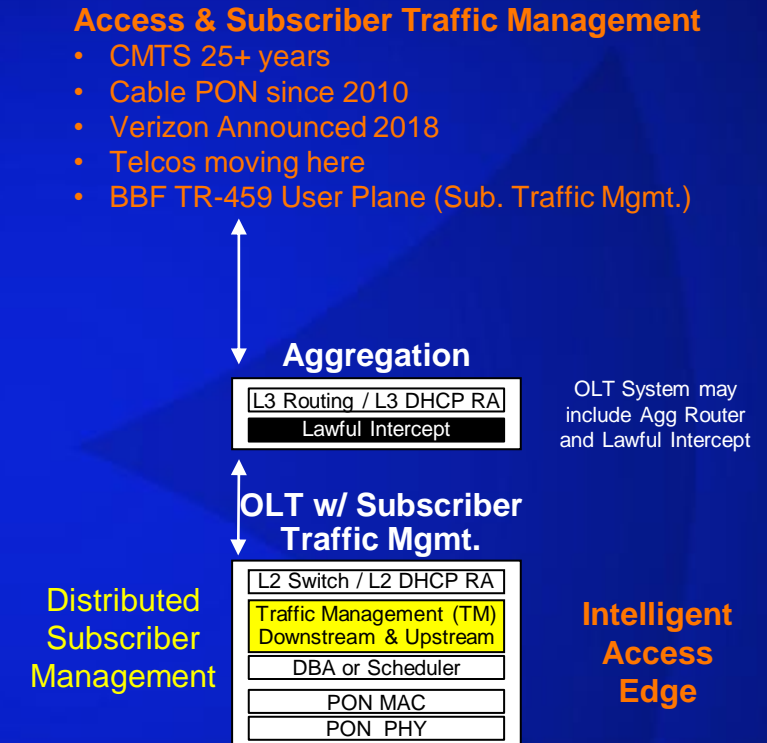
Legacy Telco OLT and BNG



Legacy Telco's have "MANY" Traffic Management Models not all are shown / mentioned

Modern OLT System with Subscriber Traffic Management

(Most Widely Deployed PON Architecture in Cable and growing in Telco)



OLT Deployment Architectures

Brownfield Lessons Learned:

- MSOs require flexible OLT systems designed for Facilities, Cabinets, & Nodes
- MSOs in brownfield are not deploying PON like HFC / RPDs
 - PON serving distances are larger compared to RPD distances
 - OLT servicing areas are larger than HFC/RPDs (ROLT @ 8 XGS ports & cabinets far more)
 - Deploying PON like HFC increases the PON active locations in the OSP by 4 to 16 times
 - Design FTTH in brownfield as “end game” with as few OLT locations as possible
- MSO brownfield overbuilds are meticulously planned
 - Examining the last “rebuild” from the late 1990s / early 2000s (original 6-12 fibers per location)
 - Those fiber locations connect directly to the facility and could be ~2,000, 1,000, or 500 HHP
 - Remote OLTs at large aggregation points
 - Cabinet OLTs for massive aggregation points
- Service Providers of all types are using cabinets to eliminate facilities



What Are the Options Beyond 10G-PON?

10G PON NOW

XGS
10GEPON
NGPON2

- All have a User Data Throughput of about ~8.5G
- NGPON2 would need "channel bonding" to exceed ~8.5G

25G PON

25GS-PON
MSA GROUP
Consortium

- Combines 50G EPON & XGS
- Small Ecosystem
- Low System & ASIC Participation
- Low Operator Interest
- Low Volumes Likely
- ~21G

50G-PON



- 50G PON is an Approved ITU-T Standard!!!
- Embraced by a Majority of the PON Ecosystem
- Leverages the GPON and XGS Lineage
- 50G x 25G and 50G x 50G
- PON Slicing
- Large Ecosystem Developing
- Large Operator Interest
- Large Volumes Likely (China)
- ~42G

Every Generation PON Standard has Increased Capacity by at Least 4 Times!!!

Services & PON Assessment

Segment	Service / Aggregation (per customer or per site)		Gbps	10G PON	25G PON	50G PON
Business Services	Business Max Service Tier and Peak Traffic		<8.5 Gbps	✓	✓	✓
	True 10G Services		10 Gbps	✗	✓	✓
	True 25G Services		25 Gbps	✗	✗	✓
Aggregation Services	Wi-Fi Access Point Transport	Wi-Fi 6 / Wi-Fi 6e Access Point Transport	9.6 Gbps	✗	✓	✓
		Wi-Fi 7 Access Point Transport	30 – 46 Gbps	✗	✗	✓
	5G Mid/Backhaul	Small Site (FR1 carrier)	2.0 Gbps	✓	✓	✓
		Small Site (FR2 carrier)	3.7 Gbps	✓	✓	✓
		Small Site (FR1 + FR2 carriers)	5.7 Gbps	✓	✓	✓
		Medium Site (FR1 + FR2 carriers)	15.2 Gbps	✗	✓	✓
		Large Site (FR1 + FR2 carriers)	36.8 Gbps	✗	✗	✓
	Transport	To/From MDU, Cabinet, & Node	10 – 40G	✗	✗	✓
Residential Services	Max Service Tier and Peak Traffic		<8.5 Gbps	✓	✓	✓
	Max Service Tier and Peak Traffic		>8.5 Gbps	✗	✓	✓

50G-PON enables convergence of all services to one network