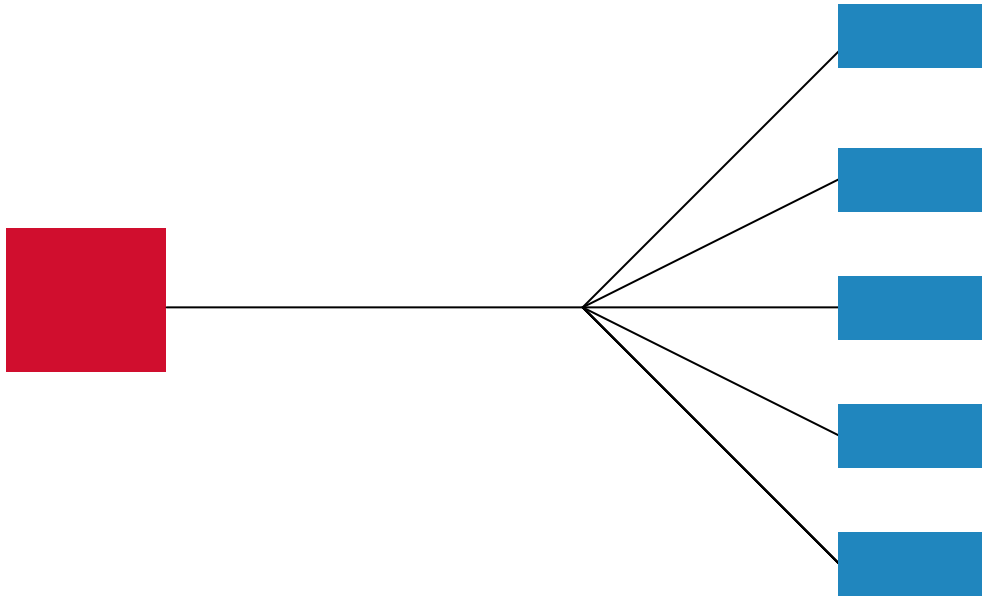
Compatibility with 802.1D Bridging in EPON

Hiroshi Suzuki
Norm Finn
Gerry Pesavento
Uri Rotshtein
Yoram Gross
Roy Bynum
Nicolas Nguyen
Ariel Maislos
Wei Gao
Bruce Tolley

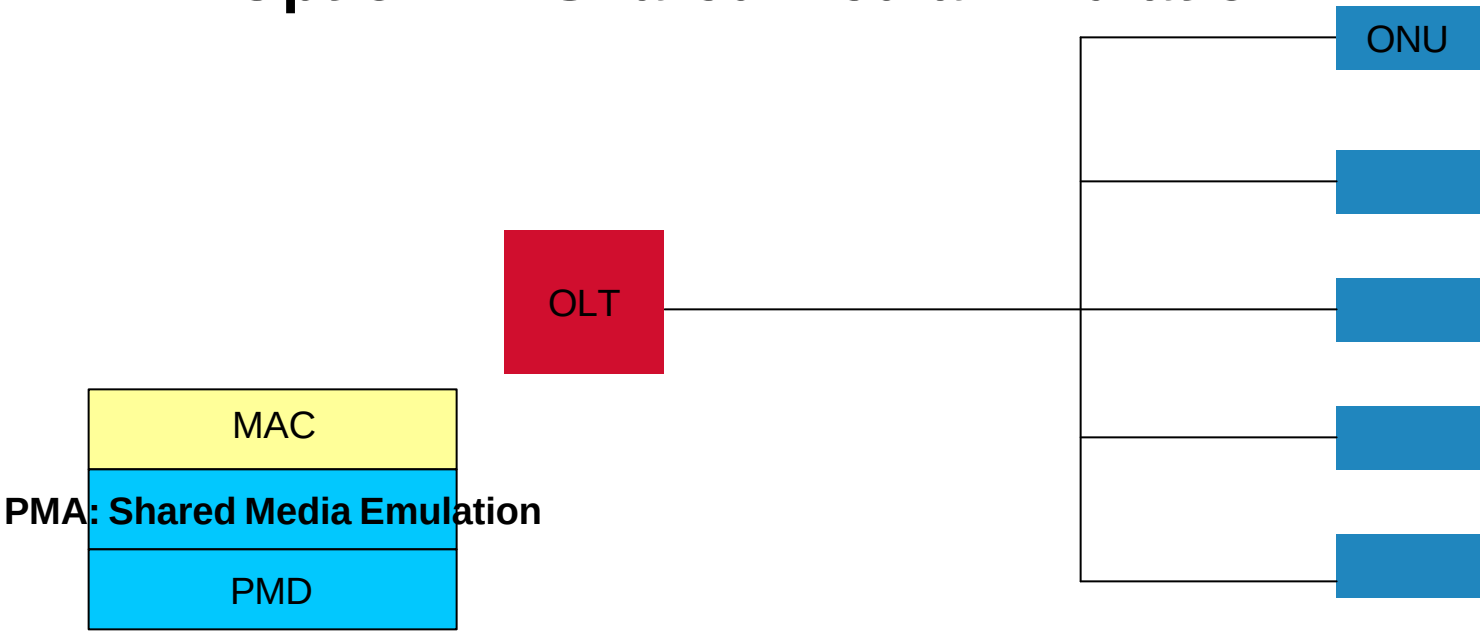
EPON Physical Topology



Point to Multipoint

Logical Topology for MAC -1

Option 1 : Shared Media Emulation

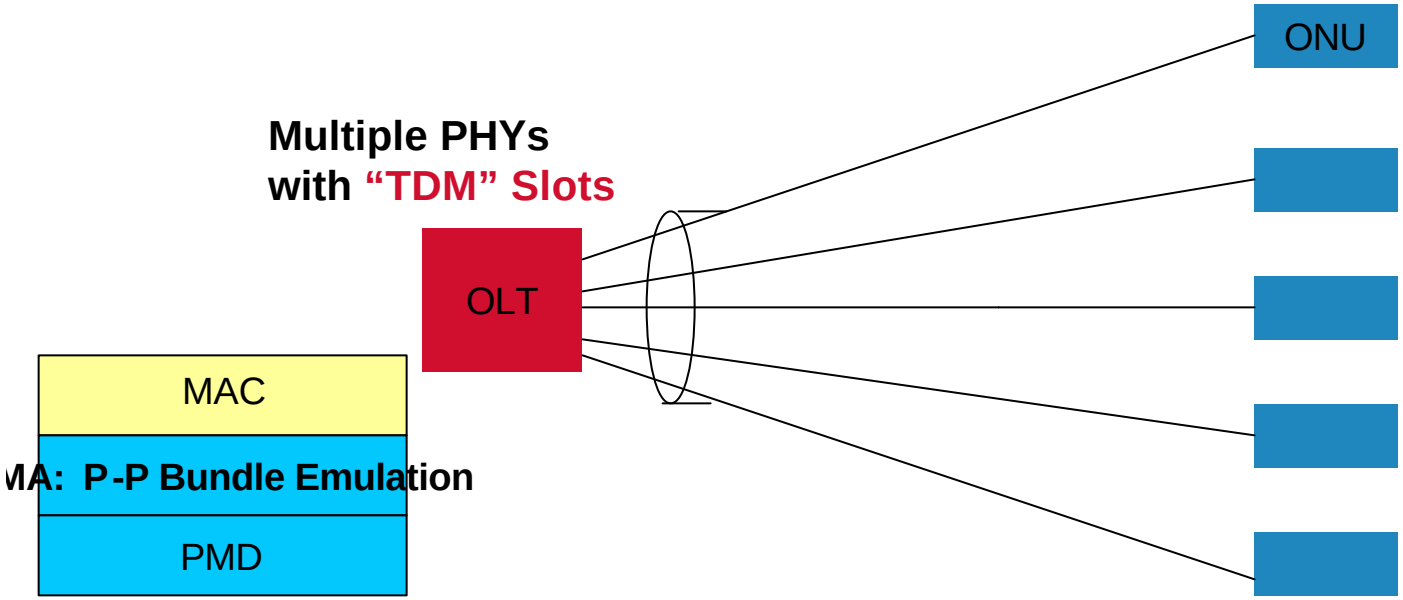


Shared Media Emulator in PHY Layer

- **Everybody sees every packets (Stupid ?)**
- **All upstream bandwidth comes to downstream !!**
- **Security ??**
- **Failure Isolation??**

Logical Topology for MAC -2

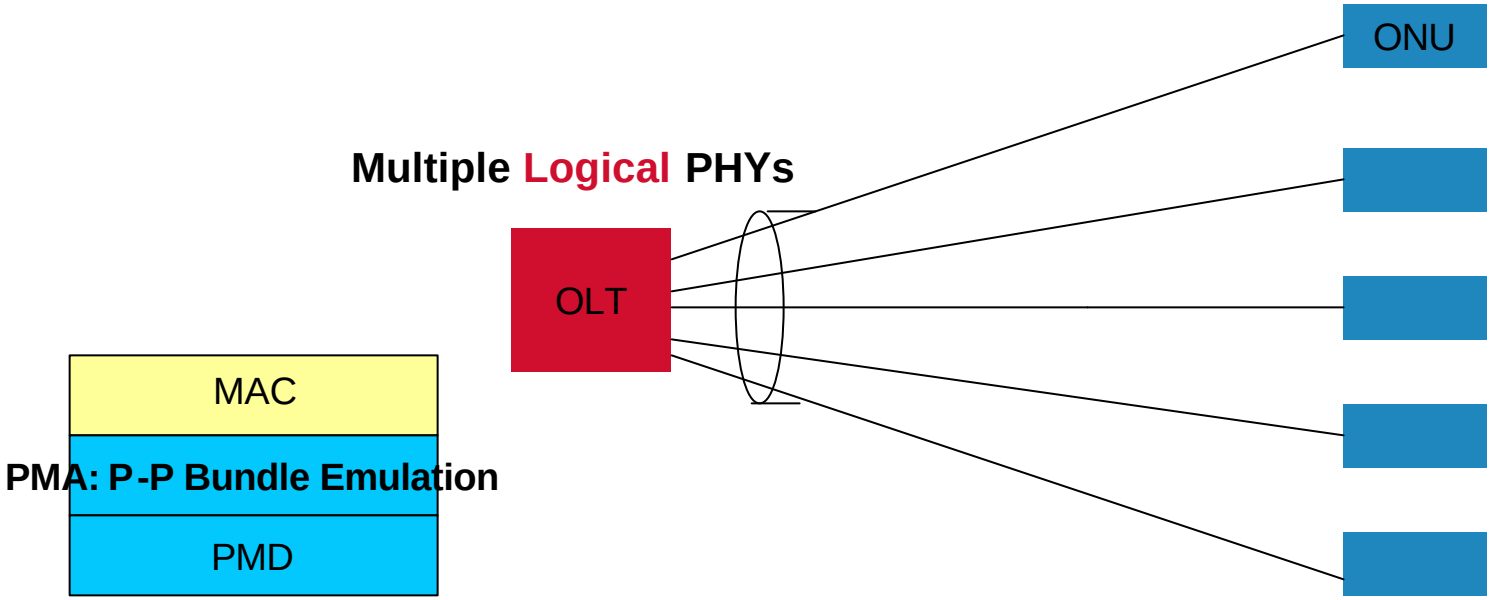
Option 2 : Many Point to Point Links with "TDM"



-Both UP and DOWN are TDM slot separated.
-Inefficient for Downstream Bandwidth (Downstream BW = 1/32G)

Logical Topology for MAC -3

Option 3 : Many Point to Point Links by Packet Mux



How to identify the Logical PHY / ONU ID ?

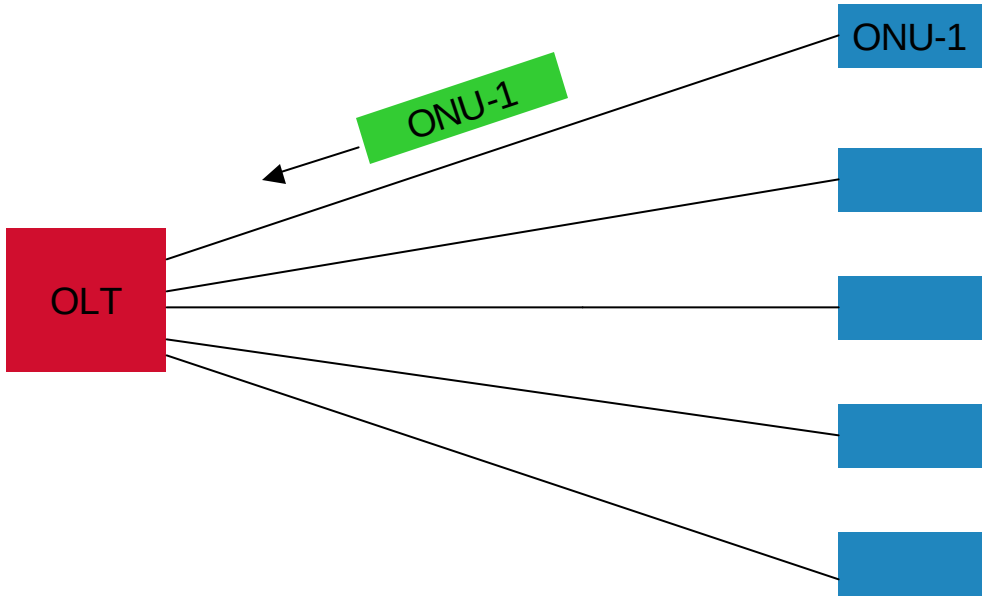
-To add ONU ID in Each Frame in "PHY layer"

ONU ID Option ?

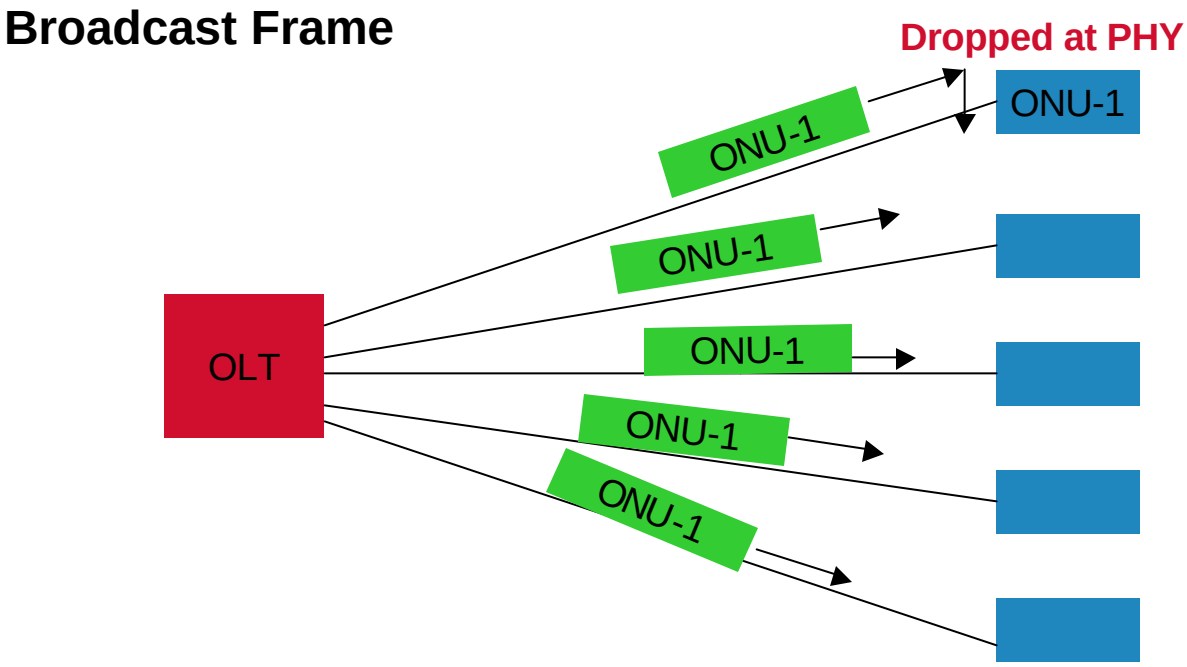
- **Destination ONU ID**
- **Source ONU ID**
- **Bitmap**
- **Multicast Group ID**

Broadcast Solution Example

Every Frame with Source ID



Broadcast Solution Example



ONU drop broadcast mesg with the same ONU ID

Where to put PHY/ONU ID ?

- **It has to be invisible to 802.1**
- **This is what 802.1 wants**
- **Possible Options**
  - **-Preamble / IPG**
  - **-New EPON PHY header**

How to allocate ONU ID ?
How many bits ?

- Auto Allocation at registration phase
- Periodic re-allocation / Static
- Up to 32 ONUs / Addressing options
  - Src/ Dest bit + ONU ID (6 bits)
  - BitMap (32 bits)
  - Multicast IDs

A Proposal

- **Support “Logical PHY Level Multiplexing” Scheme in EPON / EFM**