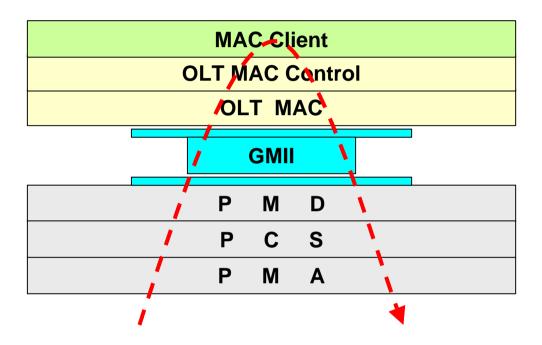# P2PE and SLE by Reflection

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IEEE802.3ah @Vancouver, July 2002

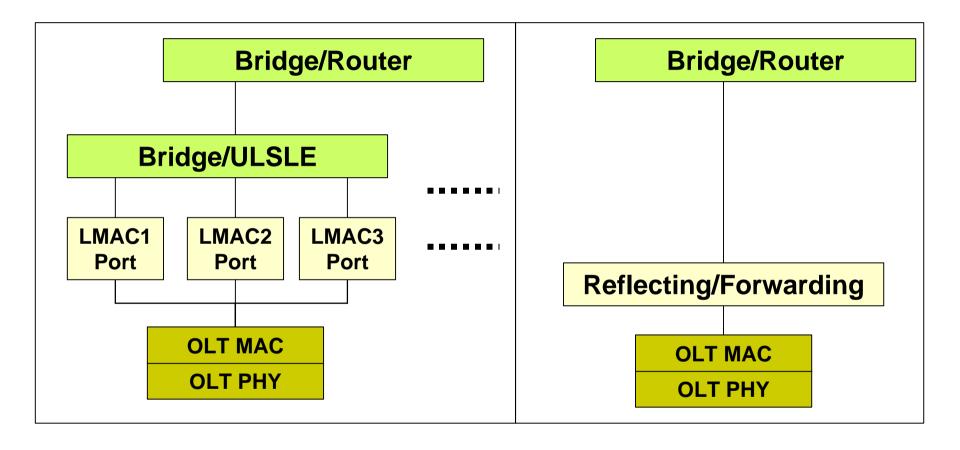# Basic Requirements for P2PE and SLE

- The basic requirement for P2PE and SLE is just a frame reflection to ONU with proper LLID.
- Just like ONU can accept / discard frames based on LLID, OLT can forward / reflect frames based on DA and LLID.

Reflection by DA and LLID

- The logical link between OLT and each ONU can be identified by LLID.

- Just like bridge can do switching per vLAN ID, it is possible to reflect frame based on LLID.

- For P2PE, a frame needs to be reflected with LLID in its destination and P2PE mode bit.

- For SLE, a frame needs to be reflected once with its own LLID and SCB mode bit.

- Reflection does not have to have 2N+1 different ports.
- If 2N+1 ports are not necessary, then scheduling of 2N+1 ports are not required.

2N+1 Ports' Switching vs. Reflection
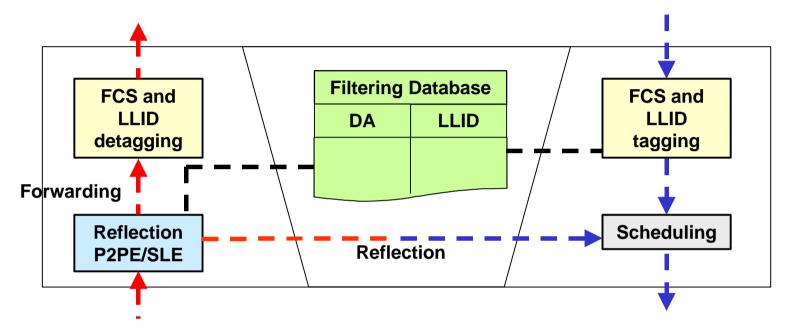
Bridge/Router

Bridge/ULSLE

LMAC1 Port

LMAC2 Port

LMAC3 Port

OLT MAC

OLT PHY

Bridge/Router

Reflecting/Forwarding

OLT MAC

OLT PHY

Imagine there are 16 ONUs and 8 LMACs per ONU.
→257 ports are needed for 2N+1 ports' switching.

OLT Reflecting/Forwarding Layer

Forwarding

FCS and LLID detagging

Filtering Database

DA	LLID

FCS and LLID tagging
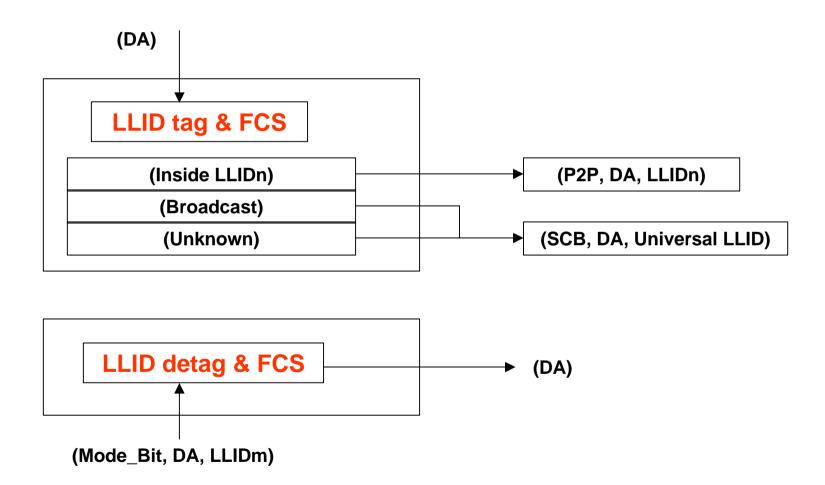
Reflection P2PE/SLE

Reflection

Scheduling

Basic Functions of vLink Control – OLT and ONU

- **Tagging and de-tagging LLID**

- **Revalidation FCS**

- **Address Learning and maintaining MAC/LLID table**

- **Reflecting/forwarding based on DA and LLID (OLT only)**

- **Spanning tree protocol need to be bypassed down to ONU**

Reflection function block for P2PE and SLE

LLID detag & FCS

Forwarding

Reflection (P2PE and SLE)

(P2P, Outside PON, LLIDm)

(SCB, Unknown, LLIDm)

(SCB, Broadcast, LLIDm)

(P2P, Inside PON, LLIDm)

LLIDm → LLIDn

Reflecting

(Mode_Bit, DA, LLIDm)

Filtering Database	
DA	**LLIDn**

** LLID tag= Mode_Bit(1 bit) + LLID

LLID tagging/Detagging and FCS function block

(DA)

LLID tag & FCS

(Inside LLIDn)

(Broadcast)

(Unknown)

(P2P, DA, LLIDn)

(SCB, DA, Universal LLID)

LLID detag & FCS

(DA)

(Mode_Bit, DA, LLIDm)

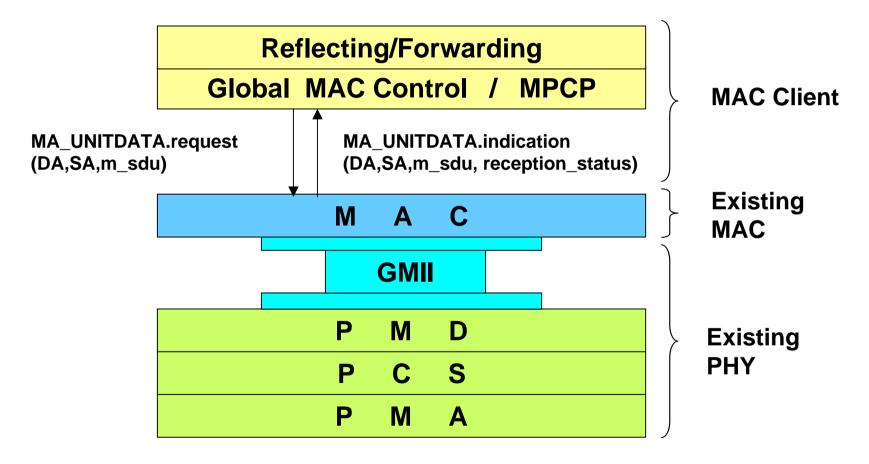# Why Reflection Layer needed?

Instead of creating lots of port-interfaces between OLT and ULSLE (or bridge) and Instead of trying to make a specification of ULSLE, maybe we can do same functionality by adding the reflection layer in OLT.

I am not sure whether or not EFM needs an approval from 802.1d for this reflection/forward layer (ULSLE does). However, it will be much better to make this inside 802.3ah scope.

Again, it will be much simpler EPON system if EPON can avoid 2N+1 buffer managements, and 2N+1 ports switching.

Layering model

LLID tag is included in the m_sdu.

Summary

Discussed about Reflecting/Forwarding layer.

The P2PE and SLE can be implemented with a proper reflection if LLID is visible in the upper layer.

The proper reflection can avoid 2N+1 ports managements as well as 2N+1 switching.