Multicast Logical Link for 10G-EPON

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Overview

- Not only PHY, but also RS and MPCP Reconciliation and Multi-point MAC Control sublayers should be discussed along with PHY layer for the reason of traffic usage, multicast, security and so on.

- Multicast Consideration
  Multicast is a representative application for the future services.
  Multicast Logical Link should be better way to provide the multicast service.
Why 10G-EPON?

- IPTV will require much more bandwidth and the number of channels.
- Large high-rise apartment buildings.
- Access line for the business VPN service.

10G-EPON should be suitable for these, but at the same time, more flexible and intelligent for the next generation services.
Problems of Multicast on IEEE 802.3ah

Multicast system is an indispensable prerequisite for the next generation broadband access system.

[Problems]
- IEEE 802.3ah cannot deliver frames to the multi-point destinations except broadcast.
- We need to take different measures to develop a multicast system on an E-PON system depending on a chip vendor.

Since the E-PON system has multiple logical links, it should have an ability to deliver Ethernet frames to the multi-point destinations.
Multicast on IEEE 802.3ah

Approach 1: IGMP/MLD snooping at ONU side

OLT broadcasts multicast traffic.

OLT

Software needs to snoop IGMP/MLD and filter multicast traffic.

ONU

ONU

ONU

OLT broadcasts multicast traffic.

ONU

ONU

Need a processor in ONU to perform IGMP/MLD snooping.

⇒ Expensive!

Need an 802.1D entity in ONU.
Approach 2: IGMP/MLD snooping at OLT side

OLT broadcasts multicast traffic.

Software snoops IGMP/MLDs and configures 802.1D entity in ONU through OAMPDU messages.

Need an 802.1D entity in ONU.
Need to specify proprietary OAMPDU messages.
Affect multicast performance due to OAMPDU delay time.
Proposed approach: Multicast Logical Link

Only OLT is responsible for handling IGMP/MLD and delivering multicast traffic.
ONU can be a repeater without a processor.
Broadcast within VLAN segment

Only OLT is responsible for handling VLAN switching. ONU can be a repeater without a processor.
10G-EPON Objective

 ➢ 10G-EPON SG needs more discussion on Reconciliation and Multi-point MAC Control to standardize the method to provide applications such as multicast and ensure that the next generation services are really available and stable.

 ➢ Multicast Logical Link (proposal)
   Multicast Logical Link allows ONU to be just a repeater with processors or IEEE 802.1 entities out-of-scope like most of the xDSL products so that the system cost would significantly be reduced.