10G Broadcast in a Coexistence-enabled PON

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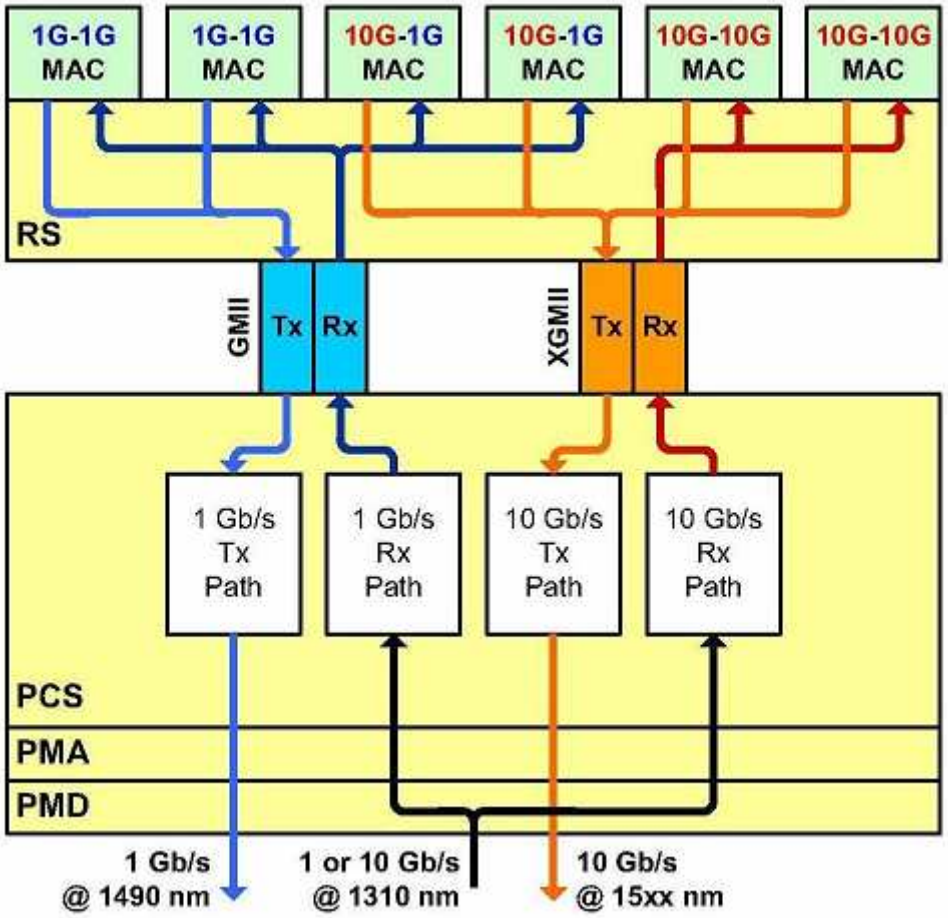
10GEPON OLT with full coexistence support

- 10G/10G, 10G/1G, and 1G/1G ONUs are supported
- 10GEPON OLT RS supports both the GMII and XGMII interfaces
- RS routes downstream data from MAC instances to appropriate Downstream according to LLID



From 3av_0701_kramer_1.pdf

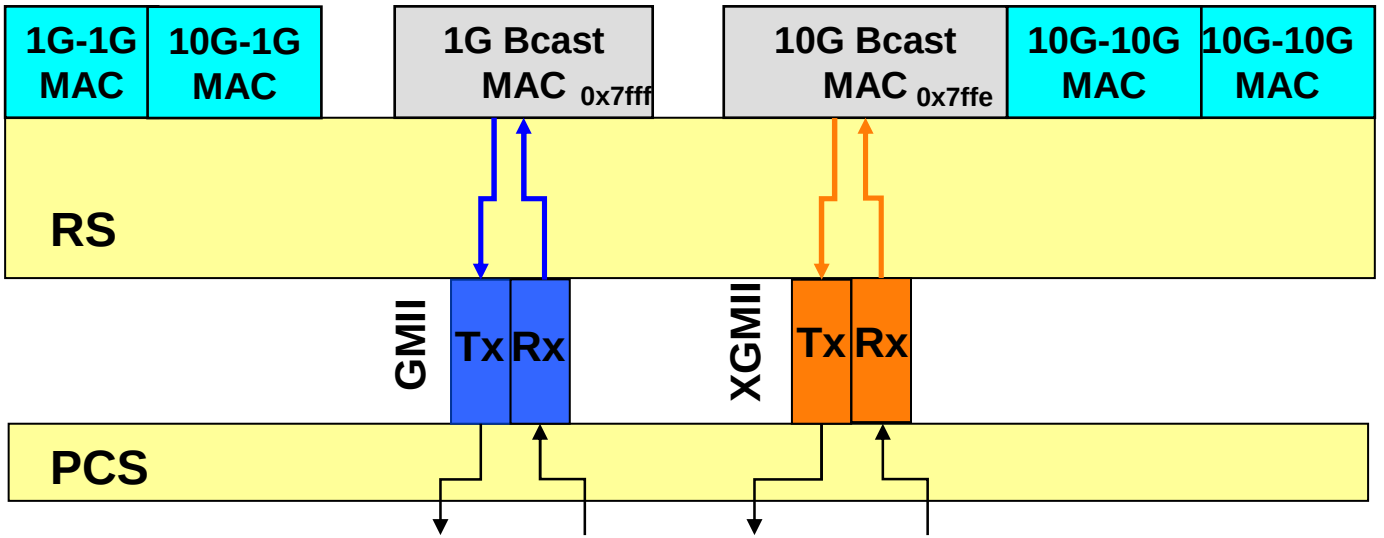
10G broadcasts in a PON with coexistence – An observation

- Broadcast data (eg. multimedia streams) might need to be transmitted on the 10G downstream but not on the 1G downstream (or vice versa).

- If we retained a single broadcast channel, broadcast data for the 10G downstream could easily consume a large proportion of the 1G downstream bandwidth

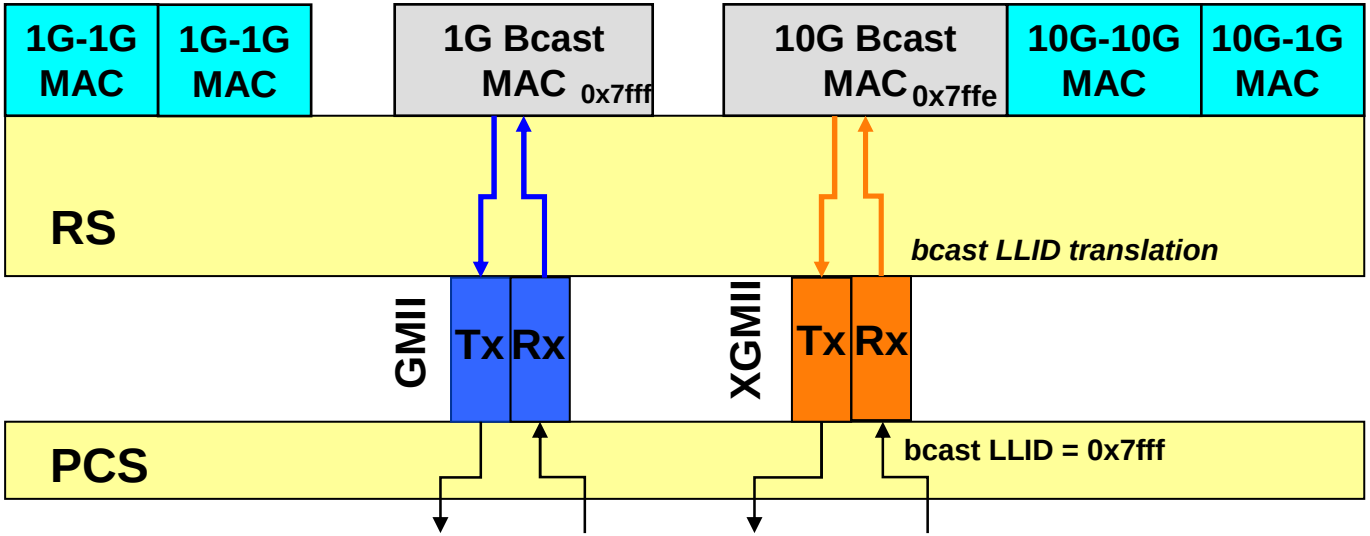
- 10G broadcast traffic must be handled separately from 1G broadcast traffic

Distinct OLT MAC for 10G Broadcast



- In EPON Multipoint MAC Control, each MAC instance is assigned a unique LLID (“logical link id”)
- Data frames for the 10G broadcast MAC or 1G broadcast MAC originate at their respective *MAC Clients (*as always*)* according to higher layer protocols
- We might anticipate that traffic such as high-definition video would be made available by a service provider to 10G ONUs only

Proposal: RS changes the 10G broadcast LLID



- A distinct MAC instance for 10G broadcast is defined with reserved LLID 0x7ffe.
- 10G ONUs still use 0x7fff as broadcast LLID.
- Reconciliation Sublayer performs translation of LLID on transmit/receive over XGMII

Adjustments to Reconciliation Sublayer

1. Note that currently there exist no state diagrams for the EPON RS

2. LLID 0x7ffe is used for 10G Broadcast above the RS only. The RS:

   - On Rx: checks for LLID 0x7fff in a frame received on the XGMII and - if found - uses 0x7ffe for selection of the receiving MAC instance

   - On Tx: checks for LLID 0x7fff in a frame destined for transmission on the XGMII and - if found - replaces it with 0x7fff (and recomputes CRC-8) before transmission

3. Descriptive text in 65.1.3.3.2 is updated as follows**:**

   “b) If the received logical_link_id value matches 0x7FFF or 0x7FFE and an enabled MAC exists with a logical_link_id variable with the same value then the comparison is considered a match to that MAC.

   c) If the received logical_link_id value is any value other than 0x7FFF or 0x7FFE and an enabled MAC exists with a mode variable with a value of 0 and a logical_link_id variable with a value matching the received logical_link_id value then the comparison is considered a match to that MAC.”

MAC Issues

1. MPCP and other Control Broadcast frames shall always be sent identically on both downstreams

   – *MAC Control Client (*not specified by GE-PON standard*)* shall enforce transmission of identical broadcasts by always invoking its request API for each of the broadcast MAC instances

   – In this manner the specification for control behaviour is consistent across all configurations

2. State Machines that are specified by clause 64.3.3.6 as implemented in the broadcast MAC Control instance must be specified as being implemented in *each* of the broadcast MAC Control instances

3. No changes to MAC-layer state diagrams at OLT or ONU

   – however there is various descriptive text that must be updated to refer to the potential of two broadcast MACs rather than one (clauses 64.1.2, 64.3.2.3, 64.3.6.1 …..)

Straw Poll

I prefer:

- 10G ONUs receive broadcasts on LLID 0x7fff (with RS translation) ____
- 10G ONUs receive broadcasts on LLID 0x7ffe ____
- Something different ____