NG-EPON:
Considerations on architecture

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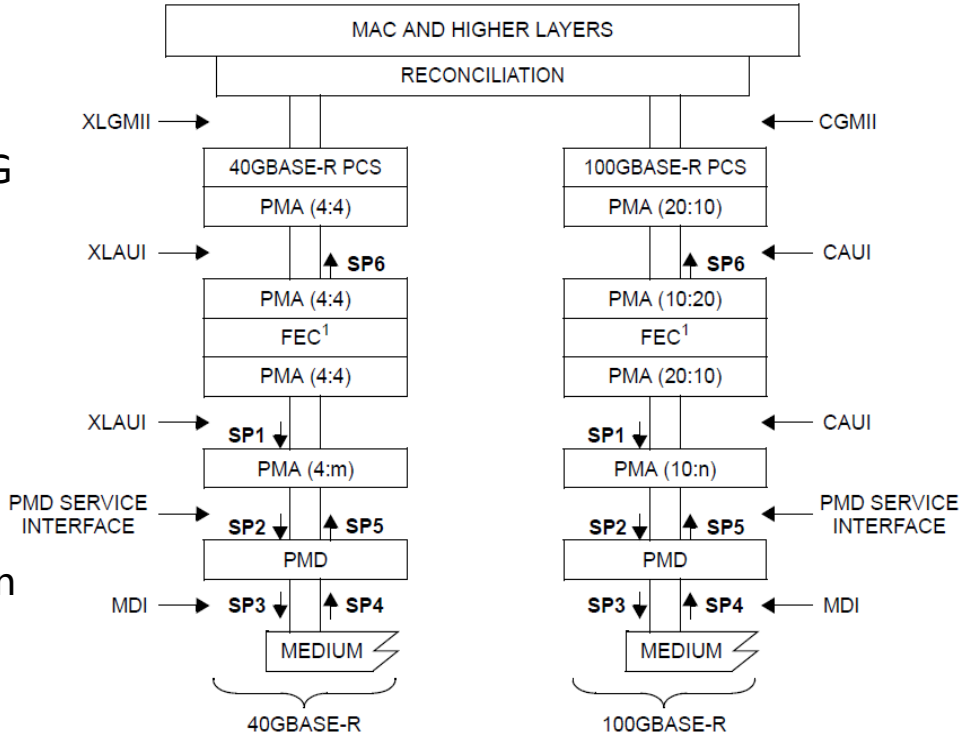
NG-EPON architecture based on 100GBASE-R

If NG-EPON architecture based on 100GBASE-R

- Convenient to borrow well defined 100G interfaces, such as CGMII, CAUI, and multi-lane operation procedures
- However, full 100G capacity has to be supported from the beginning.
- In addition, multi-lane traffic distribution through these interfaces is fixed (in octets or blocks), so it's very hard to achieve flexible multi-rate objectives

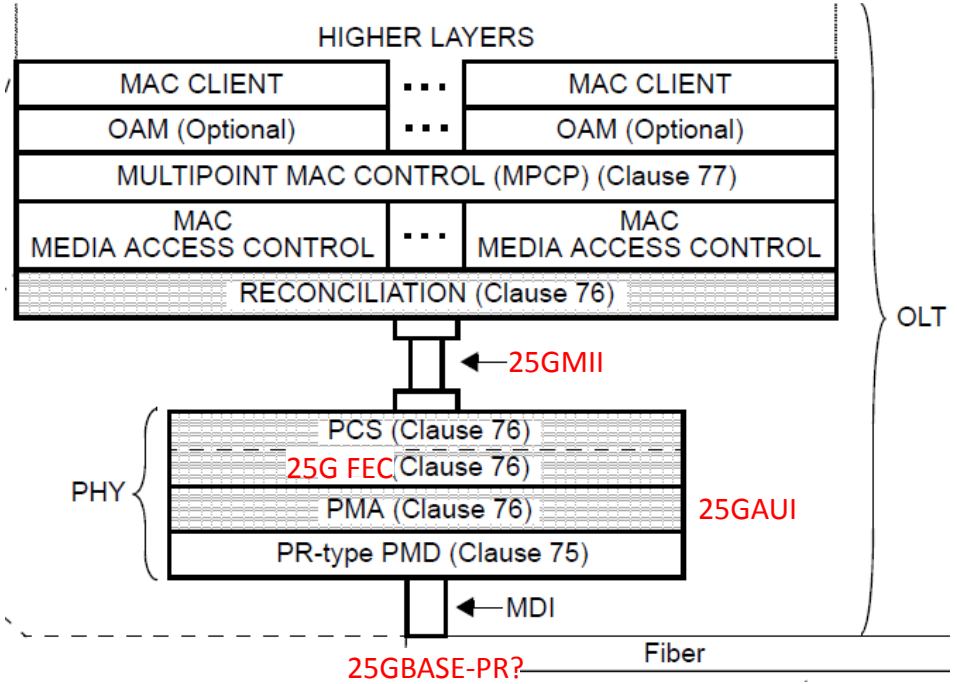


NG-EPON single lane architecture based on 25GBASE-R

Since single lane 25GBASE-R and its interfaces, 25GMII and 25GAUI are specified by 802.3by, and 25Gb for SMF has been started last year.

We think it is suggested to specify a single lane NG-EPON architecture based on 25GBASE-R as the first step.

NG-EPON specific extensions, such as MPCP and 25G PR? type PMDs, can be easily and quickly consented.

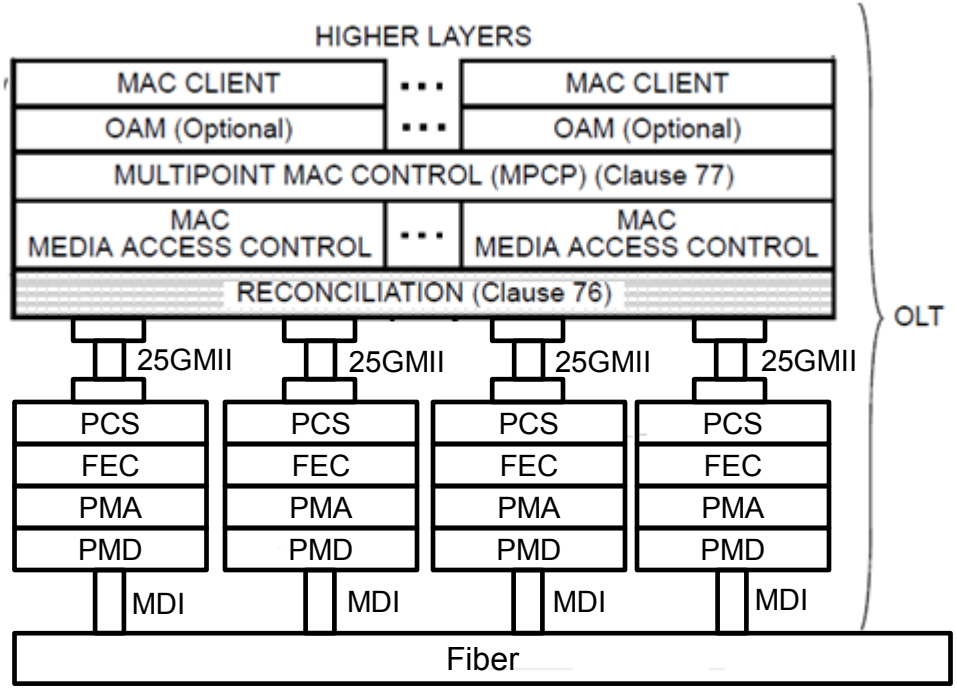


Next step - extend to multi-lane 100G architecture

25GBASE-PR PHY specs must be reused, including data interfaces, line coding, FEC, modulation and PMD parameters.

OLT MAC should support full 100G capacity

- MPCP should be further extended to support multi-wavelength operation
- RS layer should be extended to support traffic distribution across multiple PMD lanes based on frame destinations, and be capable of creating sub MACs in flexible rate



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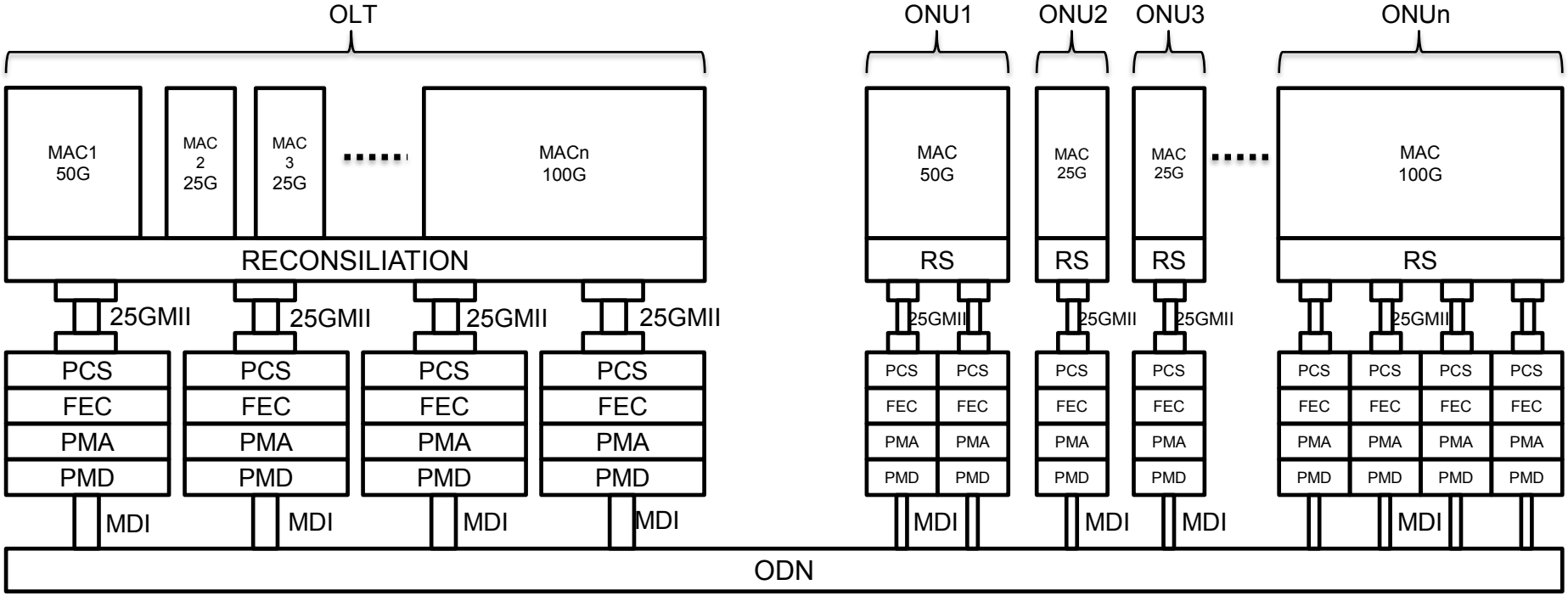
Multi-rate ONU support



Rate of OLT sub MAC depends on the associate ONU MAC rate

RS layer should provide packet distribution across multiple 25GMII interfaces

Details of RS procedures and functions are for further discussion

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ONU optics in multi-lane 100G architecture

Number of wavelengths	Fixed wavelength	Tunable wavelength
1	Colored, low cost	Colorless, medium cost
2	Colored, high cost (more combinations)	Colorless, high cost
4	Colorless, medium cost	-

From the perspectives of transceiver color and cost of ONU optics

- Two wavelengths options are out of consideration due to the highest cost.
- Fixed 4 wavelength seems the only solution to achieve flexible ONU rate by turning on/off any set of wavelengths using single type of ONU transceiver, colorless and lower cost can also be achieved simultaneously.
- Fixed optics eliminates the unreliable and immature concerns of tunable optics.
- Existing 4x25G Ethernet optics supply chain, e.g., QSFP28 can be leveraged.

Summary

NG-EPON architectures are discussed

- It is suggested 25G-EPON as the base architecture in first step
- 100G-EPON can be easily extended from 25G-EPON
- MPCP and RS for multi-lane support are for further study

4 fixed wavelength ONU optics seems the best choice in multi-lane

- It supports flexible ONU rate in single type of ONU transceiver.
- It avoids the immature and performance issues of tunable optics.
- Existing 100G industry supply chain can be leveraged.

Thank you

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