Collaboration between .3cz and .3dh Specifications to leverage and work to do

Rubén Pérez-Aranda, KDPOF

IEEE 802.3dh Task Force - July 2022 Plenary Meeting

Introduction

- Original 802.3cz PAR was split in two separate projects because:
  - Both projects target different communications media: OM3 vs GI-POF
  - Both projects have different timeline: GI-POF based proposal need time for developing fiber specs, therefore PHY specs
- 802.3cz project have covered a long path in developing technically complete specifications of an optical PHY for automotive applications based on OM3 fiber: link model, PCS, PMA, PMD, channel, EEE, OAM, test methods, test modes, loopback modes, etc.
- Collaboration between .3cz and .3dh is proposed:
  - To avoid re-inventing the wheel in many common topics
  - To reduce as much as possible fragmentation of the automotive optical market: only the medium change
  - To provide the best PHY specification for GI-POF

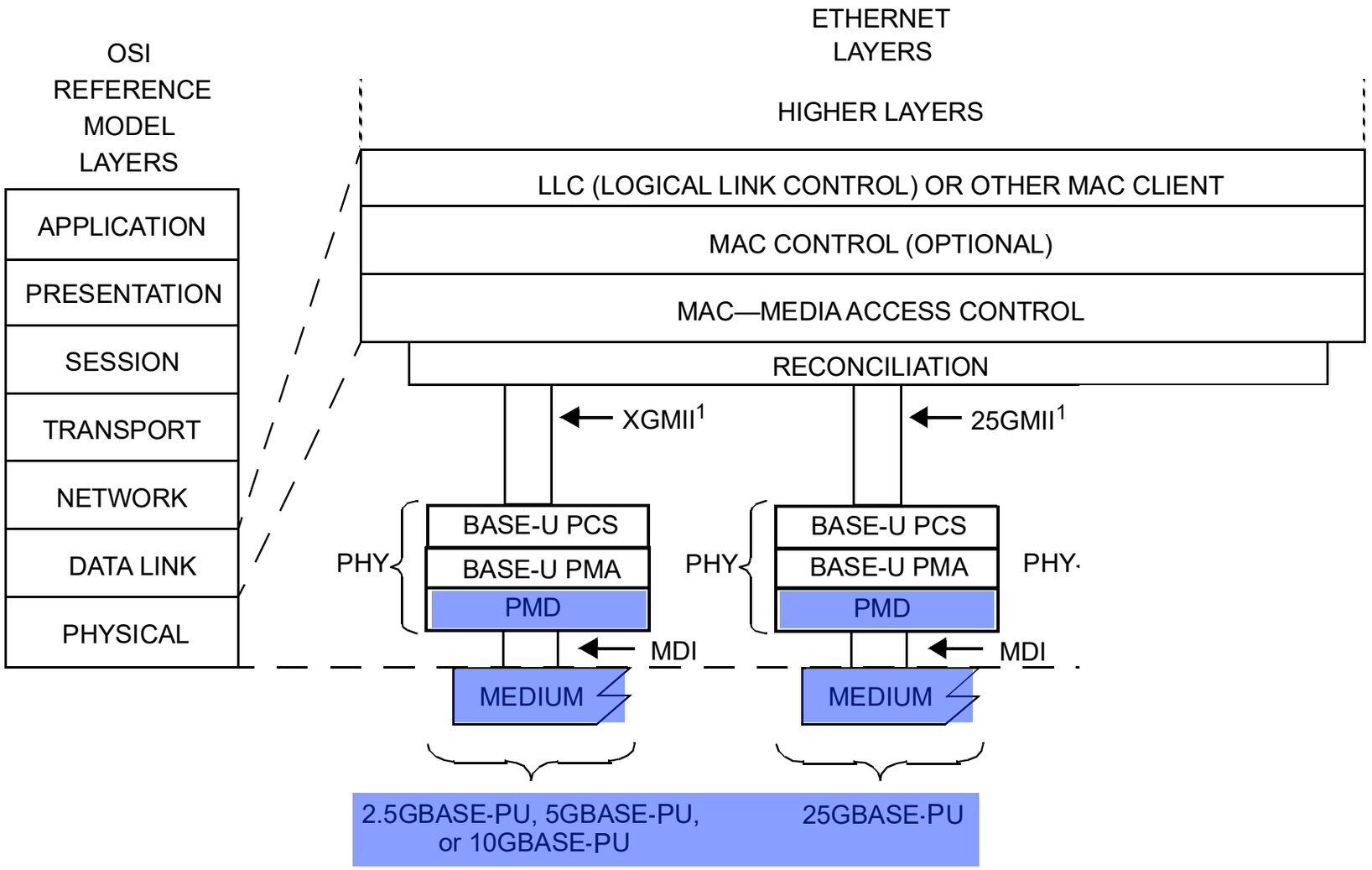
Specifications to leverage

- All the specifications can be leveraged except ones that depend on optical fiber characteristics and 50 Gb/s rate:
  - 166.6.3.1 Operating range
  - 166.6.3.3 BASE-AU receiver optical specifications. Only RX characteristics that depends on optical fiber characteristics: OMA sensitivity, min AOP
  - 166.6.3.4 BASE-AU illustrative link power budget
  - 166.9.1 Optical fiber cable
  - 166.9.2.1 Optical fiber connection insertion loss
- TX characteristics are 100% valid for GI-POF and can be leveraged
- Most of these specifications can be leveraged by 802.3dh, because target application is the same, link length is reduced from 40 meters to 15 meters
- BASE-U PCS and PMA sublayers provide:
  - Best receiver sensitivity for GI-POF (lower BW and higher attenuation than OM3)
  - Best performance and yield in varying automotive conditions
  - OAM channel, which is an specific automotive requirement
  - Optional EEE

Wavelength leveraging

- Many contributions in 802.3cz supported adoption of 980nm as the optimal wavelength for automotive applications:
  - https://www.ieee802.org/3/cz/public/may_2021/king_3cz_01a_0521.pdf
  - https://www.ieee802.org/3/cz/public/22_jun_2021/pankert_3cz_01_220621_random_failures.pdf
  - https://www.ieee802.org/3/cz/public/jul_2021/perezaranda_3cz_01_0721_wavelength.pdf
  - https://www.ieee802.org/3/cz/public/may_2021/perezaranda_3cz_01_0521_VCSEL_980nm.pdf
  - https://www.ieee802.org/3/cz/public/11_may_2021/perezaranda_3cz_01a_110521_50Gbps_850nm_demo.pdf
- According to https://www.ieee802.org/3/dh/public/July_2022/Presentation_dh_2_2022_July_watanabe.pdf 980nm is technically feasible for GI-POF
- There are no reasons to use different wavelength

Work to do (in blue)



MDI = MEDIUM DEPENDENT INTERFACE
XGMII = 10 GIGABIT MEDIA INDEPENDENT INTERFACE

NOTE—XGMII, 25GMII and 50GMII are optional

PCS = PHYSICAL CODING SUBLAYER
PMA = PHYSICAL MEDIUM ATTACHMENT
PMD = PHYSICAL MEDIUM DEPENDENT
PHY = PHYSICAL LAYER DEVICE

Conclusion

- This contribution proposes a close collaboration between 802.3cz and 802.3dh:
  - To avoid re-inventing the wheel in many common topics
  - To reduce as much as possible fragmentation of the automotive optical market: only the medium change
  - To provide the best PHY specification for GI-POF
- Most of the specifications can be leveraged
- Work to do: optical fiber characteristics and partial PMD specification (RX and link budget)
- Once the optical fiber characteristics are ready, link budget and RX characteristics can be derived using the same link model of 802.3cz

Thank you