

Architectural Issues for 40GBASE-T

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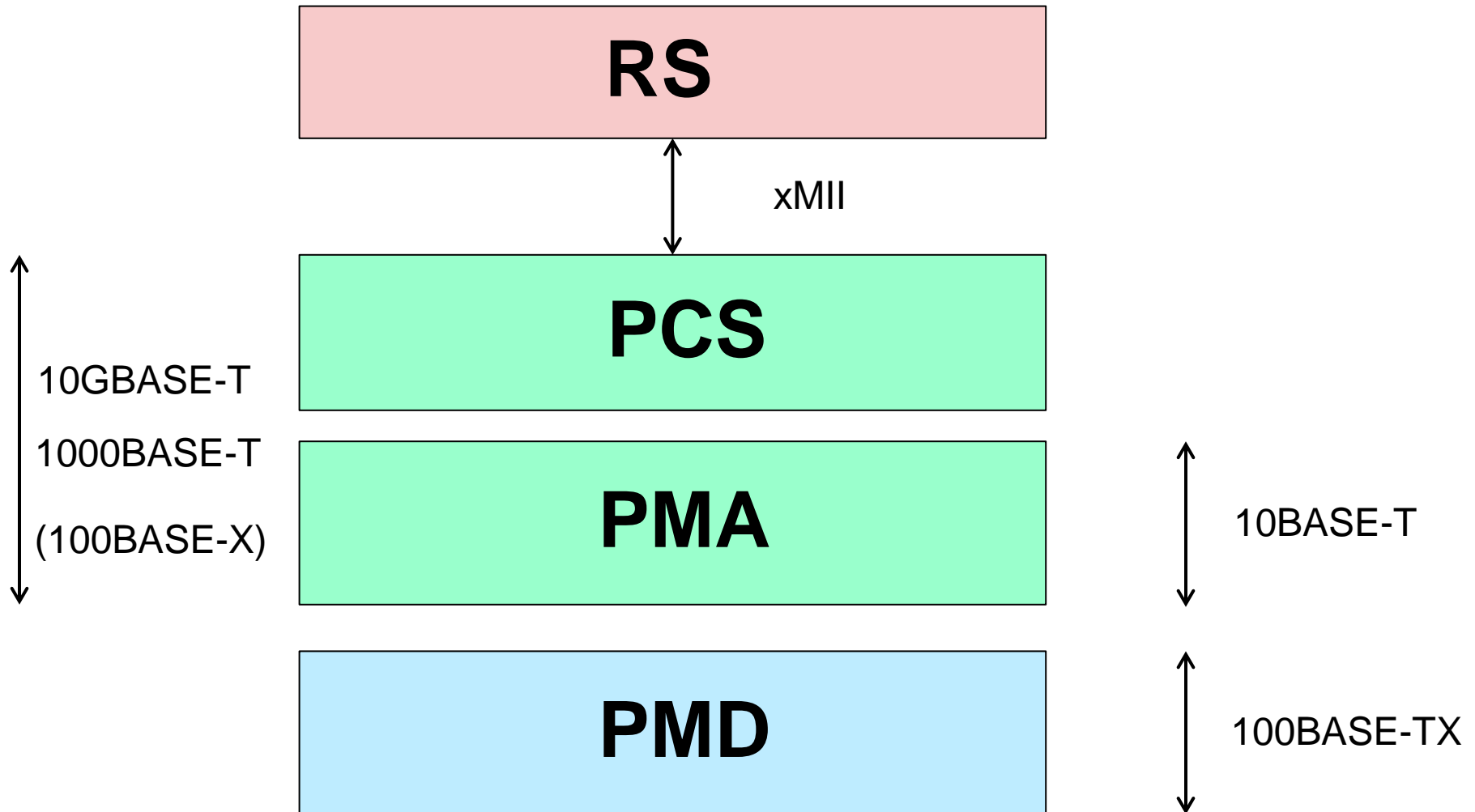
Intel

40GBASE-T – 3 decisions

- Layer architecture:
 - follow other BASE-T?
 - compatibility with .3ba architecture?
- Fast retrain support:
 - Do we need it for 40GBASE-T?
 - in same manner as .3az or new concept?
- EEE Fast Wake:
 - PCS only (as other PHYs)?
 - Specific to 40GBT?

Layer Architecture

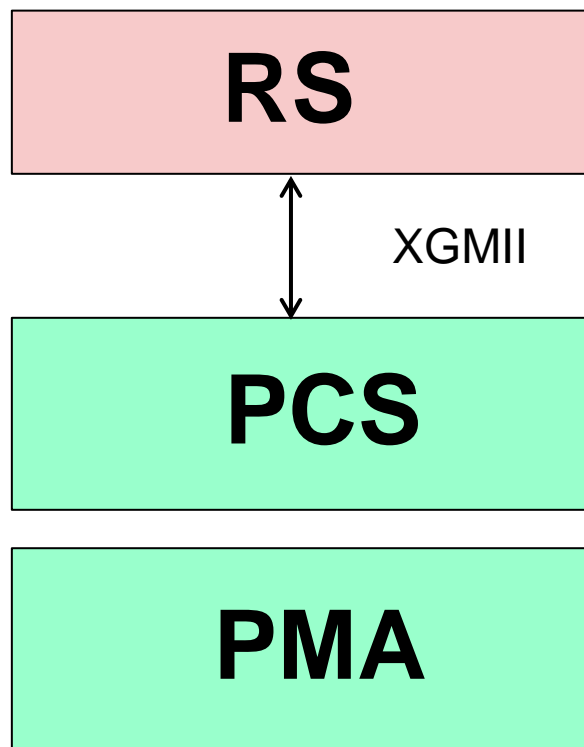
Generations of BASE-T PHYs



Assumed title for 40GBASE-T clause...

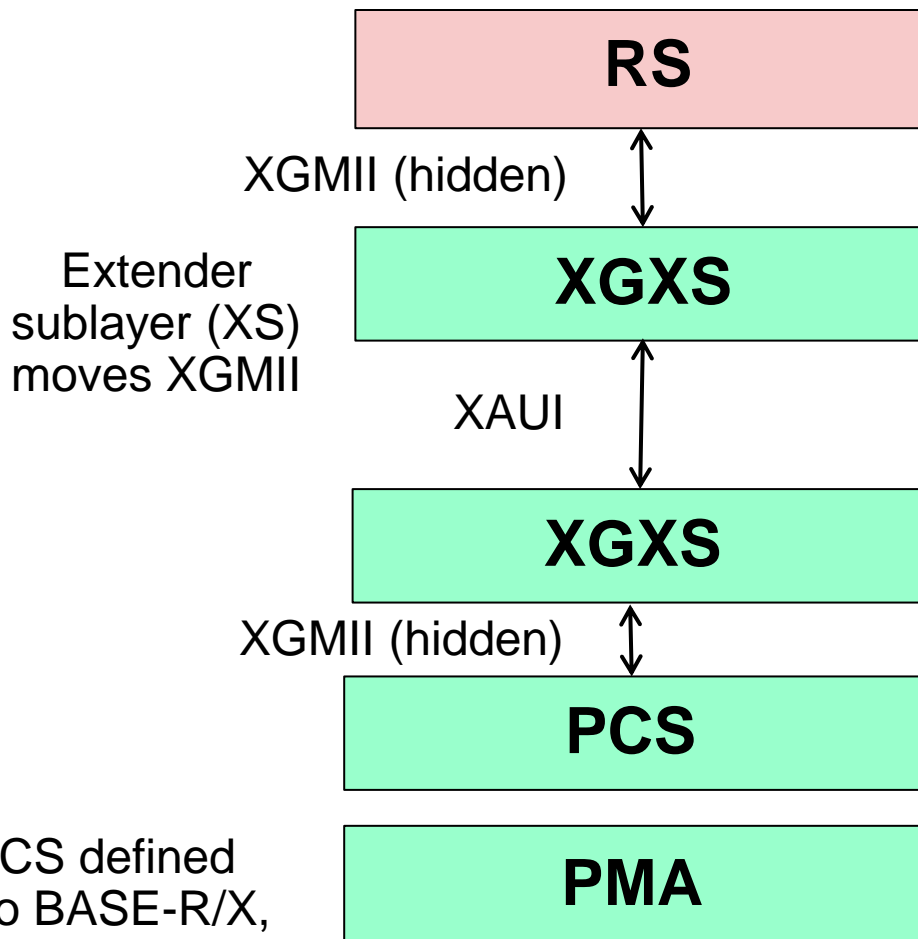
- **Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 40GBASE-T**
- But...
- This could create problems with 802.3ba architecture (for 40G & 100G PHYs)

10GBASE-T



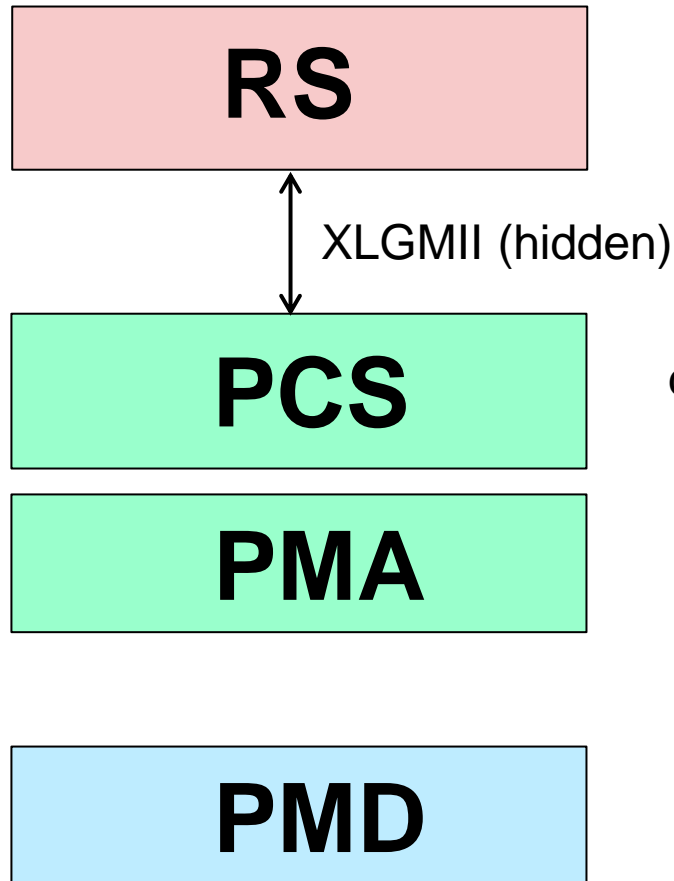
BASE-T PCS defined
separately to BASE-R/X,
but shares MMD

10GBASE-T, attached by XAUI

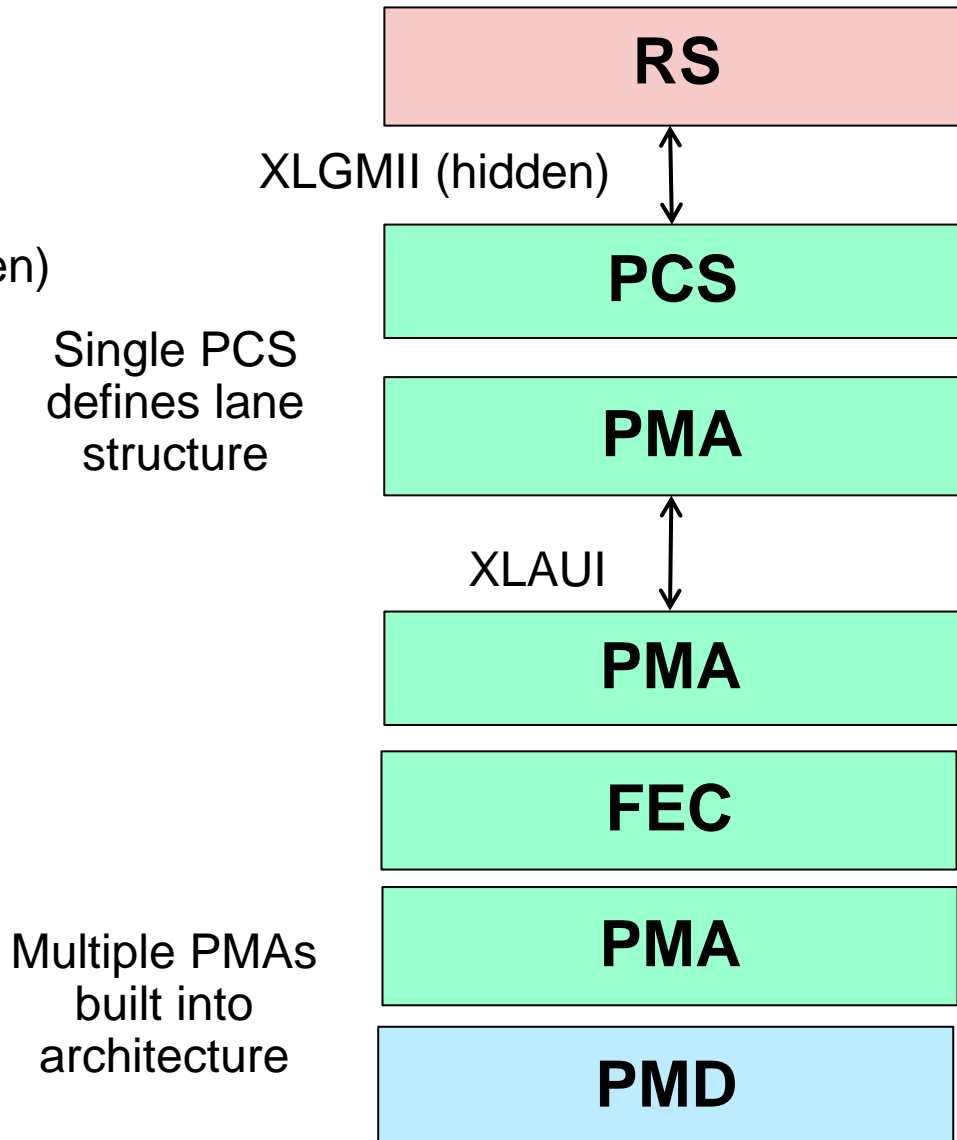


Extender
sublayer (XS)
moves XGMII

40GBASE-R

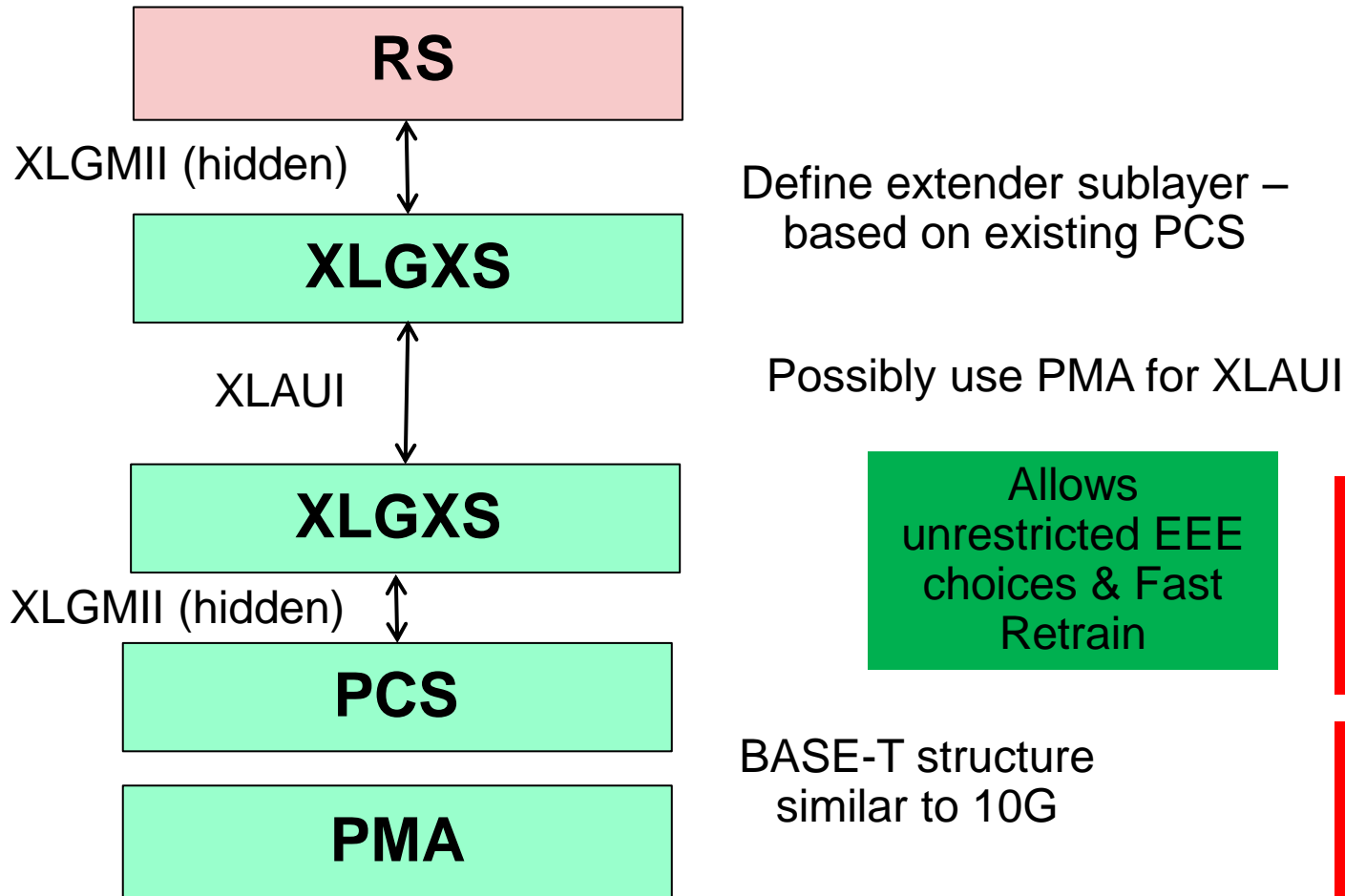


40GBASE-R, attached by XLAUI



40GBASE-T solution

Option #1 – old school approach

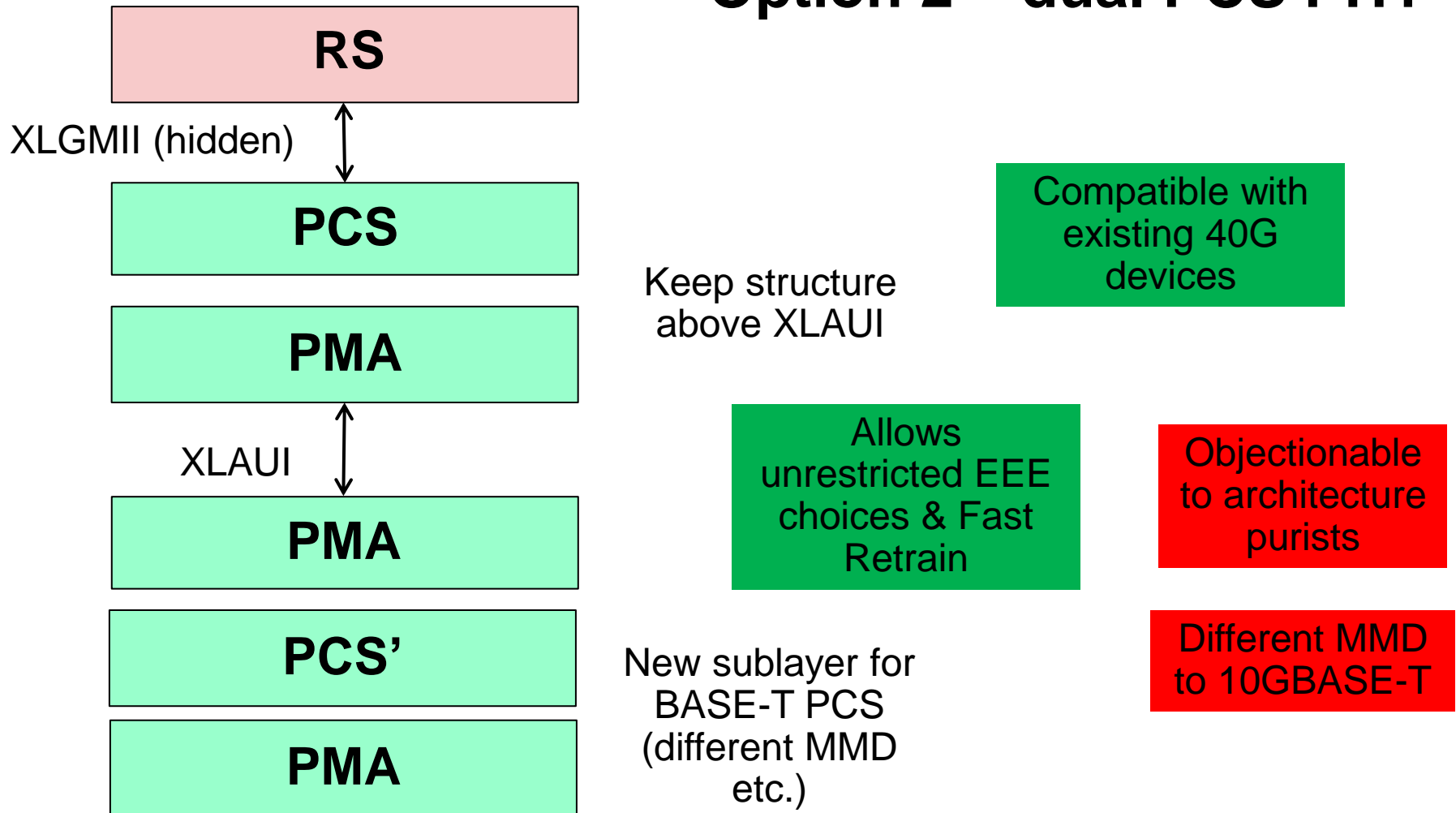


Problems with use of existing devices above XLAUI

Probably not acceptable for existing BASE-R community

40GBASE-T solution

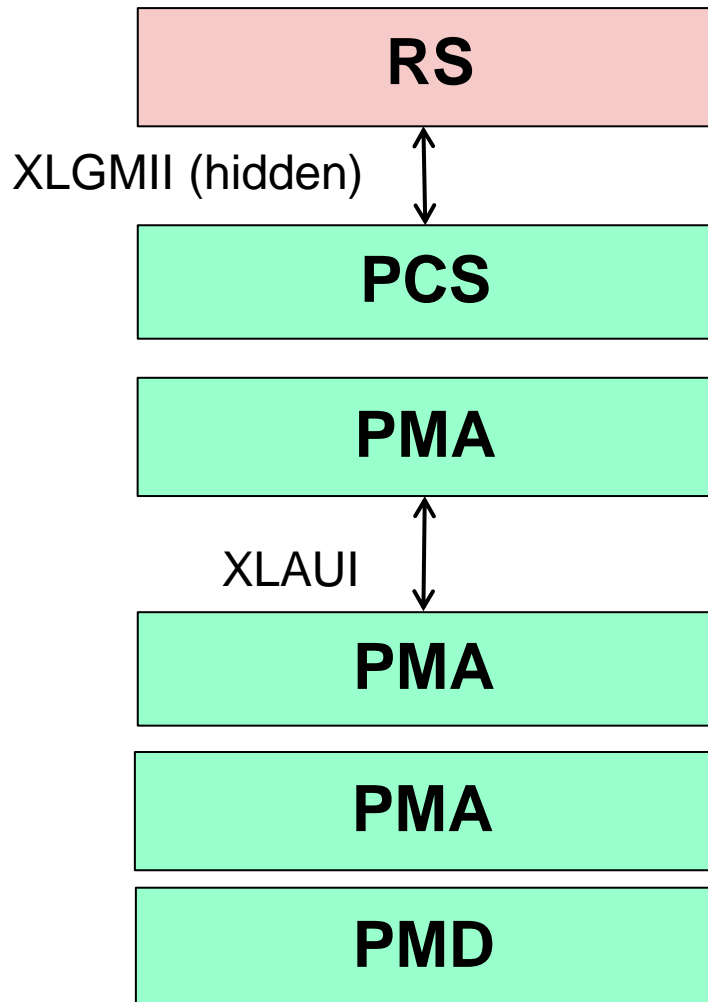
Option 2 – dual PCS PHY



(similar to 10GBASE-T with XFI)

40GBASE-T solution

Option 3 – BASE-T PMA/PMD



Keep structure of
40GBASE-R

Compatible with
40G architecture

Approach similar
to 100G copper

EEE behavior
governed by
PCS

Define
transcoding &
FEC in PMA (&
FEC sublayer if
necessary)

Fast Retrain
would require
Clause 82 edits

Choice required between 3 options

- **Choice must be made prior to baseline**
 - (for document structure, if nothing else!)
- **Choice may have impact on EEE and Fast Retrain decisions**
- **Old school approach** – v. disruptive to current architecture
- **Dual PCS approach** – ugly, but lowest impact
- **BASE-T PMA/PMD approach** – most constrictive for EEE & FR

Continuing with smaller decisions

- Fast retrain support:
 - in same manner as .3az?
 - new PHY, new concept?
- EEE Fast Wake:
 - PCS only (as other PHYs)?
 - Specific to 40GBT?

Fast Retrain

- Fast retrain was introduced during 802.3az
 - Reacts to changes in link characteristics
 - Particularly pseudo stationary RF
- Decisions for 40GBASE-T...
 - Do we want to support Fast Retrain?
 - In service link parameter changes
 - Maybe constant back-channel
 - What about link interruption?
 - (i.e. PMA/PCS signal back to RS to stop data for period of retrain)
 - React to non-stationary noise

EEE questions

- If 40GBASE-R PCS is controlling EEE...
 - Some options – (e.g. deep sleep timing)
 - Fast wake expected to operate PCS-PCS
 - Maybe some PMA/PMD savings for fast wake
- If 40GBASE-T PCS controls EEE, more decisions
 - Do we want fast wake at all?
 - If so, will it operate the same as for BASE-R?
 - (i.e. PCS-PCS communication continues)
 - Or other solution specific for 40GBASE-T?
 - (e.g. stop signaling, but maintain sync)

40GBASE-T – 3 decisions

- Layer architecture:
 - Fast retrain support:
 - EEE Fast Wake:
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- **How & when will these be resolved?**
 - **(before baseline completion)**

Thanks!