End-to-end FEC for 200G per lane applications in Data Center

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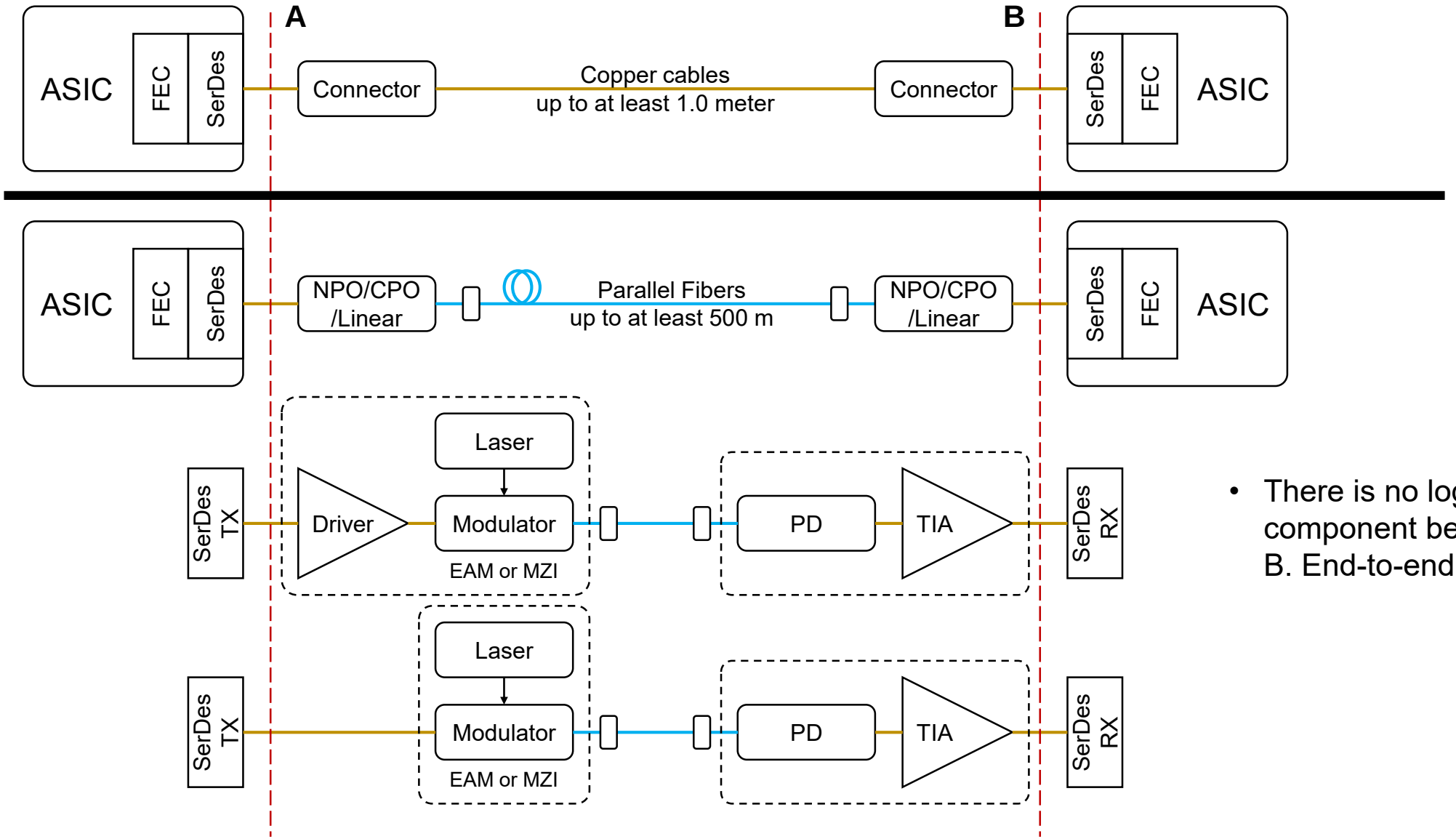
Requirements for Data Center applications

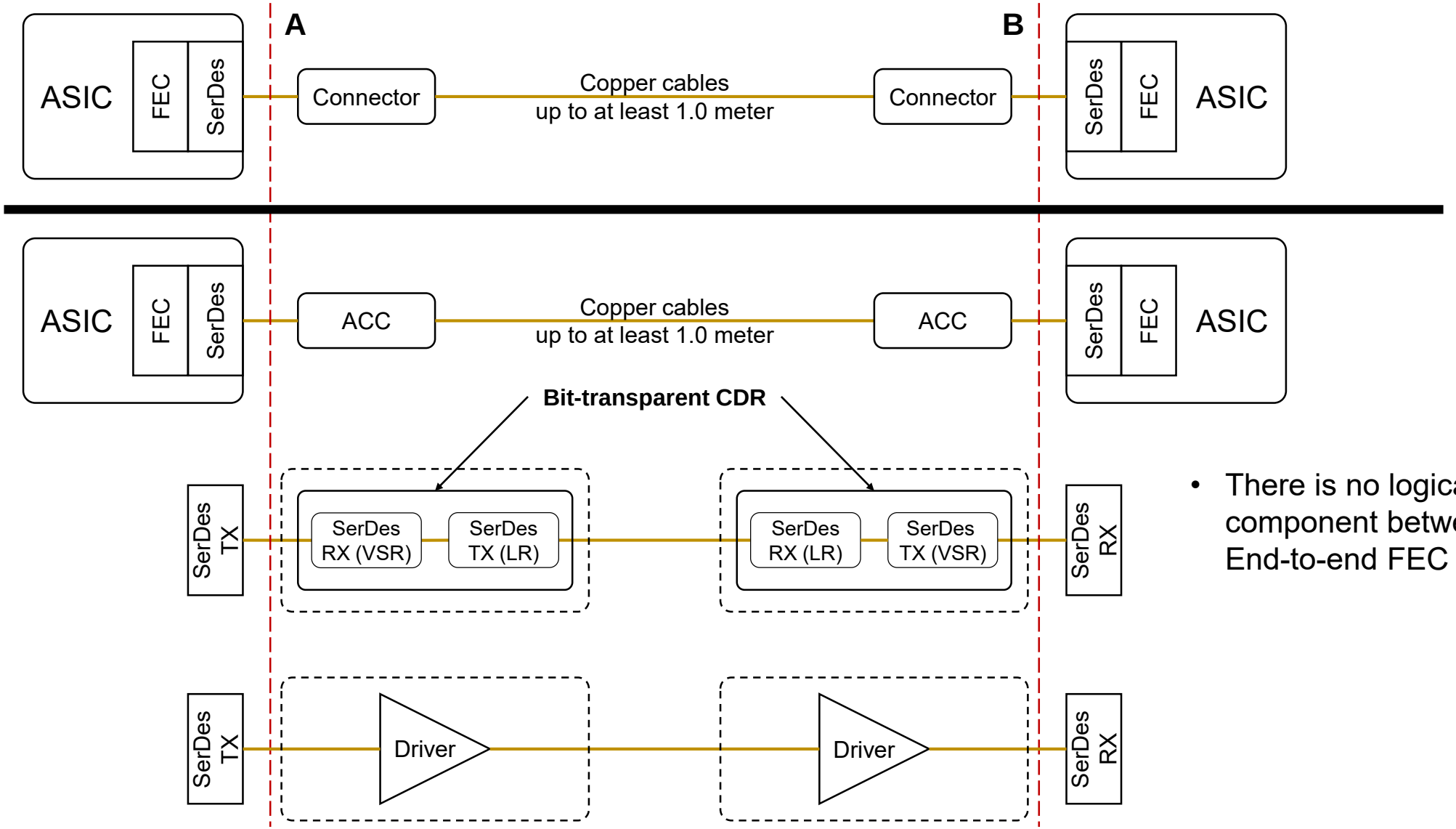
- For high density switches, the 800G module power dissipation should be ~16 W (yin_3df_01b_2207.pdf).
- Low latency for AI/HPC applications in datacenter as stated in yin_3df_01b_2207.pdf and zhuang_nea_01_220622.pdf. “FEC flexibility is needed to accommodate different PMDs (requirement)”.
- “Short” links cover a large portion of data center networks links (e.g. 79% up to 500m in stone_b400g_01_210503.pdf).

Applications where End-to-End FEC is needed (NPO/CPO/Linear)



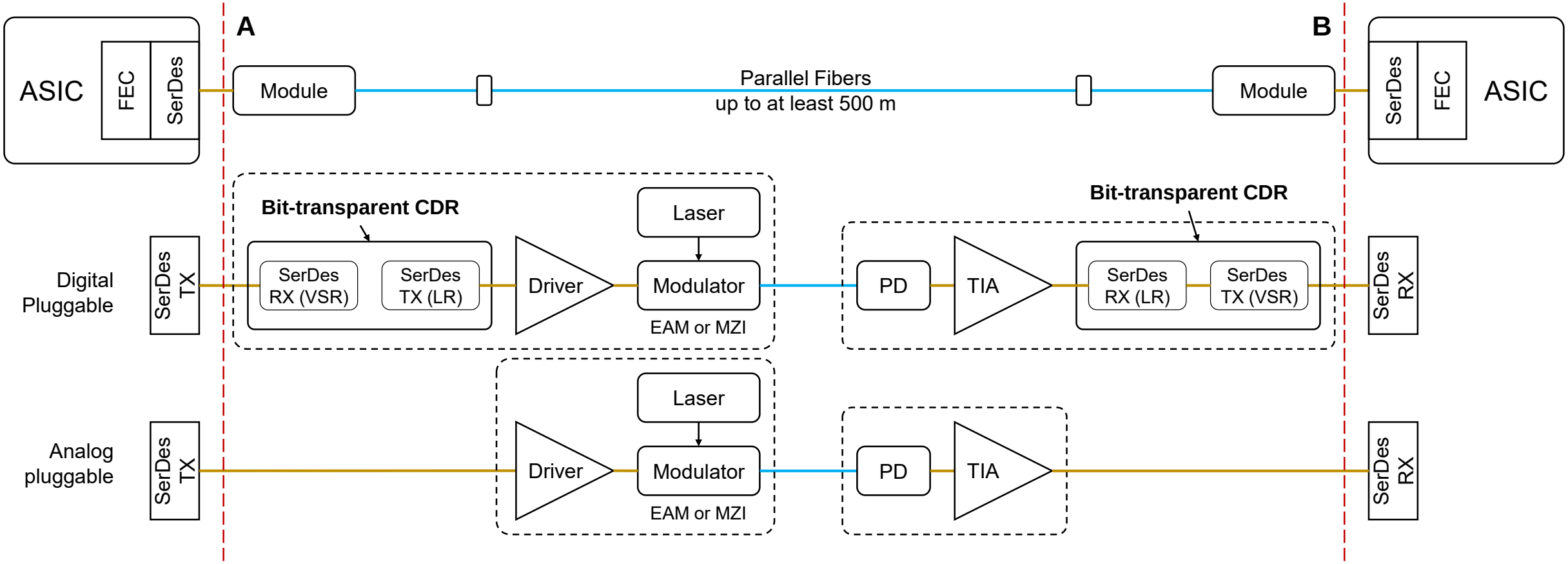
- There is no logical processing component between point A and B. End-to-end FEC is mandatory.

Applications where End-to-End FEC is needed (Copper/ACC)



- There is no logical processing component between point A and B. End-to-end FEC is mandatory.

Applications where End-to-end FEC is optimal (DR)



- We presented simulations and experiments using a EML device for 200G/L PAM4 transmission for DR applications (li_3dj_01a_230206), in which signaling rate of 106.25GBd could be viable for 200G/L parallel fiber and could leverage existing 100G/lane KP4 FEC.
- FEC processing inside the CDR is sensitive to latency and low-power consumption requirements.

Discussion about end-to-end FEC for DR applications

- The contributions about using end-to-end RS(544, 514) FEC for DR applications. simms_3df_01_221005 , welch_3df_01a_221011 , ingham_3df_01_221011, li_3dj_01a_230206.

- lu_3df_01b_220215, lu_3df_logic_220425, lu_3df_01a_2211 illustrates why end-to-end FEC architecture is always the best choice that we should pursue.

Summary

- End-to-end FEC is optimal for short links (DR) since it provides low latency and low power consumption.
  - End-to-end FEC is needed for 200G per lane CPO/NPO/Linear/Copper/ACC links.
- End-to-end FEC can be achieved in short links (DR)
- Suggest End-to-End FEC for DR reaches while for difficult channels concatenated FEC can be used.