Towards a 200G/lane Backplane Objective

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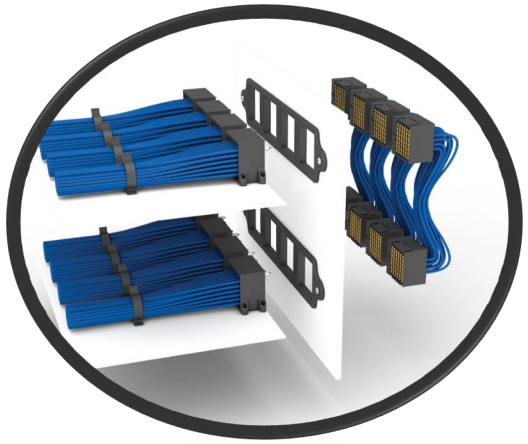
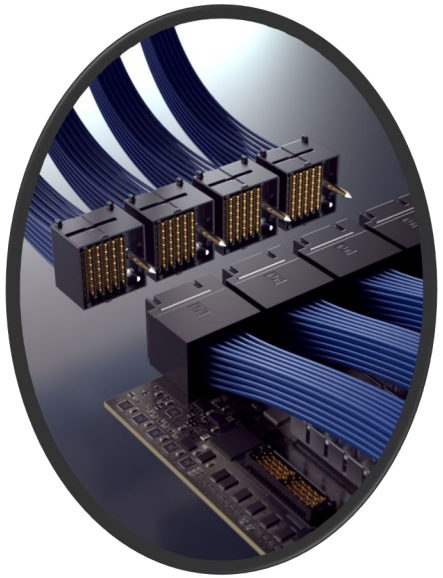
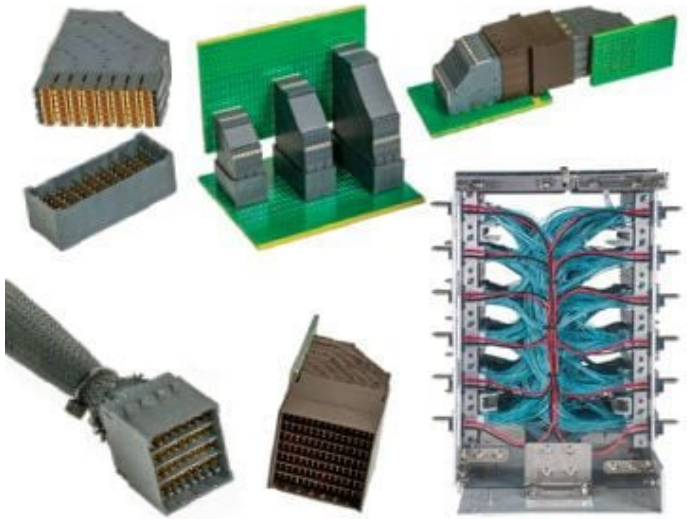
What we know today versus one year ago?

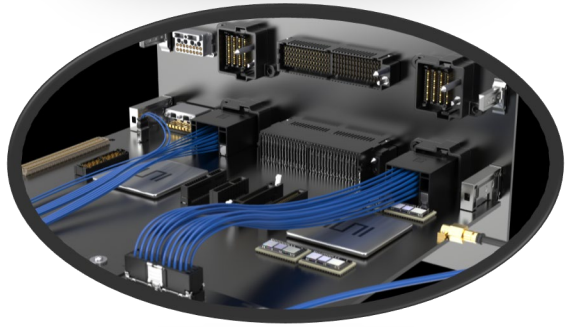
- Original P802.3df TF split to two Task Forces
  - Welcome P802.3dj 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Task Force!
- PAM-4 Modulation selected for 200 Gbps/lane Optics (500m and 2km), and 200 Gbps/lane AUIs. Expect reaffirmation by 3dj
  - See https://www.ieee802.org/3/df/KeyMotions_3df_221117.pdf
  - Nyquist frequency = 53.125GHz
- Backplane PHYs still being broadly used Ethernet deployments today
  - Individuals have submitted backplane-like channels for consideration by the TF (see: https://www.ieee802.org/3/df/public/tools/index.html)

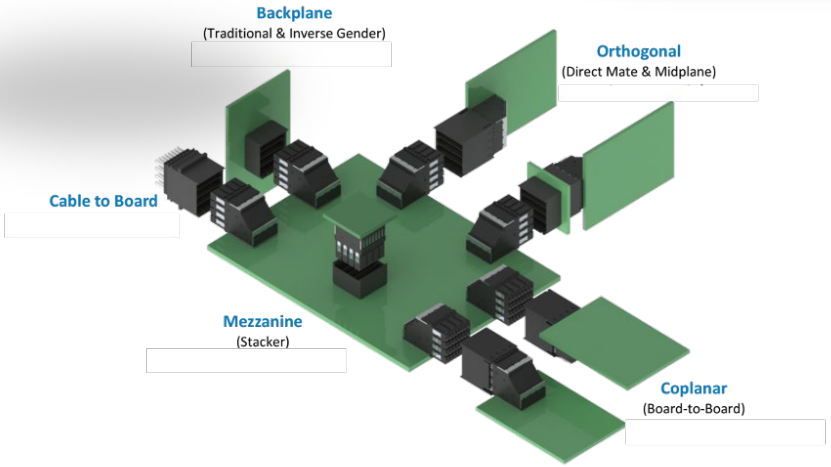
Backplane Interconnects of Today and Tomorrow

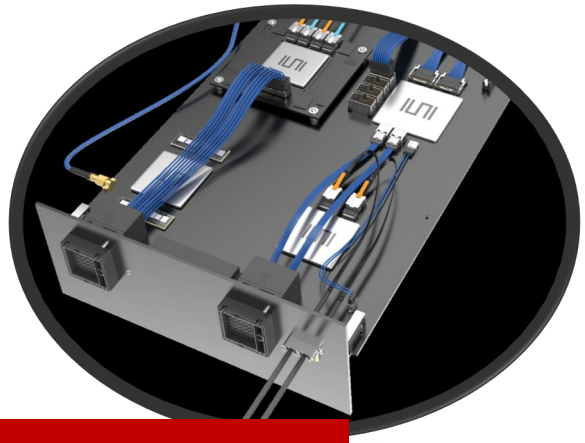






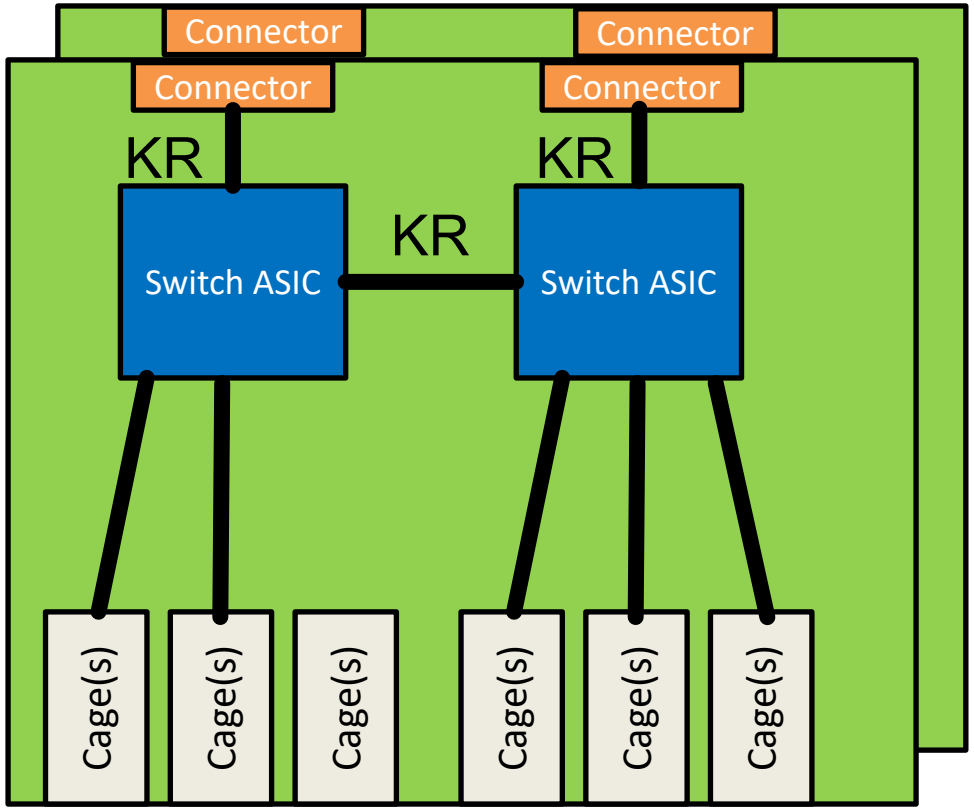




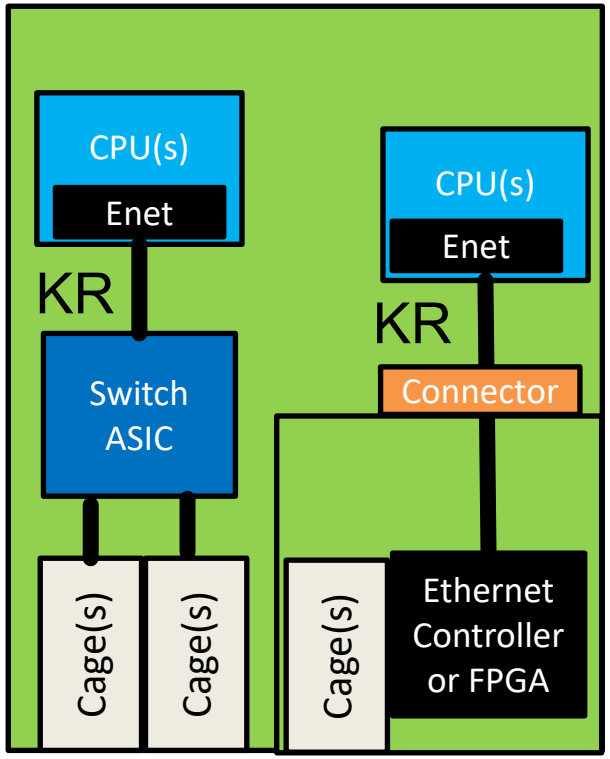


Backplane Ethernet is more than a “traditional” PCB backplane

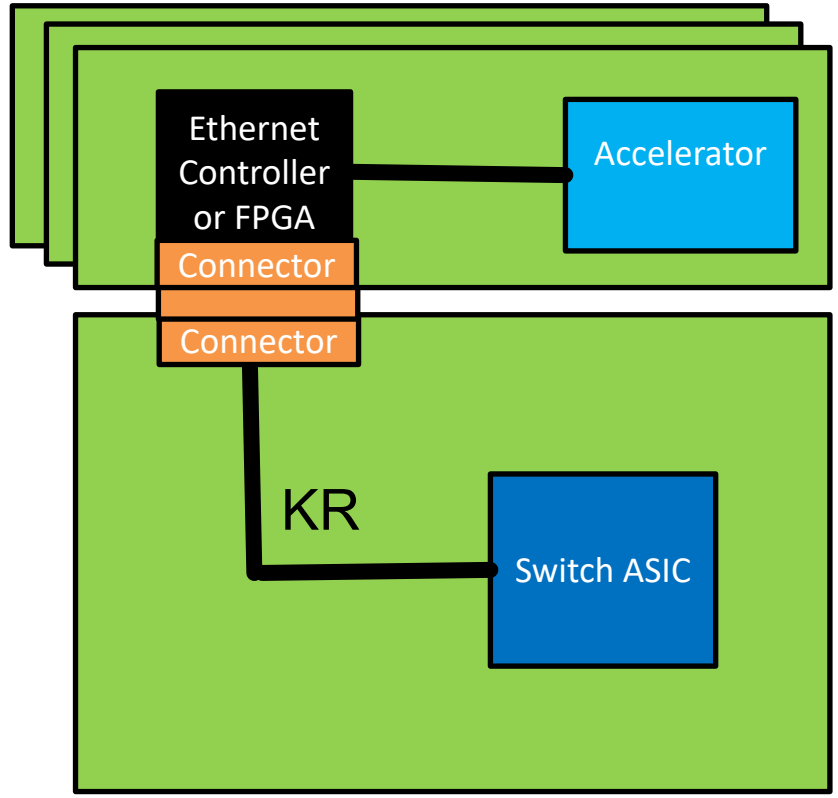
Some Examples of How Backplane PHYs are Used



Switches (inter line-card)



Telcom System



Blade System

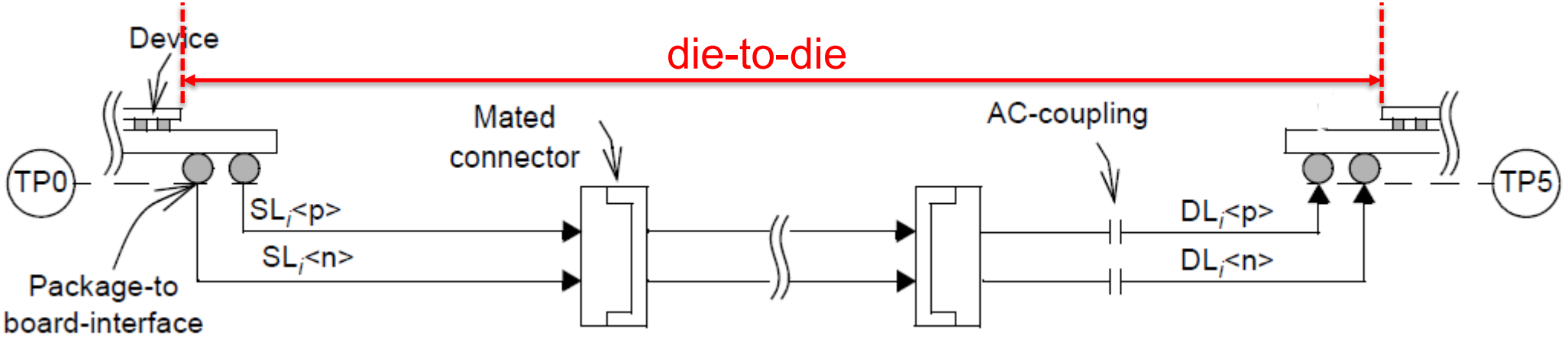
Backplane Ethernet rates need to scale to support user needs

Revisiting the Backplane Objective Format

- For the last ~10 years (3bj, 3by, 3cd, 3ck, 3df), backplane objectives were implied as “ball to ball” (TP0-TP5)
  - Example from P802.3df: “Define a physical layer specification that supports 800 Gb/s operation over eight lanes over electrical backplanes supporting an insertion loss ≤ 28dB at 26.56GHz”
  - https://www.ieee802.org/3/df/proj_doc/objectives_P802d3df_221117.pdf
- However, the backplane channels includes fixed packages at both ends
- At 200 Gbps/lane, we may find a broader application space by using a more holistic definition of the backplane channel including the packages

Proposed Backplane Objective Format

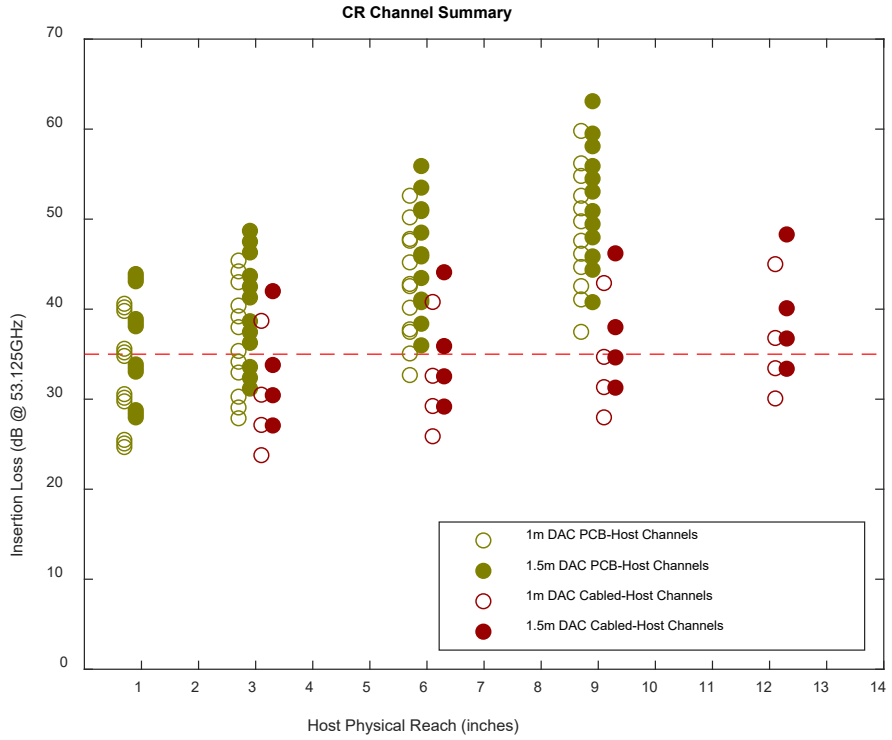
- Reshape the backplane objective format to be inclusive of the package structures → die-to-die
  - Test points and compliance methods would be a subject for baseline proposals
- Example: “Define a physical layer specification that supports [n*200] Gb/s operation over [n] lanes over electrical backplanes supporting an insertion loss ≤ X dB (die-die) at 53.125 GHz”



Potential Path to Enable Passive Copper Cables

- Backplane can set the channel die-to-die loss guardrails for all passive interconnect

- An objective specifying die-to-die loss would significantly help the analysis of passive copper cable, which has been an open request by the TF



https://www.ieee802.org/3/B400G/public/21_08/kocsis_b400g_01a_210826.pdf

Proposed Straw Poll #1

- I am interested in backplane PHY objectives for 200Gbps/lane rates
- Y, N, A

Proposed Straw Poll #2

- I would support adopting a set of 200 Gbps/lane backplane objectives of the form:
  - “Define a physical layer specification that supports [n*200] Gb/s operation over [n] lanes over electrical backplanes supporting an insertion loss ≤ X dB (die-die) at 53.125 GHz”
- Y, N, A

THANKS!

Objectives as documented in P802.3ck

- Define a [n-lane, 100G/lane] PHY for operation over twin-axial copper cables with lengths up to at least 2 meters

- Define a [n-lane, 100G/lane] PHY for operation over electrical backplanes supporting an insertion loss ≤ 28dB at 26.56GHz