Co-packaged Optics for Facebook

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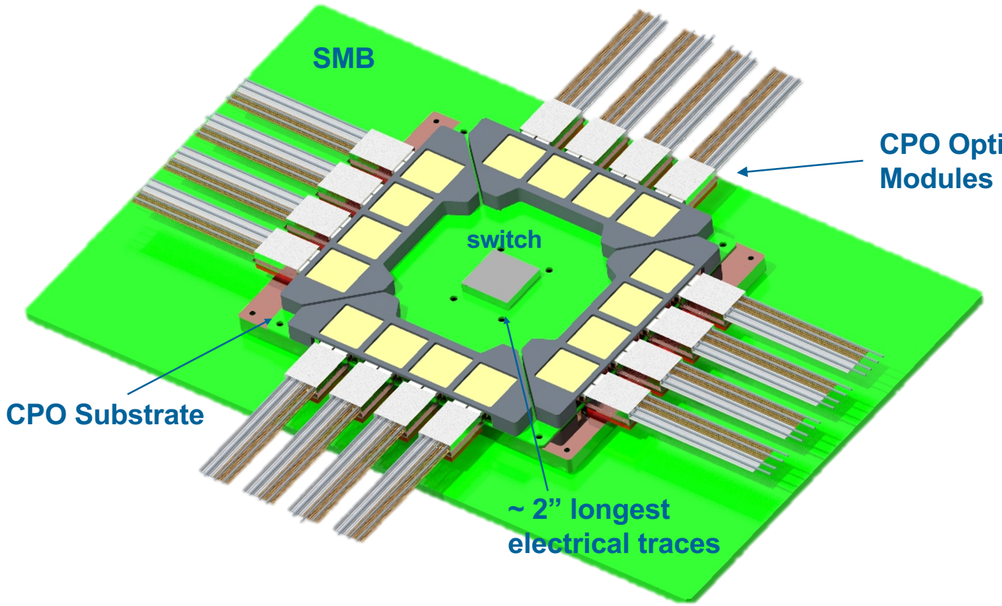
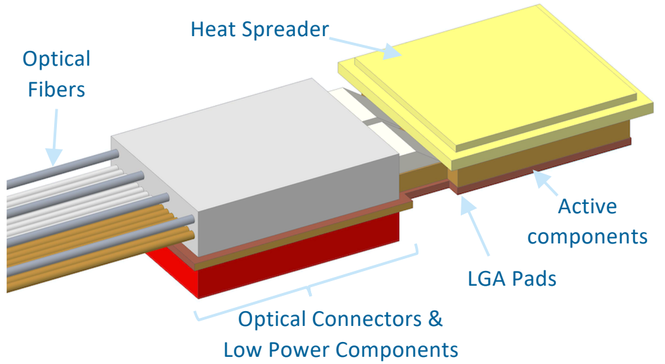
FACEBOOK Infrastructure

CPO Conceptual View



CPO Switch Main Board (SMB) View (Concept only)



- Two optical PMDs supported:
  - 8×400GBASE-FR4
  - 8×400GBASE-DR4
- Two laser options
  - Internal laser (within CPO module)
  - External laser (outside CPO module)
- Critical features
  - Highly integrated 3.2 Tb/s Optical Module
  - Low power
  - Tight channel pitch
  - retimed (AUI) XSR C2M interface

Source: OIF (Feb 2021) by Jeff Rahn (FB) & Mark Filer (MSFT)

- Move optics closer to switch → shorter electrical channels, less serdes power

Challenges at Scale

Reliability

- Challenge for CPO vs Front Panel Pluggable (FPPs)
- Serviceable External Laser Source vs Redundant Integrated Laser Source

Upgradeability

- Minimize disruption to network during upgrades
- Backwards compatible modes 200GE 4 x 50G → 100GE 4 x 25G
- Forward compatibility desirable

Infrastructure Reuse

- Compatibility with existing network topology → scale up switch bandwidth while preserving radix
- Maintain networking power footprint gen over gen

Ecosystem

- Interoperability and flexibility – open, standardized interfaces
- All levels of the supply chain to support the migration of CPO

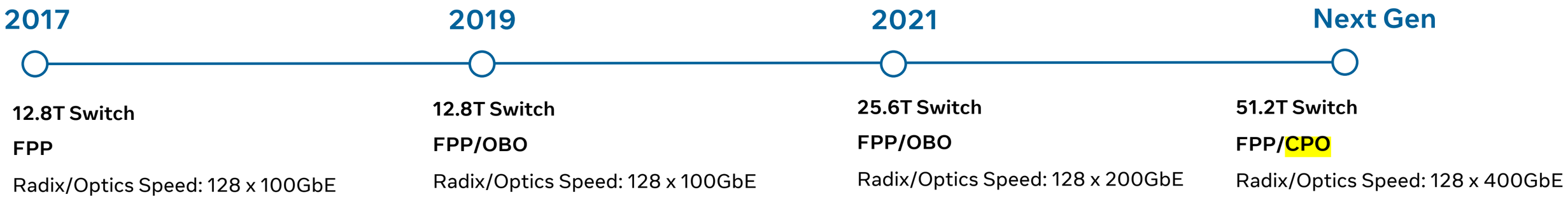
Facebook Vision

Desired End-state:

- Interoperable ecosystem of CPO optics and silicon enabling flexibility and choice
- Benefits: supply chain redundancy, minimize reliance on single supplier, and enable innovation
- Preserve best of breed optionality

Call for Action:

- Standards supported ecosystem is required for wide adoption. Participation is encouraged
  → Microsoft / Facebook JDF *www.copackagedoptics.com*
  → OIF CPO Project
  →COBO : CPO working group



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