On the Broad Market Potential of the 800 Gb/s 4 wavelength 2km on Single Mode Fiber Objective

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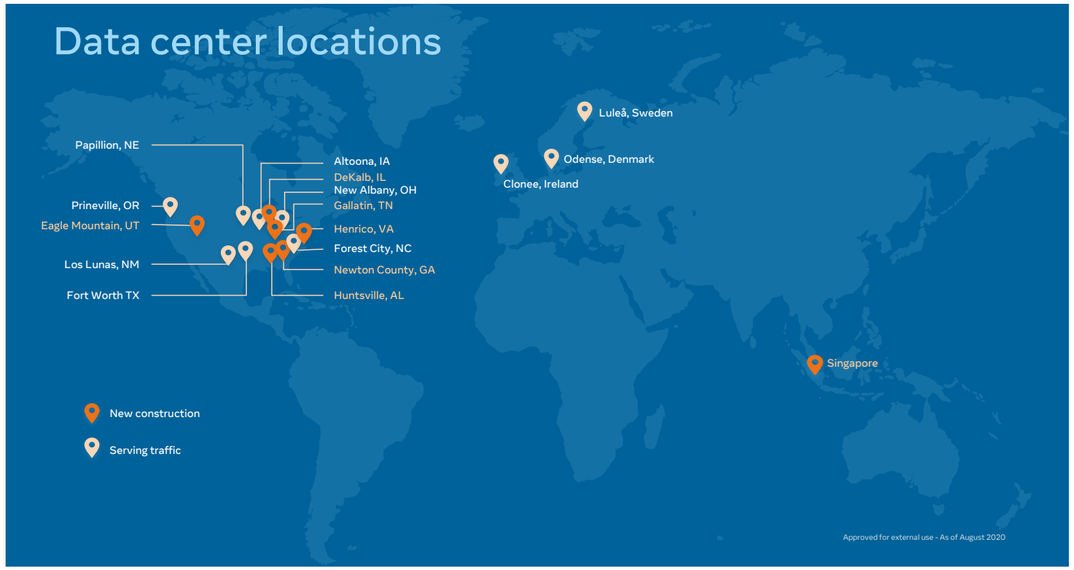
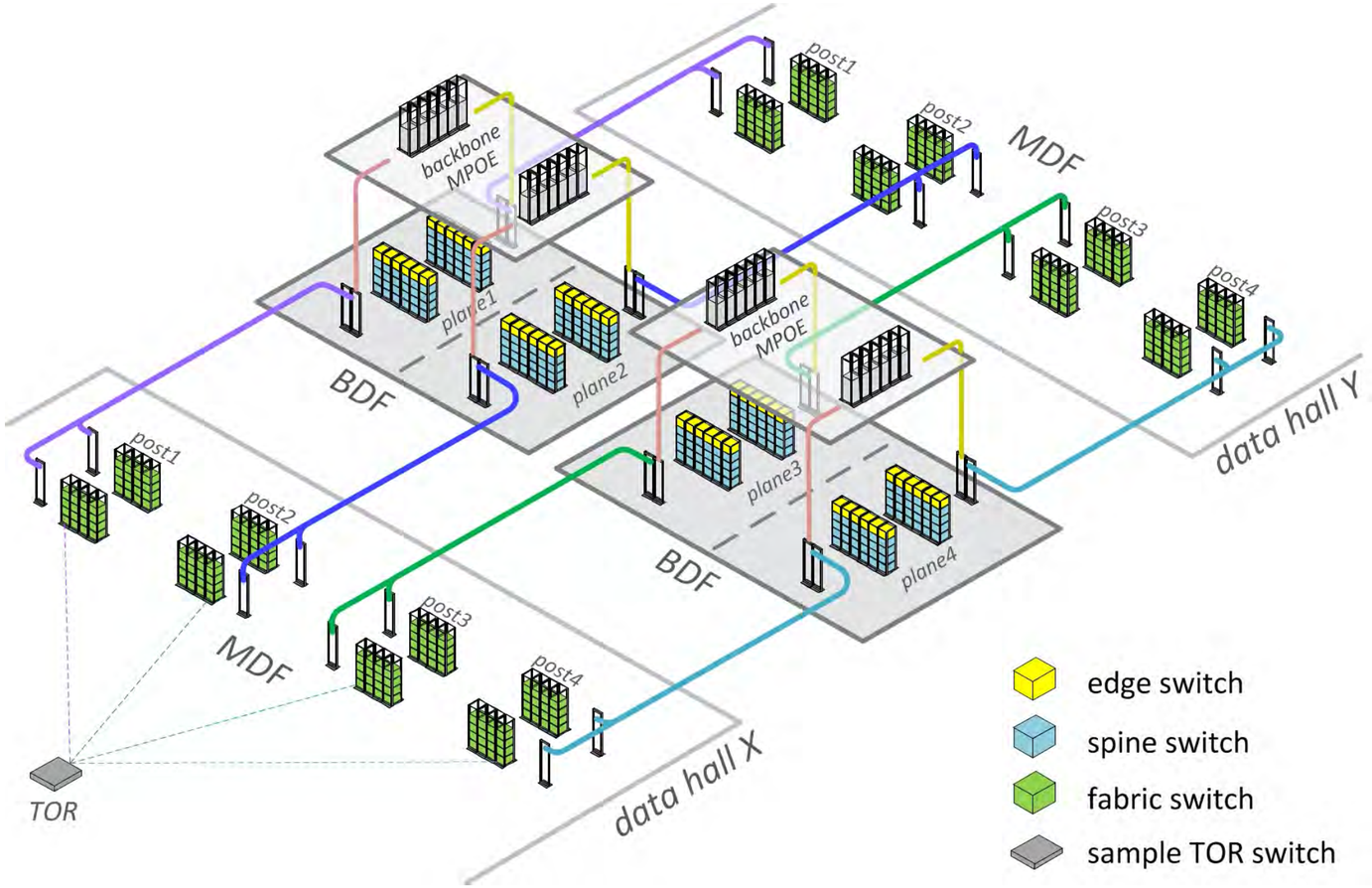
Facebook

FACEBOOK Infrastructure

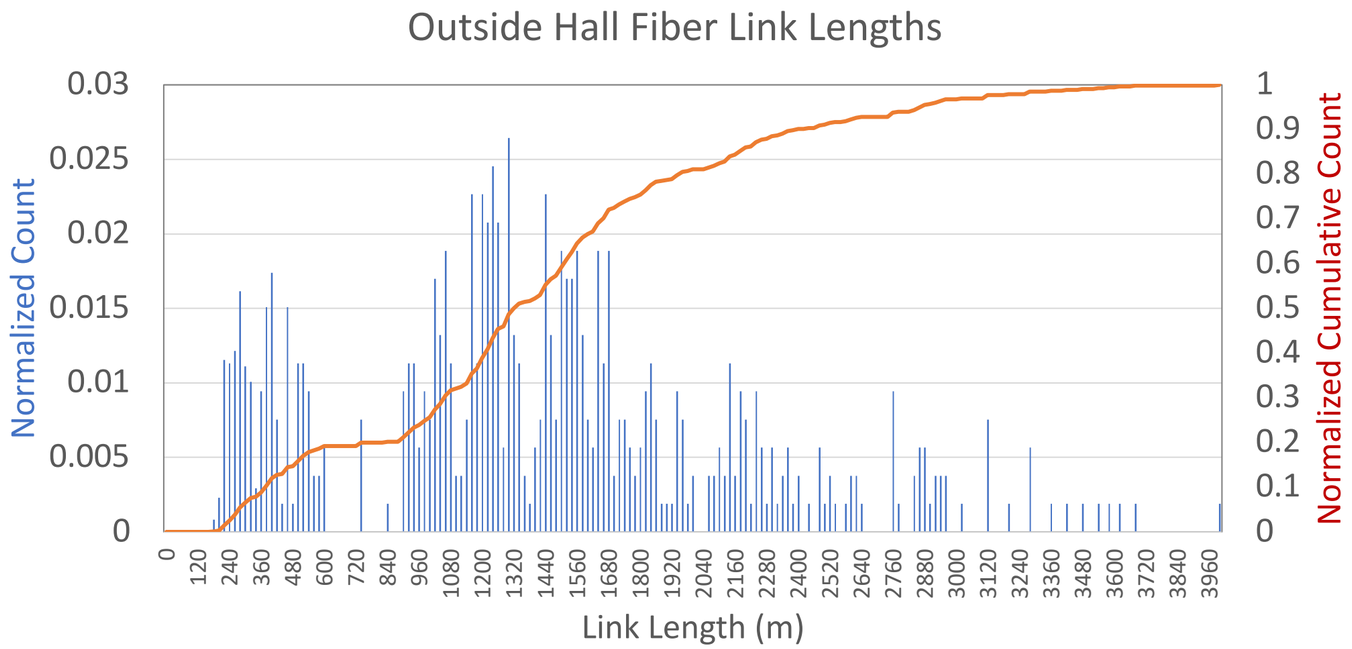
Facebook Data Center Properties



Physical Site Layout



SMF Interconnect Link Lengths



Summary: Inside + Outside Data Hall Links:

Length	Total Number of Links
Up to 500m	79%
Up to 1000m	81%
Up to 2000m	95%
Up to 3000m	99%

Operation at Scale

- Need to optimize for uniformity!
  - Use of a single part code to cover all applications is highly desirable for operational simplicity
- Currently Facebook use a single optical PMD for the datacenter fabric links to support the superset of reaches
  - 200G: 200G-FR4-OCP
  - 400G: 400G-FR4-OCP (to be published)
  - Planned adoption of subsequent interface will be 800G-FR4
- These are derivatives of the IEEE parent specifications with the following modifications (200G example):
  - Narrower wavelength range (enabled by tighter case temperature range in DC environment)
  - 3km reach (to support hyperscale infrastructure, as shown here)
- Note: retaining a 4 wavelength PMD which is backwards compatible with existing legacy interfaces (in “down-speed”) mode is highly desirable for ease of network upgrade

Summary

- Non IEEE derivative –FR4 specifications exist to satisfy a broader market
  - These use effectively identical components to the IEEE spec, subject to different test criteria
  - 2km reach is insufficient to support Facebook data center use case for 800GBASE-FR4
- Co-packaged optics suggests a PMD to cover this application space is even more critical
  - Hard to build mix / match optics tailored to different link distances once you migrate away from pluggable optics
- Suggest the study group consider adopting “at least 3km” language for the objective to cover both inside and outside data hall applications and increase broad market potential for the 800GBASE-FR4 application

Thank you!