

400G SMF Data center objectives

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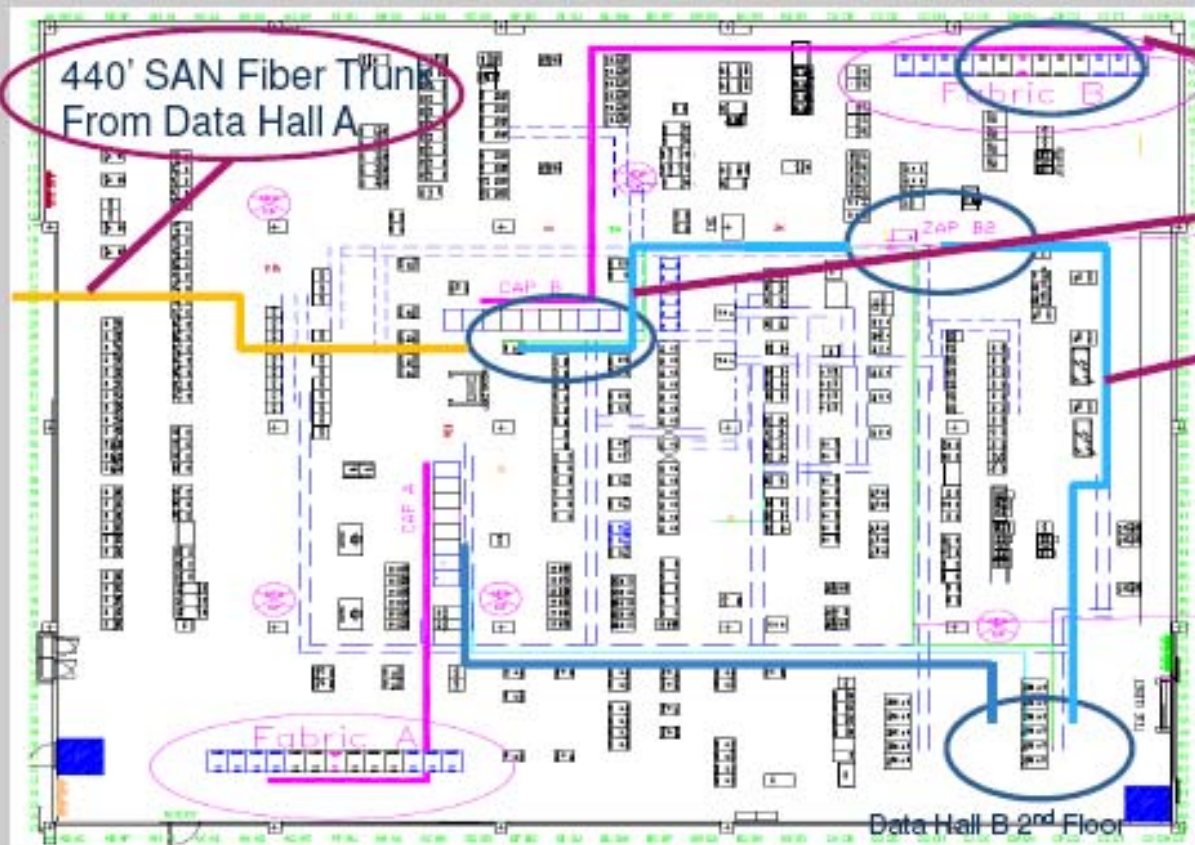
Luxtera

Data center media usage

- Some data centers use mixed media
 - Uses MMF for shorter reaches, SMF for longer reaches
 - Past solutions have taken advantage of lower cost MMF modules
- Some data centers have SMF only
 - Use SMF for both short and long reaches
 - Takes advantage of cost savings of a single media

Mixed Media Data Center

24K SqFt. Traditional Data Hall with Structured Cabling



440' SAN Fiber Trunk
From Data Hall A

150 Ft. Fiber Trunk
Switch To Central Patch

70 Ft. Fiber Trunk
Central To Zone

140 Ft. Fiber Trunk
Zone to Cabinet

(LAN) 360 Ft of Fiber
(.25dB fiber Loss)

(SAN) 650 Ft of Fiber
(.60dB fiber Loss)

4 Mated Pairs @ .5 dB
(2 dB of Connector
Loss)

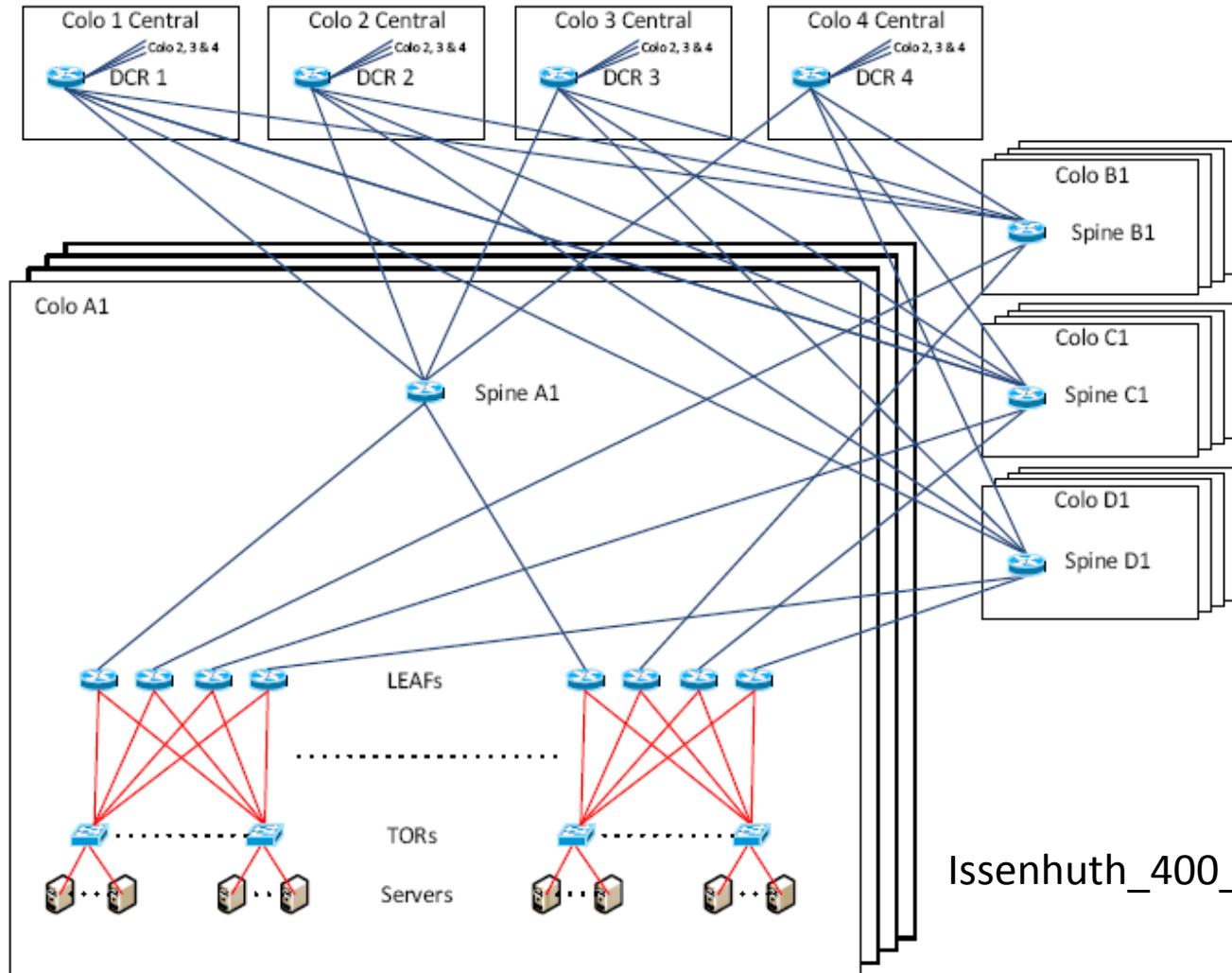


Represents mated pairs of Fiber Connectors

Courtesy DCS

SMF only data center

Representative Data Center Campus Interconnections



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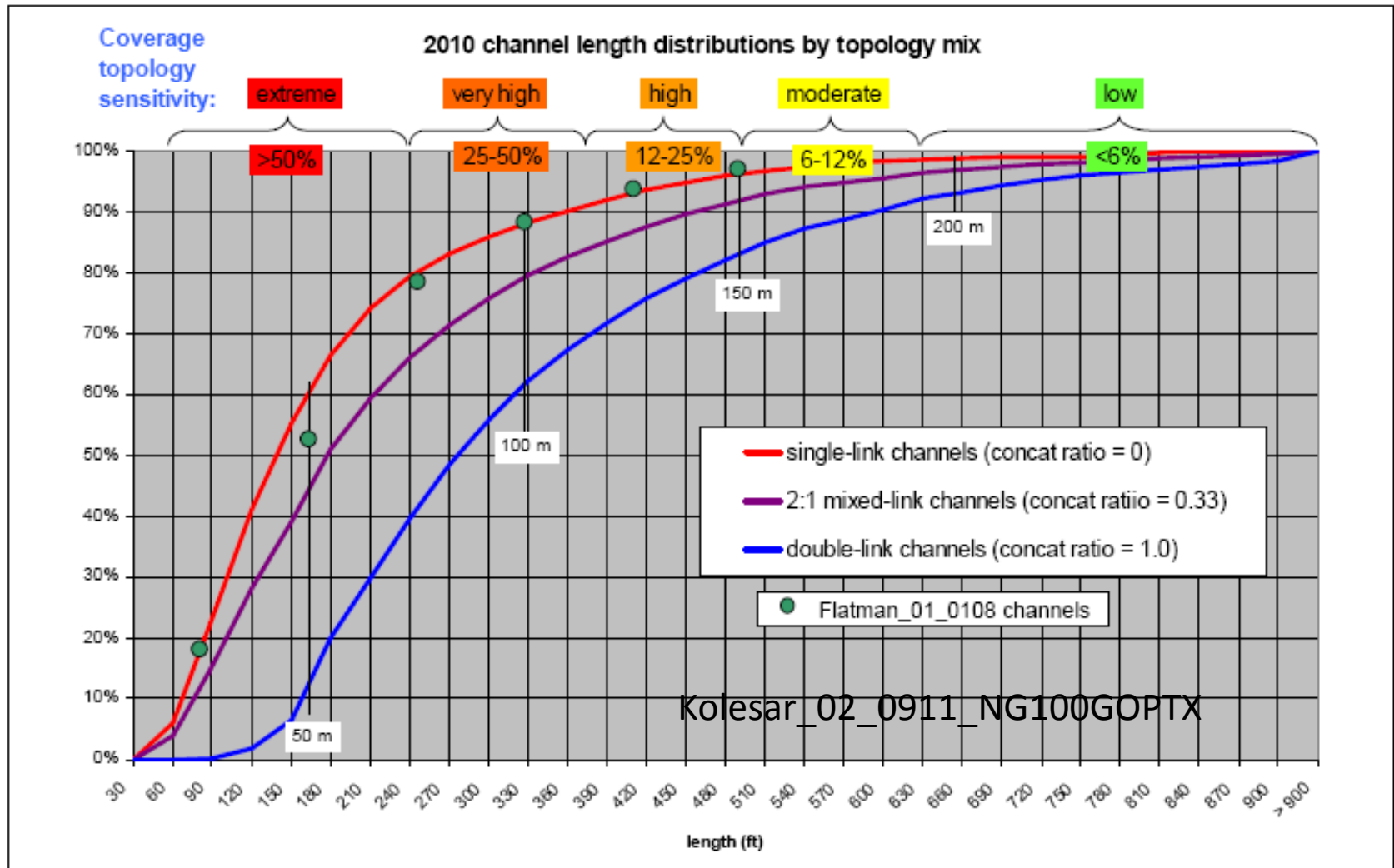
SMF data center (continued)

A End	Z End	Link Quantity	Link Length	Type of interconnection
Server	TOR	10,000s	.5-3m	TwinAx
TOR	LEAF	1,000s	1-20m	AOC
LEAF	SPINE - local	100s	20-300m	SM fiber
LEAF	SPINE - inter building	1,000s	100-400m	SM fiber
SPINE	DCR	100s	100-1,000m	SM fiber
INTRA METRO		100s	1,000m+	SM fiber

Broad Market Potential

- Each data center type is best served with multiple objectives
 - provides a cost effective overall solution
- Derive reach/objective from market sizing
 - Objective 1 = shortest 75%
 - Objective 2 = middle 20%
 - Objective 3 = longest 5%

Link Distributions in 2010 (We need this for 2015)



What can we say about the future?

- Data centers are getting larger (both new and expanded)
 - Fiber interconnect lengths grow proportionately
- Data center architectures are changing
 - More operators moving towards SMF

Conclusion

- For Broad Market Potential 400G should consider objectives that minimize the overall interconnect cost of the data center.
 - Data centers require:
 - a mix of MMF, SMF
 - all SMF
 - We should not shy away from multiple objectives