

Parallel SMF (PSM) in the Data Centre - End User Survey -

Alan Flatman, Independent
+
Brad Booth, Independent

Contributors

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- **Jonathan Jew, J&M Consultants**
- **Lisa Huff, Discerning Analytics**
- **Lone Hansen, BSRIA**

Need to Assess Acceptance/Reluctance of PSM in the Data Centre

- PSM4 is 1 of 5 candidates for P802.3bm 500m SMF objective
- *mixed messages* being received on PSM
 - a question of system cost effectiveness?
 - will it fit with existing SMF infrastructure?
 - does PSM offer evolutionary potential?
- need for an independent assessment
- no conclusions have been drawn by the authors - this is intentional!
- **survey also relevant to 400G Study Group**

Survey Approach

- ***early adopter* respondents only**
- **EDCs and IDCs the main focus**
- **2-tier and 3-tier DCs considered**
- **survey conducted for IEEE 802.3**
- **all survey data to be anonymous**
- **respondents get copy of survey**

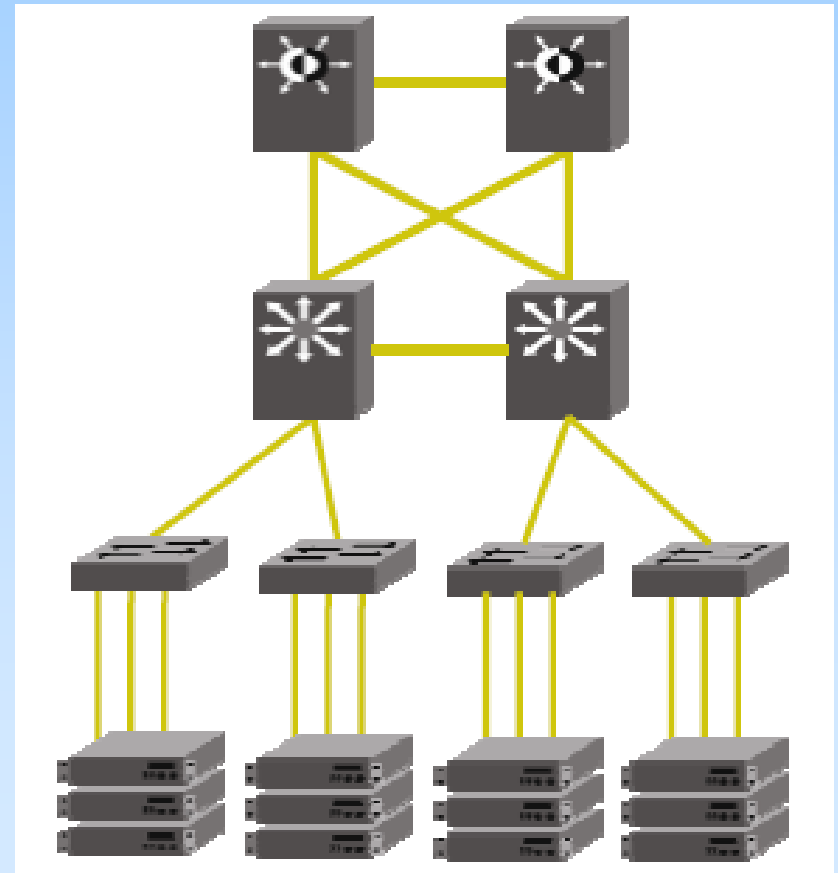
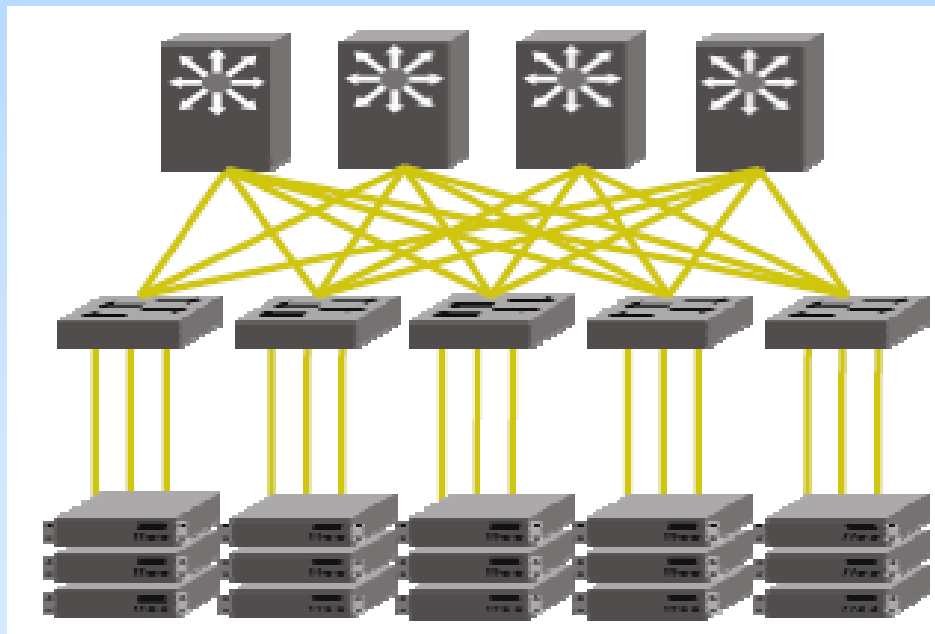
Survey Questionnaire

- DC area including elec+mech rooms
- total physical servers in data centre
- max length of tier-2/3 Ethernet links
- installed and planned optical fibre
 - duplex & parallel MMF
 - duplex & parallel SMF
- install PSM if system cost effective?

Would you install parallel SMF+MPO connectors for 100G & higher speeds if the total cost of cabling + optical modules was similar to the total cost of duplex SMF + LC connectors + modules?

Survey Responses – DC Types

- EDC/IDC mix approx 50:50
- 2/ 3-tier architecture approx 50:50



Survey Responses - Dimensions

- **responses from 6 very large EDC/IDCs**
- **total DC real estate ~2.5 million sq. ft**
- **total server count exceeds 120,000**
- **max link length reported was 1,000m**
 - **155m max link in 370,000 sq. ft EDC**
 - **250m max link in 1.4 million sq. ft IDC**
 - **15km max link for remote connections**

Survey Responses - Cabling

	#DCs Installed	#DCs Planned
Duplex MMF Support	6	5
Parallel MMF Support	2	2
Duplex SMF Support	6	6
Parallel SMF Support	1	1

Survey Responses - PSM Attitudes

	#DCs
<i>Would</i> deploy PSM if system cost was less than duplex SMF system	2
<i>May</i> deploy PSM if system cost was less than duplex SMF system	2
<i>Opposed</i> to PSM due to duplex orientation of installed SMF cabling	2

PSM in the Data Centre - Additional Observations

Existing datacenter practices more or less dictate duplex connections. It is more than likely that parallel fibre will be charged as multiple duplex connections. Please note that these are recurring costs. Respondent #1

Fiber optic infrastructure represents a significant portion of our CapEx, so each strand counts. Parallel fiber, providing virtually no net bandwidth increment, is not feasible. Introducing MPO connectors into our standard cabling process would be problematic. Rate of failure and average time to troubleshoot and repair parallel fiber would be expected to increase. We see little value in multiplying fiber strand or wavelength count. Respondent #2

MPO leaves stranded strands in the back bone. There needs to be an effective way to harvest and use stranded strands. Respondent #3

The use of parallel fiber gives us the lowest overall interconnection cost and ensures the fiber plant can be used for multiple generations of optical interfaces. The economic benefit we receive by using parallel fiber outweighs any additional operational challenges we may face. Respondent #4

PSM in the Data Centre - Additional Observations

Many large IDCs are using 100GBASE-SR10. They understand that it's cheaper than 100GBASE-LR4 but are not keen on ribbon cable solution due to its preferential bend (i.e. better in one direction).

Lisa Huff, Discerning Analytics

The majority of data centers are much smaller than this and cost is absolutely the biggest factor in their decision-making on fiber. It's why they are still mostly copper and OM3/4. And, while they may not use a lot of SMF right now, they are increasingly going to as the optical reach gets shorter at higher data-rates. To me, what you have here is great information, but a larger sample size of varying types of data centers should be taken.

Lisa Huff, Discerning Analytics

Most of the data centres are much smaller than those in the survey sample. The trends we have observed in most countries is a clear drive towards fibre, mostly MMF. The large data centres are typically 70-90% fibre, while many of the medium data centres are 50-60% in favour of fibre. The small data centres are dominated by copper. We see negligible deployment of SMF in medium-large data centres today. Lone Hansen, BSRIA