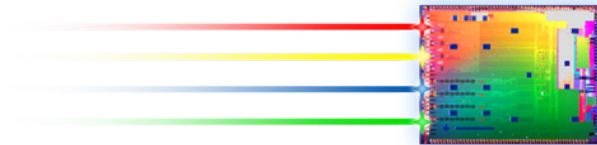


PSM4 Broad Market Potential update

Tom Palkert

March 20 2013 Orlando

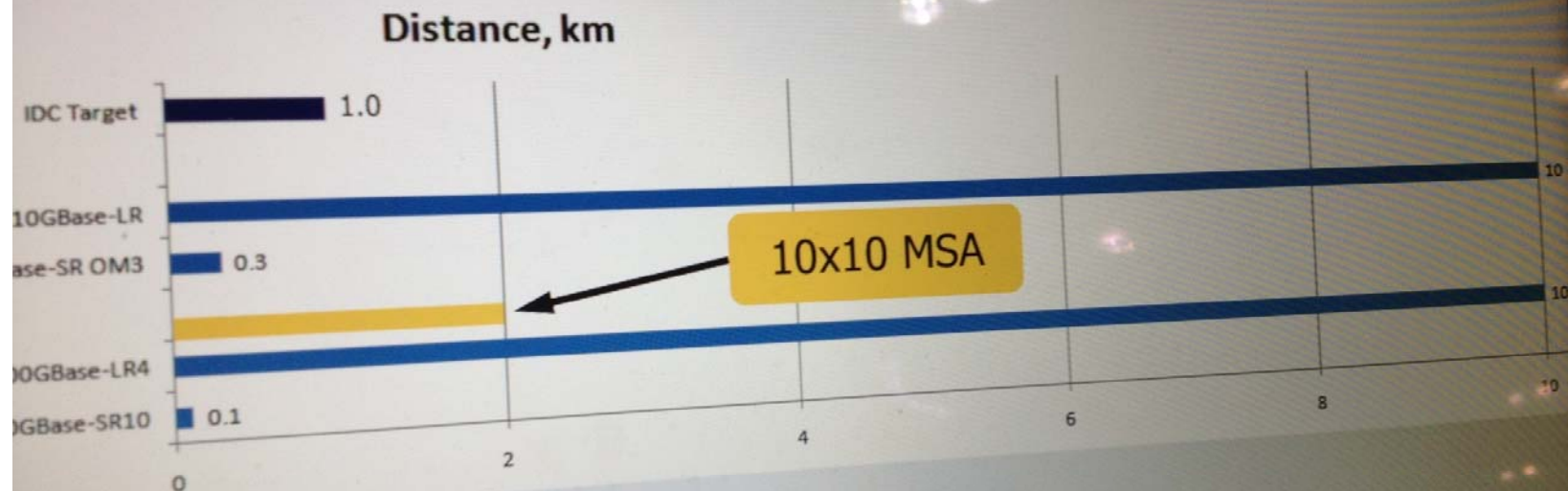


Summary of end user feedback

- Data center requires low cost 100G before it will be deployed in any volume
- First 100G Ethernet standards did not satisfactorily respond to data center needs
 - Data center guys asked for 1-2km we gave them 10km
 - There was not enough focus on cost
- Opportunities exist for both low cost 2km and low cost 300m links
 - MSAs are acceptable solutions in place of Ethernet standards
 - i.e. 10x10msa
- Parallel fiber exists in the data center now or will be in the future and can be used for PSM4 if a cost savings is realized

Facebook feedback (2012 OFC)

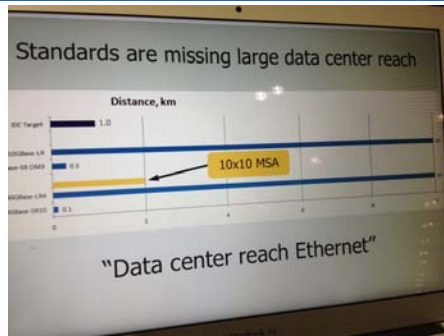
Standards are missing large data center reach



“Data center reach Ethernet”

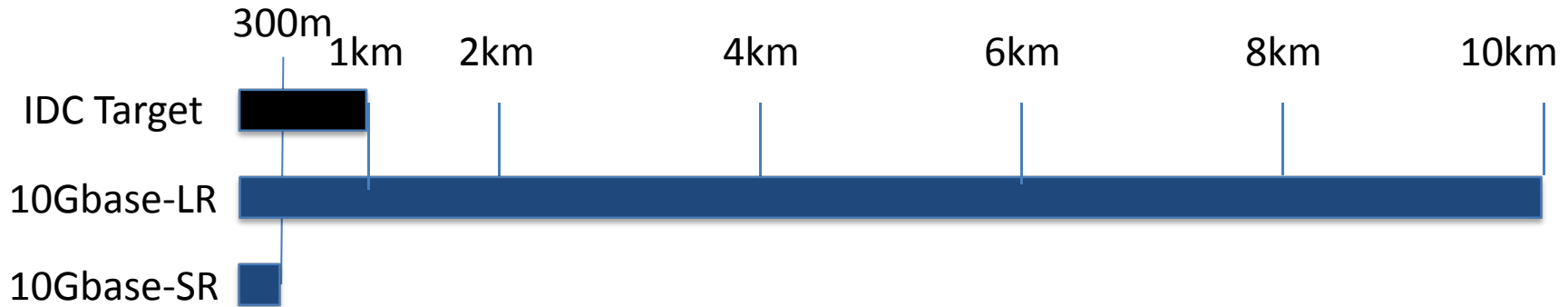
Used by permission:
Donn Lee Facebook

Data center targets for 10G Ethernet

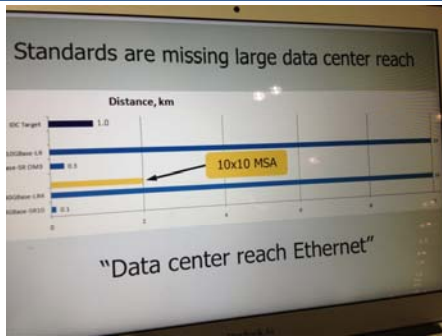


A low cost 10Gbase-1km variant would have fueled an earlier adoption of 10G Ethernet in the data center

Used by permission:
Donn Lee Facebook

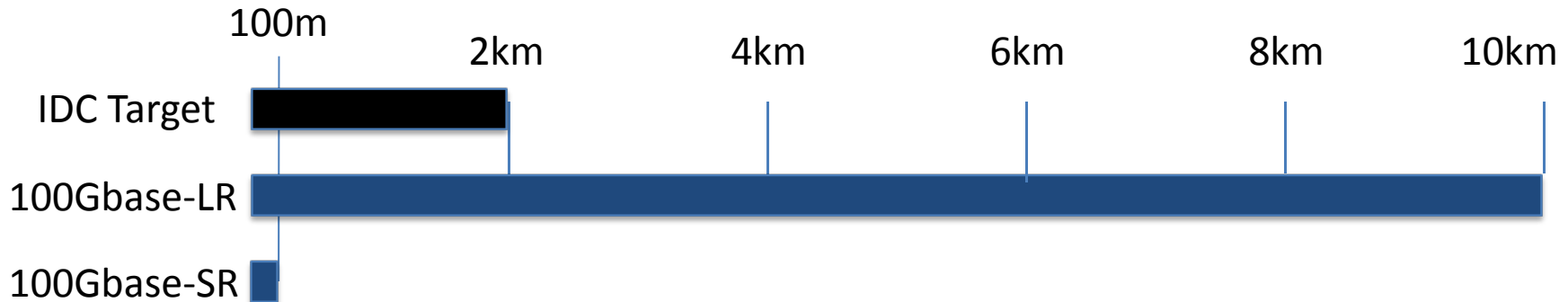


Data center targets for 100G Ethernet



A low cost 100Gbase-2km variant was needed for the data center and resulted in the 10x10 MSA

Used by permission:
Donn Lee Facebook



Notable quotes:

- Very Large Data center #1: All of our 100G links are shorter than 500m
- Very Large Data center #2: All of our links are 300m or less
- Very Large Data center #3: All of our 100G links are either less than 70m (intra suite) or we use the 10x10 MSA for 2km. A 300m solution might be interesting in the future.
- Very Large Data center #4: We will deploy the lowest cost 100G solution regardless of what the IEEE standardizes in a similar process as the 10x10G MSA
- Small data center (40k sq ft): We use duplex SMF for longer reaches (100m). Deploying parallel fiber in the future would not be a significant cost to install and total system cost would drive any decision.

Summary:

- Data center engineers would like better support from IEEE but they are not willing to spend time at our meetings
- Total system cost is the most important criteria in their decision to deploy 100G links
- Distances mentioned were 70m, 300m, 500m, 1km and 2km (none mentioned 10km)