

Use Cases for no-FEC on Short Cables

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Data Center Cable Length Scenarios

Examples from Microsoft Data Center usage.

Compute rack with “TOR” switch in middle of rack

- E.g. rack with 4 Open Compute Server (OCS) chassis (96 blades) per rack with single switch
- Cable lengths: 0.5m, 0.75m, 1.0m, 1.5m, 2.0m
- All server-TOR links are candidates for “no FEC”

3m and 5m requirements exist but much lower volume

- Cross-rack connections
- Chassis extension requirements, e.g. hot swap disk drawer
 - Majority of cables in rack are still $\leq 2\text{m}$

Bump-in-the-Wire topologies

- Single board implementations may use “KR” spec
- Multi-board implementations may use 0.5m cable



Broad Market Potential for cables $\leq 2\text{m}$

Example of per section data center cable volumes in booth_400_01a_1113

- Server-TOR links are up to 80% of links in data center.
- Compute servers and majority of storage servers use cables $\leq 2\text{m}$

A End	Z End	Volume	Reach (max)	Medium	Cost Sensitivity	Market Space
Server	TOR	10k – 100k	3 m	Copper	Extreme	LAN
TOR	LEAF	1k – 10k	20 m	Fiber (AOC)	High	
LEAF	SPINE	1k – 10k	400 m	SMF	High	
SPINE	DCR	100 – 1000	1,000 m	SMF	Medium	Campus
DCR	Metro	100 – 300	10 - 80 km	SMF	Low	WAN

Impact of Requiring FEC for all links

Reduced performance in latency sensitive applications

- High Performance Computing (HPC) and Cloud compute servers
- Remote Direct Memory Access (RDMA) in storage servers

Increased cost to implement FEC

- Chip Resources & Power
- FPGA implementations
- Testing and verification

Solutions engineered to further reduce costs forced to be non-compliant

- Many data center links are fixed configurations that do not require plug & play

Recommendations

Don't preclude no-FEC operation in spec

- Allow AN to negotiate no-FEC operation
- Links not using AN can be forced to no-FEC operation

Specify a channel that passes COM without FEC using approach described by Mellitz

- Normative vs. Informative?

Leave room for compliant engineered solutions where plug & play is not required

Thank You!
