

# TEF 2016

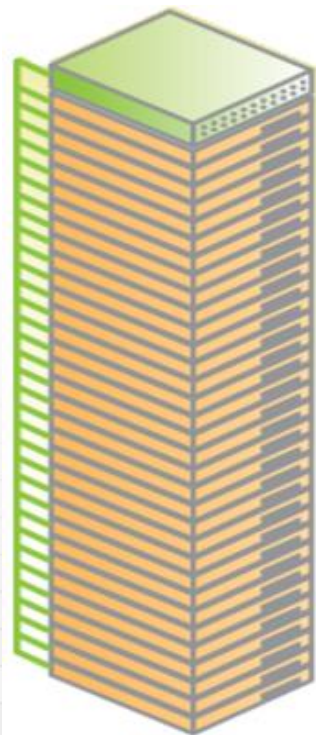
## Next Generation ToR Solutions

Darcy Phillips - Panduit

# Top of Rack (ToR) Solutions - Today

## Benefits of Top of Rack

- Clear access layer migration path
- Latency reduced with flatter networks
- Promotes modular, agile DC expansion



## 10GBASE-



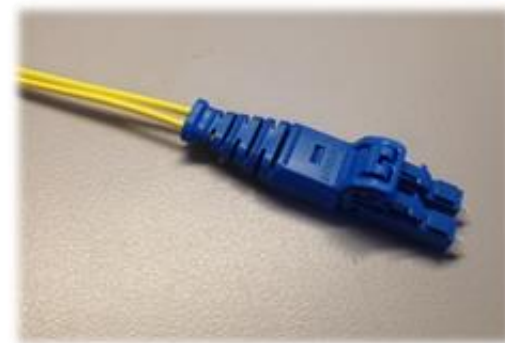
Twisted pair  
10GBASE-T



Multimode fiber  
10GBASE-SR



DAC/AOC



Singlemode fiber  
10GBASE-LR

## ToR Solutions

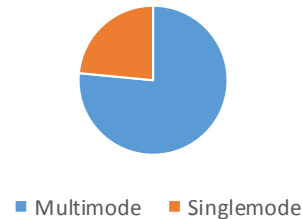
### Fiber Patchcords

- MMF and SMF used as switch/server interconnect
- Future proofed, low latency, lightweight
- Supports all Ethernet speeds

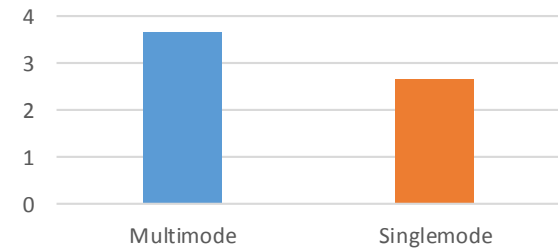
*Continued use in ToR???*

### Patchcord Preference

1 and 2 Fiber



### Patchcord Average Length (m)



### Copper Patchcords

- Low cost switching, Low cost cabling
- High cost power consumption

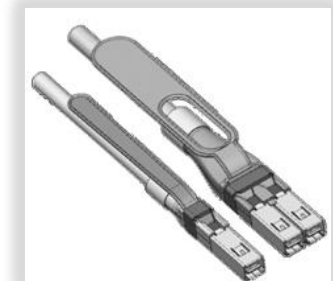
*Continued use in ToR???*



### Direct Attach Assemblies

- Form factors abundant!
- Coding challenges to continue?
- Multi-platform

*Continued use in ToR???*

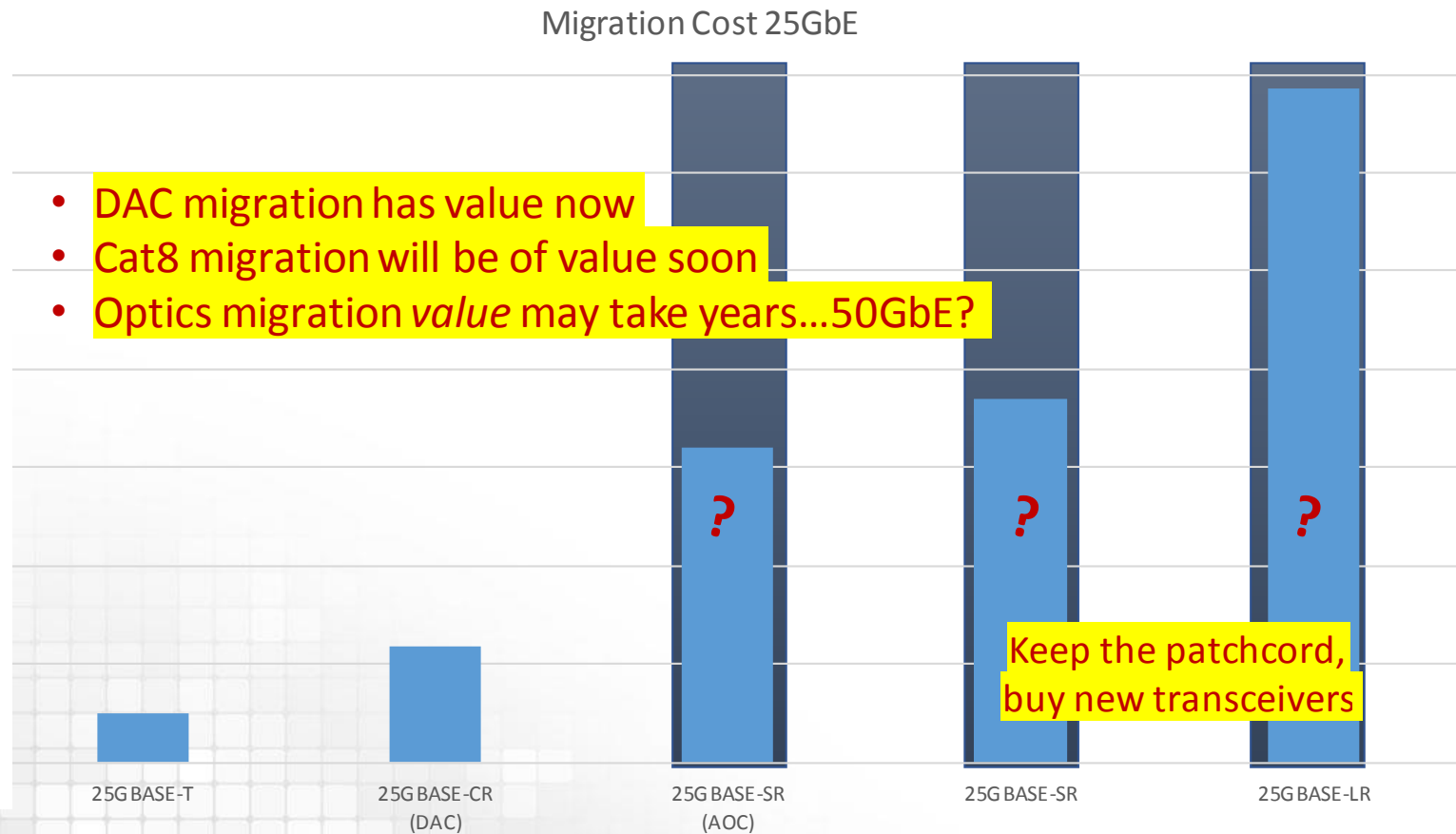


# 10GbE Cabling Cost

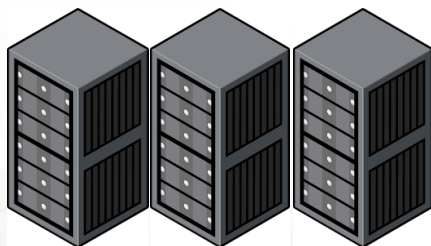
Total Cost of Link 10GbE ToR



# 25GbE Cabling Cost



# ToR Market Trends



Market	Fiber	Copper	Direct Attach
Web-Scale Data Center	↑	↓	↑
Colocation	↔	↑	↓
Enterprise	↔	↑	↑

# Summary

## What we know

10GBASE technology led to commoditization

- Fiber/Copper Patchcords
- Direct Attach Assemblies
- Optical Transceivers

25/50GBASE ToR solutions knocking on the door

- New form factors
- Cost to migrate
- Interoperability risk

Value remains in products already owned

- Connectivity chosen today should consider tomorrow
- Not all Ethernet speeds adopted at the server
- Cabling cost can exceed equipment cost

## What to expect

25/50GBASE commoditization trend will continue

- Density, flexibility, cost factors
- Server requirements can determine ToR connectivity
- Despite commoditization, custom products prevalent