

# Practical Equipment Cord & Link Lengths in Data Centre Applications

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CTO



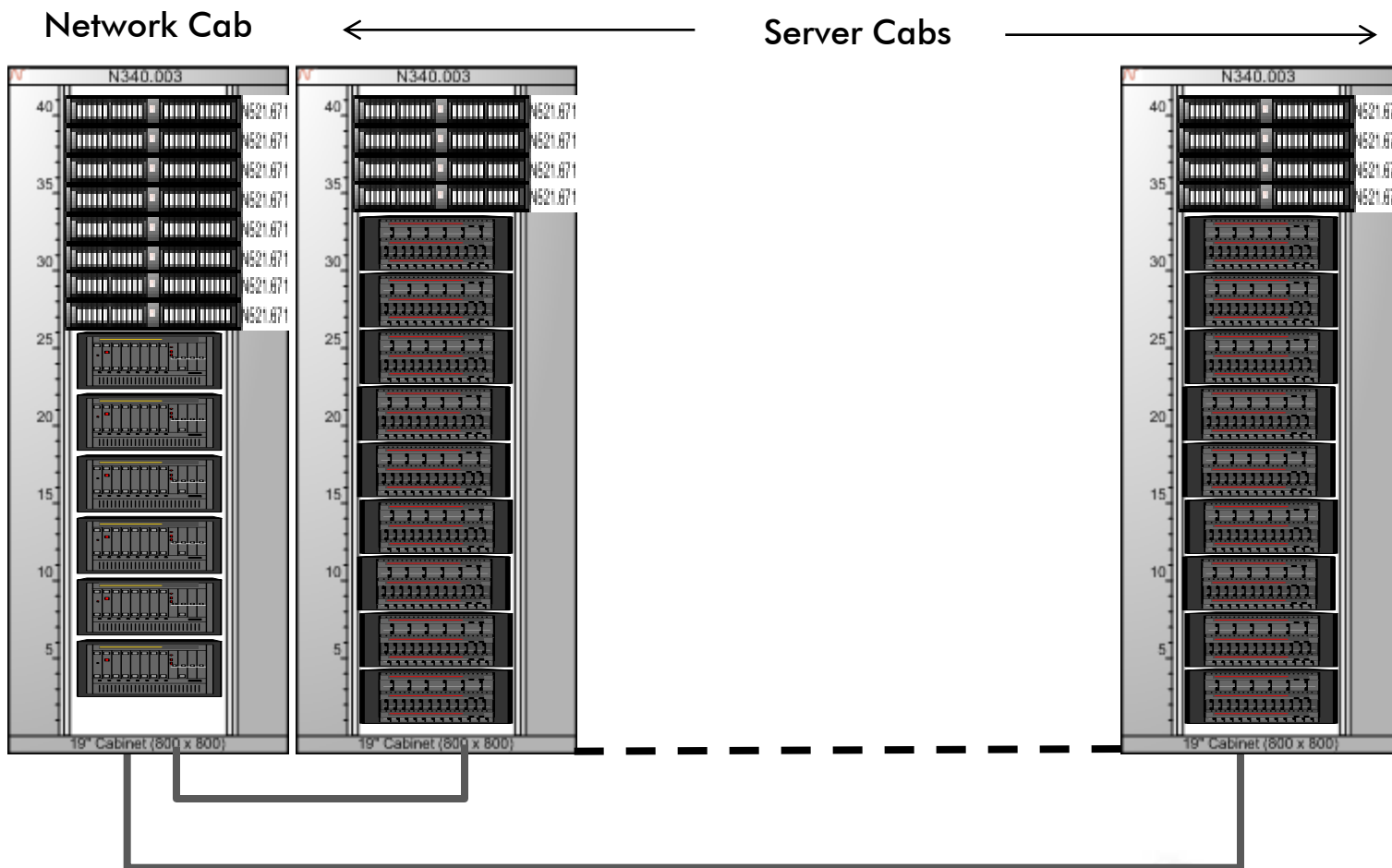
- ◆ Yakov Belopolsky
- ◆ Brad Booth
- ◆ Alan Flatman
- ◆ Bob Wagner
- ◆ Martin Rossbach
- ◆ Victor Renteria
- ◆ Brian Buckmeier

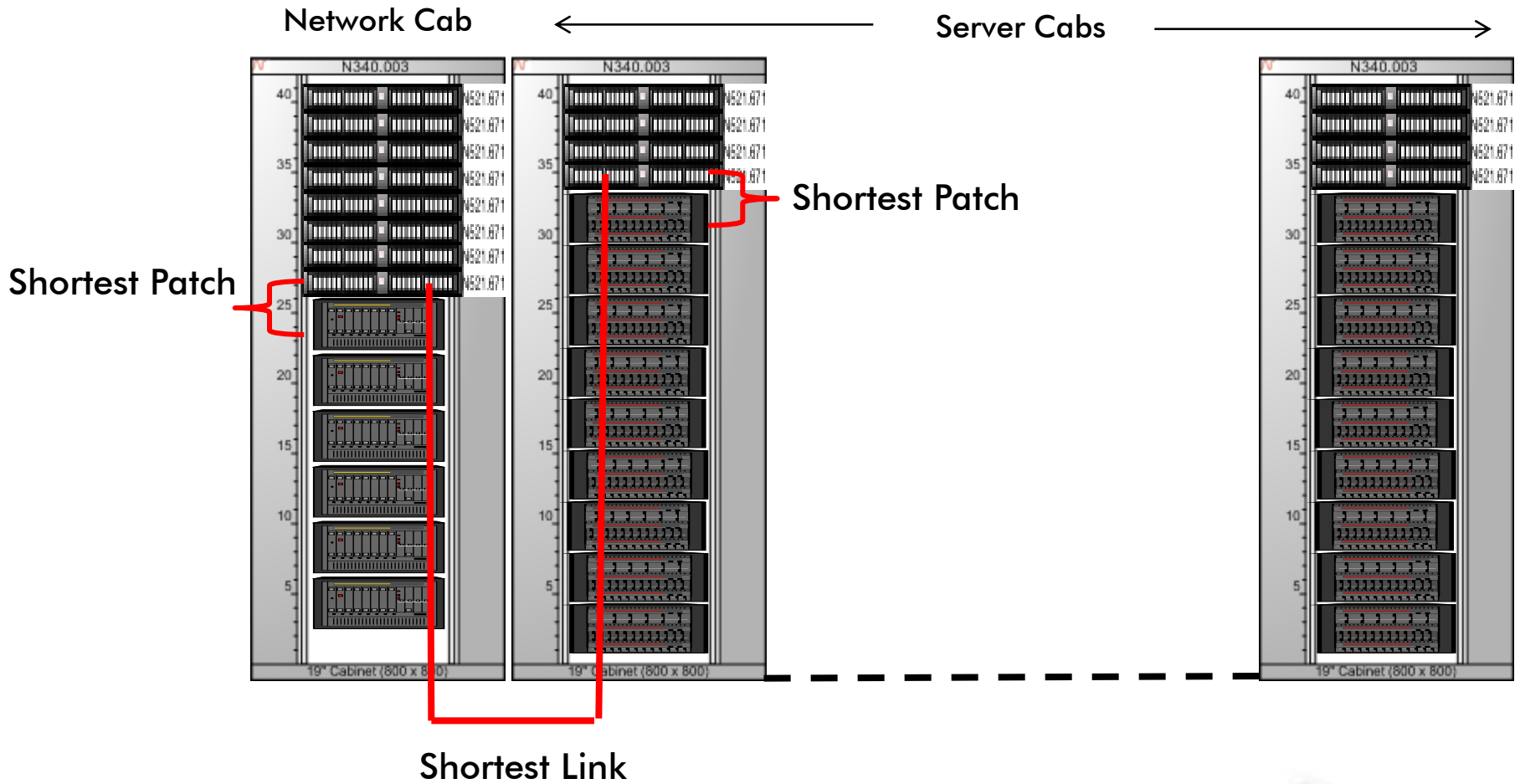


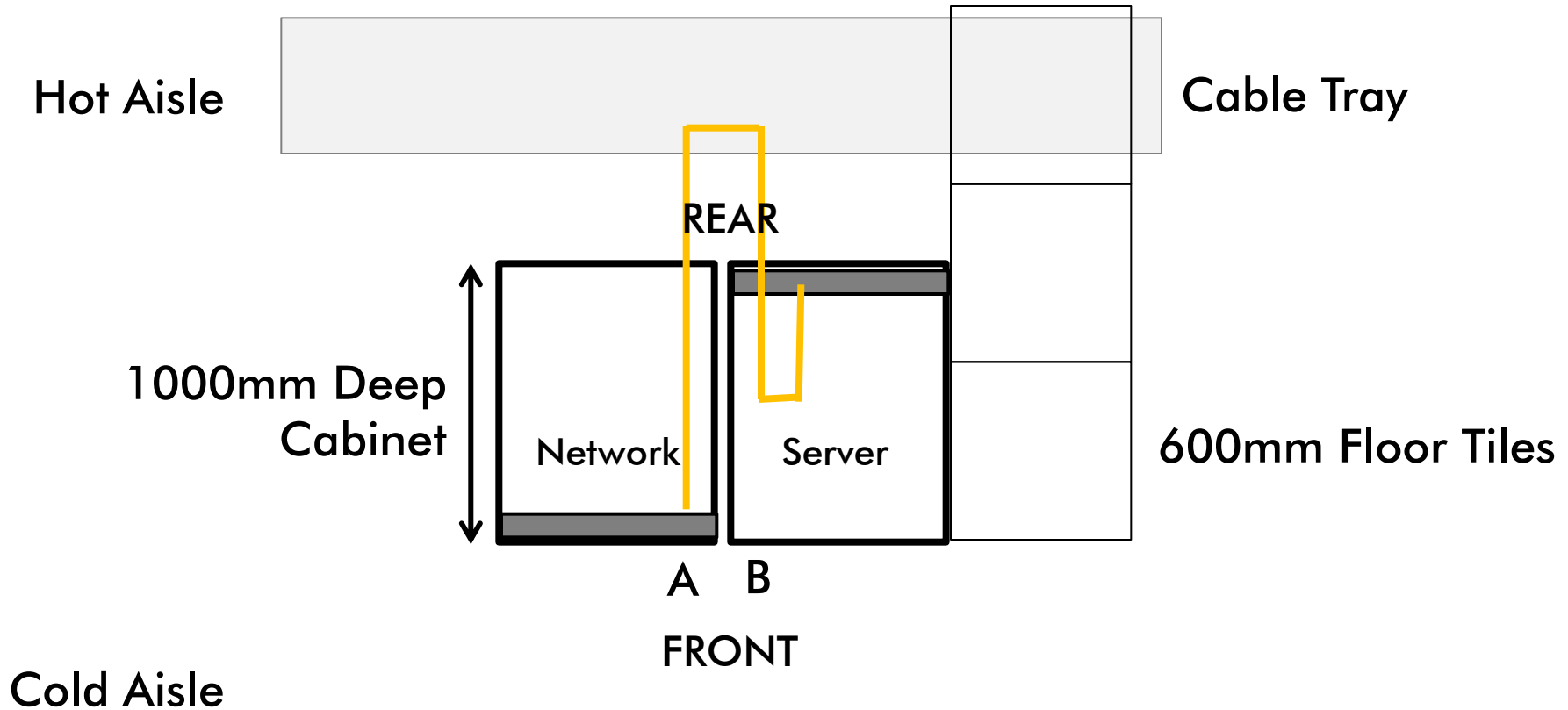
- ◆ Provide supporting material to the task force for PHY modelling
- ◆ This could provide future direction with channel configurations
- ◆ This may also present opportunities to assess the performance of channel configurations for optimum PHY performance
- ◆ This study is based upon actual data centre applications

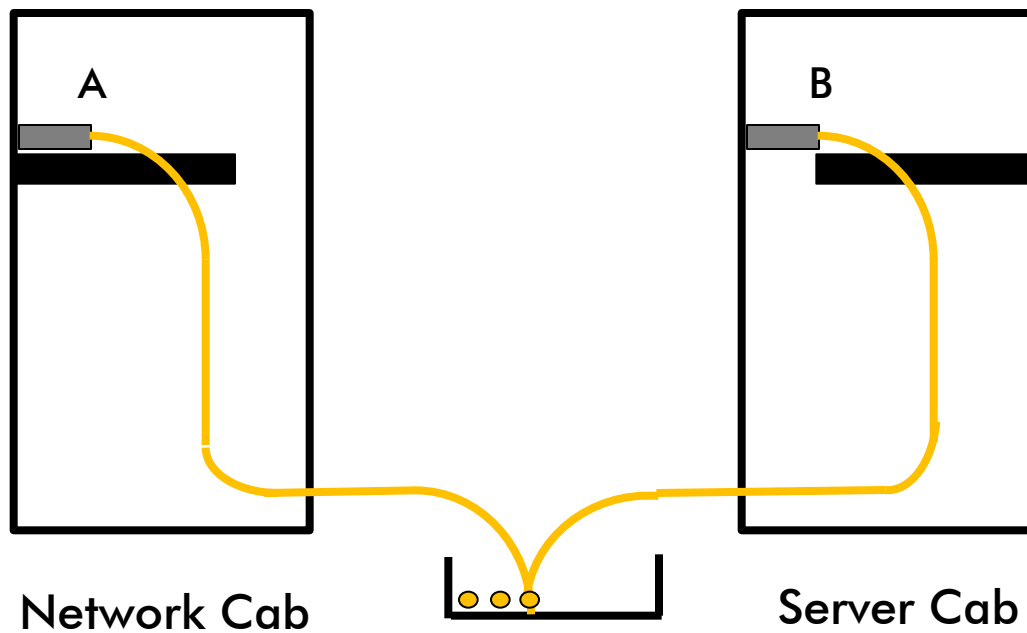


- ◆ 2 Connector Channel Model Topologies
- ◆ Shortest Link & Equipment Cord Lengths in Existing 2 Connector Channels
- ◆ Data Centre Trends Impacting Current & Future Equipment Cord Lengths
- ◆ Conclusions







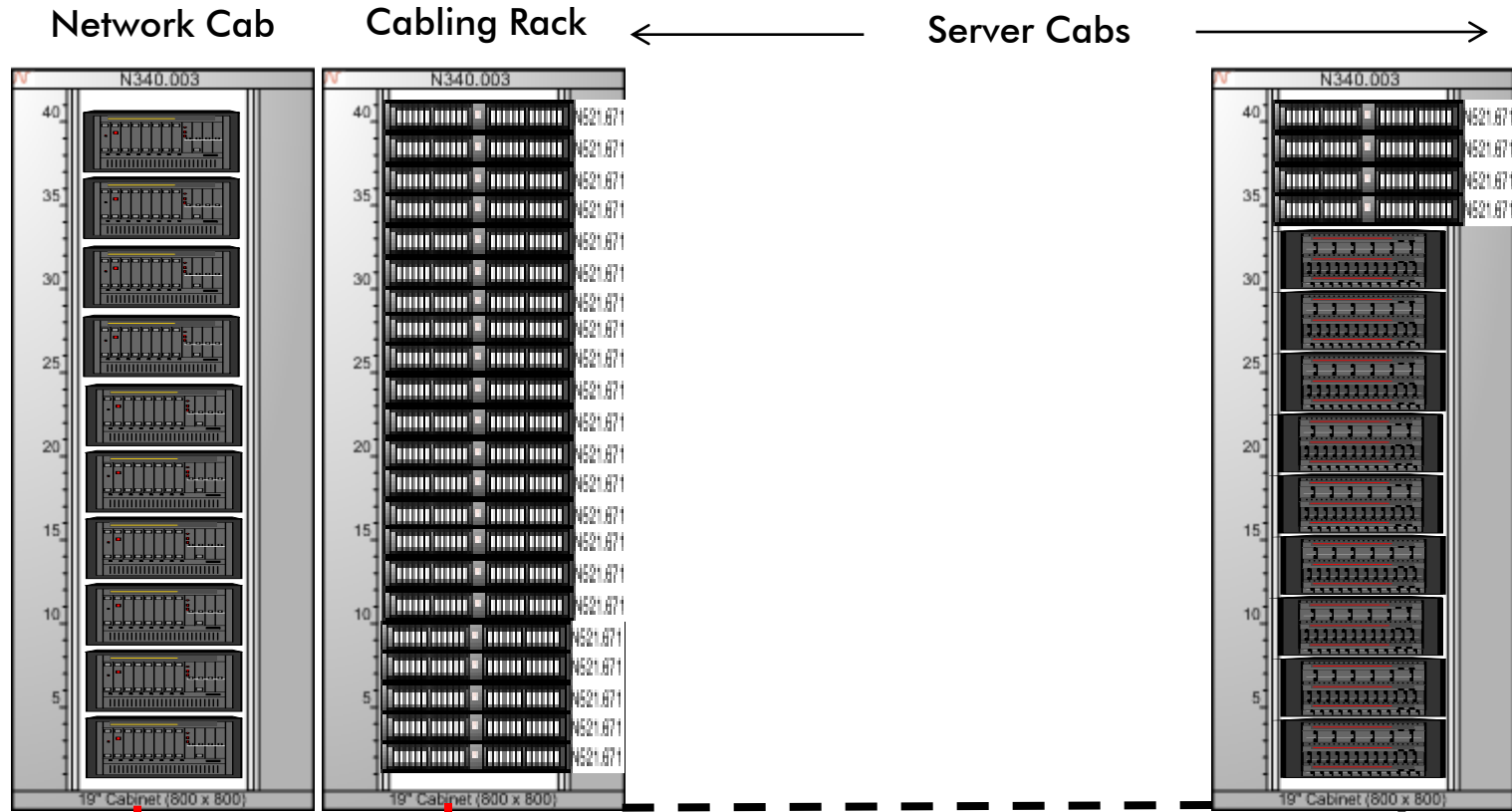


Distance A to B = 0.5m + 1.0m + 0.7m + 0.3m + 1.0m + 1.0m + 0.5m = 5.0m

Shortest Channel = 0.3m patch + 5.0m link + 0.3m patch







Patch  
front of panel to front  
of switch





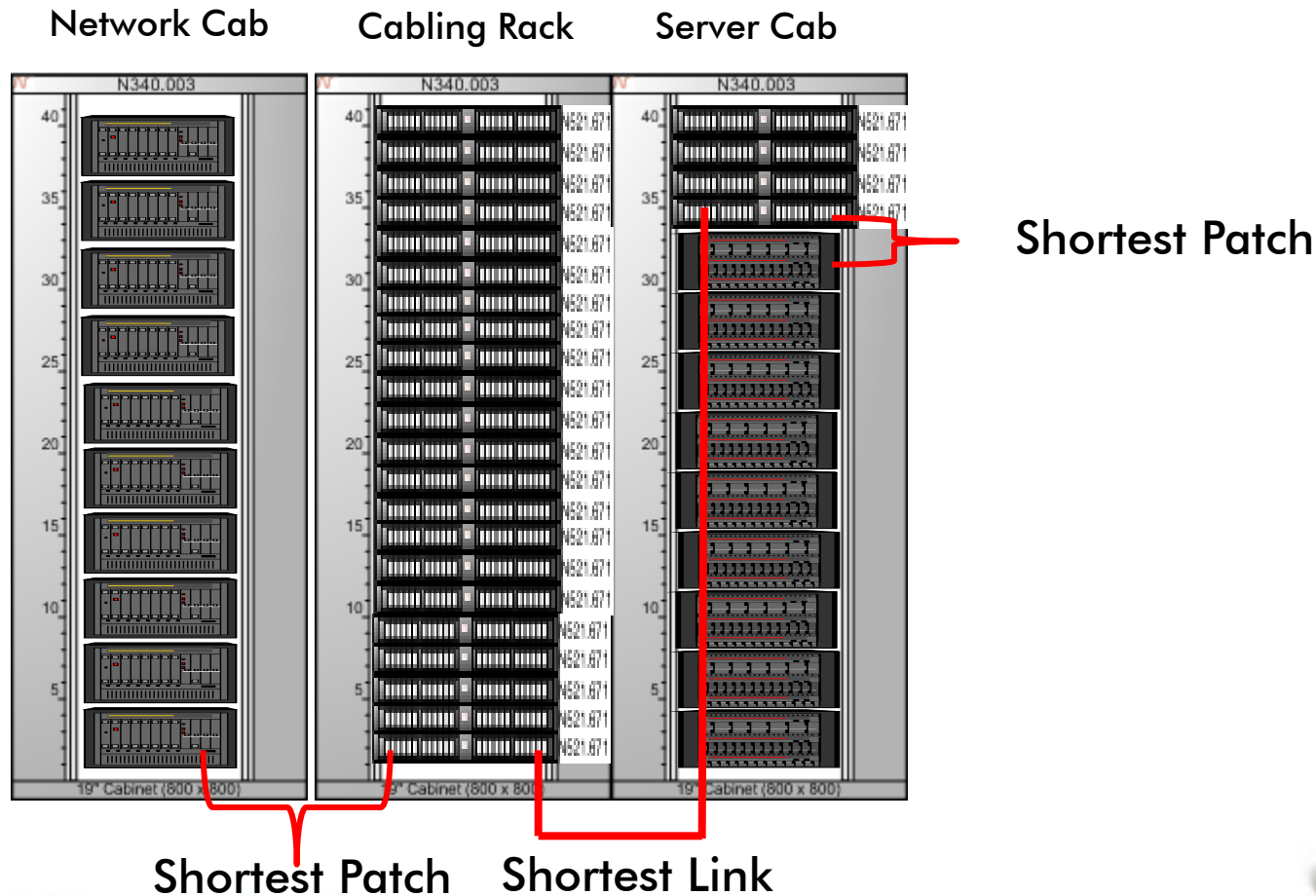
Patch cords from switches connect to adjacent cabling rack





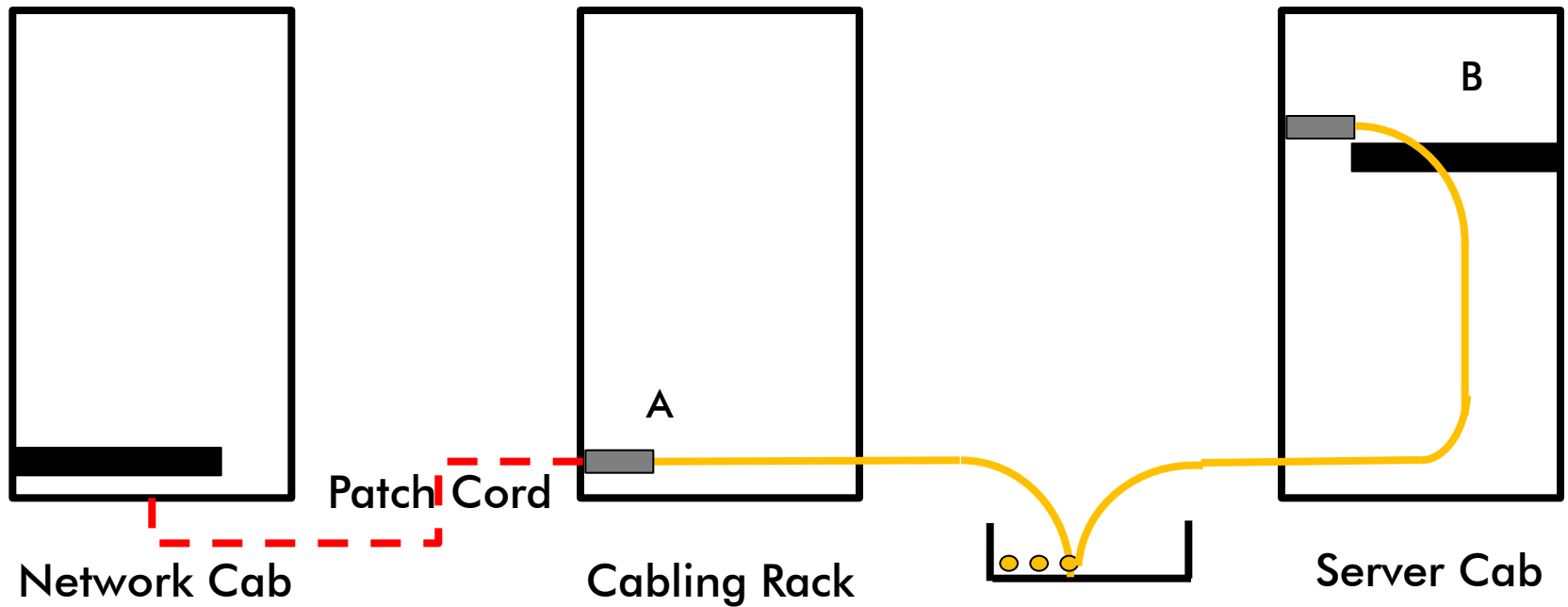
Patch cords from cabling rack connect to switches in adjacent rack





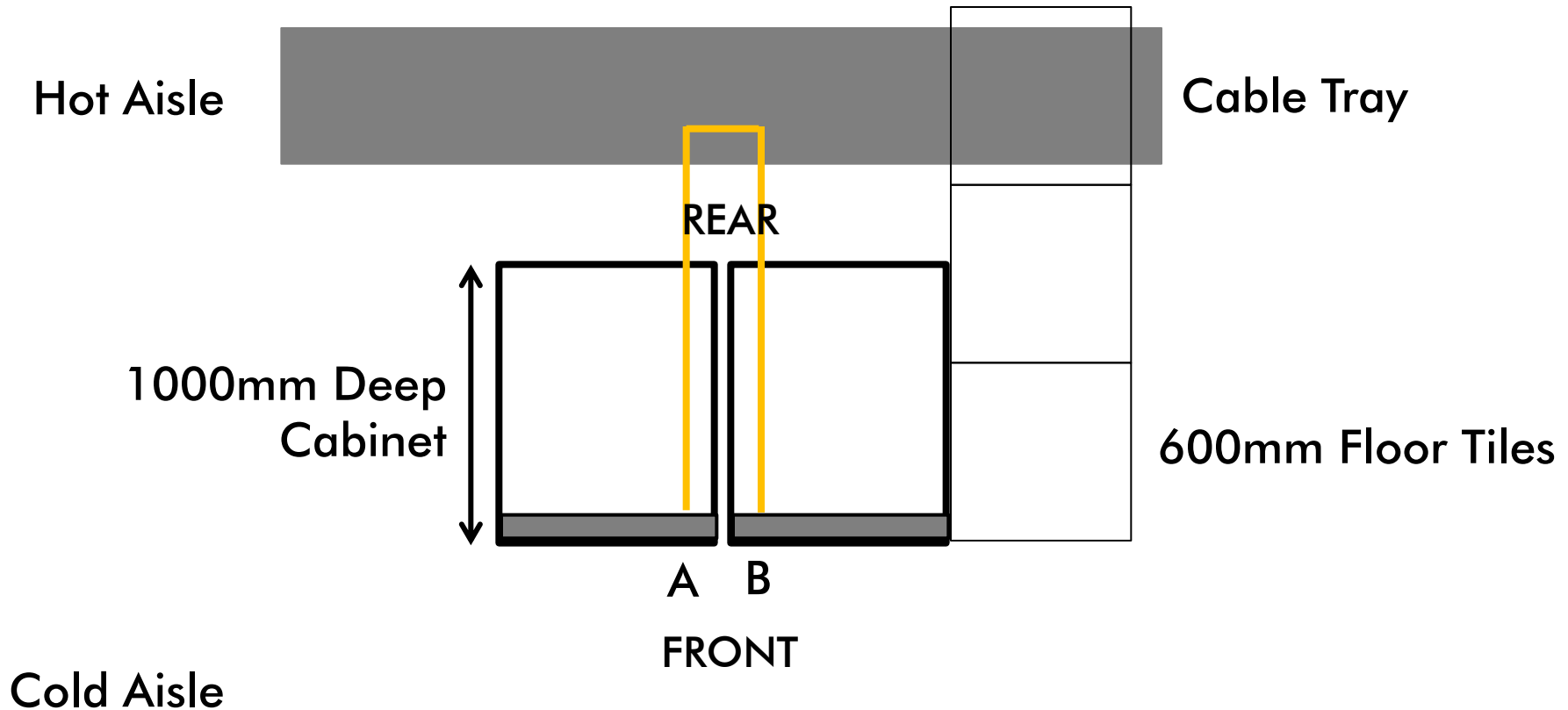
Shortest Channel = 2.4m + 2.3m + 0.3m  
 IEEE P802.3bq 40GBASE-T November Dallas 2013





$$\text{Distance A to B} = 1.3\text{m} + 0.3\text{m} + 1.0\text{m} + 1.0\text{m} + 0.5\text{m} = 4.1\text{m}$$





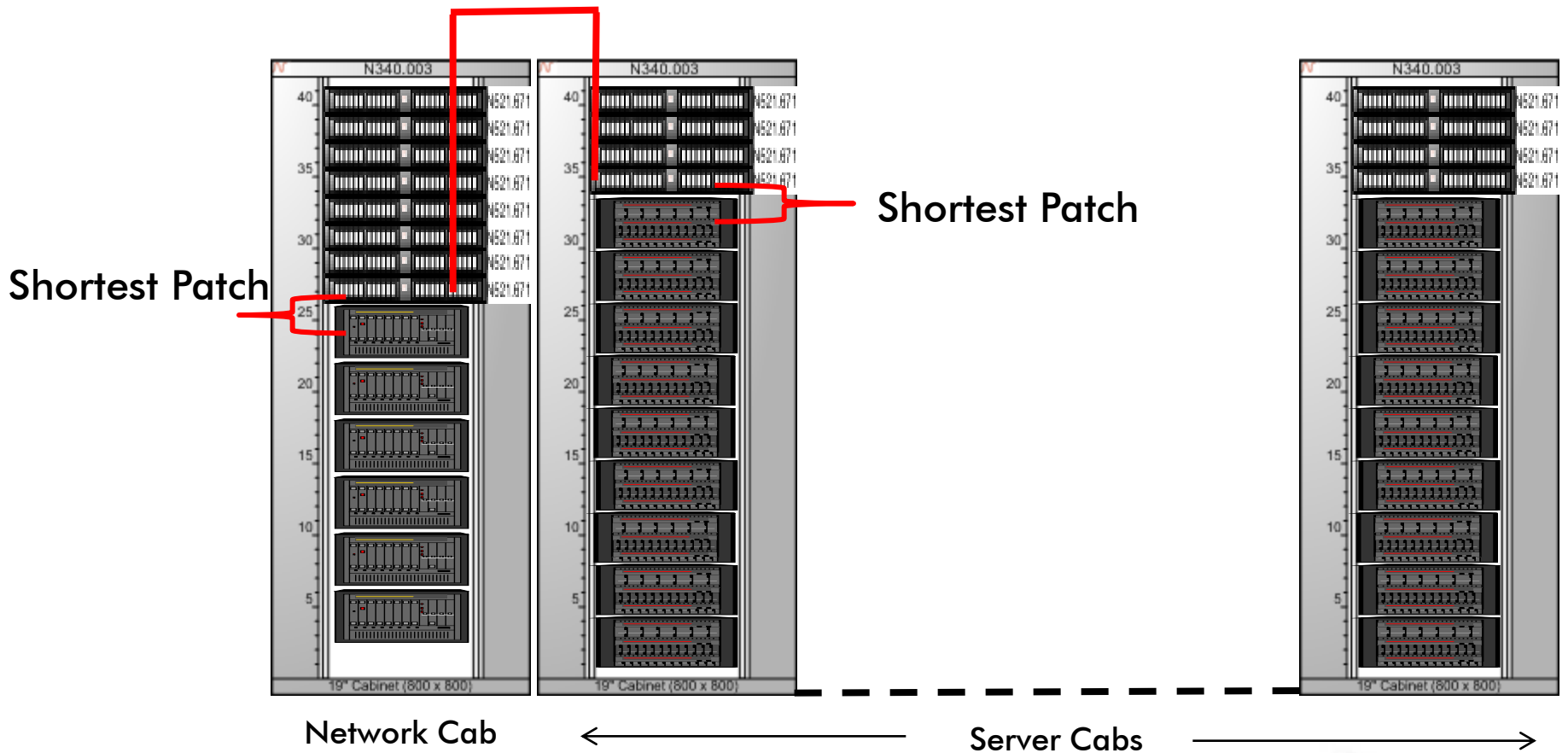
$$\text{Distance A to B} = 1.4\text{m} + 0.2\text{m} + 1.4\text{m} = 3.0\text{m}$$

$$\text{Shortest Channel} = 3\text{m} + 4.1\text{m} + 0.3\text{m}$$





## Shortest Link

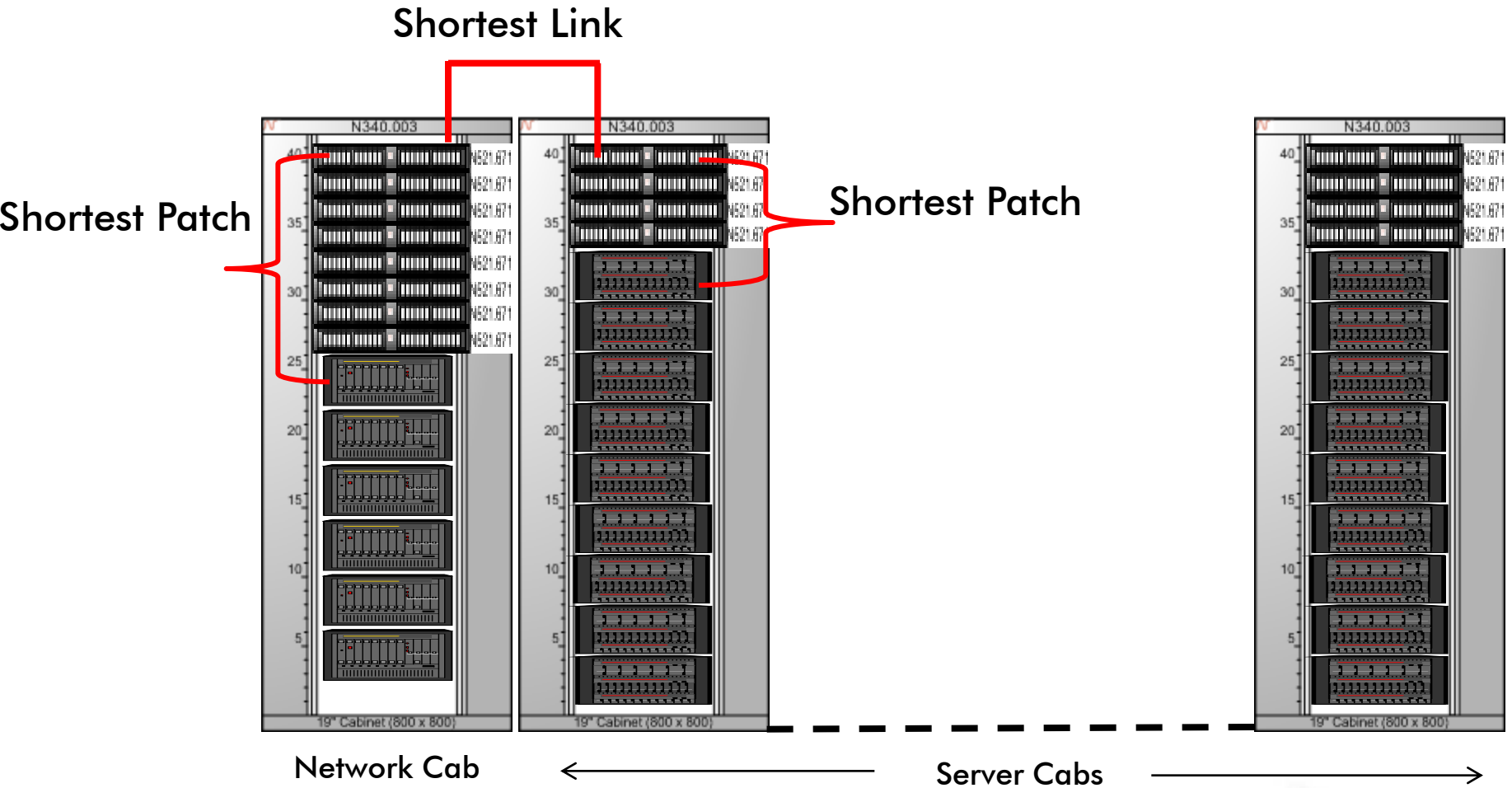


$$\text{Shortest Link} = 1.5\text{m} + 0.3\text{m} + 1\text{m} = 2.8\text{m}$$

$$\text{Shortest Channel} = 0.3\text{m} + 2.8\text{m} + 0.3\text{m}$$



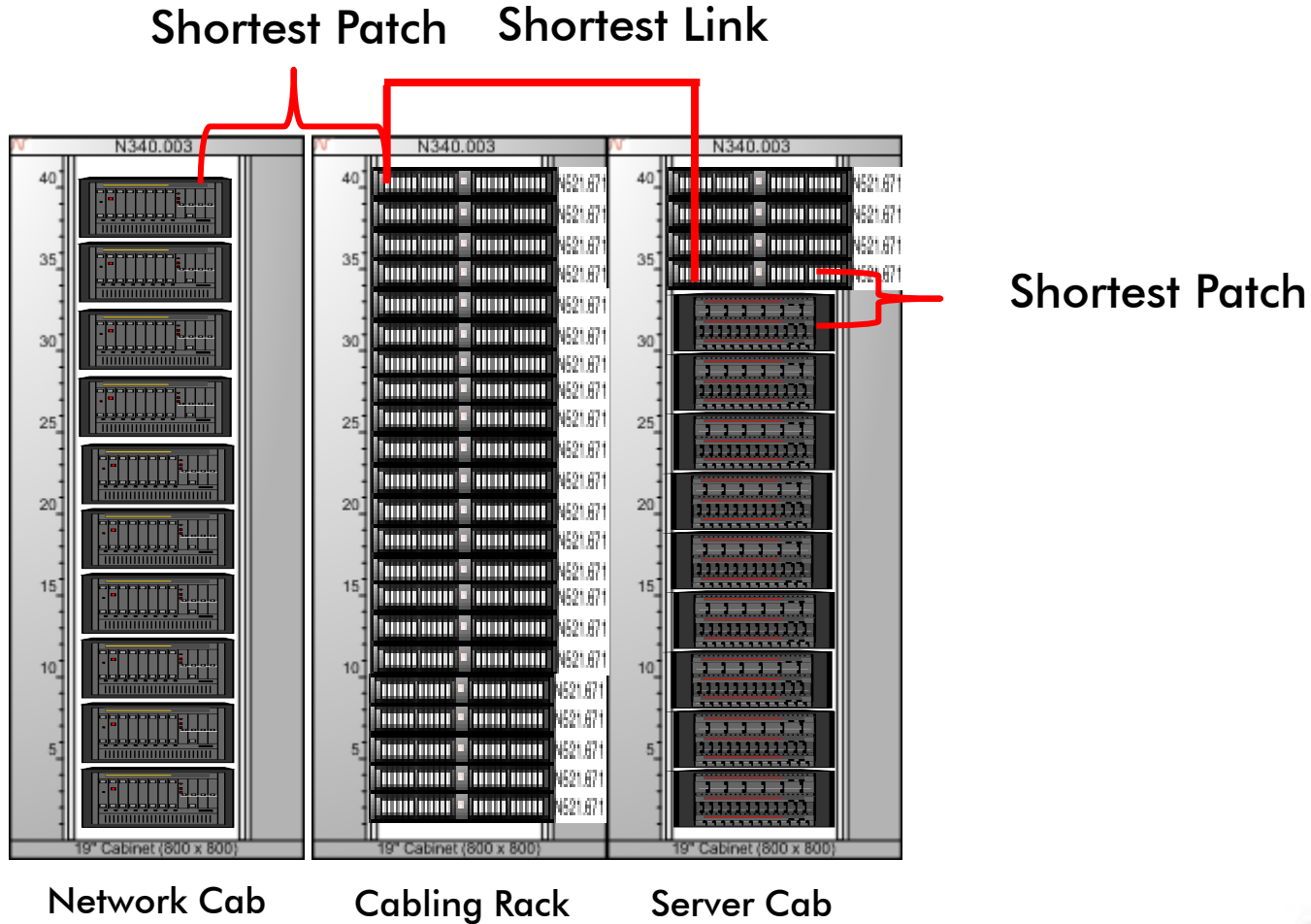




$$\text{Shortest Link} = 1.0\text{m} + 0.3\text{m} + 1.0\text{m} = 2.3\text{m}$$

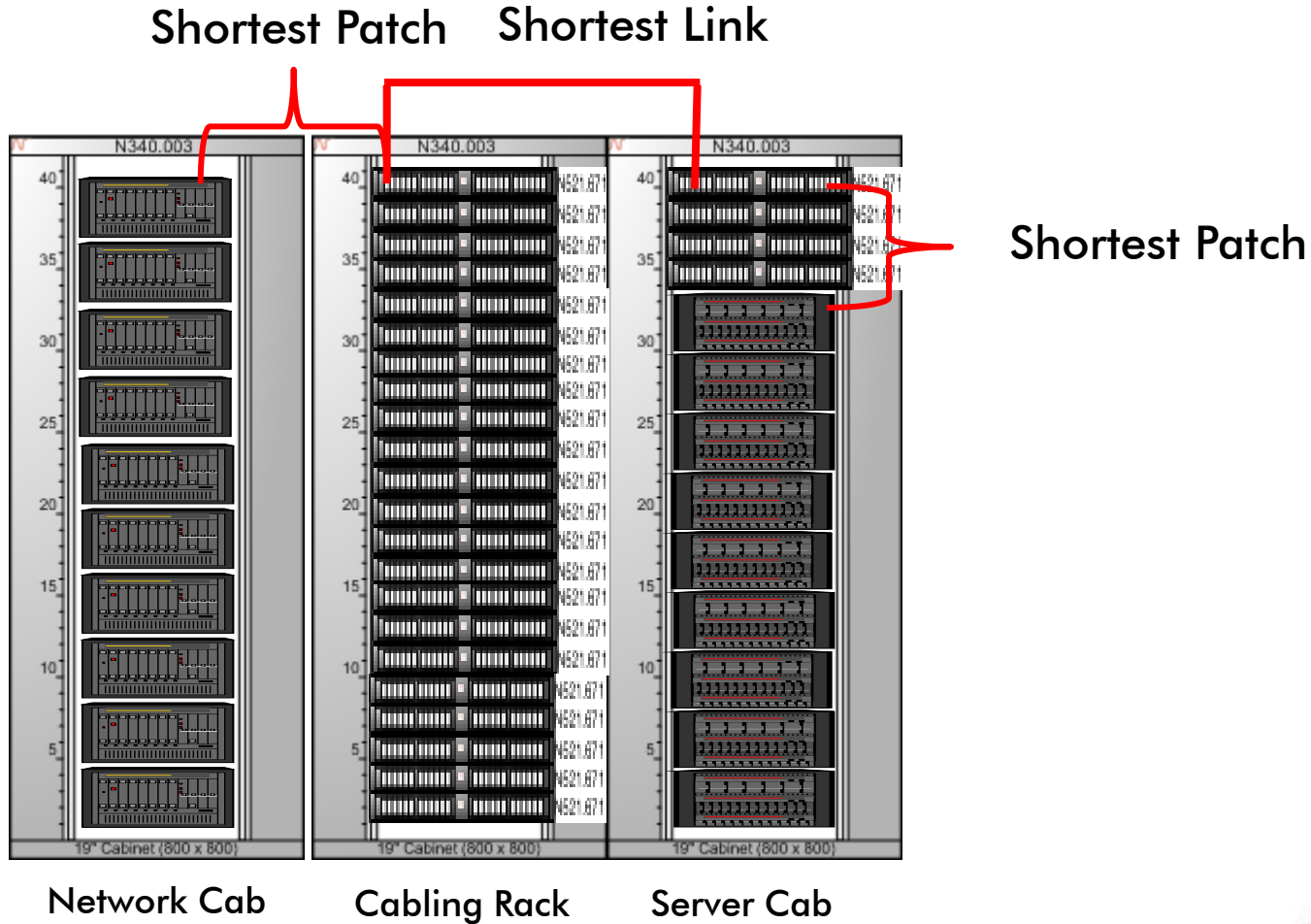
$$\text{Shortest Channel} = 1.0\text{m} + 2.3\text{m} + 0.5\text{m}$$





Shortest Channel = 2.4m + 3.0m + 0.3m





**Shortest Channel = 2.4m + 2.8m + 0.5m**



	Switch Cord	Link	Server Cord	
Sub-Floor	0.3m	5.0m	0.3m	
Sub-Floor	3.0m	4.1m	0.3m	Cabling Rack
Overhead	0.3m	2.8m	0.3m	
Overhead	1.0m	2.3m	0.5m	
Overhead	2.4m	3.0m	0.3m	Cabling Rack
Overhead	2.4m	2.8m	0.5m	Cabling Rack



- ◆ Different channel configurations will show different results for NEXT, FEXT, RL etc
- ◆ This can impact PHY modelling and magnetics performance targets



- ◆ Changes in overall design of equipment and cabling cabs tend to be in line with active equipment refreshment rates of 3 to 5 years
- ◆ Active equipment cabs 1200mm deep now being deployed
- ◆ 1200mm deep cabs set to become de-facto standard for high server count, high speed data centres when 40GBASE-T standard is published
- ◆ Increase in cabinet depth will increase link length



- ◆ PHY modelling should take into account channel configurations which reflect actual market requirements
- ◆ Links below 2.3m are impractical
- ◆ If the PHY specification requires a step function improvement in complexity and cost to capture shortest channel configurations this should be disregarded
- ◆ Short 0.3m & 0.5m cords represent <2% of applications
- ◆ If these create PHY performance issues they should be disregarded
- ◆ The study group agreed to adopt a 30m minimum channel reach which captures 80% of the market. Why encompass short equipment cords for 2%?