

From Gigabit to Terabit Ethernet

The Past Present and Future of Ethernet Optics

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February 27, 2012



What is this?



Early Gigabit Blade

4 FDDI Ports at 250 Mbps to
yield one of the first
Gigabit/second blades
-circa 1990s

By 2000, up to 8 GBICs in one
switch – no 10GbE yet



FDDI Module on IEEE 802.4



GBIC Module for 100BASE-SR



Generations of Optics

- GbE from GBIC to SFP to 1000BASE-T



- 10GbE from 300pin to SFP+ to 10GBASE-T



- Will 100GbE follow?

Or Twinax



The First Speaker

- Chris Cole
 - Finisar Engineering Director
 - Leading the development of 100Gb/s and beyond optics
 - IEEE 802.3 contributor
 - CFP MSA Spokesman



The Perfect Storm that Won't Stop

- More Devices



- Over a billion smart devices to ship in 2012 (desktops, laptops, pads and smartphones)
- TVs connecting to the Internet for Over-The-Top (OTT) Video

- More Users

- More Applications



By 2010, 100s of Gbps / blade

640Gbps/blade – 80 times faster than a decade ago



Four 40G
QSFP Ports

48 10G
SFP+ Ports

We're in the early days of 100GbE, so we're seeing only 1, 2 to 4 ports of 100GbE per blade today.

This is about to change...

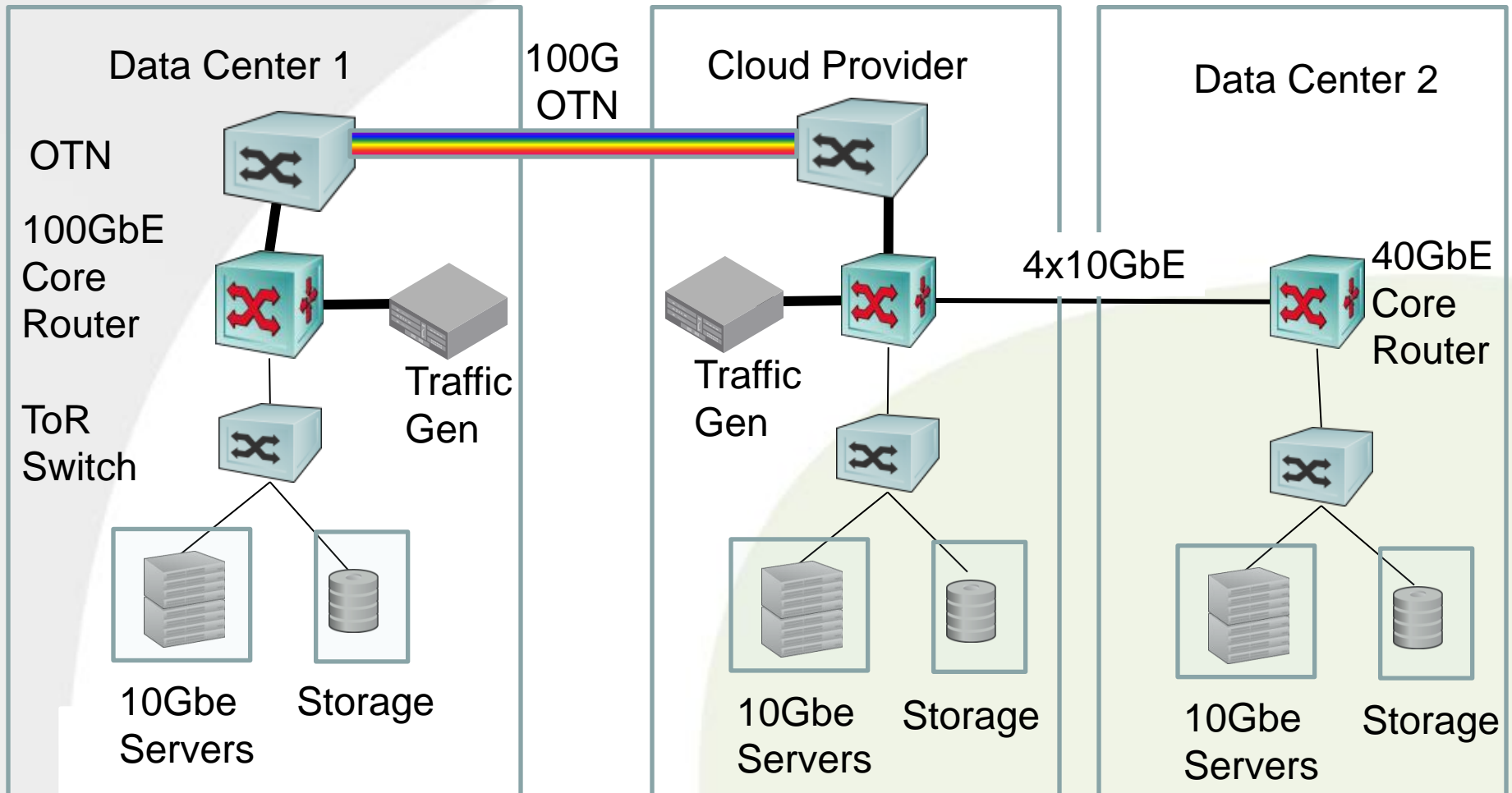


Second Speaker

- Mark Nowell
 - Cambridge graduate
 - Director of Engineering in Cisco's Silicon Engineering team
 - IEEE 802.3.bg Chair - 40 GbE Serial



From Switches to Networks

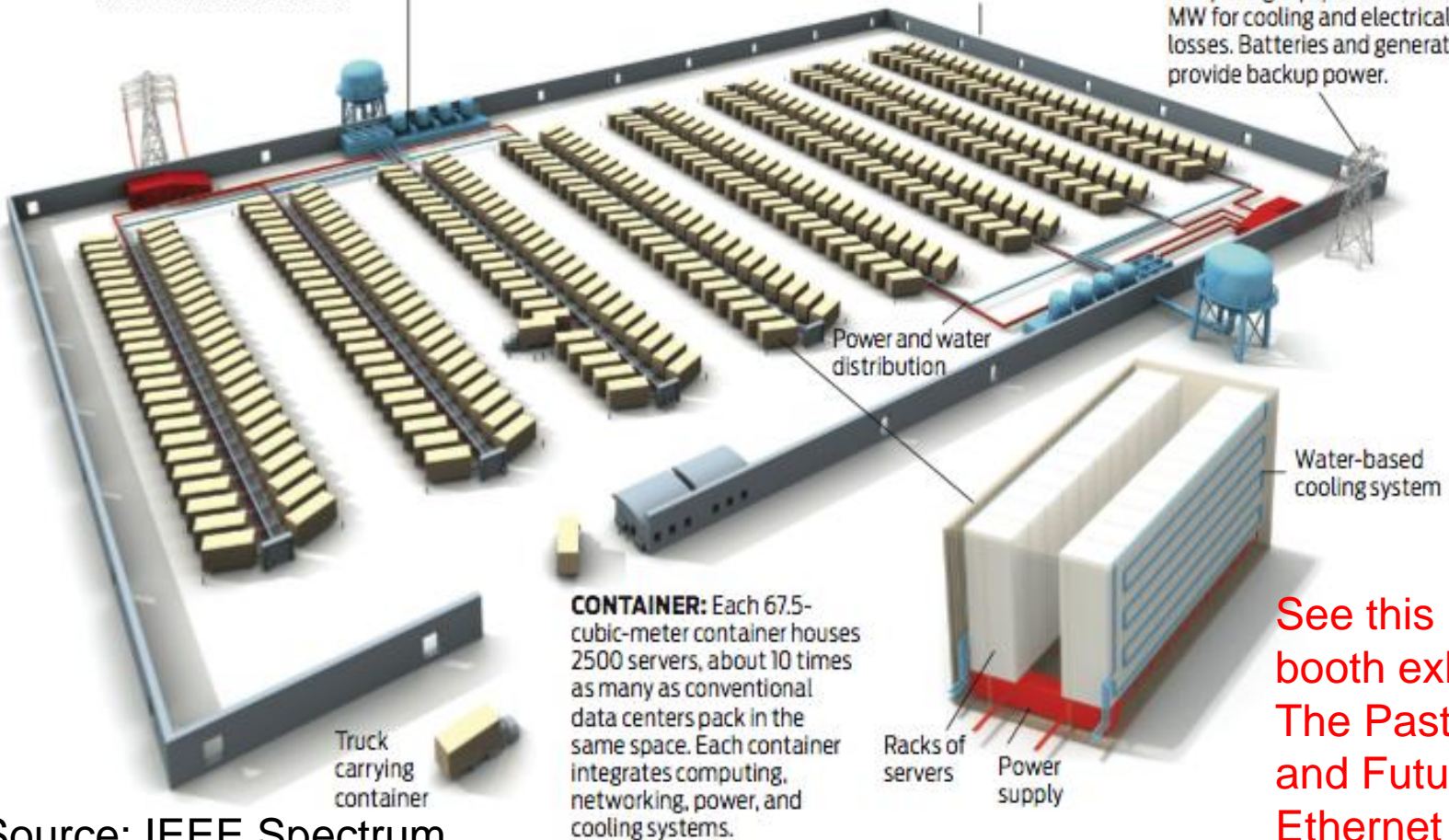


How do you build a million server DC?

COOLING: High-efficiency water-based cooling systems—less energy-intensive than traditional chillers—circulate cold water through the containers to remove heat, eliminating the need for air-conditioned rooms.

STRUCTURE: A 24 000-square-meter facility houses 400 containers. Delivered by trucks, the containers attach to a spine infrastructure that feeds network connectivity, power, and water. The data center has no conventional raised floors.

POWER: Two power substations feed a total of 300 megawatts to the data center, with 200 MW used for computing equipment and 100 MW for cooling and electrical losses. Batteries and generators provide backup power.



See this in the EA booth exhibit:
The Past, Present and Future of Ethernet Optics

Third Speaker

- Bikash Koley
 - University of Maryland graduate
 - Google Technical Lead and Manager, Network Architecture and Capacity Planning
 - 10X10 MSA Leader



100GbE Question

100Gbps Next Generation Optics Study Group considering three objectives

- CAUI-4 4X25G retimed interface – Approved
- 100m on MMF – 100GBASE-SR4
- 500m to 2km on SMF – 100GBASE-MR4
 - 8 Parallel SMF with Directly Modulated Lasers
 - 2 Duplex SMF with one Externally Modulated Lasers
 - What is best or is LR4 enough?



Discussion and Q&A

