100G CLR4 Industry Alliance

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Announcing Today

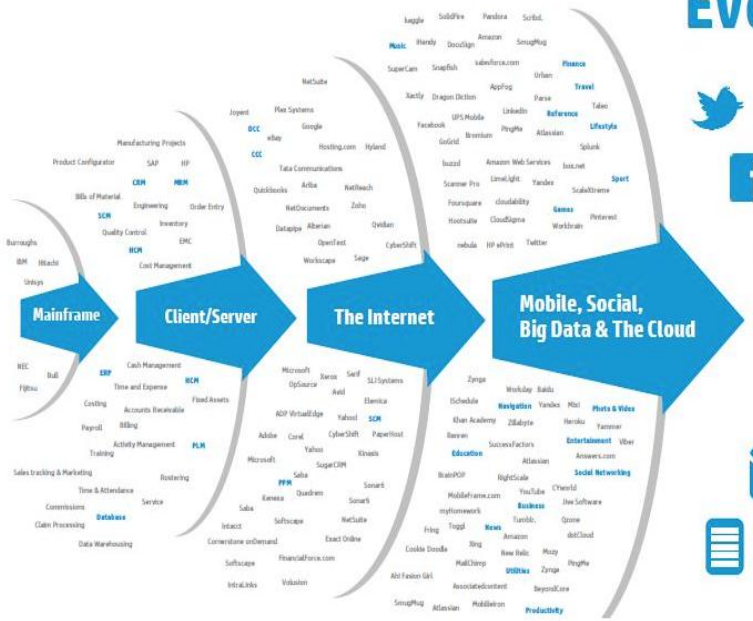
- The formation of an Alliance consisting of end customers, system companies, and optical companies to create a new, open, multi-vendor, 100G optics specification called 100G-CLR4
- 100G CLR4 focus is to address market requirements of large data center customers
- 100G CLR4 is low-power, cost-effective solution for up to 2km
- Duplex single mode fiber: reducing cable fiber count by 75% over parallel optics
- Many companies have announced support for 100G CLR4 alliance
- Open process to create a multi-vendor industry specification

100G-CLR4 Alliance Mission

Create* an *open, multi-vendor specification for a cost-effective, low-power, 100G-CWDM Optical Transceiver in QSFP Form Factor with a reach of up to 2km over duplex single-mode fiber.

Challenges Facing the Data Center

Problem 1 : 100G Needed for Data Explosion



Every 60 seconds

- **98,000+** tweets
- **695,000** status updates
- **11million** instant messages
- **698,445** Google searches
- **168 million+** emails sent
- **1,820TB** of data created
- **217** new mobile web users

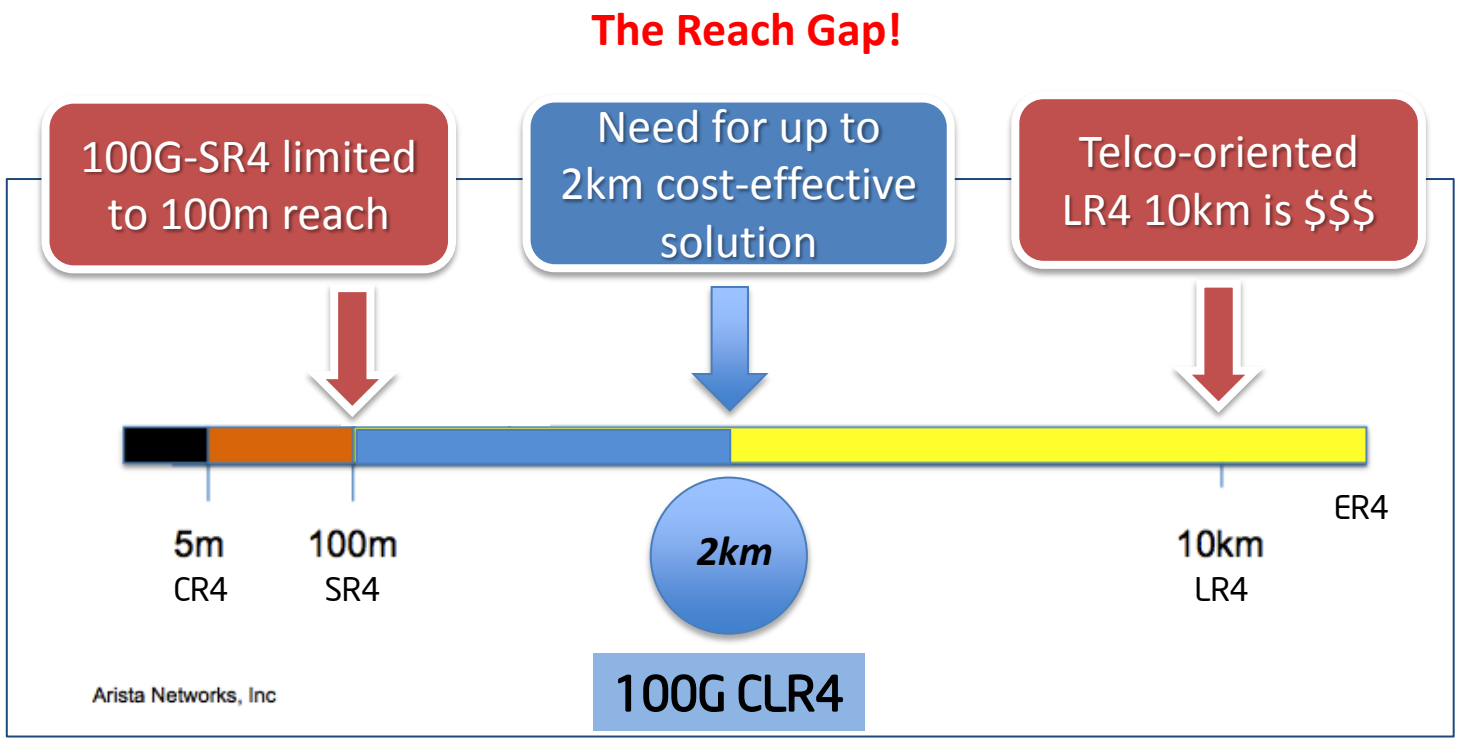
Problem:
The ubiquitous data explosion

Problem:
10G and 40G expansion does not support density

Problem:
100G has been Telco focused, too $$ for DC

Result: Pent up demand for cost-effective 100G optics addressing Data Center specific product requirements.

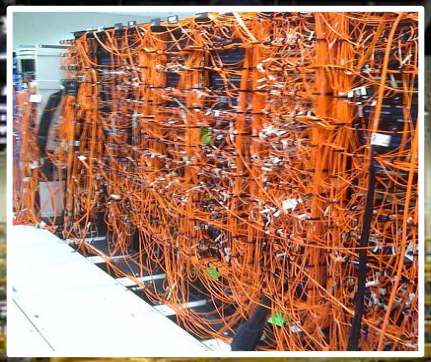
Problem 2 : 100G Standard Reach & Price Gap



Problem 3 : Data Centers Growing

Increasing Scale

More Connectivity



Limited Port Density

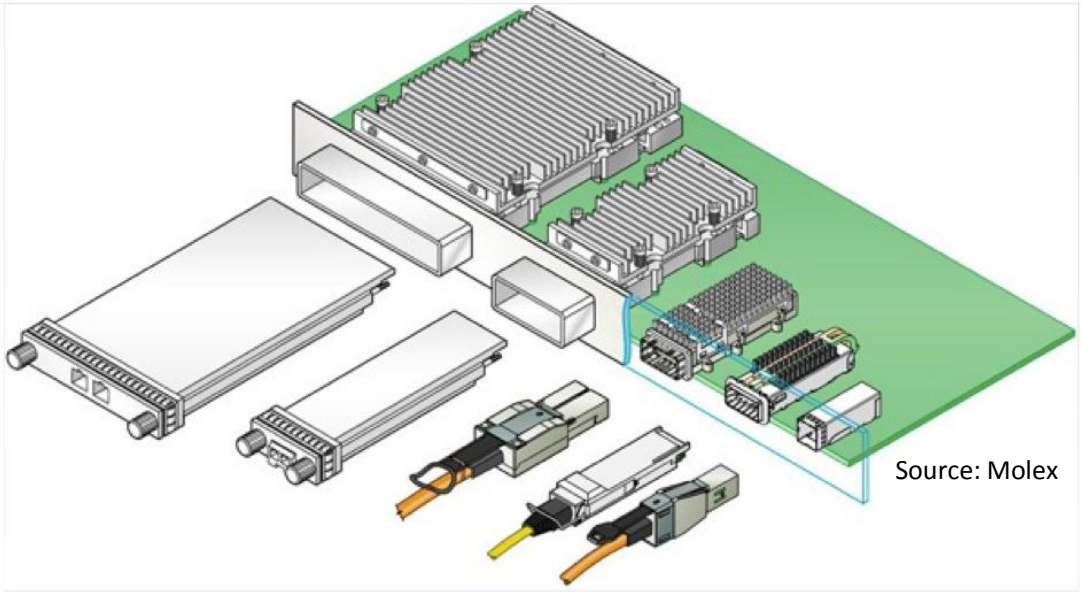
Source: Quality Technology Services (QTS) data center

Problem 4 : Too Many Form Factors

6 Form Factors for 100G

1) CFP
2) CFP2
3) CFP4
4) CXP
5) QSFP
6) CPAK

Data centers require smallest form factor for maximum port density

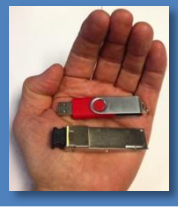


More differences than 10G or 40G Ethernet ever had

The Solution: 100G CLR4

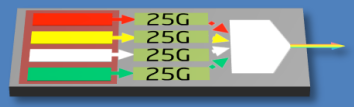
2 km, CWDM, <3.5W in QSFP Form Factor

Small Form Factor



QSFP form factor – smallest 100G
8.5mm x 18mm x 72mm

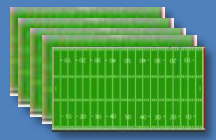
75% Fiber Reduction



CWDM

Only 2 optical fibers (4 wavelengths)
100Gbps per fiber (1 send, 1 receive)

Low power Long distance



Power consumption : < 3.5 Watts
Fiber reach: up to 2 km
(~20 football fields end-to-end)

High Density Products

Enables 36 100G ports in 1 RU

CLR4 Alliance Formation

- Open to anyone wanting to use build or sell 100G CLR4-based interoperable products
- Alliance has collected product requirements from end-users
- Focus is on requirements of large data center customers
- Work with interested parties to create consensus specification
- Work with companies that will make CLR4-based products
- 100G CLR4 specifications will be available at no charge

Goal: Help accelerate the market for 100Gigabit Ethernet

100G CLR4 Alliance – Industry Supporters

Summary and Next Steps

- 100G-CLR4 is a specification for a cost-effective, low-power 100G CWDM transceiver in QSFP form factor
- Release preliminary spec April 2014.
- Collect feedback on initial preliminary spec
- Publish revised consensus spec May 2014
- Get industry to build & deploy 100G CLR4 products
- Anyone can participate and use the open specification

Thank You

Disclaimer

No license, express or implied, by estoppel or otherwise, to any intellectual property right is granted by any of the companies listed herein for use of the preliminary specification.

Alliance participation terms and conditions, such as cost, Intellectual Property Rights etc., to be discussed with interested companies in the future.

The CLR4 Alliance acknowledges the work of the IEEE standards efforts.

The CLR4 Specifications are based on much of the work the IEEE standards body has developed for 40GBase-LR4 and 100GBase-LR4 industry standards.