Data Center end users for 40G/100G and market dynamics for 40G/100G on SMF

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Now that 40GbE is part of the IEEE 802.3ba there will be a wider array of applications that will require this bandwidth. This is what historically has led to the success of any generation of Ethernet and its current prevalence throughout the network.

Without 40GbE there would be a class of users that would achieve higher bandwidth by aggregating multiple 10GbE links. Therefore 40GbE offers a path to higher speed for this set of users.

However, there is another class of users whose bandwidth needs will drive them directly to 100 GbE.
Server Farm Environments

Type and Size (IDC 2006 classification)

- **Web/Service Provider**
  - **Very Large**
    - ~25000
      - Supports Internet users
      - Servers are consolidated across multiple data centers
      - Location: geographically distributed (multiple active-active)
      - 1 - 4 Interfaces per Server
      - 25000 – 100000 GE Ports

- **Large Enterprise**
  - **Large Data Center**
    - 2000 to 2500 Servers
      - Supports the bulk of enterprise users
      - Servers are consolidated
      - Location: Headquarters (primary), major hub (remote), failover site (backup)
      - 1 - 4 Interfaces per Server
      - 2000 – 10000 GE Ports

- **Medium Enterprise**
  - **Medium Data Center**
    - 1500-1700 Servers
      - Supports medium to large groups of users
      - Servers are consolidated
      - Location: Headquarters (primary), major hub (remote), failover site (backup)
      - 1 - 4 Interfaces per Server
      - 2000 – 10000 GE Ports

- **Small Data Center**
  - 350-500 Servers
    - Supports a small group of users
    - Servers are remote from primary data center
    - Location: Small branch offices
    - 1 - 2 Interfaces per Server
    - 350-1000 GE Ports
Server density and I/O speed determine depth and scale of the Data Center architecture layers

Tier 3 - 76% of Data Centers (IDC)
Server density and I/O speed determine depth and scale of the Data Center architecture layers

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Large Enterprise

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Tier 2 - 17% of Data Centers (IDC)
Server density and I/O speed determine depth and scale of the Data Center architecture layers

- **Core Layer**
- **Aggregation Layer**
- **Access Layer**

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**Small Data Center**
- 350-500 Servers
- 350-1000 ports

**Medium Data Center**
- 1500 -1700 Servers
- 3000-3400 ports

**Large Data Center**
- 2000-2500 Servers
- 2000-10000 ports

**Very Large Data Center**
- 25000 Servers
- 25000-100000 ports

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**Tier 1 - 7% of Data Centers (IDC)**
Switch aggregation speed needs in the Data Center

Different classes of Data Centers have different needs (and cost sensitivity) in terms of aggregation link speed.
Migration to Higher Speed Ethernet is stronger on SMF than MMF.
Ethernet Switching Singlemode Cost and Volume Transition

1G to 10G (10km links only)

10G/1G Cost Ratio (X)

10G = 18x 1G cost
Volume = 0.6% of TXCVR shipments

10G = 11x 1G cost
Volume = 13% of TXCVR shipments
SMF Module 40G/100G cost in 2010

Cost Ratio to HSE/10G
(X)

2010

Source: Cisco estimates
Core Applications does not follow the same Cost/Volume Relationship

Cost Ratio to OC-768/10G (X)

Source: Cisco Internal data
Summary

- Different tiers of datacenter have differing HSE needs in terms of server speeds and server density which determine the speed of aggregation links.

- For Tier 2 and some Tier 3 datacenters (~40-45% of the ports), 40GbE represents a much better compromise between cost and performance than 100G.

- For very large datacenters (Tier 1) and Web hosting/SP applications the need for 100GbE will not be diminished by the Tier2/3 need.

- At the introduction of HSE the adoption of SMF interfaces is higher than that for MMF

  - highlights the need for a 40GbE 10km SMF interface

- The introduction of a 40GbE SMF interface will not cannibalize the 100GbE SMF volume requirements because of the different balance between cost and performance driving Tier 1 and Tier 2/3 end users.