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

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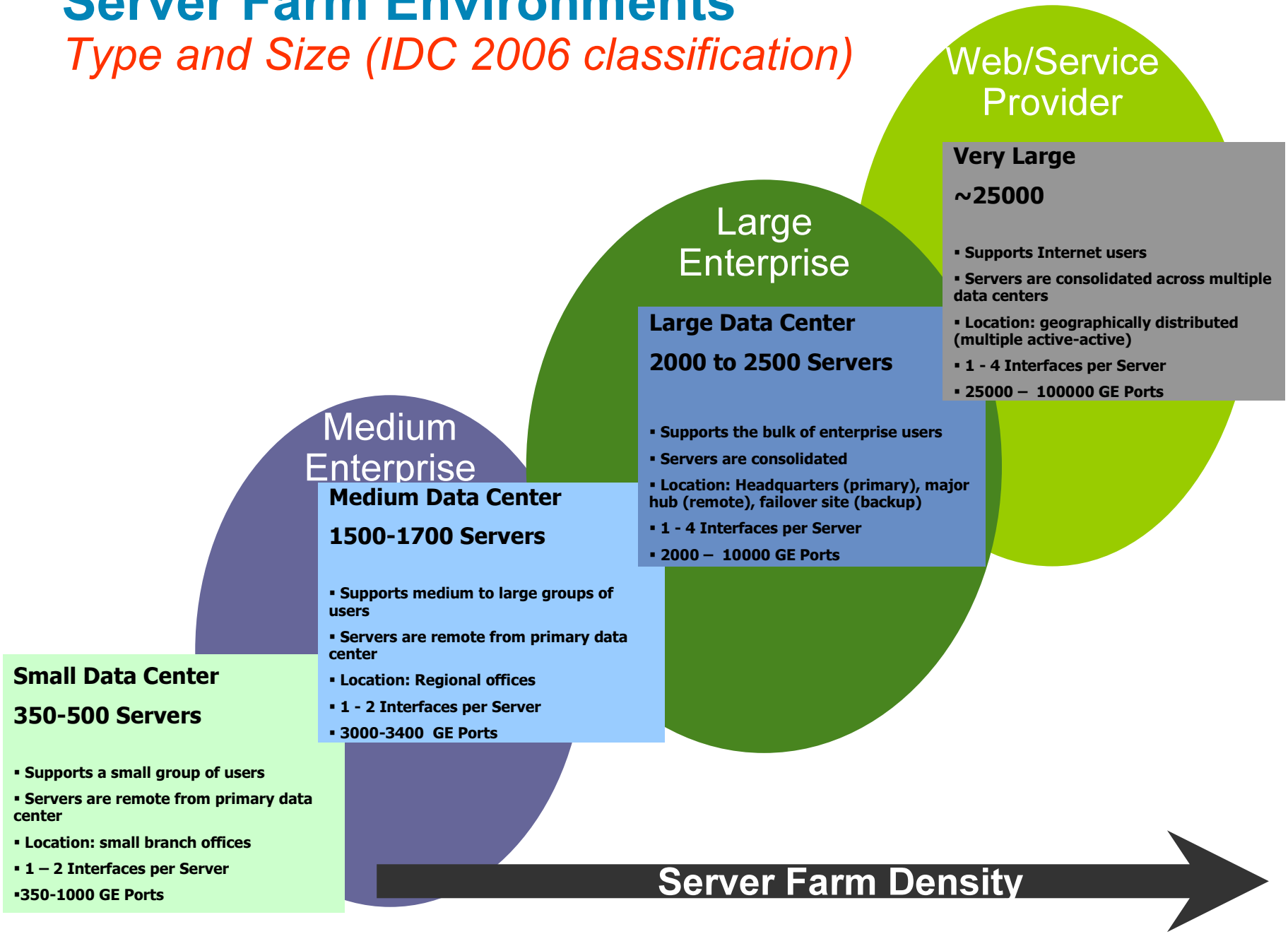
Now that 40GbE is part of the IEEE 802.3ba there will be a wider array of applications that will require this bandwidth. This is what historically has led to the success of any generation of Ethernet and its current prevalence throughout the network.

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.

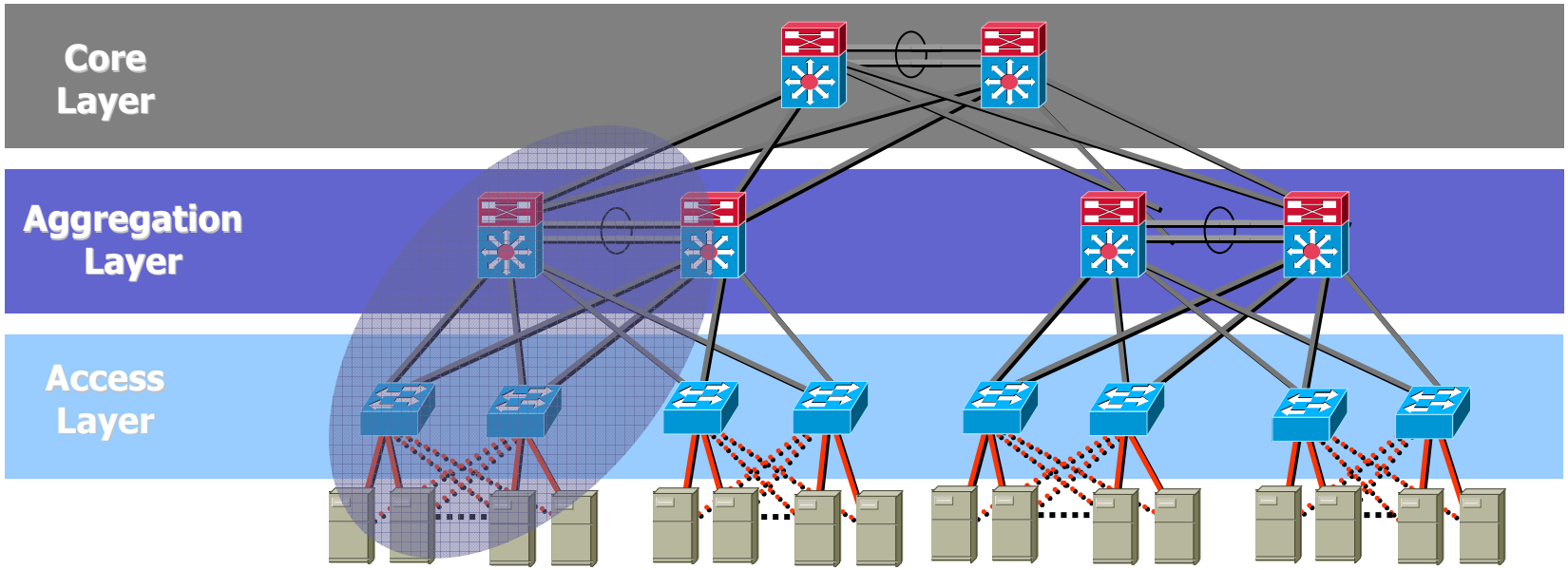
However, there is another class of users whose bandwidth needs will drive them directly to 100 GbE.

Server Farm Environments

Type and Size (IDC 2006 classification)



Server density and I/O speed determine depth and scale of the Data Center architecture layers

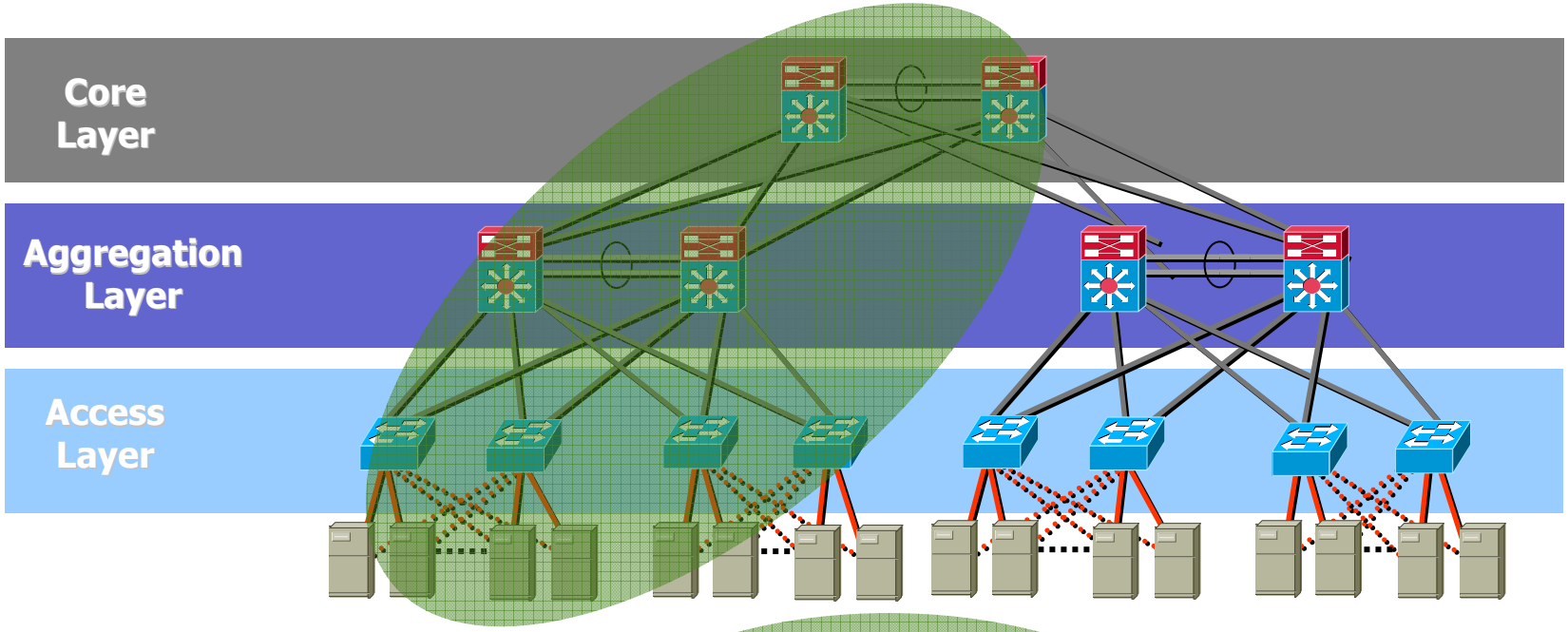


Small Enterprise

Small Data Center	Medium Data Center	Large Data Center	Very Large Data Center
350-500 Servers	1500 -1700 Servers	2000-2500 Servers	25000 Servers
350-1000 ports	3000-3400 ports	2000-10000 ports	25000-100000 ports

Tier 3 - 76% of Data Centers (IDC)

Server density and I/O speed determine depth and scale of the Data Center architecture layers

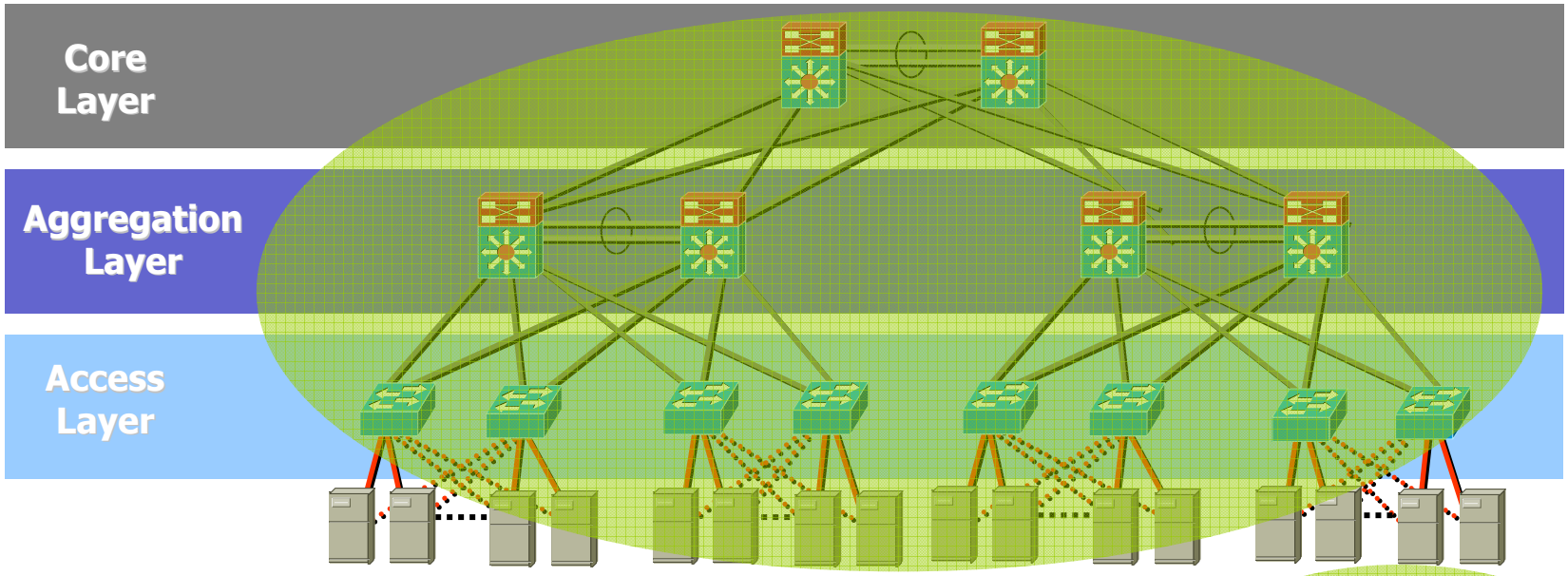


Large Enterprise

Small Data Center	Medium Data Center	Large Data Center	Very Large Data Center
350-500 Servers	1500 -1700 Servers	2000-2500 Servers	25000 Servers
350-1000 ports	3000-3400 ports	2000-10000 ports	25000-100000 ports

Tier 2 - 17% of Data Centers (IDC)

Server density and I/O speed determine depth and scale of the Data Center architecture layers

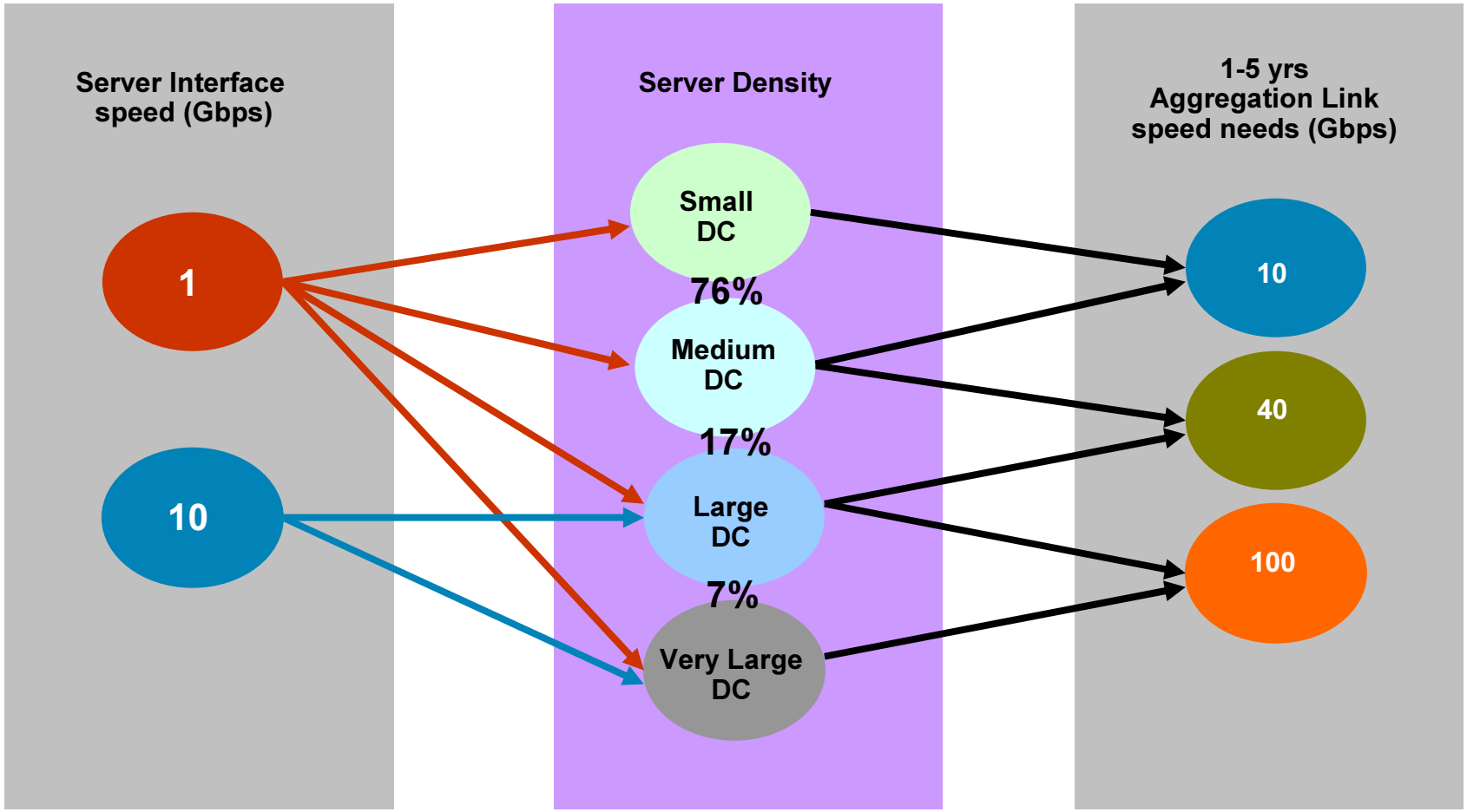


Web/Service Provider

Small Data Center	Medium Data Center	Large Data Center	Very Large Data Center
350-500 Servers	1500 -1700 Servers	2000-2500 Servers	25000 Servers
350-1000 ports	3000-3400 ports	2000-10000 ports	25000-100000 ports

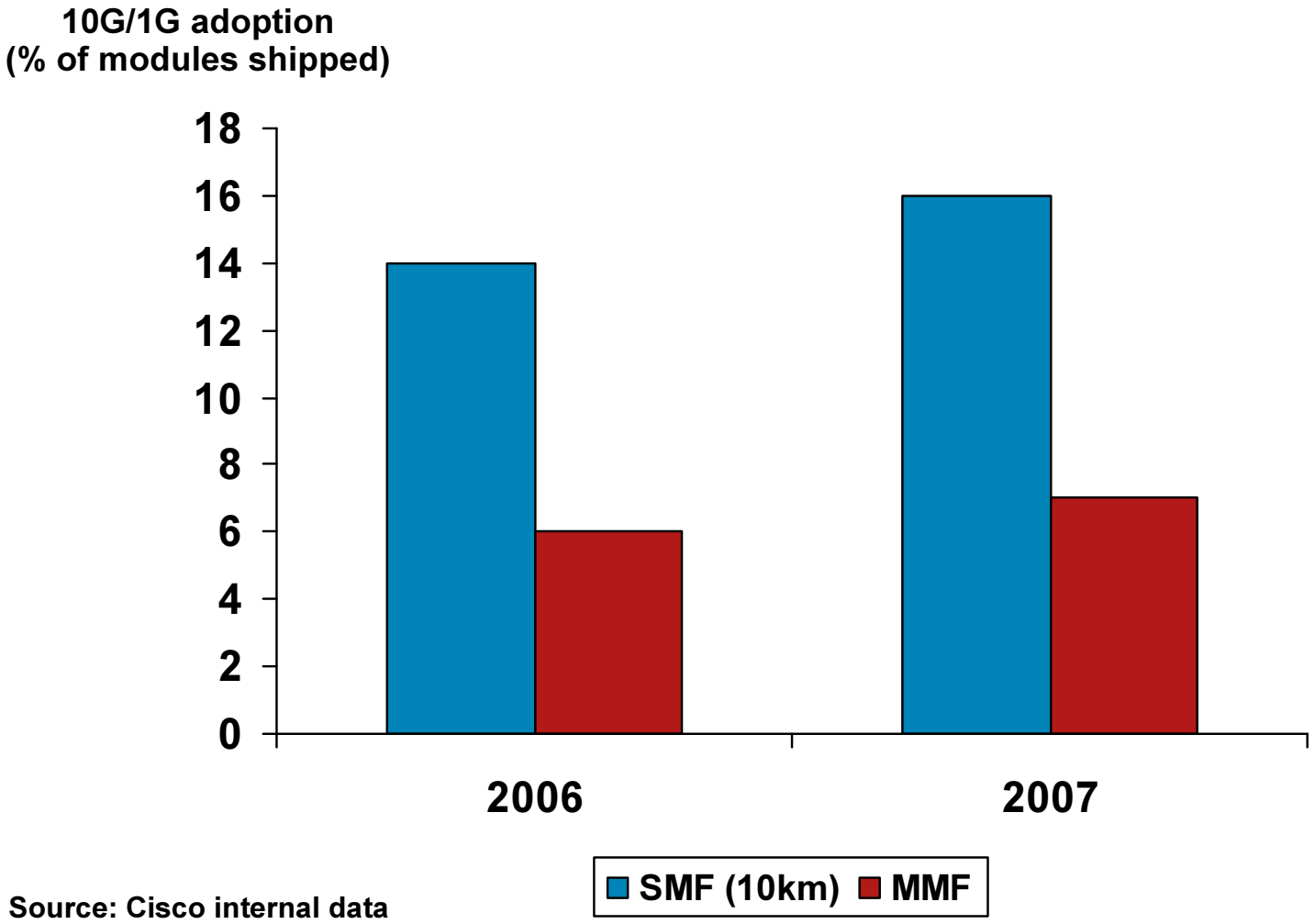
Tier 1 - 7% of Data Centers (IDC)

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.

1G to 10G PMD Migration Rate

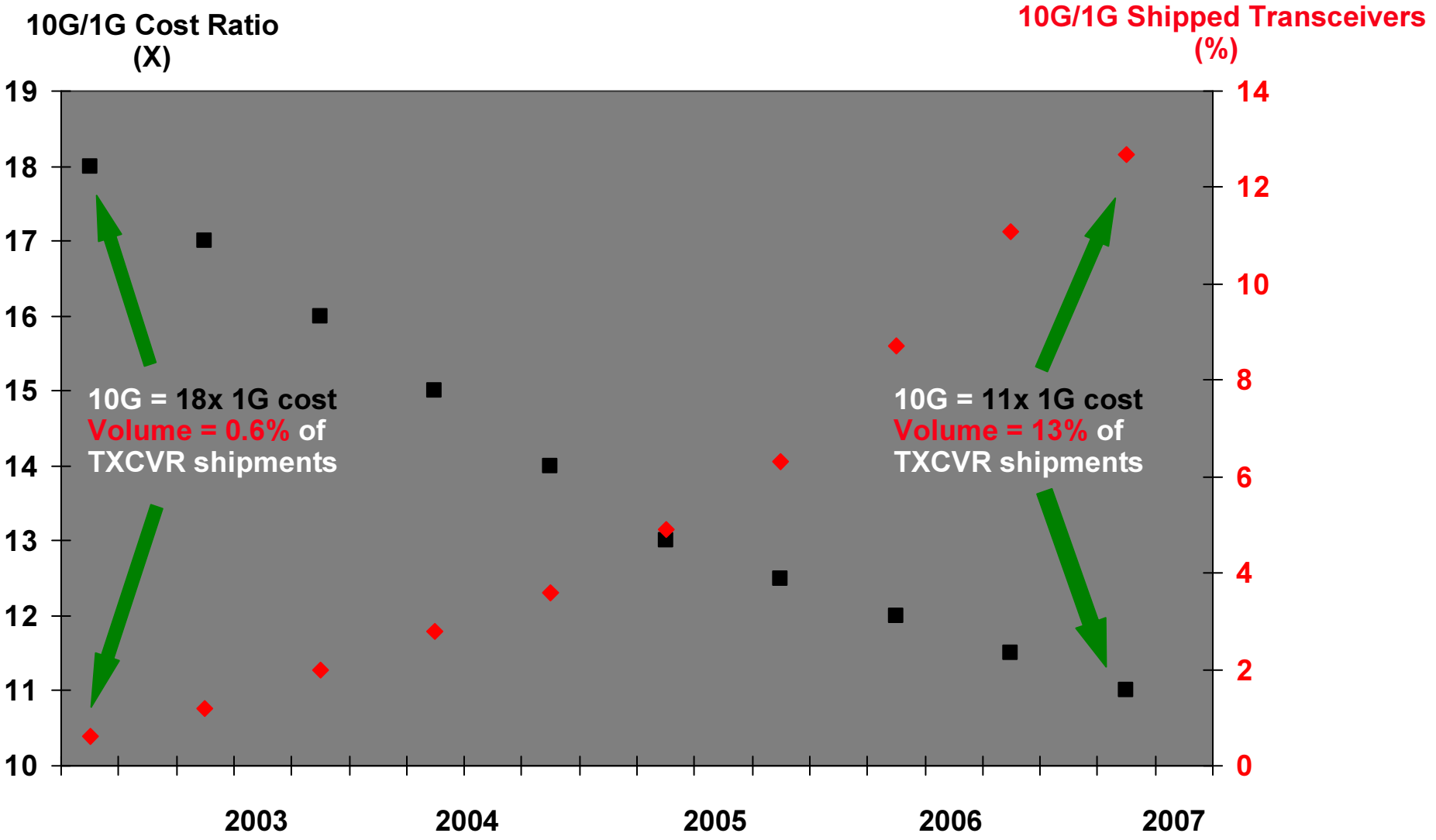


Source: Cisco internal data

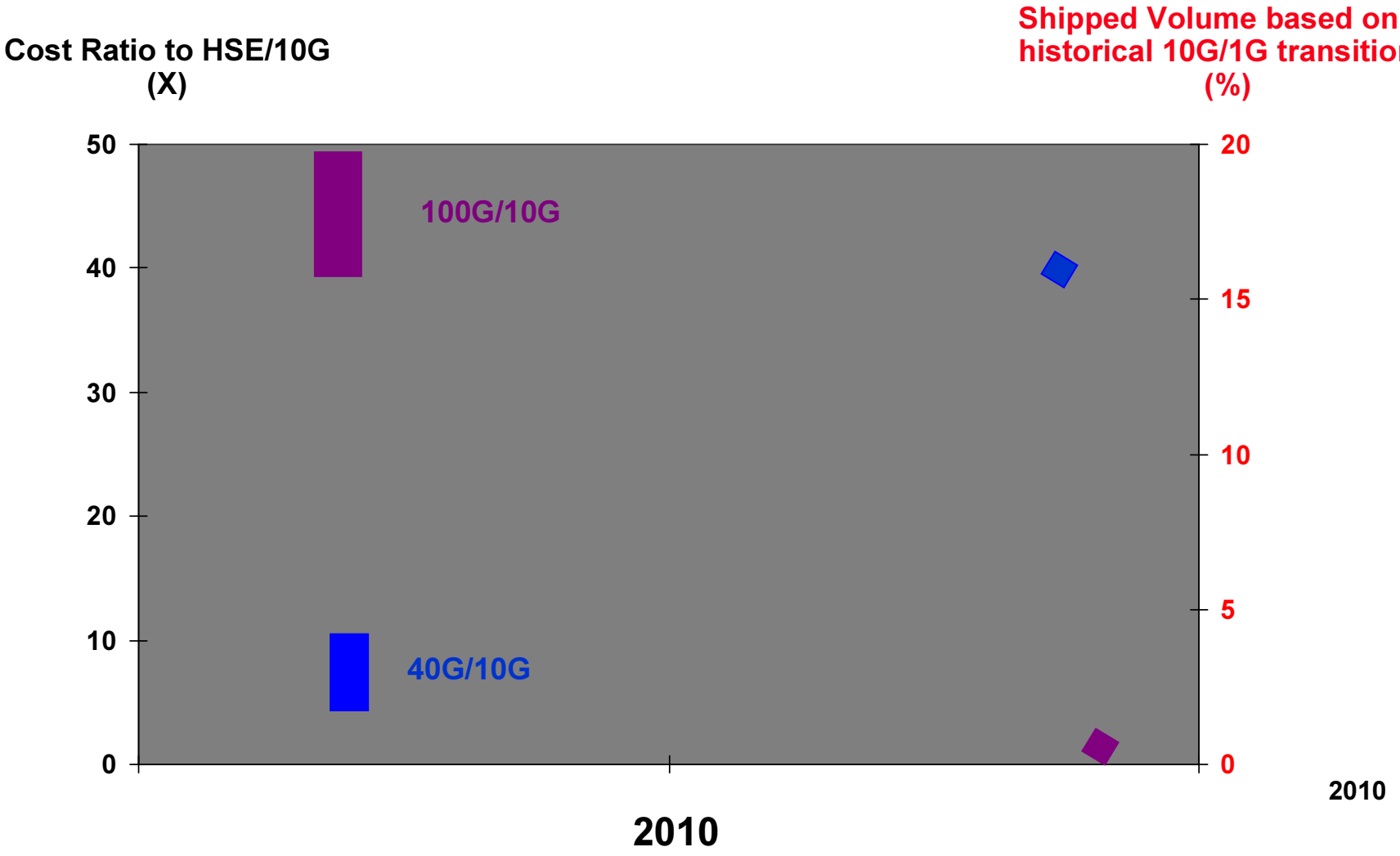
Migration to Higher Speed Ethernet is stronger on SMF than MMF.

Ethernet Switching Singlemode Cost and Volume Transition

1G to 10G (10km links only)

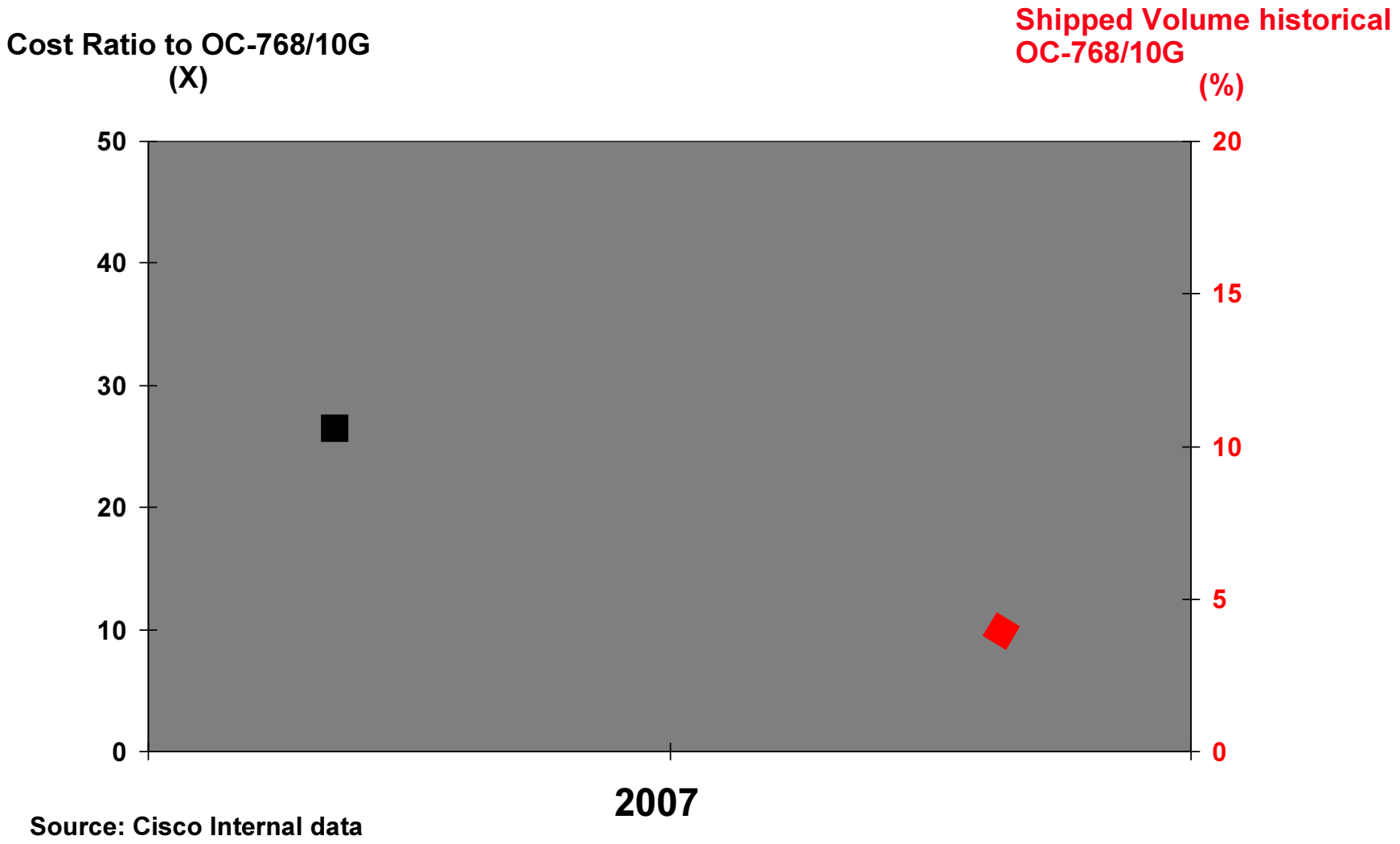


SMF Module 40G/100G cost in 2010



Source: Cisco estimates

Core Applications does not follow the same Cost/Volume Relationship



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.