HPC Market and Interconnects Report

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About This Presentation

- **This presentation provides information on**
  - HPC market status and forecast
  - Revenues estimation and breakdown
  - Interconnect survey results
    - Clustering, storage, systems vendors
- **The info is provided on behalf of the HPC Advisory Council**
  - As a service to its members and the HPC community
- **The author would like to express great appreciation to IDC and Tabor Research for their support**
- **For more information, please refer to:**
  - http://hpcadvisorycouncil.mellanox.com
  - www.idc.com
  - www.TaborResearch.com

Executive Summary

- **2008 brought a slow down to the world's economies**

- **HPC market showed slight decline in 2008**
  - Same anticipated for 2009, in particular for the first half

- **Starting 2H09 and throughout 2010 – HPC market is expected to show growth**
  - IDC forecast[1] shows 5.5% CAGR growth 2008-2013
  - Tabor Research forecast[2] shows 6.9% CAGR growth 2009-2013

- **Clusters are expected to continue and be the dominant solution (70-80%)**

- **Growing HPC requirements will accelerate consolidation**
  - Server, storage and interconnect consolidations

- **InfiniBand and Ethernet will dominate in equal shares**
  - On behalf of proprietary interconnects
  - InfiniBand will continue to provide the best performing interconnect solution
    - Enables users to deliver products faster to market

- **Key criteria for HPC interconnects**
  - Performance, price/performance, scalability and application productivity

[1] source: IDC, Worldwide Technical Computing Server 2009 - 2013 Forecast, Mar 2009, Doc #217232
[2] source: Tabor Research, InterSect360™ Market Advisory Service, 2008 Technical HPC Server Market Review, April 2009

HPC Server Market Revenue Forecast

Worldwide High-Performance Technical Systems Total Market Revenue Forecast, 2004 - 2013
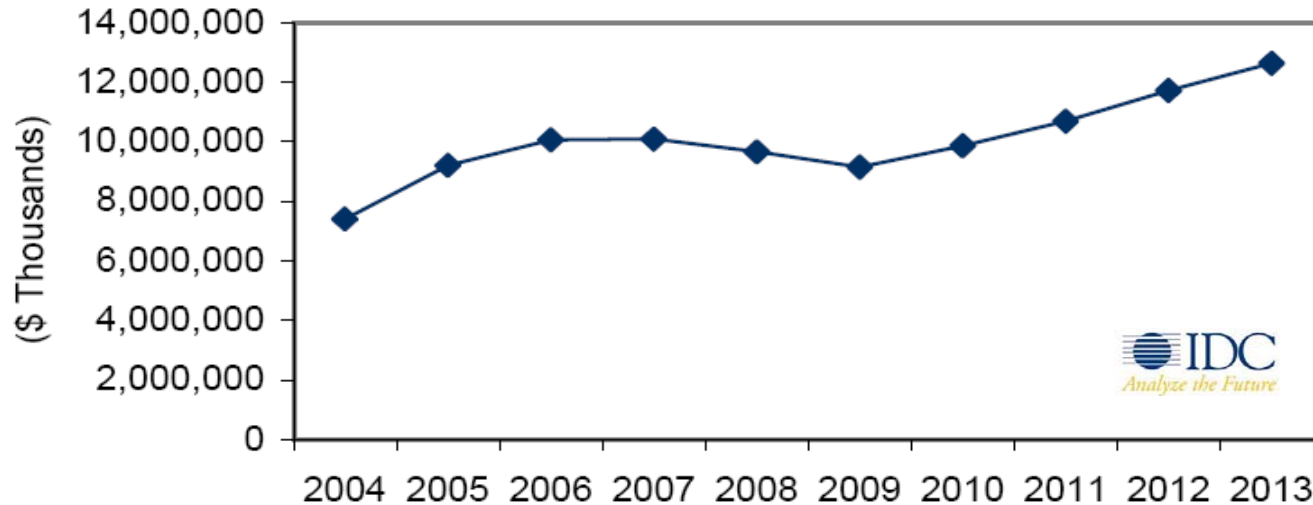
- **HPC server market revenue estimated for 2008**

  – $9.77B, 3% down compared 2007

  – Slight market decrease estimated for 2009, with a strong increase from 2010

- **Estimated 5.5% 2008-2013 CAGR**

source: IDC, Multi-Client Study, IDC End User Multi-Client Study and Survey: HPC Interconnect Report, 2009
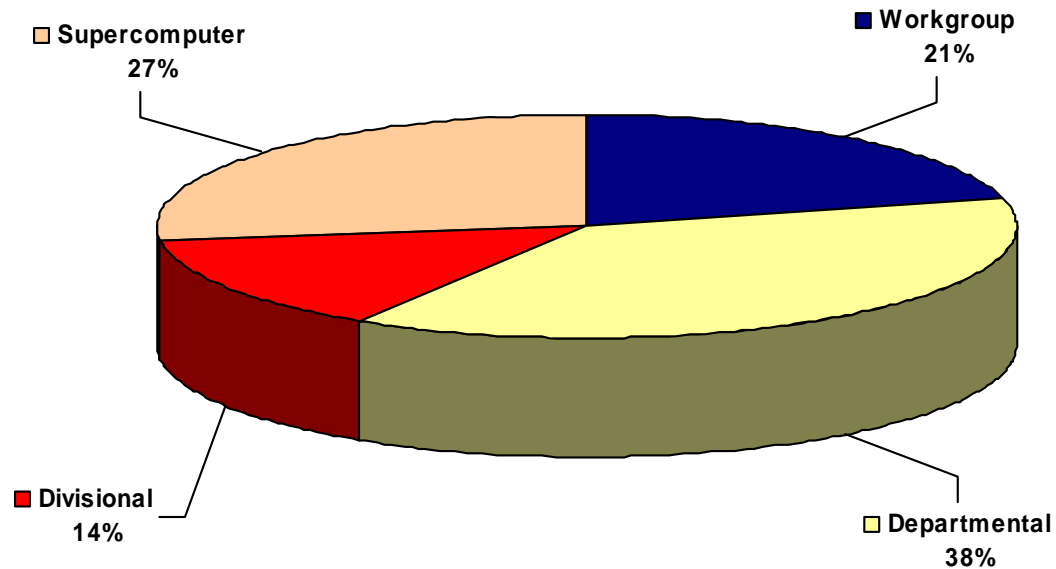
HPC Market Revenue - Geographic

Traditional HPC Revenue Share by Geographic Regions (%)

Regions	2006	2007	2008
North America	58.7%	57.9%	54.5%
EMEA	25.1%	26.1%	28.0%
Asia-Pacific	14.5%	14.2%	15.9%
Latin America	1.7%	1.9%	1.6%
Total	100.0%	100.0%	100.0%

- **North America continues to account for major HPC installations**
- **Strong growth in Asia (8.8%) and EMEA (4.1%)**
  – Compared to 2007

HPC Market Revenue - Segments

Worldwide High-Performance Technical Server Shares by Competitive Segment, 2008 Estimation

- Supercomputer 27%
- Workgroup 21%
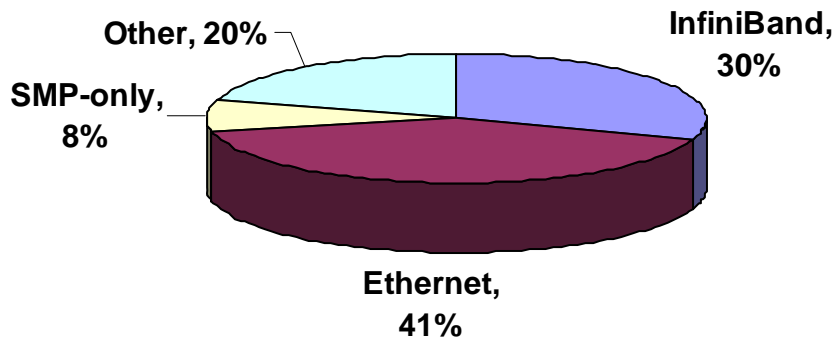- Divisional 14%
- Departmental 38%

IDC maps the segments by:

- Supercomputers - technical servers that sell for over $500,000 (author note: this can be related to 512 nodes or above)

- Divisional servers - technical servers that sell for $250,000 to $499,999 (author note: this can be related to 512-128 nodes)

- Departmental servers - technical servers that sell for $100,000 to $249,999 (author note: this can be related to 128-16 nodes)

- Workgroup servers, - technical servers that sell for under $100,000 (author note: this can be related to 16 nodes or less)

source: IDC, Multi-Client Study, IDC End User Multi-Client Study and Survey: HPC Interconnect Report, 2009

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HPC Market - Interconnect

- **Interconnect survey results**
  - 110 sites across the entire HPC market – government, academic, industry
- **InfiniBand and Ethernet have relatively equal shares**
- **InfiniBand shows an increase of 33% in new systems installations**
  - From 30% in current systems to 40% in new systems

Interconnect Types In Use

Other, 20%
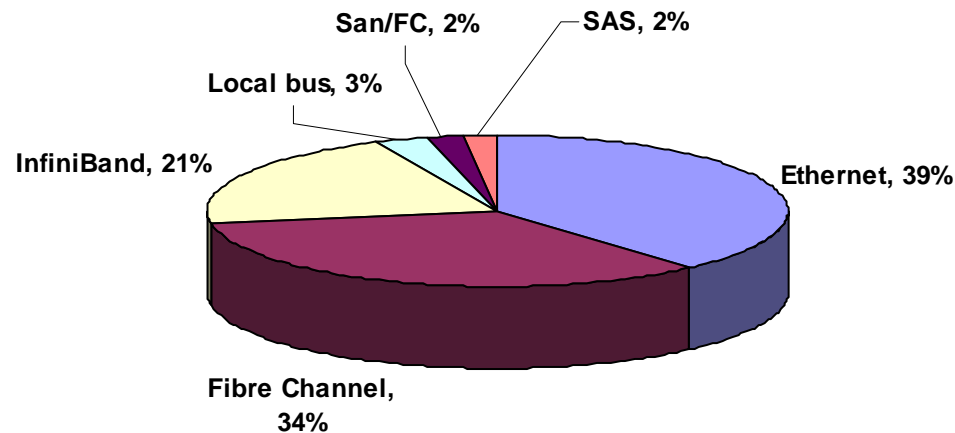SMP-only, 8%
InfiniBand, 30%
Ethernet, 41%

Interconnect Types for the Most Recent Cluster

Other, 17%
InfiniBand, 40%
Ethernet, 43%

source: IDC, Multi-Client Study, IDC End User Multi-Client Study and Survey: HPC Interconnect Report, 2009
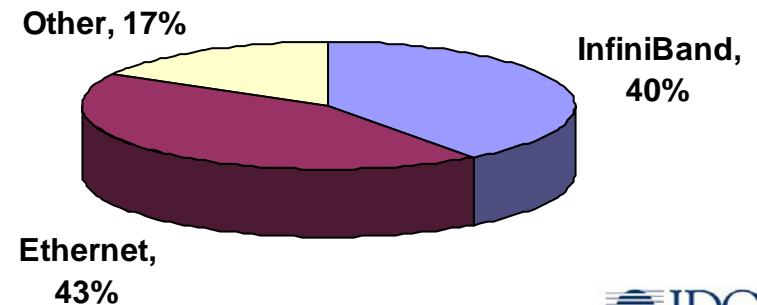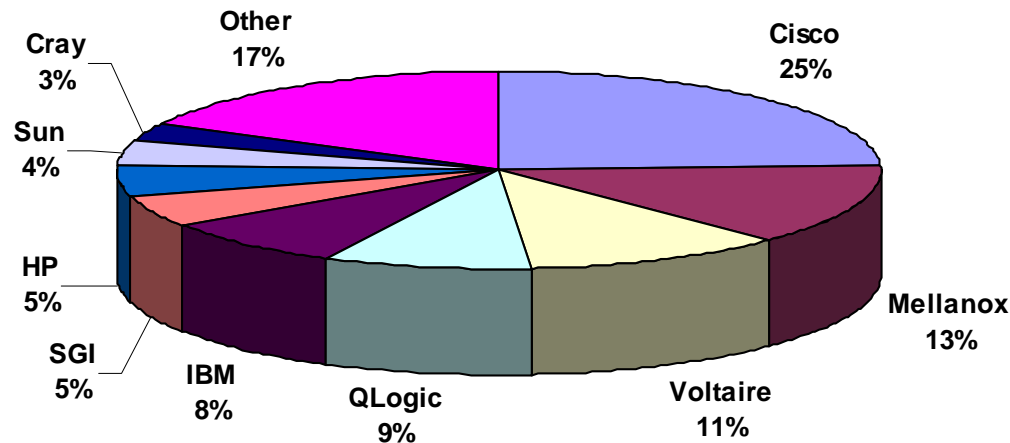
HPC Market - Storage

- **Storage survey results**

  – 110 sites across the entire HPC market – government, academic, industry

- **Fibre Channel and Ethernet are the most popular protocols**

- **On the most recently purchased systems InfiniBand substantially narrowed the gap**

  – InfiniBand doubles its share for storage connectivity to reach 21%

Backbone Protocol For The Most Recent Storage System

San/FC, 2%   SAS, 2%

Local bus, 3%

InfiniBand, 21%   Ethernet, 39%

Fibre Channel, 34%

source: IDC, Multi-Client Study, IDC End User Multi-Client Study and Survey: HPC Interconnect Report, 2009

- **Interconnect survey results**
  - 110 sites across entire market – government, academic, industry
- **Leading system vendors – Cisco, Mellanox, Voltaire**
  - All with double figures, rest of the vendors with a single digit

Interconnect Vendor Count For The Most Recent System

- Cray 3%
- Other 17%
- Sun 4%
- HP 5%
- SGI 5%
- IBM 8%
- QLogic 9%
- Voltaire 11%
- Mellanox 13%
- Cisco 25%

source: IDC, Multi-Client Study, IDC End User Multi-Client Study and Survey: HPC Interconnect Report, 2009

Most Important Purchase Criteria For Next HPC System

- **Price/flop, price/node, price/performance**

- **Raw performance, processor speed, cores per node**

- **Ease of installation, manageability, serviceability, reliability**

- **Application benchmarks, performance, speed to solution**

- **Ability to scale, system scalability, expandability**

- **Power and cooling efficiency, flops/watt**

source: IDC, Multi-Client Study, IDC End User Multi-Client Study and Survey: HPC Interconnect Report, 2009

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