

Status of the Worldwide HPC Interconnect Market

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The Worldwide HPC Market Is In A Healthy Growth Mode (\$000)



	2009	2010
Servers	8,637,114	9,504,323
Storage	3,022,990	3,328,312
Middleware	1,062,365	1,103,797
Applications	2,971,167	3,164,293
Service	1,658,326	1,727,976
Total	17,351,963	18,828,701

The High-End “Supercomputers” Segment Is Turbo-Charged (\$000)

- In 2009, the worst year of the recession:
 - Systems priced at \$500K and up grew 35%.
 - Systems priced at \$3M and up grew 65%!
- These high-end systems are prime targets for IB.



Sum of WW Rev	2007	2008	2009	2010
cs1-Supercomputer	\$ 2,682,391	\$ 2,686,128	\$ 3,342,073	\$ 3,481,577
cs2-Divisional	\$ 1,609,819	\$ 1,395,817	\$ 1,078,575	\$ 1,268,735
cs3-Departmental	\$ 3,384,308	\$ 3,167,096	\$ 2,783,518	\$ 3,279,219
cs4-Workgroup	\$ 2,399,905	\$ 2,522,809	\$ 1,409,979	\$ 1,474,792
Grand Total	\$ 10,076,423	\$ 9,771,849	\$ 8,614,145	\$ 9,504,323

Propriety Interconnects: “Don’t Look Back”

- The vast majority of HPC sites that purchase interconnects buy commercial products based on standard technologies: InfiniBand, 1-Gigabit Ethernet, or 10-Gigabit Ethernet.
- It is increasingly difficult/costly for vendors of proprietary interconnects to maintain differentiation against the advancing InfiniBand and Ethernet standards.
- As baseball great Satchel Paige once said, "Don't look back. Someone may be gaining on you."



HPC Interconnect Market Share Trends

- Since 2006:
 - Ethernet market share has stayed constant in a growing market.
 - InfiniBand has rapidly gained market share.
 - Proprietary interconnects have increasingly lost market share.
- IDC expects these trends to continue.

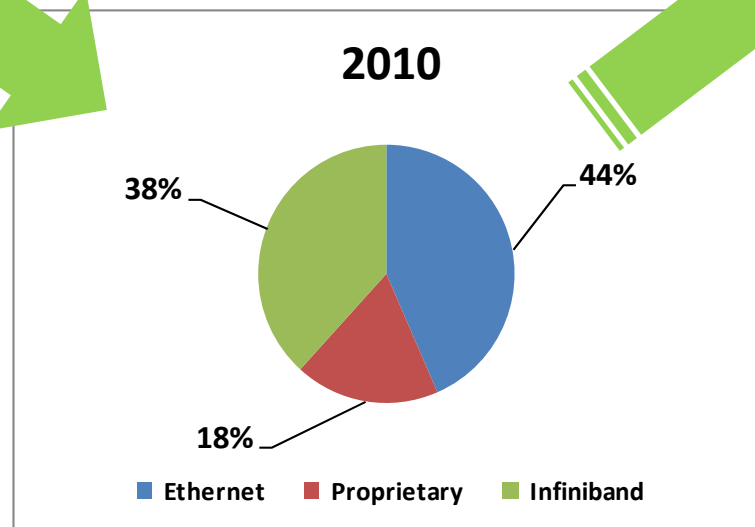
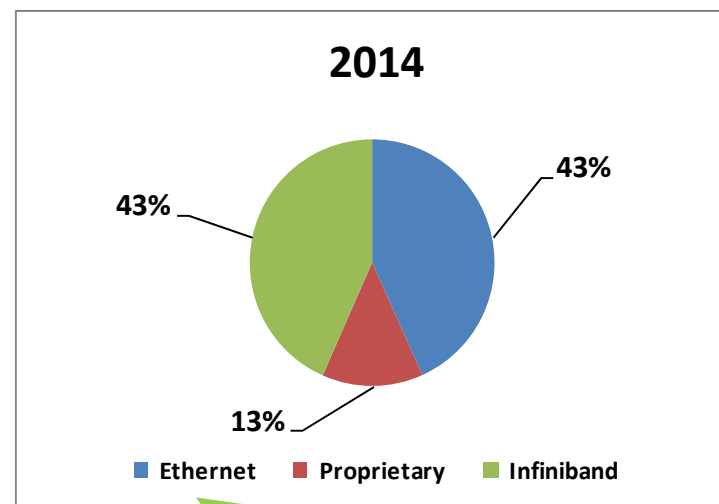
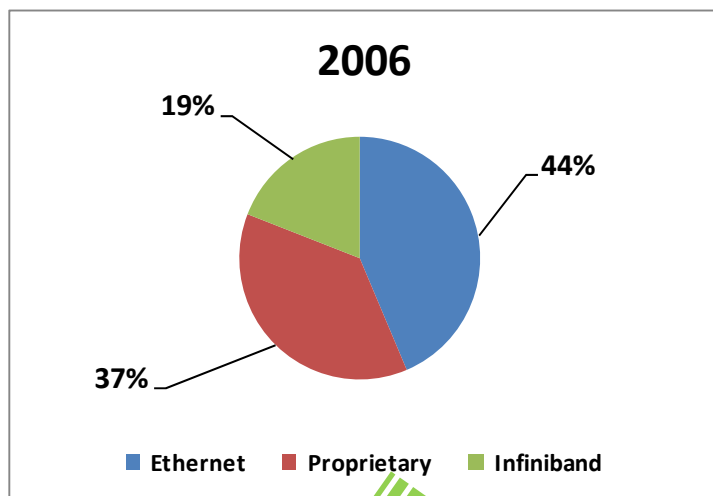


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InfiniBand Technology Advantages

- InfiniBand offers leading bandwidth and lower latency.
 - Essential for many high-end applications.
 - Applications are compiled against specific libraries to allow better utilization of the network fabric.
- InfiniBand specification supports multiple RDMA mechanisms.
- InfiniBand architectures do not need TCP/IP off-load engines for flow control.
- Latency characteristics for RDMA operations are extremely efficient.
- For high end applications and performance-oriented applications, InfiniBand provides enhanced technological capabilities to extract performance.

IB's Growing Market Share in HPC

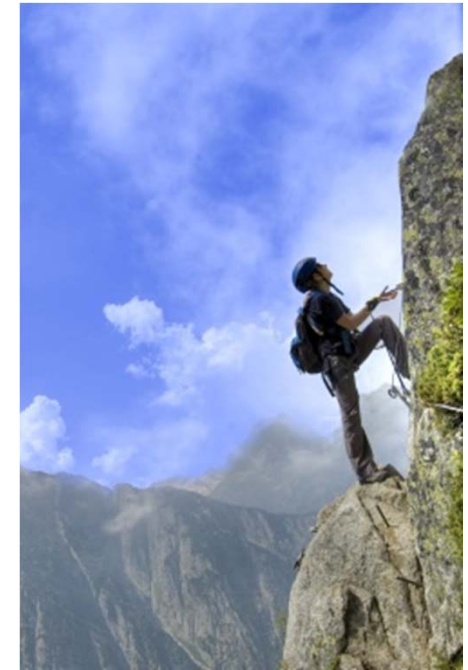


Forecast for the HPC Interconnect Market

- IDC forecasts that the HPC interconnect market will grow at a 9.1% CAGR to reach \$2 billion in 2014.
 - Ethernet and InfiniBand will vie for the lead with around 43% each
 - That will squeeze proprietary interconnects down to about 13%.
- This exceeds the projected 7.5% compounded growth rate for HPC servers.
- Interconnect revenues will climb from 15.3% of server revenues in 2009 to 16.5% in 2014.
- This forecast is partly driven by the projected strong growth for high-end HPC systems, which typically require substantial interconnect capabilities.
- The rising horizontal market for data-intensive ("big data") HPC workloads should also boost demand for interconnects.

The Interconnect Market Will Grow By Addressing Key HPC Challenges

- Memory wall → interconnects can alleviate system imbalance
- Parallel programming → interconnects can reduce the number of parallel compute elements needed for jobs – especially important for hard-to-scale codes
- Time-to-solution → better bandwidth/latency speed results
- Power (most energy is in data movement) → capable interconnects make data movement more energy-efficient
- Space → fewer compute elements needed for targeted sustained performance levels



Thank You



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