



Server Segment Selling Guide

High-Performance Computing with Intel® Server Boards and Systems



This Segment Selling Guide is designed to help you make an informed recommendation to your high-performance computing (HPC) customers.

From scientific computing and real-time financial analysis, to technical computing in government and university labs, Intel® Server Boards and Systems for HPC provide the solutions you need to succeed.

Introducing HPC

HPC is all about high performance, compute density, power efficiency, and lower cost. According to a report from IDC, IDC expects the HPC technical server market to grow at a healthy 7 percent to 8 percent yearly rate to reach revenues of USD 13.4 billion by 2015.¹



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Who buys HPC?



Government Labs

National labs use HPC for conducting research for weather prediction, energy innovation, satellite imagery, and more.



Healthcare

Sophisticated medical imaging applications demand extensive processing.



Oil and Gas

The petroleum industry uses HPC to locate reserves and calculate the best ways to reach them.



Financial Institutions

World-wide connected trading requires near-instantaneous computing to interpret data on the fly.



Higher Education and Biotech

Many major universities and labs use HPC for scientific research.

What do HPC buyers care about?

HPC buyers will pay a premium for the best performance they can buy. And while hungry for maximum performance, buyers want systems configured in a way that uses power efficiently and is cost effective. What do these buyers look for in an HPC solution?

Performance and price

Often on a fixed budget, these buyers are looking for maximum price performance.

Scalability and density

HPC buyers want to maximize compute density to get the highest performance in the smallest space. These buyers look for a small form factor that doesn't compromise performance.

I/O throughput

The performance of a clustered HPC system is greatly affected by throughput, so a built-in solution such as InfiniBand* is critical.

High memory bandwidth

HPC buyers need systems with the fastest memory throughput for their particular applications.

Cluster ready

HPC systems typically require countless hours to configure. HPC buyers look for cluster-ready boards and systems that have the connections they need, with the assurance that this equipment will work well with the rest of their system.

Did you know?

Intel was the first company to break the Tflops barrier with its experimental multicore Polaris chip in 2007.

A key measure of high-performance computing is the number of floating point operations performed per second—flops. This is expressed in teraflops (Tflops: a trillion flops) and petaflops (Pflops: a quadrillion flops).





BEST COST EFFICIENCY
Intel® Server Board S2400LP

MAX MEMORY BANDWIDTH
Intel® Server Board S2600JF

MAX MEMORY CAPABILITY AND I/O
Intel® Server Board S2600WP

Intel® Server Boards and Systems for HPC

These cluster-ready, half-width boards provide the greatest compute density and the interconnects your customers need, featuring 8 to 16 DIMMs and supporting the Intel® Xeon® processor E5 product family.

	BEST COST EFFICIENCY	MAX MEMORY BANDWIDTH	MAX MEMORY CAPABILITY AND I/O
Intel® Server Board	S2400LP	S2600JF	S2600WP
Dimensions (width x length)	Custom 6.8 inches x 16.6 inches	Custom 6.4 inches x 17.7 inches	Custom 6.8 inches x 18.9 inches
Memory Bandwidth	★★★★☆	★★★★★	★★★★☆
Memory Capability	★★★★☆	★★★★☆	★★★★★
I/O Capability	★★★★☆	★★★★☆	★★★★★
Cost Efficiency	★★★★★	★★★★☆	★★★★☆

All boards feature dual Intel® Xeon® processors as listed below:

Processors, TDP	Intel® Xeon® processor E5-2400, 95W	Intel® Xeon® processor E5-2600, 130W	Intel Xeon processor E5-2600, 130W
I/O Capabilities	SKUs for integrated PCIe* 3, Ethernet		
Integrated InfiniBand*	FDR and QDR SKU options available		
Memory Capacity and Bandwidth	<ul style="list-style-type: none"> 12 LR/U/R-DIMMs 1600 MHz max 	<ul style="list-style-type: none"> 8 LR/U/R-DIMMs 1600 MHz max 	<ul style="list-style-type: none"> 16 LR/U/R-DIMMs 1600 MHz max

“Demanding Financial Services customers rely on Colfax International for their high frequency trading compute capacity, and Colfax uses Intel Server Boards and Systems to deliver the low latency performance and density required. Our discerning customers demand the best performance and the highest quality, and we rely on Intel Server Boards and Systems to deliver it.”

Gautam Shah, President and CEO, Colfax International

Intel® Server Boards and Systems for HPC

Intel Server Boards and Systems for HPC provide the preferred compute density solution for maximum I/O capacity and memory bandwidth for maximum price performance. These building blocks were designed and optimized to best meet the challenges of HPC.



Memory throughput and capacity

Intel design innovation brings high performance optimized for compute power and maximum memory bandwidth.



Performance and price

Companies today can achieve Top500-level Tflops throughput performance by using affordable Intel® Server Boards and Systems.



Scalability and density

Half-width form factor for high-density racks allows for four nodes in 2U, advanced hot swap and storage interface options, and multiple I/O options.



Cluster ready

Intel® Cluster Ready architecture means pre-tested interoperability, so you realize HPC benefits faster, reducing your deployment time from months to weeks or even days. Supported by Intel® Enabled Solutions Acceleration Alliance (Intel® ESAA) and Intel® Cluster Ready.

Memory Bandwidth:



Memory Capacity:



I/O Capability:



Cost Efficiency:



The Cost-effective Solution

Intel® Server System H2000LP

HPC buyers battling budget cuts will be drawn to systems based on the Intel® Server Board S2400LP. With the performance of the dual Intel® Xeon® processor E5-2400 product family and the compute density offered by its half-width form factor, it is the most cost-efficient choice.

The Details

Intel Server Board S2400LP, Intel's entry-level server for HPC, provides cluster-ready compute density features in the half-width HPC product line, with memory and I/O features suitable for smaller clusters.

Nodes:

4 hot-swappable nodes with cable-free power and PCIe*

I/O Capabilities:

- Optional integrated InfiniBand*
- 10GbE is upgradable via I/O module

Internal Storage:

SATADOM

Processors:

System supports up to 8 Intel® Xeon® processor E5-2400 (95W max)

Node-level Cooling:

3 high-speed, 40-mm dual rotor fans per node prevent single point of failure

Memory:

- 4 x 12 LR/U/R-DIMMs
- Up to 1600 MHz

Hard Drives:

- 16 x 2.5-inch Hot swap HDD or
- 12 x 3.5-inch Hot swap HDD

Intel Server System H2000LP

- The cost-efficient solution for small or fast-turn clusters
- Support for high memory capacity and bandwidth with a total of 48 LR/U/R-DIMMS, up to 1600 MHz
- Save time and money with HPC Solution Guides from Intel ESAA (see page 8 to learn more)



"I can get a cluster-ready server board at a lower price from your competitor."

Response: Look beyond the base system price to the total cost of ownership (TCO). For example, Intel's standard warranty is three years, while that of the competition is only one year unless you purchase an additional two more years. Plus Intel's robust diagnostic tools backed by Intel's support organization significantly reduce TCO.

Intel Server Board S2400LP: The cost-efficient solution

The Intel® Server Board S2400LP offers the most cost-efficient and compute-dense way to add the Intel Xeon processor E5-2400 to an HPC cluster.

 **Need better computing power, better memory bandwidth, or better I/O capacity?** Take a look at Intel® Server System H2000JF.

The Performance Solution

Intel® Server System H2000JF

When maximum performance is needed, systems based on the Intel® Server Board S2600JF are the best choice. Specifically designed for the HPC market, the Intel Server Board S2600JF is a high density, half-width solution supporting the dual Intel® Xeon® processor E5-2600 product family, balancing computing power with optimal memory bandwidth for maximum price performance.

The Details

The Intel Server Board S2600JF is Intel's flagship cluster-ready server board for HPC, offering the compute density and high performance your HPC customers need, coupled with manageability features that keep the system online even during routine repair. Suitable for clusters of any size.

Intel Server System H2000JF

- Support for high memory bandwidth with a total of 32 LR/U/R-DIMMs, up to 1600 MHz
- Nearly double the PCIe* and riser slots compared to competitors' half-width designs
- Save time and money with HPC Solution Guides from Intel ESAA (see page 8 to learn more)

Flexible and Efficient Power Supplies:

- Common form factor, hot pluggable
- 1200W Redundant 80+ Platinum or 1600W Redundant 80+ Platinum

Memory:

- 4 x 8 LR/U/R-DIMMs
- Up to 1600 MHz

Nodes:

4 hot-swappable nodes with cable-free power and PCIe

I/O Capabilities:

- Optional integrated InfiniBand*
- 10GbE is upgradable via I/O module

Internal Storage:

Bridge-board connector for SATA/SAS

Processors:

System supports up to 8 Intel® Xeon® processor E5-2600 (130W max)

Hard Drives:

16 x 2.5-inch Hot swap HDD or 12 x 3.5-inch Hot swap HDD



"HPC server boards from your competitor have the same number of DIMMs. What makes Intel Server Boards better?"

Response: Performance is about more than the number of DIMMs. Intel's unparalleled signal-integrity engineering ensures that in a memory-dense usage, your systems will perform reliably.

"The best HPC server board in the industry."

John Lee, Vice President, Appro

Intel Server Board S2600JF: The ideal solution for maximum memory bandwidth

The Intel Server Board S2600JF brings added value to the HPC buyer along with the maximum memory bandwidth needed for high-compute situations.

Need more memory capacity or I/O capability in a half-width board? Take a look at Intel® Server System H2000WP.

Memory Bandwidth:



Memory Capacity:



I/O Capability:



Cost Efficiency:



Memory Bandwidth:



Memory Capacity:



I/O Capability:



Cost Efficiency:



The High-density Performance Solution

Intel® Server System H2000WP

The Intel® Server Board S2600WP delivers powerful performance and large memory capacity for high-density solutions. This HPC-optimized server board offers the compute density and performance that HPC buyers need, along with a large memory footprint.

The Details

The Intel Server Board S2600WP provides maximum memory and I/O capability in a high-density, half-width server board, with support for up to 16 total DIMMs. The server board is best for memory-intensive workloads that require a more robust platform.

4 Hot-swappable nodes in 2U:

- Pluggable carrier trays
- Cable-free power and PCIe*
- Improved serviceability and maintenance

I/O Capabilities:

- Optional integrated InfiniBand*
- 10GbE is upgradable via I/O module

Internal Storage:

Bridge-board connector for SATA/SAS

Processors:

System supports up to 8 dual Intel® Xeon® processor E5-2600 (130W max)

Node-level Cooling:

3 high-speed, 40-mm dual rotor fans per node prevent single point of failure

Memory:

- 4 x 16 LR/U/R-DIMMs
- Up to 1600 MHz

Hard Drives:

- 16 x 2.5-inch Hot swap HDD or
- 12 x 3.5-inch Hot swap HDD

Intel Server System H2000WP

- Maximum memory bandwidth and I/O capacity
- Highest memory capacity in a half-width board, with a total of 64 LR/U/R-DIMMS, up to 1600 MHz
- Nearly **double** the PCIe and riser slots compared to competitors' half-width designs
- Save time and money with HPC Solution Guides from Intel ESAA (see page 8 to learn more)

Intel® Server Board S2600WP: The solution for maximum memory capacity and I/O throughput

The Intel® Server Board S2600WP brings maximum memory capacity in a half-width board.



Need a more cost-effective solution?

Take a look at Intel® Server System H2000LP.



Need more memory capacity? Systems based on the Intel® Server Board S2600GZ with a 24-DIMM spread-core design provides higher performance and power efficiency in a larger format for special compute needs. Learn more at www.intel.com/go/serverboards.



Did you know?

Intel provides tools, such as Intel® Threading Building Blocks and Intel® Inspector XE, to help programmers make their software perform better for HPC.

Intel® Server Products in the Marketplace

Intel Server Products deliver compute density with greater flexibility, more throughput, better manageability, and higher reliability than competing products. This means that Intel Server Products provide the world-class performance that HPC applications need coupled with a lower TCO. Intel helps make you a trusted supplier, offering these features:

Rack Optimized

Half of Intel's well-balanced Intel® Xeon® E5 processor product family portfolio is rack-optimized, compared to only about one-eighth of the competitor's standard form factor designs.

Interconnects

Intel Server Products offer both two and four LAN ports and the I/O module support including 10GbE, four-port GbE, and InfiniBand, while competitors typically integrate only two LAN ports.

Modular Design

More configurations are possible with the modular design of the drive bays and common power supply units, with far fewer unique parts to stock.

Unmatched Thermal Design and Thorough Validation

Intel Server Products provide unmatched thermal design and thorough validation. Half-width Intel Server Boards have fans on trays to support higher bin CPUs.

Flexible Storage Configurations

End users can create up to eight different storage configurations by simply adding a storage activation key. Most competing products require the purchase of an entirely different motherboard to enable different ports.



"Can't I get the same chassis features and technologies from your competitors?"

Response: Not at all. Intel Server Products pair world-class boards with chassis that bring innovative features unmatched in the market to reduce your costs for cooling, maintenance, and management, all while reducing downtime. These include intelligent thermal solutions, automated power supply fail safe, true hot-swap repairs, and more. See page 8 for more information.

Customer Application Success Stories

Intel Server Products are being used not only in some of the fastest computers in the world, but also in real-world applications that have the same challenges your customers are facing. How are customers using Intel Server Products in their HPC applications today?



Appro delivers 200-Teraflop (Tflops) HPC system to San Diego Supercomputer Center

The San Diego Supercomputer Center trusted Appro, a leader in HPC, to deliver a 1,024 node supercomputer cluster, based on the Intel® Server Board S2600JF. This 200-Tflops supercomputer with 64 terabytes of memory will be one of the world's first HPC systems to feature massive amounts of Intel® Solid-State Drives, helping to greatly reduce I/O latency.



Building Blocks in some of the World's Fastest Computers

In the most recent Top500 list as of this printing (November 2011), six of the 500 fastest computers cited by Top500.org are made with Intel® Server building blocks. Computers are ranked using a specific benchmark to measure their flop rate as they solve a complex series of linear equations. Top500 began listing the sites with the world's fastest computers in 1993, updating the list every six months.

Our Optimized Designs Maximize Performance

Intel Server Boards provide the performance and compute density ideal for the HPC buyer, but that's only part of the solution. Innovative system design is the foundation of what distinguishes our server solutions:

Faster

Our systems feature a maximum memory bandwidth of up to 1600 megahertz, 2x increase in flops per clock cycle, 2x I/O capacity per node, and onboard FDR 56 gigabits per second InfiniBand.

Cooler

Intel's dedicated node-level cooling solution eliminates the risk of a single fan failure throttling all four nodes and delivers higher performance. The Intel® Server System H2000 offers fully configured support for the maximum thermal envelope of the Intel Xeon processor E5-2600 product family.

More Reliable

Independent hot-pluggable nodes feature separate front panel controls, cable-free power and PCIe delivery for improved ease of use and serviceability. Combined with solid support and a standard three-year warranty, Intel Server Systems are more reliable than the competition.

Greener

80 Plus Platinum certified 1200W and 1600W power supply options deliver more than 92-percent efficiency.

The Intel Server EDGE

Intel offers server products, services, and software to help you expand your business as you exceed customer expectations.

Learn more about Intel Server Products at IntelServerEdge.com or contact your Intel representative.



Peace of Mind for Your Full Configuration

Many components—in addition to the server board and the chassis—go into making a high-performance computing (HPC) solution. Intel has two programs to help make configuring a system easier:

Intel® Cluster Ready

Intel Cluster Ready architecture means pre-tested interoperability, so you realize HPC benefits faster; reducing your deployment time from months to weeks or even days.

Visit the Intel Cluster Ready site to learn more at <http://software.intel.com/en-us/cluster-ready>

Intel® Enabled Solution Acceleration Alliance (Intel® ESAA)

The Intel ESAA program collaborates with industry-leading ISVs and OSVs worldwide to provide validated solution recipes, saving Intel Technology Providers engineering time and money. Specific HPC Solution Guides from Intel ESAA:

- Intel® TrueScale InfiniBand HPC Cluster on Linux*
- Bright Computing Bright Cluster Manager* 
- Mellanox Technologies Connectivity Solution for InfiniBand* Clusters 
- Platform Computing HPC* 

Visit the Intel ESAA site to view recipes and learn more. www.intel.com/go/esaa

¹ HPC Server Market Delivers Record Revenues and 8.4% Growth in 2011, IDC Reports, www.marketwatch.com/story/hpc-server-market-delivers-record-revenues-and-84-growth-in-2011-idc-reports-2012-03-20

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