Product Brief

Intel® 5000P and 5000V Chipsets

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Delivering enhanced reliability and performance for Dual-Core Intel® Xeon® processor 5000 series

Intel's new server chipsets for the Dual-Core Intel® Xeon® processor 5000[3] series enable new, Intel® dual-processor (DP) balanced server platforms that are efficient, dependable, and responsive. Intel® dual-core processor-based platforms help businesses better utilize server assets with effective virtualization and increase density in their data centers through optimized power and thermal features. These DP servers offer increased value to enterprise front-end, small to medium business (SMB), and high-performance computing (HPC) applications.

The Intel® 5000P and the Intel® 5000V chipsets support Fully Buffered DIMM (FBDIMM) technology at 533 and 667 MHz for faster application response and greater memory capacity. They accelerate I/O functions to increase I/O bandwidth and reduce system latency for data-intensive applications. Intel developed these chipsets specifically for Dual-Core Intel Xeon 5000 processor series-based DP platforms. These DP servers use new 1066 and 1333[1] MHz dual independent system buses for more responsive business services.

The Intel 5000P and Intel 5000V chipsets consist of

- Intel® 5000P Memory Controller Hub (MCH)
- Intel® 5000V Memory Controller Hub (MCH)
- Intel® 6321ESB I/O Controller Hub
- Intel® 6700PXH 64-bit PCI Hub

The Intel 5000P MCH specifically supports performance and volume server applications. The Intel 5000V MCH enables value-oriented dual-processor platforms.

Dual independent buses at 1066 and 1333 MHz enable unprecedented performance for Dual-Core Intel Xeon processor 5000 series, creating powerful and responsive server platforms

The Intel 5000P and 5000V memory controller hubs provide dual independent buses at 1066 and 1333 MHz to support two Dual-Core Intel Xeon processors 5000 series for superior performance in a DP server platform. The two buses deliver an aggregated throughput of up to 17 GB/second for 1066 MHz and up to 21 GB/sec for 1333 MHz. With an independent bus for each processor, next-generation Intel® platforms can deliver higher throughput for intensive computing workloads, compared to the previous-generation platforms based on the 64-bit Intel® Xeon® processor 3.60 GHz and Intel® 7520 chipset.

With the Intel 5000P or Intel 5000V chipset and Dual-Core Intel Xeon processor 5000 series, system designers can offer new platforms that help IT services move ahead with increased productivity, higher throughput, and faster time-to-solution.

Intel 5000P and Intel 5000V chipsets overview

Features	Benefits
Supports two Dual-Core Intel® Xeon® processors 5000[3] series	• Optimized performance for intensive computing demands of enterprise and small to medium business servers, plus high-performance computing applications
1066 and 1333[1] MHz dual independent buses	• Increased platform system bus bandwidth delivers outstanding performance
PCI Express*[2] (PCIe*)	• Serial I/O technology provides a direct connection between the MCH and PCI Express components/adapters with bandwidth up to 4 GB/second on each PCI Express x8 interface
FBDIMM 533 MHz and 667 MHz memory interface	• Offers a maximum memory bandwidth up to 17 GB/second for 533 MHz and up to 21 GB/second for 667 MHz • Increased DIMMs per system, providing enhanced memory scalability for memory-intensive applications • Up to 64 GB memory capacity
Intel® 6700PXH 64-bit PCI Hub	• Optional component for PCI/PCI-X* connectivity, offering increased platform flexibility • Supports two independent 64-bit, 133 MHz PCI-X segments and two hot-plug controllers (one per segment)
Advanced Platform RAS	• Features such as memory ECC, Intel® x4 and x8 Single Device Data Correction[3] (SDDC), DIMM sparing, and memory mirroring[4] for improved system reliability • 32-bit CRC on PCIe • Hot swap PCIe enhances serviceability • SMBus port connects to Intel® 5000P and Intel® 5000V MCH for remote management operation

Advanced technologies enhance price/performance and flexibility

The Intel 5000P and Intel 5000V chipsets support a variety of new technologies and configuration options, allowing platforms to offer superior value for a wide range of price and performance needs.

Fully Buffered DIMMs

The Intel 5000P and Intel 5000V chipsets support next-generation FBDIMM technology, which significantly improves memory throughput and increases capacity for a more responsive system. FBDIMMs are ideal for servers and high-end workstations where performance is crucial to meet business or technical computing objectives. Intel 5000P chipset platforms deliver up to 3X higher memory bandwidth and up to 4X higher capacity over previous-generation platforms based on the Intel Xeon processor 3.60 GHz and Intel 7520 chipset with DDR2-400 memory.

The memory interface for the Intel 5000P MCH supports four channels of four FBDIMMs per channel, for a total capacity of up to 64 GB. The Intel 5000V MCH supports two memory channels of four FBDIMMs per channel for a total capacity of up to 16 GB.

PCI Express* (PCIe*)

The Intel 5000P and Intel 5000V chipsets use PCIe for high-speed communications of up to 4 GB/sec between third-party devices and the MCH. The Intel 5000P MCH supports three x8 PCIe links, while the Intel 5000V MCH supports one x8 link. Platform designers can bifurcate each x8 link into two x4 links for configuration flexibility.

PCI/PCI-X*

The Intel 6700PXH 64-bit PCI Hub can attach directly to the MCH through a point-to-point PCIe x8 or x4 link for support of PCI and PCI-X interfaces on the platform. Each Intel 6700PXH 64-bit PCI Hub supports two bus segments that platform designers can independently configure to operate in PCI (33 MHz or 66 MHz) or PCI-X mode (at 66, 100, or 133 MHz), for 32-bit or 64-bit PCI/PCI-X devices. Each PCI/PCI-X interface integrates a PCI standard hot-plug controller. The hub supports multiple PCI-X slots and frequencies for the high bandwidth I/O connectivity required in today's servers.

Support for Advanced Server Technologies

The Intel 5000P and Intel 5000V chipsets integrate Intel® technologies to support new dual-processor platforms that are more responsive, efficient, and reliable, including

- Intel® Extended Memory 64 Technology[5] (Intel® EM64T)
- Hyper-Threading Technology[A]
- Enhanced Intel SpeedStep® Technology
- Intel® I/O Acceleration Technology (Intel® I/OAT) — using Intel® 6321ESB I/O Controller Hub
- Intel® Active Server Manager[6] — using Intel 6321ESB I/O Controller Hub
- Intel® Matrix Storage Technology — using Intel 6321ESB I/O Controller Hub

These features increase platform performance and improve manageability.

Expanded I/O support with Intel 6321ESB I/O Controller Hub

The Intel 6321ESB I/O Controller Hub attaches directly to the MCH through the ESI interface and a x4 or x8 PCIe link. The Intel 6321ESB integrates

- Six independent Serial ATA (SATA) controllers, each capable of up to 3.0 GB/second transfer rate
- Software-driven RAID 0,1,5 technology for the most demanding storage data transfers and storage security
- Full Baseboard Management Controller (BMC)

The new I/O controller hub also supports

- Six USB 2.0 ports
- Three PCIe x4 links
- PCI-X 64/133 bus segment
- New Intel® 82563EB Dual Port adapter and Intel® 82564EB Single Port adapter

Product	Package
Intel® 5000P Memory Controller Hub (MCH)	1432 Flip Chip-Ball Grid Array (FC-BGA)
Intel® 5000V Memory Controller Hub (MCH)	1432 Flip Chip-Ball Grid Array (FC-BGA)
Intel® 6700PXH 64-bit PCI Hub	567 Flip Chip-Ball Grid Array (FC-BGA)
Intel® 6321ESB I/O Controller Hub	1284 Flip Chip-Ball Grid Array (FC-BGA)

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[1] Available in 2nd half of 2006.

[2] Reduced power-state L0s not supported.

[3] In a x8 DDR memory device, the Intel® x8 Single Device Data Correction (x8 SDDC) provides error detection and correction for 1 to 8 data bits within a single device.

[4] Memory mirroring is supported on the Intel® 5000P chipset only.

[5] Intel® Extended Memory 64 Technology (Intel® EM64T) requires a computer system with a processor, chipset, BIOS, OS, device drivers and applications enabled for Intel EM64T. Processor will not operate (including 32-bit operation) without an Intel EM64T-enabled BIOS. Performance will vary depending on your hardware and software configurations. Intel EM64T-enabled OS, BIOS, device drivers and applications may not be available.

[6] Intel® Active Server Manager requires the computer to have additional hardware and software, connection with a power source, and a network connection. Check with your PC manufacturer for details.

[a] Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. See http://www.intel.com/products/processor_number for details.

[A] Hyper-Threading Technology requires a computer system with an Intel® Xeon® processor supporting Hyper-Threading Technology and an HT Technology-enabled chipset, BIOS, and operating system. Performance will vary depending on the specific hardware and software you use. See http://www.intel.com/info/hyperthreading/ for more information, including details on which processors support HT Technology.

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