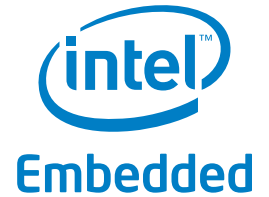


PLATFORM BRIEF

Intel® Xeon® Processor C5500/C3500
Series and Intel® 3420 Chipset
Embedded Computing



Intel® Xeon® Processor C5500/C3500 Series-based Platform

for Embedded, Communications and Storage Applications



Platform Overview

The Intel® Xeon® processor C5500/C3500 series delivers the world-class performance provided by the Intel® microarchitecture codenamed Nehalem. It represents a leap forward in Intel Xeon processor technology by lowering power and increasing performance-per-watt through the integration of I/O into the processor.

PCI Express* lanes, typically found in the I/O hub, are integrated into the processors, eliminating the need for a separate I/O hub chip. This decreases the total chip count by one and saves on overall system power, making it an ideal platform for thermally and space-constrained applications. These processors also incorporate non-transparent bridging, hardware RAID and asynchronous DRAM self-refresh—new features required by many embedded, communications and storage applications including wireless infrastructure, routers, IPTV, military, security, VoIP, NAS and SAN.

The Intel Xeon processor C5500/C3500 series delivers up to a 1.9x increase in performance-per-watt¹ (within the same thermal design power [TDP]) over the previous-generation Intel® Xeon® processor 5400 series. This new series offers

unprecedented scalability within the Intel Xeon processor product line, with single-core to quad-core options ranging from 23W to 85W. They are available in both uni-processor or dual-processor configurations for maximum flexibility (see Figures 1 and 2 on page 2). The Intel® Celeron® processor P1053^Δ provides the same new features and performance-per-watt benefits for systems that do not require RAS memory features (i.e., scrubbing, sparing and mirroring).

Many of these processors feature Intel® QuickPath Technology, Intel® Turbo Boost Technology² and Intel® Hyper-Threading Technology³ to deliver top performance for bandwidth-intensive applications. Processors also feature Intel® Virtualization Technology⁴ for flexible virtualization.

The Intel Xeon processor C5500/C3500 series and Intel Celeron processor P1053 are paired with the Intel® 3420 chipset, a single-chip platform controller hub offering 12 USB 2.0 ports, six SATA ports and eight PCI Express 2.0 lanes. As is typical with embedded Intel® processors, extended lifecycle is supported, and high TCase options are available for thermally constrained applications.

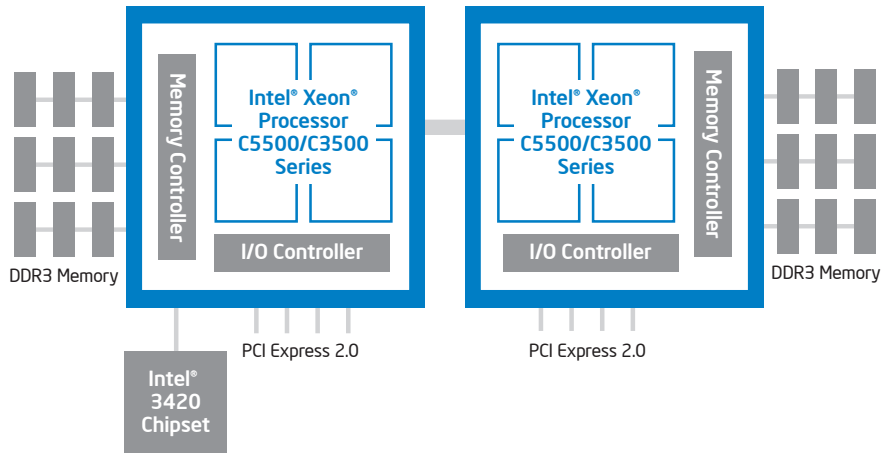


Figure 1. Dual-socket configuration of Intel® Xeon® processor C5500/C3500-based platform

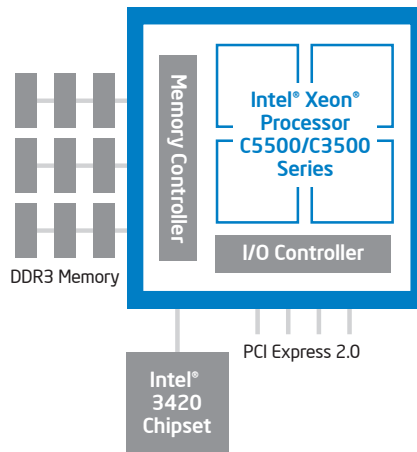


Figure 2. Single-socket configuration of Intel® Xeon® processor C5500/C3500-based platform

Software Overview

The following independent operating system and BIOS vendors provide support for these platforms. Contact your preferred vendor or an Intel representative for operating system and BIOS solutions.

OPERATING SYSTEM

Microsoft Windows Server* 2003 (64-bit)
 Microsoft Windows Server* 2008 (64-bit)
 Red Hat Enterprise Linux* 5
 Wind River VxWorks*
 Wind River Linux*

CONTACT

Intel provides drivers⁵
 Intel provides drivers⁵
 Red Hat
 Wind River
 Wind River

BIOS

American Megatrends
 Insyde Software
 Phoenix Technologies

Platform Features and Benefits

FEATURES	BENEFITS
Lowest power Intel® Xeon® processors (i.e., single-core LC3518 ^a at 23W; dual-core LC3528 ^a at 35W)	<ul style="list-style-type: none"> Meets requirements for NEBS Level 3 ambient operating temperature specifications (thermal profile). Ideal for smaller form factors with thermal constraints (blades).
I/O integrated into the processor	<ul style="list-style-type: none"> More available board real estate as a separate I/O hub chip is no longer required. Lower total system thermal design power. Ideal for solutions requiring compliance with AdvancedTCA* form factor specifications (PICMG 3.0).
Non-transparent bridging	<ul style="list-style-type: none"> Increases scalability with the ability to connect multiple systems, each with access to the other's memory window. Increases reliability due to failover capabilities.
Hardware RAID	<ul style="list-style-type: none"> No need for a custom ASIC to perform RAID 5 and 6 operations. Eases migration costs.
Asynchronous DRAM self-refresh	<ul style="list-style-type: none"> Reduces total system cost by providing the logic to protect DRAM during power failures.
Intel® Turbo Boost Technology ²	<ul style="list-style-type: none"> Boosts performance for specific workloads by increasing processor frequency.
Intel® QuickPath Technology	<ul style="list-style-type: none"> Delivers bandwidth improvement for data-intensive applications.
Intel® Hyper-Threading Technology ³	<ul style="list-style-type: none"> Boosts performance for parallel, multi-threaded applications.
Intel® Virtualization Technology ⁴	<ul style="list-style-type: none"> Hardware assists boost virtualization performance by allowing OS more direct access to the hardware. Intel® Virtualization Technology (Intel® VT) FlexMigration enables seamless migration of running applications among current and future Intel® processor-based servers. Intel® VT FlexPriority improves virtualization performance by allowing guest OSs to read and change task priorities without Virtual Machine Monitor (VMM) intervention. Extended page tables provide better performance by reducing the overhead caused by page-table utilization of virtual machines. Intel® VT for Directed I/O helps speed data movement, giving designated virtual machines their own dedicated I/O devices, thus reducing performance overhead of the VMM in managing I/O traffic.
Shared L3 cache	<ul style="list-style-type: none"> Boosts performance while reducing traffic to the processor cores.
Extended lifecycle product support	<ul style="list-style-type: none"> Protects system investment by enabling extended product availability for embedded customers.
Embedded ecosystem support	<ul style="list-style-type: none"> Along with a strong ecosystem of hardware and software vendors, including members of the Intel® Embedded and Communications Alliance (intel.com/go/eca), Intel helps to cost-effectively meet development challenges and speed time-to-market.

Intel® Xeon® Processor C5500/C3500 Series and Intel® Celeron® Processor P1053

PROCESSOR NUMBER ⁴	THERMAL DESIGN POWER	BASE CLOCK SPEED	TURBO FREQUENCY	INTEL® HYPER-THREADING TECHNOLOGY	LAST LEVEL CACHE	CORES/ THREADS	THERMAL PROFILE (HIGH TCASE)	INTEL® QUICKPATH LINK SPEED ⁶	DDR3 MEMORY
Intel® Xeon® processor EC5549	85W	2.53 GHz	Yes (Up to 2.93 GHz)	Yes	8 MB	4/8	Standard	5.86 GT/s	1333/1066/800
Intel® Xeon® processor EC5509	85W	2.00 GHz	No	No	8 MB	4	Standard	4.8 GT/s	1066/800
Intel® Xeon® processor EC3539	65W	2.13 GHz	No	No	8 MB	4	Standard	N/A	1066/800
Intel® Xeon® processor LC5528	60W	2.13 GHz	Yes (Up to 2.53 GHz)	Yes	8 MB	4/8	70° C (nominal) 85° C (short)	4.8 GT/s	1066/800
Intel® Xeon® processor EC5539	65W	2.27 GHz	No	No	4 MB	2	Standard	5.86 GT/s	1333/1066/800
Intel® Xeon® processor LC5518	48W	1.73 GHz	Yes (Up to 2.13 GHz)	Yes	8 MB	4/8	77.5° C (nominal) 92.5° C (short)	4.8 GT/s	1066/800
Intel® Xeon® processor LC3528	35W	1.73 GHz	Yes (Up to 2.13 GHz)	Yes	4 MB	2/4	79.6° C (nominal) 94.6° C (short)	N/A	1066/800
Intel® Xeon® processor LC3518	23W	1.73 GHz	No	No	2 MB	1	79.5° C (nominal) 94.5° C (short)	N/A	800
Intel® Celeron® processor P1053 ⁷	30W	1.33 GHz	No	Yes	2 MB	1/2	Standard	N/A	800

Intel® 3420 Chipset for Embedded Computing

PRODUCT	PACKAGE	FEATURES
Intel® 3420 Chipset	FC-BGA9	8x1 PCI Express* 2.0 at 2.5 GT/s; six SATA ports; 12 USB 2.0 ports; integrated Gigabit LAN controller 10/100/1000; 4.7W TDP

Intel in Embedded and Communications: intel.com/embedded

⁴ Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. See www.intel.com/products/processor_number for details.

¹ LC5518 benchmarking results collected by Intel Corporation, January 2010. L5408 benchmarking results collected by Intel Corporation, January 2008. Platform configurations:

– Intel® Xeon® processor LC5518: 1.73 GHz, 8 MB L3 cache, 48W plus Intel® 3420 chipset with 12 x 4 GB RDIMM DDR3-1333 MHz

– Intel® Xeon® processor L5408: 2.13 GHz, 12 MB L2 cache, 40W plus Intel® 5100 chipset with 4 x 2 GB RDIMM DDR2-667 MHz

Software configurations:

– Intel® Xeon® processor LC5518: OS: SuSE Linux 11 RC4; Compiler: Intel® C/C+ 11.1; Benchmark CPU2006 v1.1

– Intel® Xeon® processor E5440: OS: Red Hat Enterprise Linux 4; Compiler: Intel® C/C+ 10.1; Benchmark CPU2006 v1.0

Performance tests and ratings are measured using specific computer systems and/or components and reflect the approximate performance of Intel® products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing. For more information on performance tests and on the performance of Intel products, visit intel.com/performance/resources/benchmark_limitations.htm.

² Intel® Turbo Boost Technology requires a PC with a processor with Intel Turbo Boost Technology capability. Intel Turbo Boost Technology performance varies depending on hardware, software and overall system configuration. Check with your PC manufacturer on whether your system delivers Intel Turbo Boost Technology. For more information, see <http://www.intel.com/technology/turboboost>.

³ Hyper-Threading Technology requires a computer system with a 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. For more information including details on which processors support HT Technology, see http://www.intel.com/products/ht/hyperthreading_more.htm.

⁴ Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, virtual machine monitor (VMM) and, for some uses, certain computer system software enabled for it. Functionality, performance or other benefits will vary depending on hardware and software configurations and may require a BIOS update. Software applications may not be compatible with all operating systems. Please check with your application vendor.

⁵ Drivers available at: downloadcenter.intel.com (enter processor name).

⁶ GT/s = giga-transfers/second.

⁷ Does not support RAS features.

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