

Faster Performance for Medical Image Processing

Up to 1.7x Performance Boost with the Latest Intel® Xeon® Processor 5500 Series

Performance Brief

Intel® Xeon® Processor 5500 Series



Today's medical imaging systems produce enormous amounts of data, and the speed and quality of patient care depends on how fast and effectively that data can be turned into high-resolution diagnostic images. The computing demands are considerable and will only get more intense as system designers seek to deliver better images faster and at lower patient dosages. The ultimate goal, of course, is to provide clinicians with top quality images in real-time in order to maximize technician productivity, patient throughput, and, most importantly, diagnostic speed and accuracy.

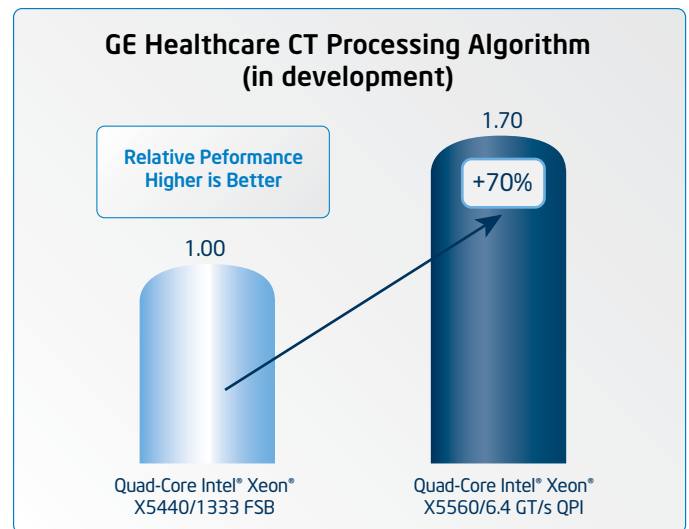
The latest Intel® Xeon® processor 5500 series offers a valuable resource for addressing these challenges. Servers based on this processor family can deliver breakthrough performance for many complex medical imaging workloads. The extra performance can be used to accelerate time to results. It can also be used to support increasingly sophisticated image processing algorithms that help to provide better image quality at a lower radiation dose for the patient.



A 70 Percent Boost in Image Processing Performance

Recent tests by GE Healthcare R&D engineers reveal just how impressive the performance gains can be. Data from a set of CT scans were processed using new complex algorithms GE is developing. The workload was run on two different dual-socket servers. Both servers were configured with quad-core processors, but one used the latest Intel Xeon processor 5500 series, while the other used the previous generation Intel® Xeon® processor 5400 series. To ensure a meaningful apples-to-apples comparison, the processors were run at the same frequency (the new processor can actually be run at higher frequencies, which would deliver additional gains).

Results showed an impressive 70 percent improvement in image processing performance, which adds to the dramatic performance gains Intel has delivered across multiple previous processor generations. These latest gains result from a number of key architectural improvements in the new processor (see the table, below).



The latest Intel® Xeon® processor 5500 series delivered 70 percent better performance than the previous generation Intel Xeon processor for complex image processing algorithms GE Healthcare has developed for potential use in future CT Scanners.

Driving Faster Image Reconstruction with the New Intel® Xeon® Processor 5500 Series

New Processor Feature	Description	Benefit
Higher Performing Cores	A number of architectural improvements enable greater instruction-level parallelism and more efficient overall processing.	Increased throughput and better performance.
Intel® QuickPath Technology with Integrated Memory Controller	A new high-speed point-to-point interconnect subsystem increases peak communication bandwidth manyfold among processing cores, memory, and I/O devices.	Faster access to data increases core utilization, which enables better processing efficiency and faster time to results.
Shared Level-3 Cache	The large, 3rd level cache stores more data on the processor die and delivers it faster and more efficiently to the processor cores.	
Intel® Hyper-Threading Technology	Each core can process two simultaneous software threads (16 threads for a standard server with two quad-core processors).	Configuring the software to support 16 threads (versus the maximum of 8 on the previous generation server) delivered an 11% performance boost.
Intel® Turbo Boost Technology	Processor clock frequency can be dynamically adjusted to boost performance without exceeding the processors thermal design point (TDP).	Enabling Intel Turbo Boost technology delivered a 6% performance gain.
Native DDR3 Memory Support up to 144 GB	Enables larger memory configurations using fast, affordable, industry-standard DDR3 memory modules.	As data sets and processing workloads increase, larger memory configurations could potentially deliver additional performance advantages.



Beyond Software and Servers

Intel and GE Healthcare continue to work together to extend the boundaries of medical imaging capabilities. According to Michael Barber, Chief Technology Officer at GE Healthcare, "Intel is not only helping us achieve performance goals and solve platform issues, but also providing us with insights into the direction of computing that are helping us shape our product roadmaps."

Staying at the forefront of medical imaging technology demands computing systems that can quickly process enormous data sets and bring together information from many sources to support and simplify diagnosis. By delivering industry-leading computing capabilities in affordable, standards-based systems—and providing comprehensive technical and strategic support—Intel is helping GE Healthcare deliver better imaging systems. Of course, the most important benefits will be realized by GE Healthcare's medical customers, who are able to review images more quickly, while consistently using lower radiation doses.

Tested Server Configurations

Processor	2 x Quad-Core Intel® Xeon® processor X5560 2.8 GHz, 8 cores, 8 MB cache	2 x Quad-Core Intel® Xeon® processor E5440 2.83 GHz, 8 cores, 12 MB cache
QPI/FSB Frequency	6.4 GT/s	1333 MHz
Memory	24 GB, 12x2 GB DDR3-1066	16 GB, 8x2 GB DDR2-667 FB
Operating System	SuSE Linux 10 SP2 w/Deep C Patch	

For more information go to: www.intel.com/xeon

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