Intel® Core™ i7: The Fastest Processor on the Planet

Dr. Pat Gelsinger
Sr. Vice President, Intel Corporation
GM, Digital Enterprise Group
November 17, 2008
Intel® Core™ i7 Microprocessor

Fastest Processor on the Planet
40% Faster*

Crossing A Threshold
Opens the Door to Exciting New Usages

Available Worldwide Today
Broad Availability and Industry Support

*Compared to Intel® Core™2 Extreme processor QX9770
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Introducing the Next Generation of the IA Family

Powered By Intel’s 45 nm High-k + Metal Gate Transistors

- Intel® Core™ i7 Processor
- Core™ 2 Processor
- Core Processor
- Pentium® 4 Processor
- Pentium III Processor
- Pentium II Processor
- Pentium Processor
- Intel 80486
- Intel 80386

Note: Images Do Not Represent Exact Sizes
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Introducing Intel® Core™ i7 Processor

First Product Based On Nehalem Microarchitecture
Introducing Intel® Core™ i7 Processor

First Product Based On Nehalem Microarchitecture

Business and Consumer Clients
- High End Desktop
- Mainstream Client
- Thin and Light Notebook

Server and Workstation
- Efficient Performance (2S)
- Expandable (4S+)

45 nm High-K → 32 nm

Havendale
Lynnfield
Westmere
Havendale
Clarksfield
Auburndale
Nehalem-EP
Nehalem-EX
Intel® Core™ i7 Processor

- Superior energy efficient performance
- Intel® Hyper-Threading Technology
  - 8 threads, 4 cores
- Intel® Turbo Boost Technology
Intel® Core™ i7 Processor and Intel® X58 Express Chipset

- 3 channels of DDR3* 1066 MHz
- Intel® QuickPath interconnect
  - 6.4GT/s up to 25.6GB/sec bandwidth
- PCI Express* 2.0 for Discrete graphics
  - Up to Quad graphics support
- 7.1 Dolby Home Theater Surround*
- I/O Expansion: S-ATA* and USB* 2.0

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Intel® Core™ i7 and Intel® X58 Express Chipset: High End Desktop Platform DX58SO
Intel® Core™ i7 and Intel® X58 Express Chipset

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A New Single Processor World Record!

**SPECint_rate_base2006**

Higher is Better

73.5 75.4 76.6 78.7 79.6 83.1 102 108 117

Intel® Core™ 2
Intel Xeon®
Intel Core 2
Intel Xeon
Intel Core 2
Intel Core 2
Intel Core 2
Intel Core i7-
Quad Q9450
Quad Q9550
Quad Q3370
Quad Q9650
Extreme QX9770
920 Processor
940 Processor
965 Processor

Extreme Edition

Undisputed Leadership on the Industry Acknowledged Performance Metric

Source: [http://www.spec.org/cpu2006/results/](http://www.spec.org/cpu2006/results/) as of November 13, 2008 Any difference in system hardware or software design or configuration may affect actual performance.

**SPEC, SPECint, SPECfp, and SPECrate** are trademarks of the Standard Performance Evaluation Corporation. For more information about this benchmark go to: [www.spec.org](http://www.spec.org)

System Configurations and Disclaimers: Appendix *Other names and brands may be claimed as the property of others.
A New Single Processor World Record!

**SPECfp_rate_base2006**

*Higher is Better*

<table>
<thead>
<tr>
<th>Processor</th>
<th>SPECfp_rate_base2006**</th>
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<tbody>
<tr>
<td>Intel Xeon X3350</td>
<td>45.4</td>
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<tr>
<td>Intel Xeon X3360</td>
<td>46.8</td>
</tr>
<tr>
<td>Intel Core™ 2 Extreme QX6850</td>
<td>48.1</td>
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<tr>
<td>Intel Xeon X3370</td>
<td>50.5</td>
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<tr>
<td>Intel Core 2 Quad Q9550</td>
<td>51.5</td>
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<td>Intel Core 2 Quad Q9650</td>
<td>52.8</td>
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<tr>
<td>Intel Core 2 Extreme QX9770</td>
<td>54.3</td>
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<tr>
<td>Intel Core i7-965 Processor Extreme Edition</td>
<td>82.9</td>
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Undisputed Leadership on the Industry Acknowledged Performance Metric

Source: [http://www.spec.org/cpu2006/results/](http://www.spec.org/cpu2006/results/) as of November 13, 2008. Any difference in system hardware or software design or configuration may affect actual performance.

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System Configurations and Disclaimers: Appendix. *Other names and brands may be claimed as the property of others.*
The Intel® Hyper-Threading Technology Solution Moves Media Creation to New Highs

Maxon CINEBENCH® 10
- Normalized to Intel® Core™2 Extreme processor QX9770
- 1.26

Autodesk 3dsMax® 2009
- 1.38

POV-Ray® v3.7 Beta 28
- 1.46

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System Configurations and Disclaimers: Appendix
Intel® Core™ i7: Enhance Your Digital Life

Be More Creative
Photo and Video Creation

<table>
<thead>
<tr>
<th>Application</th>
<th>ProShow* Gold</th>
<th>Pinnacle* Studio 12 Ultimate</th>
<th>Sorenson Squeeze*</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>25%</td>
<td>39%</td>
<td>47%</td>
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Create and Share Videos Faster!
Video Editing and Image Rendering Applications

<table>
<thead>
<tr>
<th>Application</th>
<th>Adobe* Premiere* Pro CS3</th>
<th>Sony* Vegas 8 Pro</th>
<th>AutoMKV* 0.95c</th>
<th>CyberLink* Power Director 7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>29%</td>
<td>35%</td>
<td>38%</td>
<td>79%</td>
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</table>

More Fun with Games
Popular Gaming Titles

<table>
<thead>
<tr>
<th>Gaming Title</th>
<th>World in Conflict* 1.0.0.8</th>
<th>Crysis* 1.2.1 - CPU1</th>
<th>EnemyTerritory*: Quake Wars 1.5</th>
<th>Lost Planet* DX10 Demo - Cave Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5%</td>
<td>8%</td>
<td>17%</td>
<td>35%</td>
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</table>

Amazing Immersive Gaming
Artificial Intelligence and Physics

<table>
<thead>
<tr>
<th>Test</th>
<th>3DMark* Vantage* CPU - Physics Test</th>
<th>3DMark* Vantage* CPU - AI Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>44%</td>
<td>55%</td>
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</table>

Normalized to Intel® Core™2 Extreme Processor QX9770

- Intel® Core™2 Extreme processor QX9770
- Intel® Core™ i7-965 processor Extreme Edition
INDIE FILMMAKER: JACOB ROSENBERG
CTO BANDITO BROTHERS

“We work in an environment where rendering and processing is integral to getting our work done.”
DIGITAL ARTIST: RANDALL RICKERT
3D Digital Artist

“This combination of Blender, Linux, and Nehalem make a very respectable animation platform, especially for a small studio such as mine.”
DIGITAL PHOTOGRAPHER:
STEVE HOLVICK
Independent Photographer

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Intel® Core™ i7 Overclockers Claiming New Records and We Are Just Beginning

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
<th>World Record</th>
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</thead>
<tbody>
<tr>
<td>Super Pi 32M</td>
<td>7min 2sec</td>
<td></td>
</tr>
<tr>
<td>3DMark* Vantage</td>
<td>P31605</td>
<td></td>
</tr>
<tr>
<td>PCMark* Vantage</td>
<td>21607</td>
<td></td>
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</tbody>
</table>

Source: [http://www.hwbot.org](http://www.hwbot.org)

5.292 GHz Super Pi 32M Completion - **WORLD RECORD** - Beats a 6.498 GHz Intel® Core™2 Duo E8600

“The raw performance we have achieved from overclocking the Core™ i7 is truly amazing. Intel delivers another incredible processor.”

Charles Wirth, XtremeSystems.org
Intel® Core™ i7 Microprocessor

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Consumers Communicate, Game, and Edit Media*

Q: Primary Use For Home PC?

- Communicating with Friends: 42.5%
- Gaming: 27.4%
- Editing Personal Digital Media: 14.5%
- Listening to Music: 8.3%
- Watching Digital Video: 7.3%

This Is What People Do With Their Computers Today…
But What About Tomorrow With Intel® Core™ i7?

* Source: IDC 2007
Crossing the Threshold: 
*Exciting New Usages Possibilities*

- **Breakthroughs In User Interface**
- **Back-End Compute and Analysis On the Desktop**
- **Motion Capture and Analysis**

*Intel*
Dr. Frank Schneider
Duke University Medical Center
Department of Pathology

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Gary Elsasser
Vice President
Desktop and Server Products
Acer

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Intel® Core™ i7 Processors Are Here

More Than 100k Processors Shipped

Selling In More Than 70 Countries Worldwide

Over 500 Different System Offerings Available From OEMs

Over 35 Different Motherboard Offerings In The Channel
Intel® Core™ i7: Worldwide Industry Support

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Intel® Core™ i7 Processor in Japan
The Nehalem Team
Industry Recognitions

For Outstanding Commitment and Timely Delivery of Products That Support the Intel® Core™ i7 Processor

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The Technical Press Says...

“Core i7 represents the pinnacle of desktop CPU performance today.”

“Intel’s new Core i7 processors don’t just live up to their hype—they exceed it.”

“Intel executed on its roadmap to near perfection and the Core i7 is everything they promised it would be.”

“In a nutshell, Nehalem is a masterpiece...”

“... simply destroys previous CPU benchmarks.”

“Core i7 continues to fuel Intel’s beacon of performance”

“If we had to describe the Core i7 in one word, it would be ‘monster’.”

“Intel’s done a marvelous job with the Core i7”
Summary

Intel® Core™ i7 :
The Fastest Processor on the Planet

Crossing A Performance Threshold

Products Available Today and More to Come
FASTEST PROCESSOR ON THE PLANET
Legal Disclaimers

All dates and products specified are for planning purposes only and are subject to change without notice.

Relative performance is calculated by assigning a baseline value of 1.0 to one benchmark result, and then dividing the actual benchmark result for the baseline platform into each of the specific benchmark results of each of the other platforms, and assigning them a relative performance number that correlates with the performance improvements reported.

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Warning: Altering PC memory frequency and/or voltage may (i) reduce system stability and use life of the system, memory and processor; (ii) cause the processor and other system components to fail; (iii) cause reductions in system performance; (iv) cause additional heat or other damage; and (v) affect system data integrity. Intel assumes no responsibility that the memory, included if used with altered clock frequencies and/or voltages, will be fit for any particular purpose. Check with memory manufacturer for warranty and additional details.

Warning: Altering clock frequency and/or voltage may (i) reduce system stability and useful life of the system and processor; (ii) cause the processor and other system components to fail; (iii) cause reductions in system performance; (iv) cause additional heat or other damage; and (v) affect system data integrity. Intel has not tested, and does not warranty, the operation of the processor beyond its specifications.

Intel Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, virtual machine monitor (VMM) and, for some uses, certain platform 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.

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

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- 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 http://www.intel.com/performance/.

- Hyper-Threading Technology requires a computer system with a processor supporting HT 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/info/hyperthreading.

- Intel® Turbo Boost Technology (Intel® TBT) requires a PC with a processor with Intel TBT capability. Intel TBT performance varies depending on hardware, software and overall system configuration. Check with your PC manufacturer on whether your system delivers Intel TBT. For more information, see http://www.intel.com/pressroom/archive/releases/20080819comp.htm.

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**SPEC** CPU2006** Configuration Details**

- **Configuration 1:** Intel® Core™2 Extreme Processor QX9770 (3.20GHz /1600 FSB /2x6 MB L2) Asus P5E3 Premium board, X48 chipset 2 channel 4GB (4x1GB) Corsair CM3X1024-1333C9DHX DDR3-1333 9-9-9 clocked down to DDR3-1200 by the BIOS (BIOS: 0505, INF:8.4.0.1016)
- **Configuration 2:** Intel® Core™ i7-965 processor Extreme Edition (3.20GHz/6.4GT/s QPI/8MB L3) SMT ON/Turbo ON, Asus P6T Deluxe, 3 channel 12 GB (6x2GB) Samsung M378B5673DZ1-CF8 DDR3-1066 7-7-7-20 (INF:9.1.0.1007)
- **Common Elements:** Intel® X25-M (80GB SSD SATA2), 1 x GTX 280 PCIe graphics (Graphics Driver: NV177.41), Intel® Compiler v11.0 32-bit binaries, Windows* Vista* Ultimate 64 bit.

Note: SPECrate requires 1GB of memory for each copy running. The Intel Core2 Extreme processor QX9770 requires 4GB of memory to run 4 copies of SPEC (1 copy for each thread). Furthermore, the X48 chipset supports no more than 2GB of DDR3-1600 memory and must use 4GB slower DDR3-1200 memory. The Intel Core i7 processor requires a minimum of 8GB of memory to run 8 copies of SPEC (1 copy for each thread).
System Configuration for the Intel® Core™ i7-965 processor Extreme Edition except SPEC* CPU2006*

- Configuration 1: Intel® Core™2 Extreme Processor QX9770 (3.20GHz/1600 FSB /2x6 MB L2) Asus P5E3 Premium board, X48 chipset 2 channel Corsair CM3X1024-1600 C7DHXIN XMP @1.8V 2GB (2x1GB) DDR3-1600 7-7-7-20-1T (BIOS: 0402, INF:8.4.0.1016)
- Configuration 2: Intel® Core™ i7-965 processor Extreme Edition (3.20GHz/6.4GT/s QPI/8MB L3) SMT ON/Turbo ON, Intel® DX58SO 3 channel (3x1GB) Samsung M378B2873DZ1-CF8 DDR3-1066 7-7-7-20 (BIOS: 2260B, INF:9.1.0.1007)

Note: These systems contain different amounts of memory. The purpose is to compare the fastest supported Intel® Core™2 Extreme Processor platform (2x1GB of DDR3-1600) versus the recommended configuration (3x1GB of DDR3-1066) for the Intel® Core™ i7-965 processor Extreme Edition platform.