2009 Fall IDF
32nm Westmere Products Overview

September, 2009

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Intel® Clarkdale and Arrandale Processors: Nehalem for All

- Intelligent 32nm Nehalem design brings unprecedented performance to the mainstream

- Dynamic architecture delivers the just-right mix of Intel's Turbo Boost and HyperThreading™ technologies

- First on-processor graphics in the industry. Great improvements in graphics performance.

- AES-NI accelerates execution of AES applications for the mainstream

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Intel® Desktop Processor Codename Clarkdale

Intel® Desktop processors codename Clarkdale

- 32 nm, 2nd Generation Hi-K process CPU
- 45nm, Hi-K Process, Integrated Graphics

Key Features[2]:

- 32nm Nehalem Microarchitecture (Westmere)
    - Intel® Turbo Boost Technology [1]
    - Intel® Hyper-Threading Technology [2](2 Cores, 4 threads)Up to
- Up to 4MB of Intel® Smart Cache
- Integrated Memory Controller (IMC) – 2ch DDR3, up to 1333
- Integrated Graphics or Discrete graphics support (1x16, 2x8)[4]
- Advanced Encryption Standard (AES) acceleration

Socket:

- **LGA1156 Socket** (drop-in compatible with Intel® Core™ i7-800 processor series and Intel® Core™ i5-700 processor series)

Platform Compatibility:

- Intel® 5 series Chipset

Intel® Kings Creek Platform

Integrated Graphics

Discrete Graphics also supported

DDR3

Intel® FDI

DMI

Intel® 5 series Chipset

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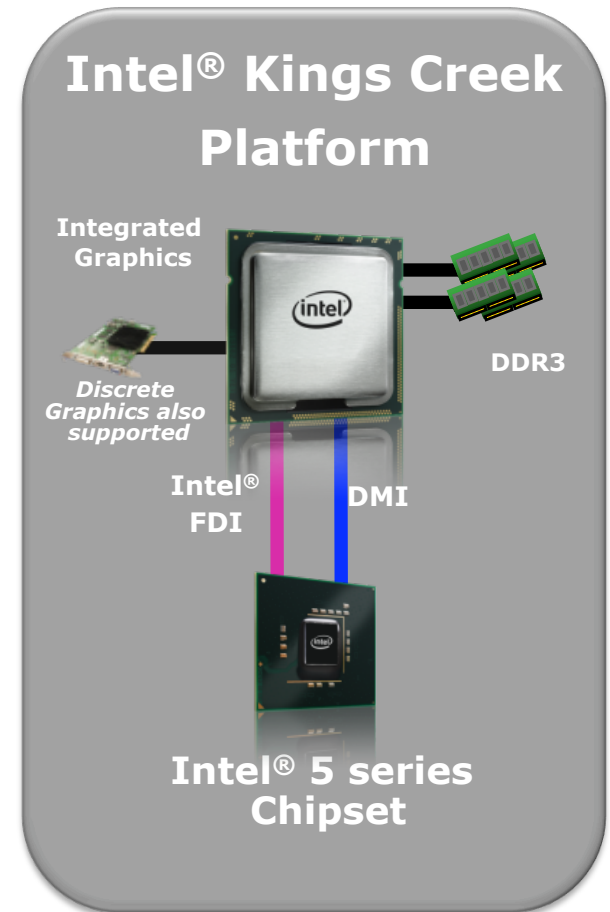
1 Intel® Turbo Boost Technology is exclusively available with selected Intel® desktop processor codename Clarkdale only

2 Intel® Hyper-Threading Technology is exclusively available with the Intel® desktop processor codename Clarkdale only

3 Integrated Graphics not enabled on some platforms

4 2x8 dual graphics support only available on select chipsets

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4

Clarkdale and Arrandale Graphics
Outstanding Media for All PC Video Usages[1]

Intel® Graphics Media Accelerator HD

Media	3D
Enthusiast Class Media Features	Great graphics experience for mainstream consumer usages
• Outstanding Blu-ray* disc playback	
• Excellent HD and SD video quality with Advanced Video Processing	
• Rich and vibrant colors	• High Quality Windows 7 experience
• Professional sound capability	• DX10, OGL2.1
	• Up to 1.7GB VRAM[2]

Intel® Core™ Processors with Intel Graphics Media Accelerator HD deliver enthusiast class media capabilities
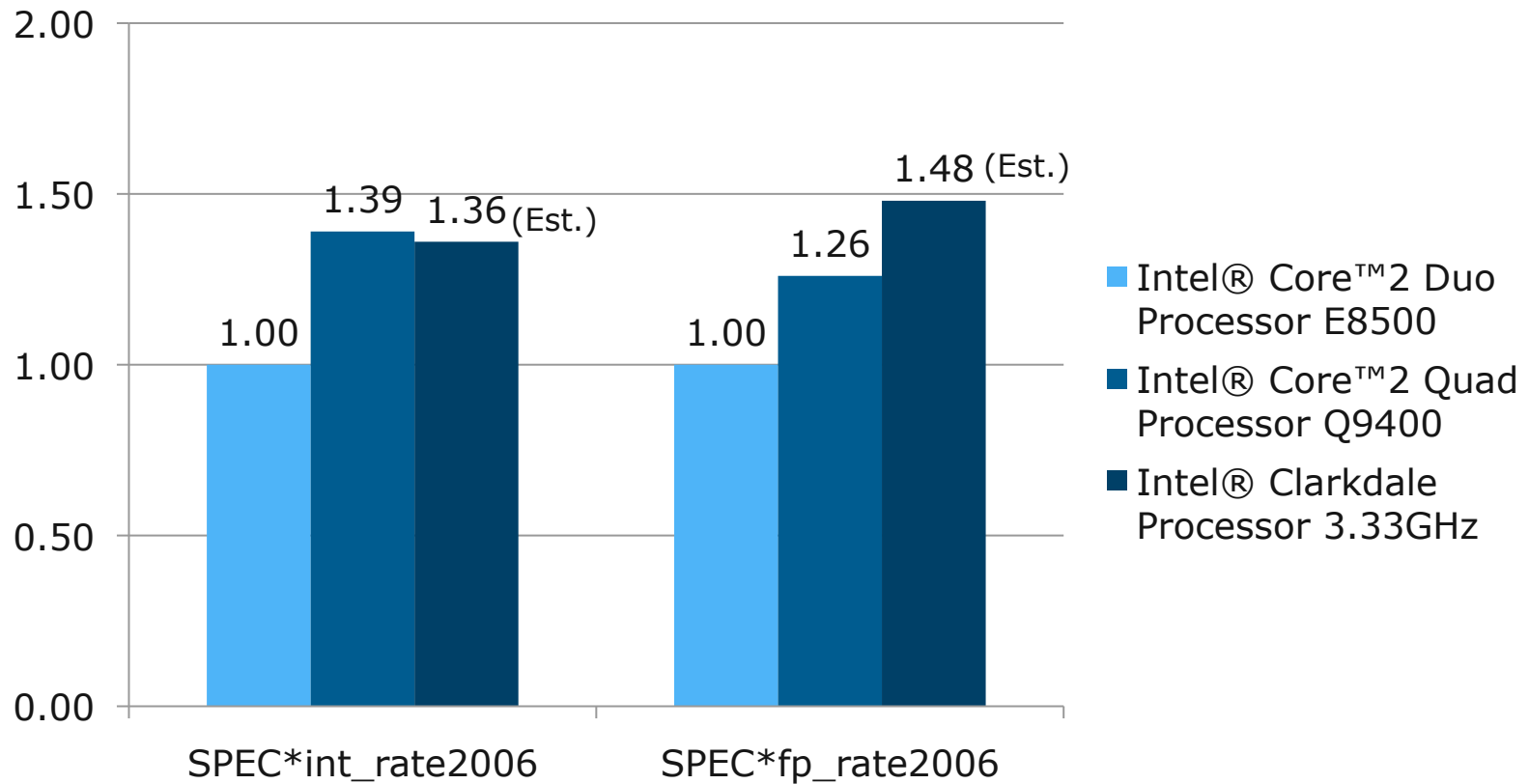
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Benchmarking on Windows* 7 Key Learnings

- **System Settling / ProcessIdleTasks:** As with Windows* Vista, you should allow at least five minutes of "settle" time to allow background OS services to complete execution after startup. In addition, run the ProcessIdleTasks API from the Run… window to verify that these tasks won't interfere with measurements.

- **Windows 7 File System**: Improved file system shows benefit in encrypt/decrypt workloads like using AES-NI (we'll show you a demo)

- Specific recommended OS parameters available in Lynnfield and Clarkdale press kit materials

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Windows 7 & Westmere: Better Together

- **Idle Core:** When the OS scheduler has a new thread to assign to a core, it will now check to see if an idle core is available, and if so, assign the new thread to that idle core.

- **Quantum End**: a time-slice for executing tasks. At the end of that time-slice the OS scheduler will look at threads in flight, and see if an idle core has become available. If so, a thread being executed on an HT core will be migrated over to the idle physical core to accelerate its execution.

- **SMT Parking & Core Parking:**
  - SMT Parking: keeps HT cores parked until physical cores are busy to the point that the HT cores are needed.
  - Core Parking: OS scheduler will "park" entire cores that aren't being used, and those cores are then put into a deep-sleep state called C6. Used only in servers.

- For a deeper dive into these topics, attend the course being co-presented by Shiv Kaushik (Intel) and Mark Russinovich (Microsoft) on Tuesday at 4pm (SPCS003, Room 3016).

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SPEC* CPU2006

2.00
1.50
1.00
0.50
0.00

SPEC*int_rate2006: 1.00, 1.39, 1.36 (Est.)
SPEC*fp_rate2006: 1.00, 1.26, 1.48 (Est.)

- Intel® Core™2 Duo Processor E8500
- Intel® Core™2 Quad Processor Q9400
- Intel® Clarkdale Processor 3.33GHz

Intel® Clarkdale Processors:
Major Performance Advances for Mainstream PCs

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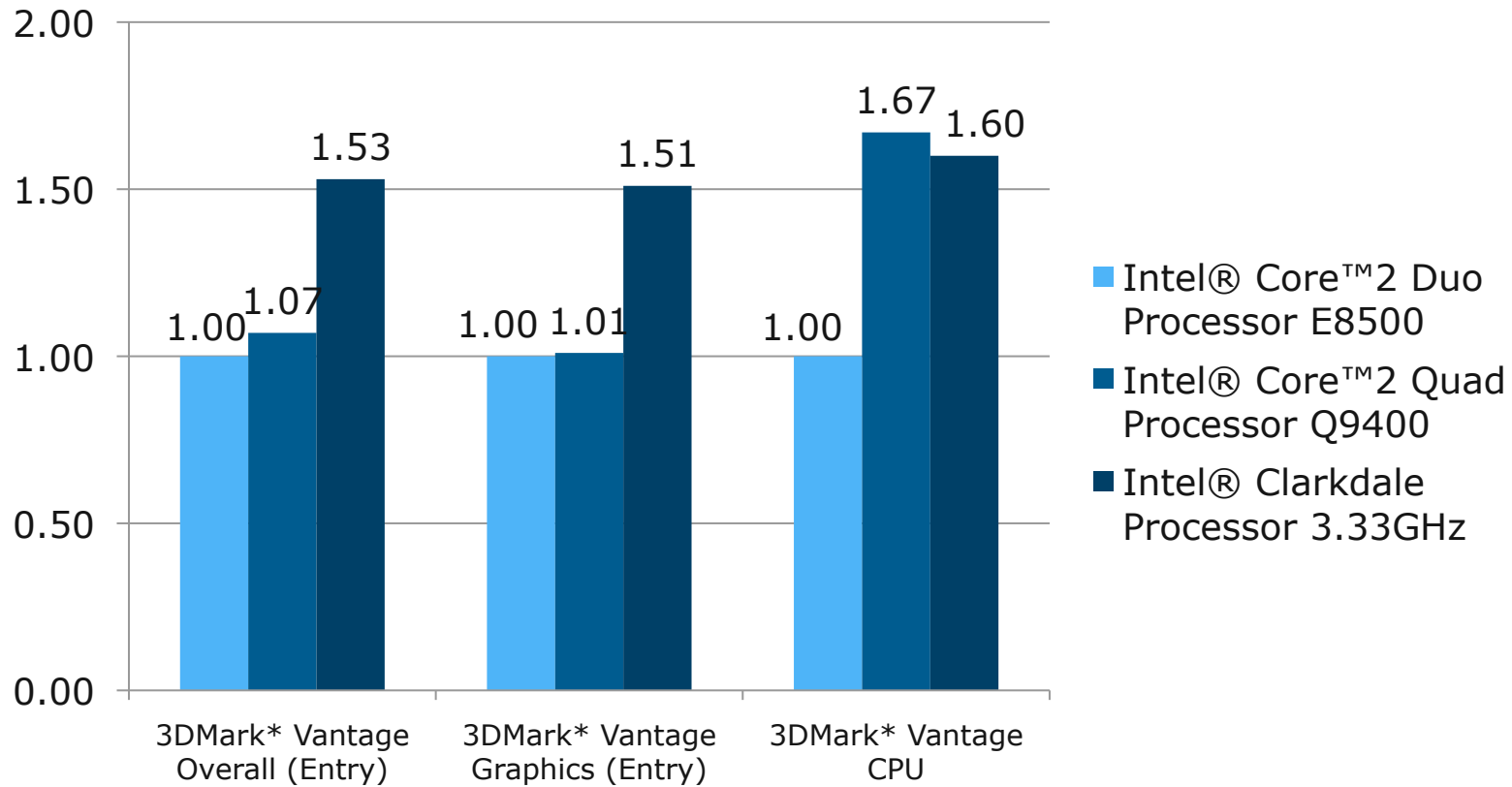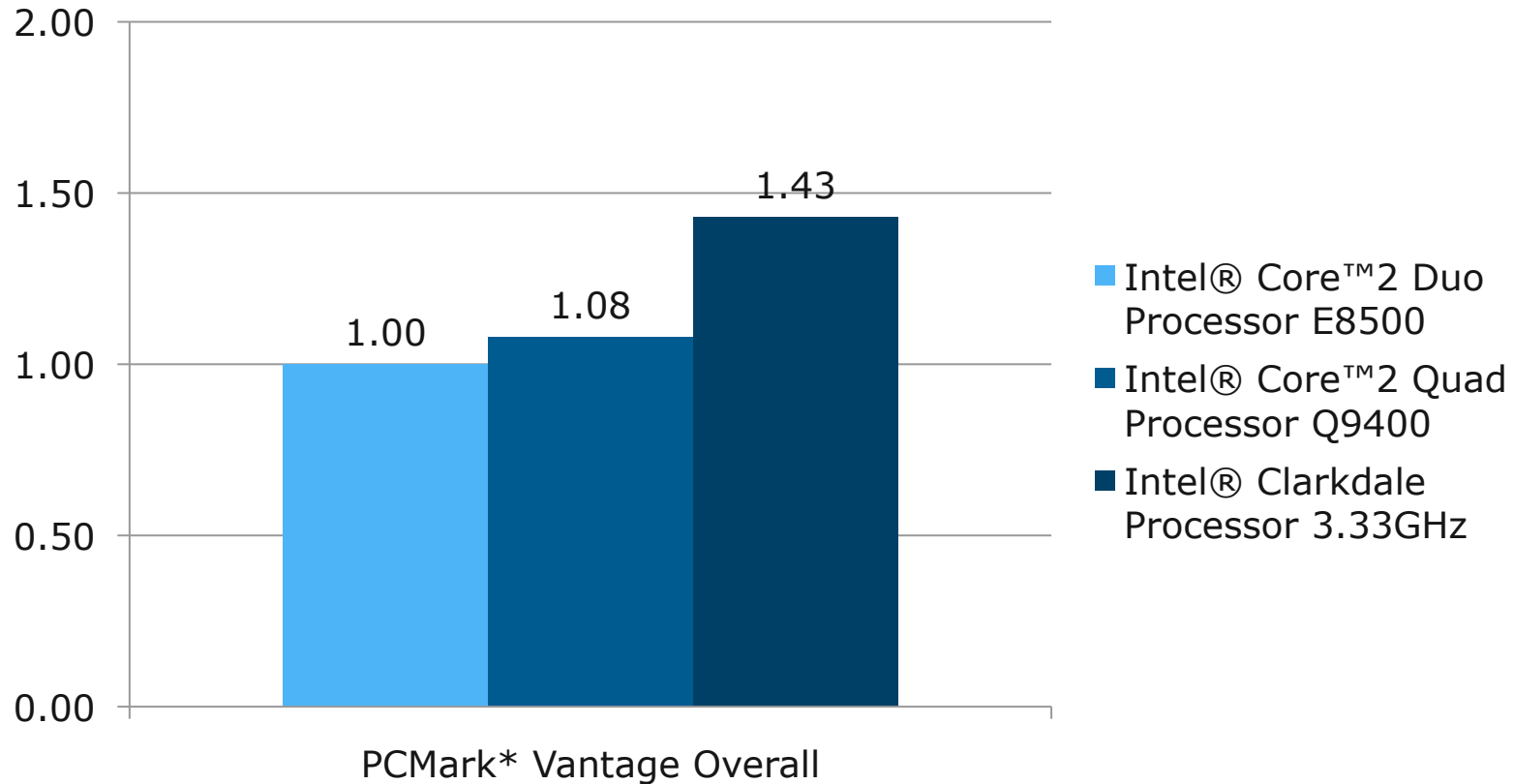
Source: Intel. Intel® Clarkdale Processor, 3.33GHz/4MB Intel Ibex Peak platform, Micron* 4GB (2x2GB) Dual channel DDR3 1333MHz, Seagate* 1TB HDD, Graphics driver: 8.15.10.1879, AMI* BIOS 4.6.3.

Intel® Core™ 2 Duo E8500 3.16GHz/1333MHz FSB/6MB and Intel® Core™ 2 Quad Q9400 2.66GHz/1333MHz FSB/6MB: Intel DG45ID, Kingston* 4GB (2x2GB) Dual channel DDR2 800 5-5-5-18, Seagate* 1TB HDD, X4500HD with 8.15.10.1840 BIOS: IDG4510H.86A.1357, Intel INF 9.1.1.1015)
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3DMark* Vantage

**Big Steps Forward in 3D Graphics:
More Mainstream Gaming Fun**

SiSoft* Sandra*
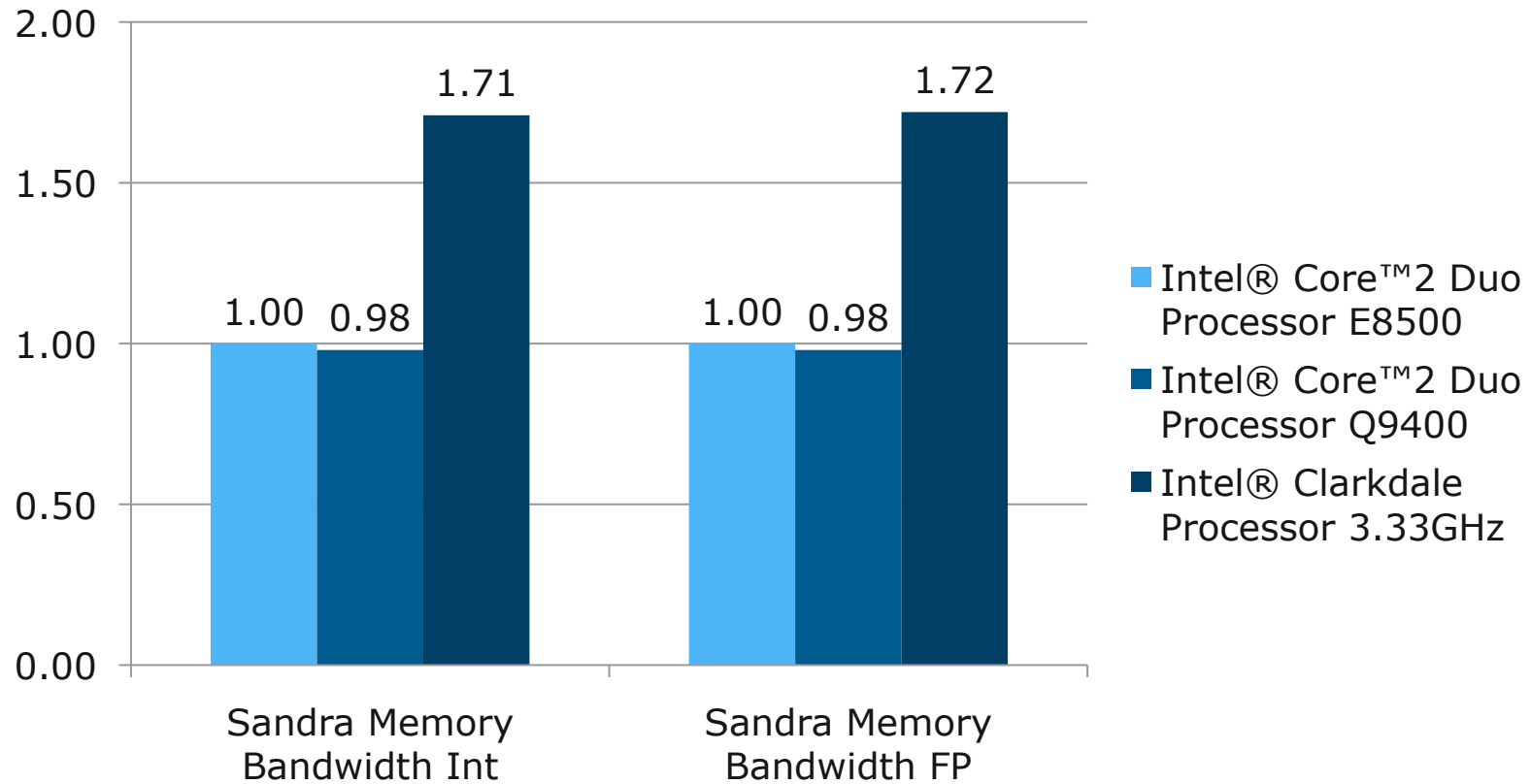
Massive Memory Bandwidth Advance

Chart legend:
- Intel® Core™2 Duo Processor E8500
- Intel® Core™2 Duo Processor Q9400
- Intel® Clarkdale Processor 3.33GHz

Sandra Memory Bandwidth Int: 1.00, 0.98, 1.71
Sandra Memory Bandwidth FP: 1.00, 0.98, 1.72

PCMark* Vantage

More Multitasking Headroom For More PCs

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