Data Center Redefined

Diverse, But Common Requirements:
Performance, Energy Efficiency, Virtualization
Innovation and Integration: What’s Next?

Extending Nehalem Microarchitecture

Security and I/O

Power and Density

Embedded and Storage
Intel® Platform Choice and Flexibility for Mission Critical Servers

Common Ingredients:
- Intel® Quick Path Interconnect
- Intel® Memory Hub & DDR3
- Intel® I/O Hub
- Increased RAS Capabilities
Nehalem-EX: Addressing The Most Demanding Workloads

• Broad range of server designs and form factors
  – Over 15 8S+ Designs from 8+ OEMs
  – Scalable blade & rack optimized designs
  – New HPC optimized solutions

• Broad support for scalability and advanced RAS
  – Microsoft, RedHat, Novell, Solaris, VMware
Nehalem-EX: A Giant Leap Forward

- Up to 3x database performance*
- Up to 1 TB memory support (4S)
- 128 threads (8S)
- Scalable to 8+ sockets
- Suite of ~20 new RAS capabilities

Largest Performance Leap In Intel® Xeon® History

*Intel internal performance measurements as of September 2009 based on OLTP on 4S Nehalem-EX based systems
Nehalem-EX: Expanded EX Focus into HPC!

“We want to focus on the science we need to solve for our National Security Mission and not the computer science. Nehalem EX represents a new SMP on a chip super-node that can help us improve our predictive science and simulation capabilities without having to invest in a vast rewrite of our applications.”

Mark Seager
LLNL Assistant Department Head
For Advanced Technologies
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What’s Next: Westmere-EP Platform

- Second generation High-k metal gate (32nm)
- Higher performance
- Improved energy efficiency
- Intel 10GbE
- Enhanced security
Improved Security Through Hardware Support

Data Protection

- AES
- New Instructions

Trusted Infrastructure

- Intel® Trusted Execution Technology

Broad Set of Server Capabilities
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World Class Power Management Solutions

Broad Industry Support and Growing Adoption For Intel Node Manager

End Users
- Baidu
- BMW
- China Telecom
- EMC
- Intel
- Oracle
- Telefonica
- Yahoo!

OEM, ODM & Console Providers
- Aquarius
- ASUS
- Cisco
- Dell
- Emerson
- Gigabyte
- HCL
- IESC
- Inspur
- Kraftway
- Lenovo
- Patriot
- Plat'Home
- MSI
- NEC
- NEC
- PowerLeader
- QNAP
- Supermicro
- SYBA
- Winfirst
- Wipro
- Z-Base
- ZT Systems

Other brands and names are the property of their respective owners.
Andy Bechtolsheim
Founder
Chief Development Officer and Chairman
Arista Networks

ARISTA
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Embedded and Storage
Jasper Forest

Increased CPU Integration for Reduced Power and Footprint

Intel® Xeon™ 5500 Processor
Mainstream Server

- DDR3
- DDR3
- DDR3
- DDR3
- DDR3
- DDR3
- QPI
- PCIe

Intel® 5520
I/O Hub

Jasper Forest
Embedded & Storage

- PCIe
- I/O Virtualization
- Non-Transparent Bridge
- RAID 5 & 6

Intel® 3420
Chipset

ESI

Highest Perf/Watt/In² and Up to 20% Lower Footprint In <200W Embedded and Storage Blades

Performance/watt/inch² based on Intel internal measurements of SpecIntRate and processor plus chipset thermal power. Footprint based on Intel internal comparison between Jasper Forest and Intel Xeon processor 5500 series.
Jasper Forest
Leadership in Ultra Dense Computing for Embedded & Storage

Launch Q1 2010

Communications
Military/Aerospace
Storage

ATCA 200W Blades
Compact PCI 50-100W Blades
Storage Bridge Bay 60W-200W
Innovate and Integrate

Server

Client
New Intel® Core™ i7 and Core i5 Processors

“The performance these processors deliver at these price points is superb … Intel has a real winner on its hands.”
ExtremeTech, September ‘09

“It seems that everyone will have something to love about these new Lynnfield CPUs – I would find it hard pressed to recommend anything else today.”
PC Perspective, September 2009

“Lynnfield is amazing, and in many ways, I consider this launch to be much more important than Nehalem’s last fall…”
Techgage, September 2009

Driving Nehalem Micro-architecture Innovation To Mainstream
Windows* 7 Optimization

Performance

Power Management

Stop / Start and Resume Speed

Graphics and Multi-Media

Security / Manageability
Next Generation Intel® vPro™ Platforms
Integration of Security and Manageability

- Smarter, Energy-efficient Performance
  - 32nm Westmere

- Expanded Manageability
  - Intel® Active Management Technology

- Enhanced Security
  - Intel® Anti-Theft Technology

Integrating Better Manageability
Introducing Keyboard-Video-Mouse Remote Control

IDF2009
INTEL DEVELOPER FORUM
Integration Beyond PCs

Broad Traction of Intel® vPro™ Technology In Embedded

- Gaming Machines
- Point of Sale
- Digital Signage

Intel® vPro™ Technology
Larrabee Execution Update

• Fully programmable rendering
• Many-core Intel Architecture
• First products: discrete performance graphics
• Software development systems shipping now

Enemy Territory: Quake Wars, id software
Extending Performance Leadership for Enthusiasts

2008
- High End Desktop
- 4 Cores
- 8 Threads
- Revolutionary Microarchitecture
- 45nm High-K

2010
- 6 Cores
- 12 Threads
- Compatible with Intel® X58 Express Chipset
- 32nm High-K

6-Core Gulftown Coming in 2010
32nm Westmere Processor — Clarkdale

- 32nm Processor
- AES-NI acceleration
- Intel® Turbo Boost Technology
- Intel® Hyper-Threading Technology
- 45nm Graphics

Turbo and Hyper Threading Will Transform Industry in 2010
# 4004 Instruction Set

## BASIC INSTRUCTIONS

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<tr>
<th>Code</th>
<th>Description of Operation</th>
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Note: Images Do Not Represent Exact Sizes