Today’s Highlights

Strong momentum for Intel® Xeon® 5500 processor
- Projected @>50% of DP shipments by Aug ’09

Nehalem microarchitecture coming to MP servers
- **9X** the Memory Bandwidth
- Doubling memory capacity with 16DIMMs per Socket
- >15 8-Socket+ designs from 8 OEMs - 128 thread demo
- New advanced reliability w/ MCA Recovery on Xeon
Intel® Xeon® Processor 5500 Series
*Momentum*

**Launch Highlights**
- 30 world record results
- 100+ optimized software products
- 73 OEMs shipping 230 solutions
- Hardware enabled FCoE
- Rapid payback from refresh
- Enabling intelligent datacenters

**Post Launch**
- Systems from Cisco, IBM, Fujitsu, Sun
- Performance Records
  - 10 New VMware VMmark* results
  - Top 7 SPECpower results
- 20 joint ISV solutions briefs
- Xeon ROI Estimator usage up 10X
- 6K+ press articles, 97K+ blog posts, and 60K+ Intel social media views

*Expected to be 50%+ of DP Shipments by Aug’09*
Intel Leadership in MP Segment

1st MP quad-core – Xeon® 7300
1st 6-core/16MB cache – Xeon® 7400
Gained >9% 4S MSS in 2008*
7 World Record Results - IBM 1.2M TPM-C !!
RISC migrations to Xeon – Aviza, BMW, Lockheed Martin, & VeriSign

*Source: IDC Worldwide Quarterly Server Tracker Q4’08, Represents gains in 4S x86 market from Q4’07 to Q4’08
MP Solutions Designed for the High-End

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Delivering Lower TCO
Nehalem-EX Overview

- Up to 8 Cores/16 Threads
- 24MB of Shared Cache
- Integrated Memory Controllers
- 4 High-bandwidth QPI Links
- Intel® Hyper-Threading
- Intel® Turbo Boost
- 2.3B Transistors

The Next Generation Intelligent Expandable Platform
Nehalem-EX: Leadership 4-socket Platform

- 4 Sockets / 64 Threads
- Intel® Scalable Memory Interconnect with Buffers
- 2X Memory Capacity
  - 16 DIMMs per Socket
  - 64 DIMMs per platform
- Advanced Virtualization & I/O Technologies

Unmatched Enterprise, Virtualization, and HPC Solutions
Next Generation MP Advances

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Extending Leadership Solutions
Nehalem-based Server Performance

The Greatest Intel® Xeon® Performance Leap In History!

Xeon® 5500 vs. Xeon® 5400

- Up to 3.5x Memory Bandwidth
- Up to 2.5x Database Performance
- Up to 1.7x Integer Throughput
- Up to 2.2x Floating Point Throughput

Nehalem-EX vs. Xeon® 7400

- Up to 9x Memory Bandwidth
- > 2.5x Database Performance
- > 1.7x Integer Throughput
- > 2.2x Floating Point Throughput

Expecting larger gains from Nehalem Architecture in MP

1Based on May’09 internal measurement using OLTP workload.
2Based on May’09 internal measurement using Intel internal workload

Flexibility and Investment Protection

Intel® VT FlexMigration Assist & VMware* Enhanced VMotion

- **2006-2007**: Intel® Core™ Microarchitecture
- **2007-2008**: Intel® VT FlexMigration Assist
  - Enhanced Intel® Core™ Microarchitecture
- **2008-2010**: Intel® Nehalem Microarchitecture
  - Investment Protection w/future VMware vSphere*

Live VM Migration w/ ESX 3.x* Today
Nehalem-EX: 8-Sockets and Above

Intel Architecture capable of QPI connected 8-Sockets / 128 threads

Scalable systems and >8-socket capability with OEM node controllers

Scalable performance through modularity

Leadership RAS with MCA recovery

Targeting High-End Enterprise Apps and Large Scale Consolidation

> 15 designs from 8 OEMs
Delivering Solutions through our Partners

Alex Yost,
VP and Business Line Executive
IBM System X and BladeCenter
High End Workloads Drive Increasing Demands

**Workload Demands**

- **High End Workloads**
  - Virtualization and Consolidation
  - Database Applications
  - Enterprise Applications

- **Customer Pain Points**
  - Managing space, power, and server utilization resources
  - Maximizing system uptime, and minimizing administrative costs
  - Keeping performance high and energy consumption low
  - Adding new function with affordable scaling infrastructure

**System Requirements**

- **Reliability**
  - Mainframe inspired system availability for maximum uptime

- **High Memory Performance**
  - More memory DIMMs for:
    - Low cost large memory capacities
    - Greater memory bandwidth
    - More VMs and more GBs per VM

- **Cost Savings Consolidation**
  - More VMs per software license
  - Power optimized systems
  - Invest protection through scalability
IBM x3850 M2 / x3950 M2

Best solution for reliability
Mainframe-inspired RAS with IBM eX4 technology

Best solution for large memory capacity
High-memory capacity x3850 M2 cost up to 17% less to purchase than equal capacity DP systems

Best solution for server consolidation
46% lower cost/VM makes server consolidation for large numbers of users most cost-effective

Best solution for virtualization
38% lower cost/VM for virtualized ERP instances and other mission-critical apps

Best solution for growing businesses
Savings up to $12,000 at time of purchase and still have the ability to scale to eight+ sockets

Leadership Performance

#1 x86-64 TPC-C Benchmark
First to break the 1 million transactions per minute barrier

#1 VMware 24-Core benchmark

#1 SAP SD Standard Application two-tier 8-processor result

#1 SAP SD Standard Applications two-tier Win 4-processor result

#1 Oracle E-Business R12 Large Payroll Batch Benchmark

#1 TPC-C 4-processor benchmark

#1 TPC-E 4-processor benchmark

#1 Spec CPU2006 benchmarks
IBM’s X-Architecture
Continued Investment, Continued Differentiation

5th Generation of IBM X-Architecture
Maximum Productivity, Reliability, and Scalability

4th Generation – Today
Introduced First x86 Platform to Break 1 Million tpmC

3rd Generation – 2005
Introduced Hot-Swappable Memory for Maximum Reliability

2nd Generation – 2003
Introduced Snoop Filter to Achieve 100 #1 Benchmarks

1st Generation – 2001
Introduced First Scalable 16 Socket x86 Platform

x3850M2/x3950M2
The Evolution of IBM’s 4 socket X-series servers
Leading the MP Market Today and Tomorrow

A Dynamic Infrastructure to addresses today’s challenges and tomorrow’s opportunities

Solving Customer Problems
- Space Constrained Data Centers
- Maxed-out Data Center Power
- Rising Management Costs
- Underutilized Servers with Expensive Software Licenses

...with the Data Center
- Reduce Costs
  - Greater Business Productivity
  - Large Scale Consolidation
  - Equal Performance at Less Cost
- Manage Risks
  - Mainframe Inspired Reliability
  - Investment Protection
- Improved Service
  - Easier Administration
  - Greater Productivity per System and Software License
Advanced RAS - MCA Recovery

Detected CPU, memory, & I/O errors

Works with OS to correct

Recovers from otherwise fatal system errors

First Machine Check Recovery in Xeon-based Systems
**Strong OS Support for MCA Recovery**

"Novell SUSE* Linux Enterprise 11 is optimized for Xeon, and will continue as we use MCA recovery in the Nehalem-EX processor. This is a major step forward in moving Novell on Xeon into the Mission Critical space previously occupied by RISC...”
- Carlos Montero-Luque, VP Business & Product Mgmt

"RHEL will make excellent use of Intel’s Nehalem-EX MCA recovery...This will be the first time this level of RAS capability is seen outside RISC and mainframe systems.”
- Scott Crenshaw, VP of Platform Business Unit

"Microsoft is excited about...our technology collaboration. Windows Server 2008 R2 will support Intel’s upcoming Nehalem-EX MCA recovery features, giving IT professionals confidence to move to higher levels of consolidation.”
- Bill Laing, Corporate VP

"VMware will be supporting Intel’s implementation of MCA recovery in future versions of VMware vSphere to enhance consolidation of business critical workloads. When combined with VMware vSphere, Intel’s MCA will deliver new error recovering capabilities for improved reliability in large memory systems, helping customers accelerate their journey towards 100 percent virtualization to achieve better efficiency, control and choice for their datacenters.”
- Dr. Stephen Herrod, CTO and SVP of R&D
Industry Standard Architectures

Growth vs. RISC

“Nehalem EX’s core platform attributes make it very capable to further disrupt parts of a declining RISC market.”
Vernon Turner, IDC

Lower TCO
Higher Performance
Flexibility

Nehalem-EX expected to accelerate conversion

Source: IDC Worldwide Quarterly Server Tracker, Q4’08
The Most Complete Server Product Portfolio

2009

- **Xeon® 5500**
  - Top Performance / $, Energy Efficiency, & Flexibility for Infrastructure Apps

2010

- **Westmere-EP**
- **Xeon® 7400**
  - Scalable Performance, Flexibility, & Advanced RAS for Demanding Apps / Consolidation

- **Nehalem-EX**

- **Itanium® 9100**
  - Highest Scalability and Most Advanced RAS for Most Demanding Environments

- **Tukwila**

**Sequence**

- 5000
- 7000
- 9000
Summary

Strong Intel® Xeon® processor 5500 momentum
Intel high-end enterprise leadership today
Nehalem-EX on track for 2H’09 production
Join the Industry’s Conversation Online at www.intel.com/server
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