Intel® Xeon™: the Enabling Technology to the Performing, Flexible & Energy efficient Cloud Infrastructure

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Market Development Manager
Cisco Connect Athens, 23/4/2013
IT Must Do More With Less

Escalating demands on IT drives need for the best combination of performance, efficiency and cost

**More Users**
- >1 Billion More Netizen’s

**More Devices**
- 15 Billion Connected Devices

**More Data**
- >1,000 Exabytes Internet Traffic

1. IDC "Server Workloads Forecast" 2009
2. IDC "The Internet Reaches Late Adolescence" Dec 2009, extrapolation by Intel for 2015
3. Intel "Worldwide Device Estimates Year 2020 - Intel One Smart Network Work" forecast
Intel® Xeon® Processor Families
Expansion Offers New Levels of Choice & Flexibility

Intel® Xeon® Processor E7 Family
*Highest reliability & scalability*

Intel® Xeon® Processor E5 Family
*Most flexible & efficient*

Intel® Xeon® Processor E3 Family
*Highest density, lowest cost*

**E7-8800/4800/2800**
8-Socket+/4-Socket/2-Socket
Top of the Line Performance

**E5-4600**
Dense
4-Socket

**E5-2600**
Mainstream Leadership

**E5-2400**
Enter
2-Socket

**E3-1200 v2**
Dependable & Economical 1-Socket
The Heart of a Next-Generation Data Center

Leading Performance
Up to 80% performance boost over Intel® Xeon® processor 5600 series-based servers¹

Best combination of performance, power efficiency, and cost

Flexible & Efficient
Advanced features automate power consumption across the platform

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products.

For more information go to intel.com/performance"
The Heart of a Next-Generation Data Center

- **Up to 4 channels DDR3 1600 Mhz memory**
- **Up to 8 cores**
- **Up to 20 MB cache**
- Integrated PCI Express* 3.0
- Up to 40 lanes per socket

Performance when you need it with Intel® Turbo Boost Technology 2.0

Dramatically reduce compute time with Intel® Advanced Vector Extensions

Up to 80% performance boost vs. prior gen¹

Intel® Integrated I/O with Intel® Data Direct I/O cuts latency² while adding capacity & bandwidth

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¹ Performance comparison using best submitted/published 2-socket server results on the SPECint_rate_base2006 benchmark as of 6 March 2012.
² Source: Intel internal measurements of average time for an I/O device read to local system memory under idle conditions comparing Intel® Xeon® processor E5-2600 product family (230 ns) vs. Intel® Xeon® processor 5500 series (340 ns). See notes in backup for configuration details.

* Other names and brands may be claimed as the property of others.
More Capabilities for a Next-Generation Data Center

More Cores

More Memory

More Integration

More Bandwidth

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Address the Needs of Growing Small and Medium Businesses with Entry 2-Socket Processor

Up to 3x performance increase vs. Intel® Xeon® processor E3-1200 v2 product family^1

More memory, I/O and reliability for growing small & medium businesses

Supports new technologies & features of Intel Xeon processor E5 family

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^1 Source: Intel internal measurements on SPECjbb*2005 benchmark as of March 2012

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Extend the Value into 4-Socket Servers

High Density, Cost Effective 4-Socket

Up to 83% performance increase vs. Intel Xeon processor E5-2600 product family

Up to 2X the memory (48DIMMs) and 2X the I/O to increase flexibility and performance

Supports new technologies & features of Intel Xeon processor E5 family

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1 Source: Based on comparing the best published results on the Intel Xeon processor E5-2600 product family to the E5-4600 product family, both at the 130W TDP processor specification.
2 Intel internal assessment compared to Intel Xeon processor E5-2600 product family
New Intel® Integrated I/O

1st server processor with Intel® Integrated I/O

Reduces I/O latency by as much as 30%¹

Improves IO bandwidth by as much as 2x with PCI Express* 3.0 support²

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¹ Source: Intel internal measurements of average time for an I/O device read to local system memory under idle conditions comparing Intel® Xeon® processor E5-2600 product family (230 ns) vs. Intel® Xeon® processor 5500 series (340 ns). See notes in backup for configuration details.

² Source: 8 GT/s and 128b/130b encoding in PCIe® 3.0 specification enables double the interconnect bandwidth over the PCIe® 2.0 specification (www.pcisig.com/news_room/November_18_2010_Press_Release/).

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**Intel® Technologies: Server Security**

### Isolate

Intel® VT & Intel® TXT protects VM isolation and provides a more secure platform launch.

### Enforce

Intel® TXT establishes “trusted” status, foundation to control migration based on security policy.

### Encrypt

Intel® AES-NI delivers built-in encryption acceleration for better data protection.
Intel® Xeon® Processor RAS Feature Comparison

**High Availability**
- Advanced recovery
- Failover
- Self Healing

**Advanced RAS**
(Intel® Xeon® Processor E7 Family)

**Advanced Data Protection**
- Compute
- I/O (PCIe)
- Coherency Bus (QPI)
- Memory Interconnect

**Service Cost Reduction**
- Flexible Capacity
- Hot Swap
- Server Partitioning
- Active Sparing

**Common RAS Foundation**
(Intel® Xeon® Processor E7, E5 Families)

**Data Protection**
- Parity
- CRC
- ECC
- Error Containment

**Common Error Handling Architecture**
- MCA
- CMCI

**Server Management Support**
- FRU Identification
- PFA support
- Problem Diagnosis
Machine Check Architecture Recovery
Allows Recovery From Otherwise Fatal System Errors

System works in conjunction with OS, VMM, or DBMS to recover or restart processes and continue normal operation

Error information passed to SW layer

Bad memory location flagged so data will not be used by OS or applications

Un-correctable Errors

Error Contained

Error Detected

Error Corrected

HW Correctable Errors

Normal Status With Error Prevention

1 Errors detected using Patrol Scrub or Explicit Write-back from cache
New Technologies Reduce Total Cost of Ownership

Refresh and Save

• Power management and increased efficiency is estimated to reduce power ~90% to deliver the same level of performance

• Significant performance gains maximize output per software license – possibly saving over $25k over a system’s life

Reduce Total Cost of Ownership by an estimated 66%¹

Go to www.intel.com/go/xeonestimator to learn more

TCO savings of 66% based on Intel estimates using Intel® Xeon® Processor-based Server Refresh Savings Estimator by refreshing quantity 100 2S Intel® Xeon® X5365 based servers with quantity 16 2S Intel® Xeon® E5-2690 based servers in a physical-to-physical consolidation that provides equivalent total server performance. The 4-year TCO savings based on: One time server acquisition cost of $129,968 (16 servers at $8123 each) plus installation cost of $21,800 ($1362 per server). Removing 84 servers from the data center provides network and server maintenance savings of $53,040 ($157 per server/year), utility savings of $177,540 ($528 per server/year) and OS license savings of $436,464 ($1299 per server/year).
Intel® Xeon® Processor E7 Family Server Roadmap

**Boxboro-EX Platform**

- Intel® Xeon® processor E7-8800 product family
- Intel® Xeon® processor E7-4800 product family
- Intel® Xeon® processor E7-2800 product family (Westmere-EX)
- Intel® 7500 chipset (Boxboro-EX IOH)
- Intel® 7510 Scalable Memory Buffer (Mill Brook 21,2)
- Intel® 7512 Scalable Memory Buffer (Mill Brook 21,2LP)
- Intel® 7500 Scalable Memory Buffer (Mill Brook 1)
- Intel® Xeon® processor E7 family
- Up to 10 Cores /20 Threads
- 30MB Shared Cache

**Technologies**

- Intel® Turbo Boost Technology
- Intel® Hyper-Threading Technology
- Intel® VT-x, -d, & -c
- DDR3-1066/978/800MHz memory (1.5V & DDR3L 1.35V)
- Intel® Advanced Encryption Standard New Instructions (Intel® AES-NI)
- Intel® Trusted Execution Technology (Intel® TXT)

**Brickland**

- Intel® Xeon® processor E7-8800/4800/2800 v2 product families (Ivy Bridge-EX)
- Intel® C602J chipset
- Intel® C102/C104 Scalable Memory Buffer (Jordan Creek 1)

- **Intel® Xeon® processor E7 family**
  - Up to 15 cores/30 threads

- **Technologies**

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# Intel® Xeon® Processor E5 Family Server Roadmap

## Romley-EP 4S Platform

**Intel® Xeon® processor E5-4600 product family (Sandy Bridge-EP 4S)**

- Intel® Xeon® processor E5-4600 product family
- Intel® C600 series chipset

**Efficient Performance**

**Four Socket**

## Romley-EP Platform

**Intel® Xeon® processor E5-2600 product family (Sandy Bridge-EP)**

- Intel® Xeon® processor E5-2600 product family
- Intel® C600 series chipset

**Technologies:**
- Up to 8 cores/16 threads, Intel® Advanced Vector Extensions (Intel® AVX), Integrated 3Gb/s SAS, 3Gb/s and 6Gb/s SATA, Intel® Integrated I/O (Intel® IIO), Intel® Hyper-Threading Technology, Intel® Turbo Boost Technology 2.0, Intel® VT-x, -d, & -c, Intel® QuickPath Interconnect (QPI), Intel® Advanced Encryption Standard New Instructions (Intel® AES-NI), Intel® Trusted Execution Technology (Intel® TXT), Intel® Node Manager, Intel® Active Management Technology (Intel® AMT), Lead and halogen free platform kit

## Romley-EN Platform

**Intel® Xeon® processor E5-2400 product family (Sandy Bridge-EN)**

- Intel® Xeon® processor E5-2400 product family
- Intel® C600 series chipset

**Technologies:**
- Same as Romley-EP

## Q1’13 Q2’13 Q3’13 Q4’13 Q1’14

- **Romley-EP 4S Platform**
  - Intel® Xeon® processor E5-4600 product family (Sandy Bridge-EP 4S)
  - Intel® C600 series chipset

- **Romley-EP Platform**
  - Intel® Xeon® processor E5-2600 product family (Sandy Bridge-EP)
  - Intel® C600 series chipset

- **Romley-EN Platform**
  - Intel® Xeon® processor E5-2400 product family (Sandy Bridge-EN)
  - Intel® C600 series chipset

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