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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.


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.

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 here.

Intel® Turbo Boost Technology requires a Platform with a processor with Intel Turbo Boost Technology capability. Intel Turbo Boost Technology performance varies depending on hardware, software and overall system configuration. Check with your platform manufacturer on whether your system delivers Intel Turbo Boost Technology. For more information, see http://www.intel.com/technology/turboboost.

No computer system can provide absolute security under all conditions. Intel® Trusted Execution Technology (Intel® TXT) requires a computer system with Intel®
Intelligent Data Center

- Compute
  - Dedicated Servers
  - Virtualized Servers
  - Low-Latency, Proximity Storage
    - NVM
  - High-Capacity Storage
  - Premium Storage
- HPC & Decision Support
- Edge/M2M
- VPN or LAN
- WWW
- IT/Web/App Dev Infrastructures
- IOPS/TB Optimized
- "$/TB Optimized

Unified Network
Romley Platform for Enterprise Storage

Sandy Bridge and Ivy Bridge-EP/EN CPU:
- Integrated DDR3 memory controller
- Integrated PCIe Gen 3 with up to 40 PCIe lanes per CPU for improved bandwidth and connectivity

Integrated Storage features
- Hardware XOR/P+Q DMA acceleration to deliver faster workloads that use less computing resources and power for RAID 5/6
- Asynchronous DRAM refresh (ADR) operates DIMMs in self-refresh mode to retain cached memory even through a power failure
- Non-Transparent Bridging (NTB) to keep nodes in sync for high availability

Intel C600 series chipset (Patsburg)

* RAID 5 on SCU SATA ports requires custom BIOS control
** Sample and launch schedule for Embedded-only SKUs is up to one quarter later
Intel® Xeon® = Heart of the Intelligent Data Center

- Integrated PCI Express Gen 3.0
- Hyper-Threading technology, 2 Threads/Core
- Shared Last Level Cache, 2.5 MB/Core
- Higher Memory Bandwidth with DDR3
- Integrated Memory Controller
- PCIe Non-Transparent Bridge
- Asynchronous DRAM self-refresh (ADR)
- Intel® QuickData Technology Direct Memory Access

* Other names and brands may be claimed as the property of others
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Intel® Xeon® Powers Big Data Compute

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New Memory Hierarchies – Non Volatile Memory

**Intel® 910 SSD**

- **Enhanced Performance**
  - Seq. R/W: 2.0/1.0 GB/s
  - Rand. R/W: 180/75 KIOPS
  - Latency R/W: 65/65us

- **High Endurance 25nm HET MLC**
  - 10x drive writes / day for 5 years
  - 30x endurance over standard MLC due to improved write amp and NAND management

Reduction of SW latency dramatically increases application IOPS as NVM latency decreases
Intelligent Storage Optimizations

**De-duplication**
- BEFORE DE-DUPLICATION
- AFTER DE-DUPLICATION

**Real Time Compression**

**Intelligent Tiering**

**Thin Provisioning**
- TRADITIONAL ALLOCATION
- THIN PROVISIONING

Tuesday, December 4, 12
Intelligent Storage Optimizations

De-duplication

95% smaller backup*

Intelligent Tiering

Up to 80% reduction in disk expenses***

Real Time Compression

Up to 80% data reduction**

Thin Provisioning

Up to 25% reduction in annual storage CapEx growth****

* IBM storage simulcast, November 9, 2011
** IBM storage simulcast, November 9, 2011
*** Dell “Fluid Data Storage: Driving Flexibility in the Data Center”, February 2011
**** Intel IT study “Solving Intel IT’s Data Storage Growth Challenges”
Summary

• Big Data Phenomenon is Real
• Analytics based on Hadoop will be the norm
• Compute, Network & Storage will converge for Big Data Solutions
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Intel® Architecture is Foundational to Big Data Solutions!
Tick-Tock Development Model: Sustained Microprocessor Leadership

- Intel® Core™ Microarchitecture
- Intel® Microarchitecture Codename Nehalem
- Intel® Microarchitecture Codename Sandy Bridge
- Intel® Microarchitecture Codename Haswell

- Merom
  - 65nm
  - New Micro-architecture
  - Tock

- Penryn
  - 45nm
  - New Process Technology
  - Tick

- Nehalem
  - 45nm
  - New Micro-architecture
  - Tock

- Westmere
  - 32nm
  - New Process Technology
  - Tick

- Sandy Bridge
  - 32nm
  - New Micro-architecture
  - Tock

- Ivy Bridge
  - 22nm
  - New Process Technology
  - Tick

- Haswell
  - 22nm
  - New Micro-architecture
  - Tock

- Future
  - 14nm
  - New Process Technology
  - Tick