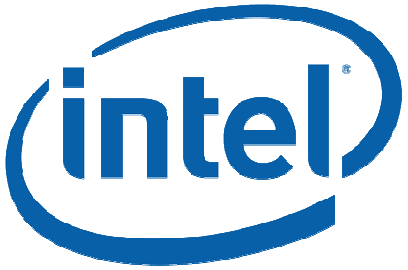
Legal Disclaimer

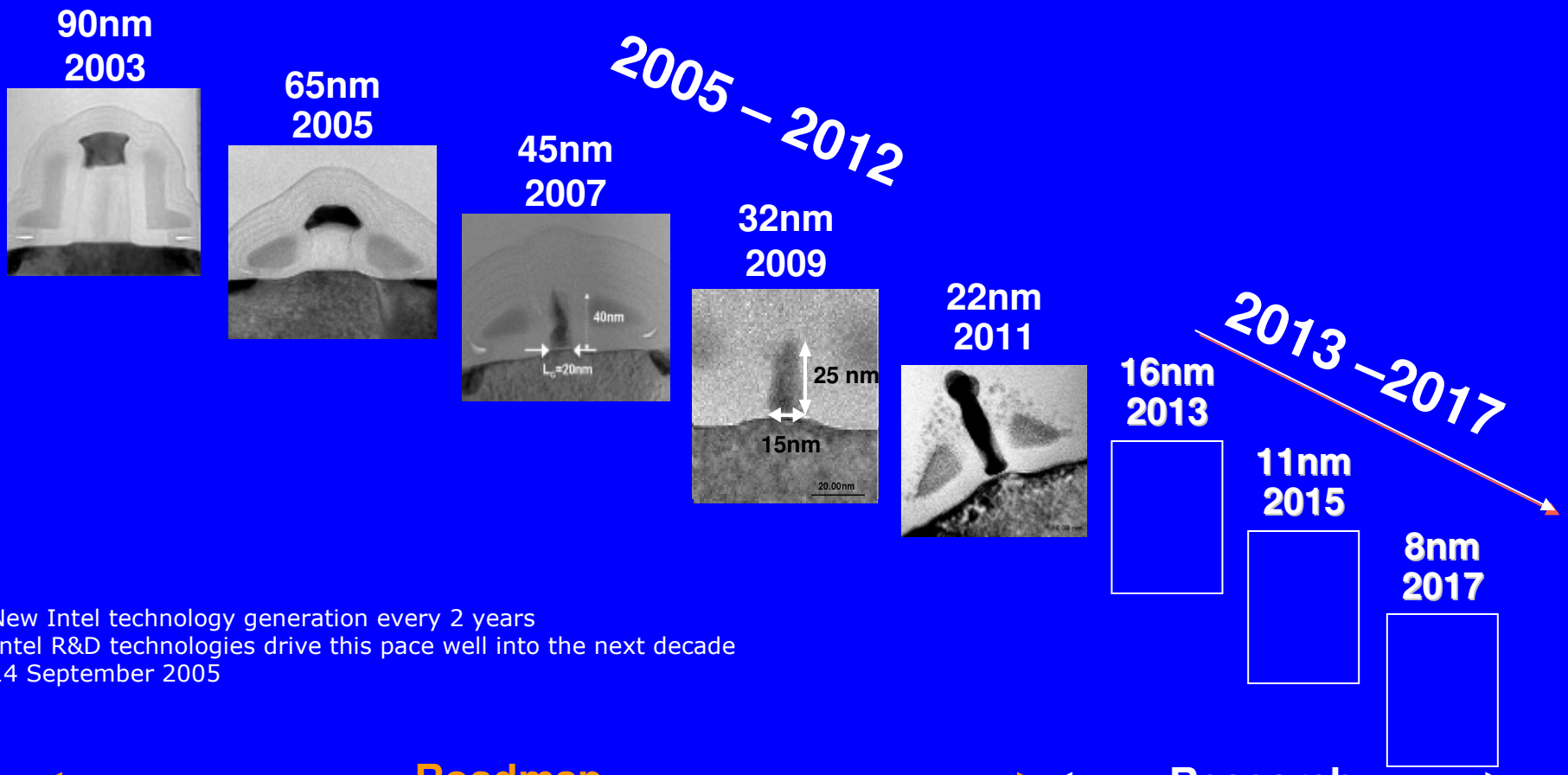
- INFORMATION IN THIS DOCUMENT IS PROVIDED IN CONNECTION WITH INTEL® PRODUCTS. NO LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT. EXCEPT AS PROVIDED IN INTEL'S TERMS AND CONDITIONS OF SALE FOR SUCH PRODUCTS, INTEL ASSUMES NO LIABILITY WHATSOEVER, AND INTEL DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY, RELATING TO SALE AND/OR USE OF INTEL PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. Intel products are not intended for use in medical, life saving, or life sustaining applications.
- Intel may make changes to specifications and product descriptions at any time, without notice.
- Designers must not rely on the absence or characteristics of any features or instructions marked "reserved" or "undefined." Intel reserves these for future definition and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to them.
- The Intel® Core™ Microarchitecture, Intel® Pentium, Intel® Pentium II, Intel® Pentium III, Intel® Pentium 4, Intel® Pentium Pro, Intel® Pentium D, Intel® Pentium M , Itanium®, Xeon® may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.
- Contact your local Intel sales office or your distributor to obtain the latest specifications and before placing your product order.
- This document contains information on products in the design phase of development. Do not finalize a design with this information. Revised information will be published when the product is available. Verify with your local sales office that you have the latest datasheet before finalizing a design.
- All dates specified are target dates, are provided for planning purposes only and are subject to change.
- All products, dates, and figures specified are preliminary based on current expectations, provided for planning purposes only, and are subject to change without notice.
- Intel and the Intel logo is a trademark or registered trademark of Intel Corporation or its subsidiaries in the United States and other countries.
- *Other names and brands are the property of their respective owners.
-



Intel Technology Update
November 08

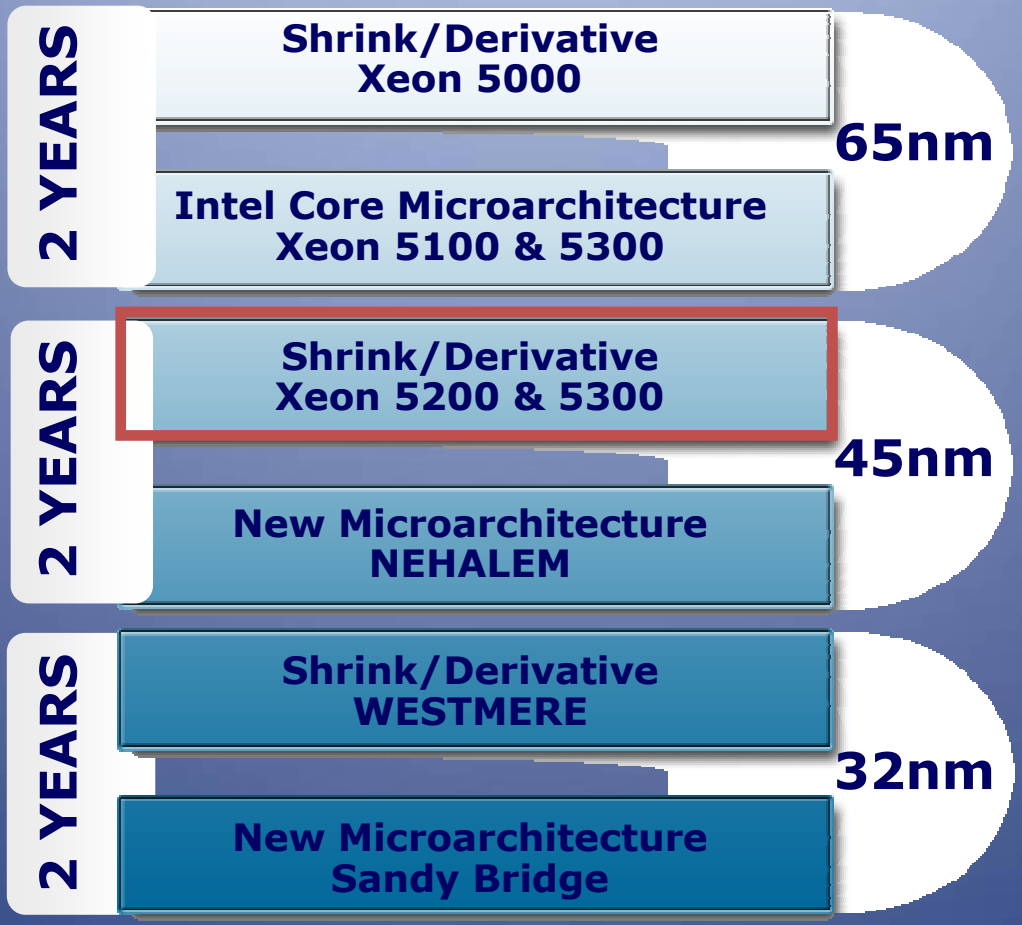
Bill Horan
Technical Account Manager IBM EMEA
Bill.horan@intel.com

Silicon Roadmap



New Intel technology generation every 2 years
Intel R&D technologies drive this pace well into the next decade
14 September 2005

Intel Design & Process Cadence

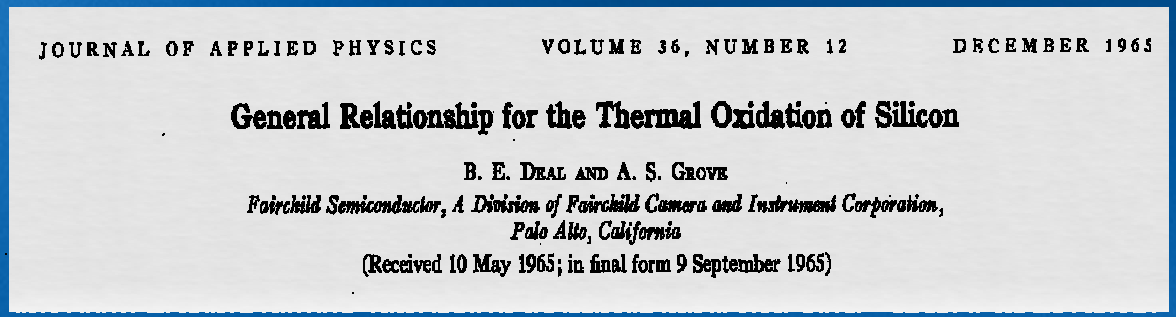


New performance and capabilities each year

Intel's 45nm process: Biggest Change to the Transistor *Since Andy, Gordon and Les*

"The implementation of high-k and metal materials marks the biggest change in transistor technology since the introduction of polysilicon gate MOS transistors in the late 1960s," said Intel Co-Founder Gordon Moore.

Intel press release, January 26, 2007



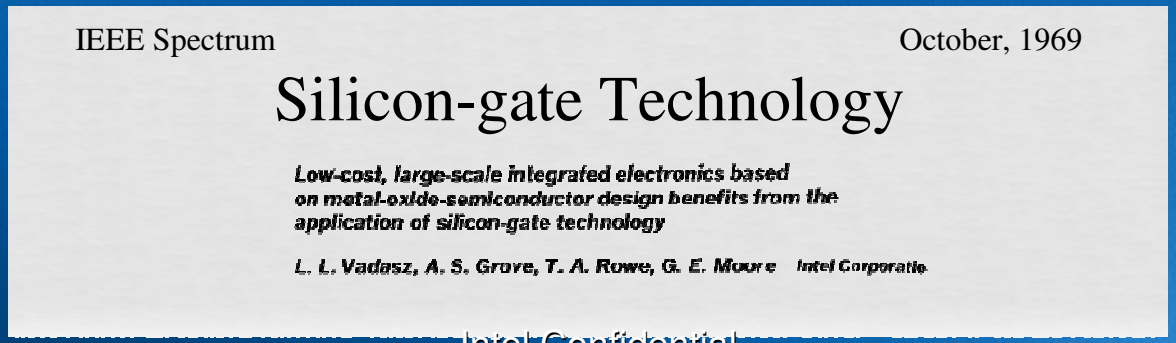
JOURNAL OF APPLIED PHYSICS VOLUME 36, NUMBER 12 DECEMBER 1965

General Relationship for the Thermal Oxidation of Silicon

B. E. Deal and A. S. Grove

Fairchild Semiconductor, A Division of Fairchild Camera and Instrument Corporation, Palo Alto, California

(Received 10 May 1965; in final form 9 September 1965)



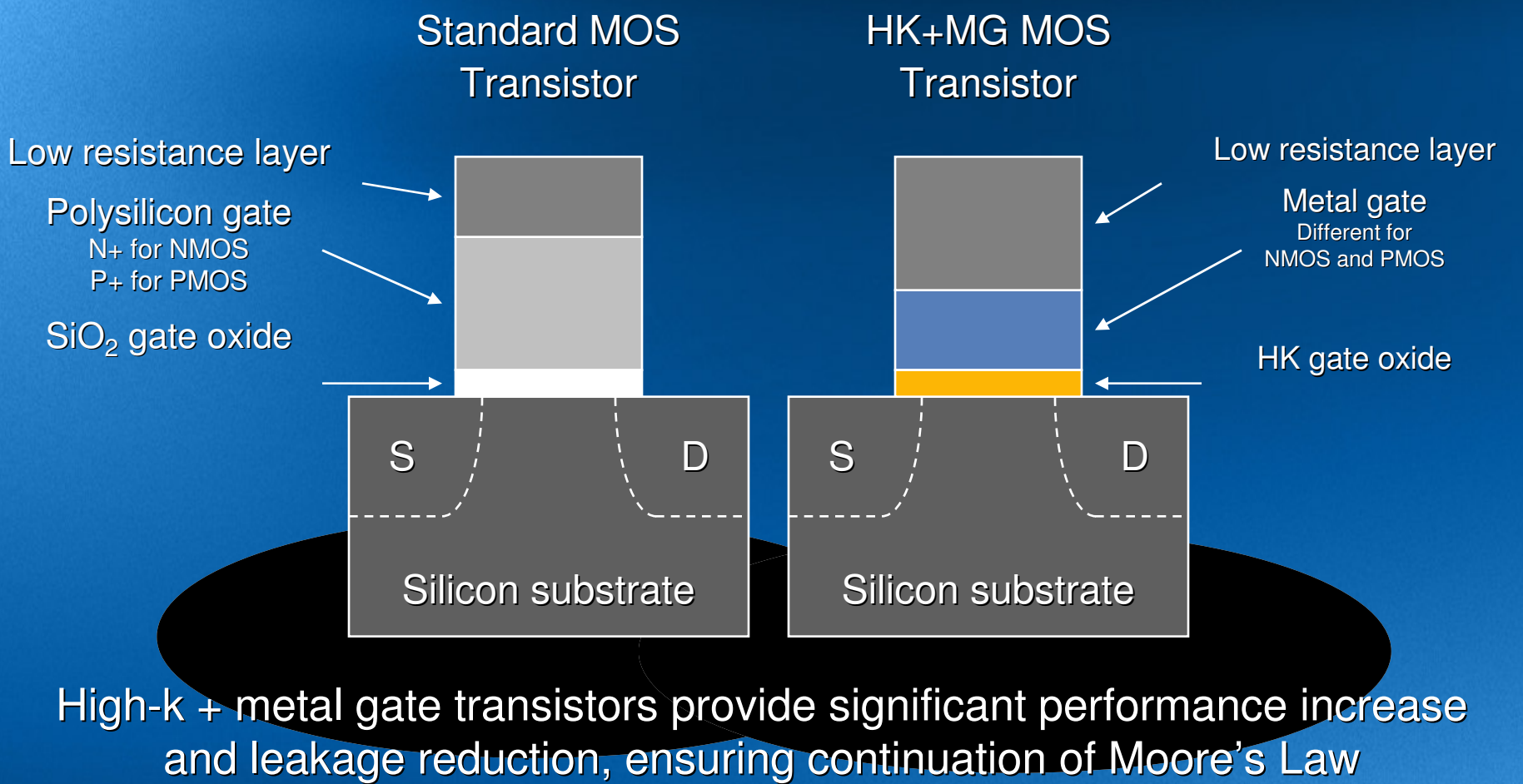
IEEE Spectrum October, 1969

Silicon-gate Technology

Low-cost, large-scale integrated electronics based on metal-oxide-semiconductor design benefits from the application of silicon-gate technology

L. L. Vadasz, A. S. Grove, T. A. Rowe, G. E. Moore Intel Corporation

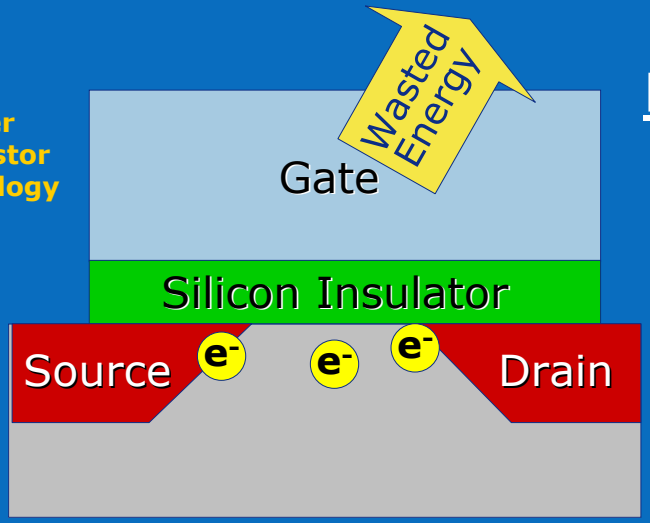
High-k + Metal Gate Transistors



High-k + metal gate transistors provide significant performance increase and leakage reduction, ensuring continuation of Moore's Law

Silicon Transistor "Leakage"

Older Transistor Technology

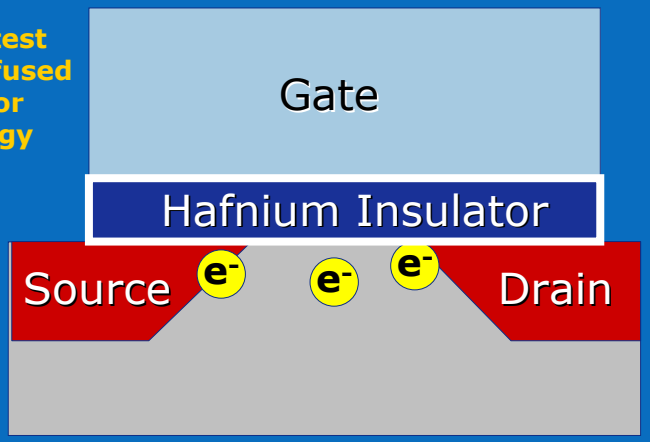


Problem:

Older transistors waste energy when electrons "leak" across the silicon insulator

- Limits transistor performance
- Wastes energy

Intel's Latest Hafnium-infused Transistor Technology



The Solution: *Hafnium Insulator*

- ***Tenfold decrease in leakage***
- Allows chip to run faster
- More energy efficient

leaking electrons waste energy

Extending the Lead with 45nm Technology

Compared to 65 nm technology, Intel's 45nm technology provides:

~2x improvement in transistor density – for either smaller chip size or increased transistor count

>20% improvement in transistor switching speed

>5x reduction in source-drain leakage power

>10x reduction in gate oxide leakage power

~30% reduction in transistor switching power

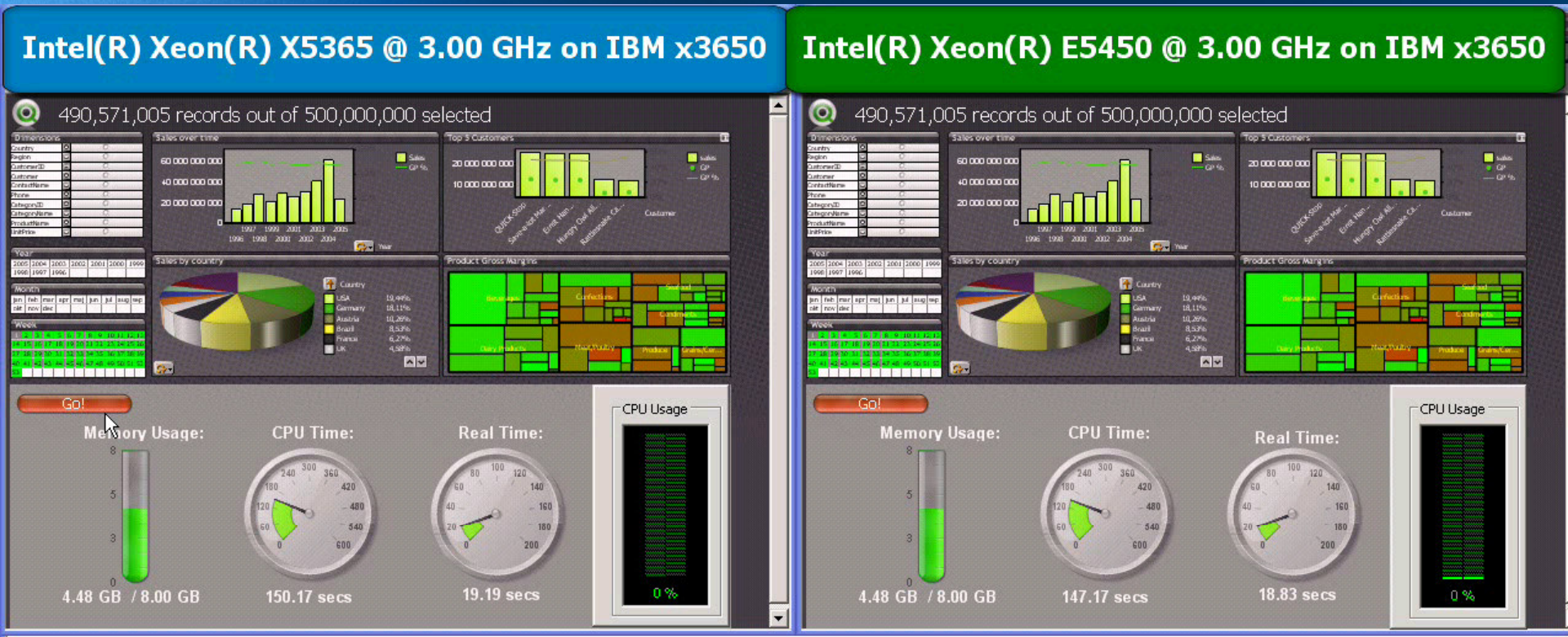
Providing the Foundation for Improved Performance/Watt

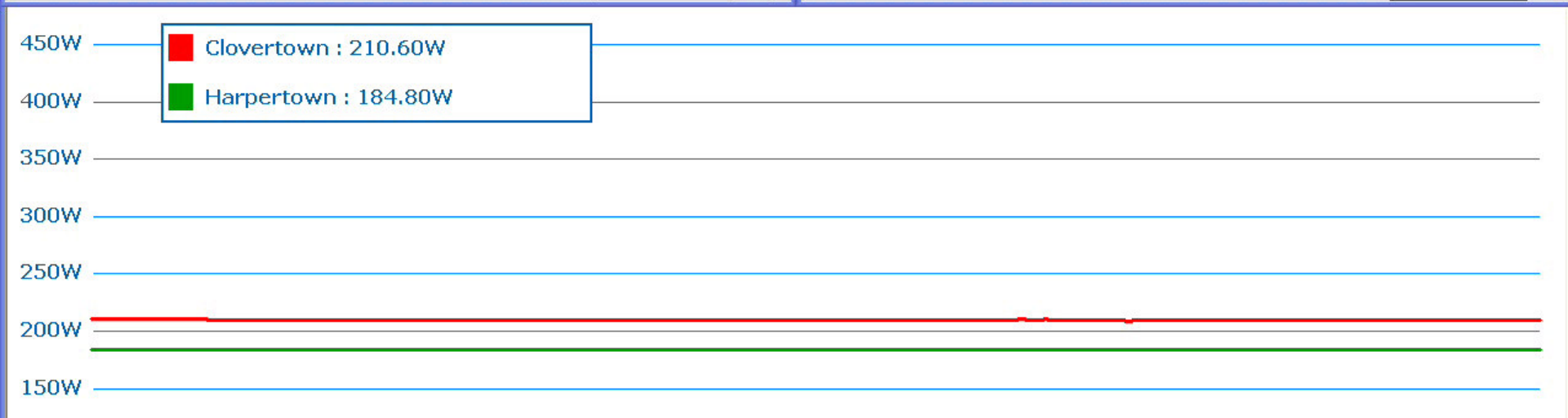
intel

DEMO

- Compare 2 x IBM x3650
  - Same system configuration except processors
- 3.0GHz 65nm Xeon vs. 3.0GHz 45nm Xeon
  - Intel® Xeon™ X5365 processor vs Intel® Xeon™ E5450 processors
- Qlikview* by Qlicktech* BI application used as benchmark
  - 500 000 000 sales records
  - 4 Sales reports
- Faster is better
- Measure power at the wall socket

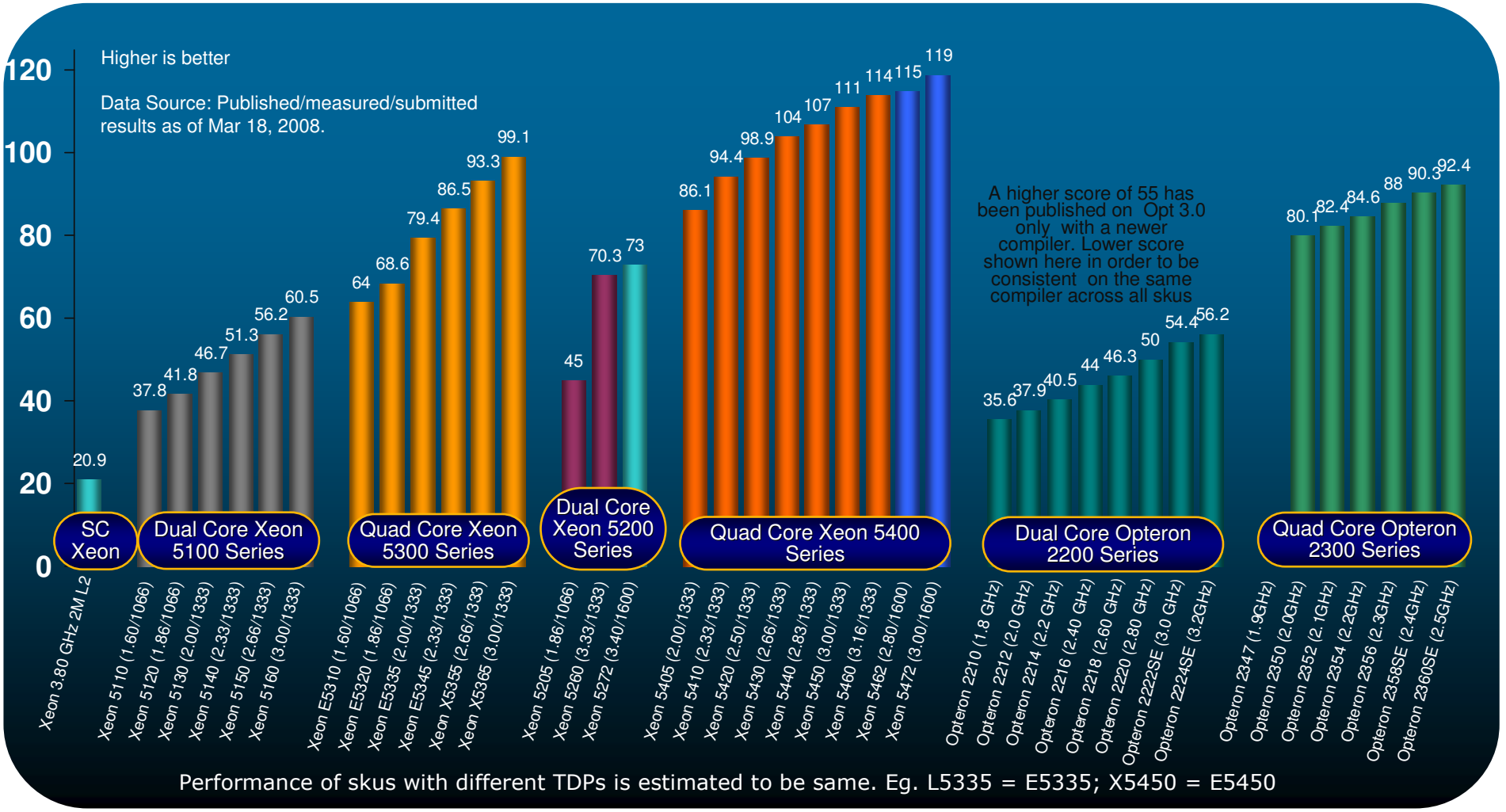
DEMO


Intel(R) Xeon(R) X5365 @ 3.00 GHz on IBM x3650
Intel(R) Xeon(R) E5450 @ 3.00 GHz on IBM x3650
490,571,005 records out of 500,000,000 selected
490,571,005 records out of 500,000,000 selected
Go!
Go!
Memory Usage:
CPU Time:
Real Time:
CPU Usage
4.48 GB / 8.00 GB
150.17 secs
19.19 secs
0 %
Memory Usage:
CPU Time:
Real Time:
CPU Usage
4.48 GB / 8.00 GB
147.17 secs
18.83 secs
0 %


450W
400W
350W
300W
250W
200W
150W
Clovertown : 210.60W
Harpertown : 184.80W

Quad-Core Intel® Xeon® Processor 5400 series based Platforms

SKU comparison using SPECint*_rate_base2006 “Base”



Performance of skus with different TDPs is estimated to be same. Eg. L5335 = E5335; X5450 = E5450

Quad-Core Xeon 5400 for General Purpose Computing

Xeon 51xx – Dual-Core Intel® Xeon® Processor 51xx (“Woodcrest”)
Xeon 53xx – Quad-Core Intel® Xeon® Processor 53xx (“Clovertown”)
Xeon 52xx – Quad-Core Intel® Xeon® Processor 52xx (“Wolfdale-DP”)
Xeon 54xx – Quad-Core Intel® Xeon® Processor 54xx (“Harpertown”)

Opteron 22xx – Dual-Core AMD Opteron* Model 2xx/22xx
Xeon 3.80 GHz – 64-bit Intel® Xeon® Processor 3.80; (“Irwindale”);
Opteron 23xx – Quad-Core AMD Opteron* Model 23xx

Back to Index Slide 1

The opportunity to Refresh

Reduce annual cost and floor space with server refresh

Business Requirement: Deliver 5.1 Million Business Operations Per Second
Using 45nm Quad-Core Intel® Xeon® processor 5400 series

2004

- **5.1M bops**
- **6 racks**
- **126 servers**
- **240 sq ft**
- **48 kW**

2008

- **5.1M bops**
- **1 rack**
- **17 servers**
- **40 sq ft**
- **6 kW**

The Bottom Line Benefits for IT (< 2 year ROI[4])

Floor Space
83%
Reduction[1]

Annual
Energy Costs
87%
Reduction[2]

Estimated
Energy Savings
$53K
Savings[3]

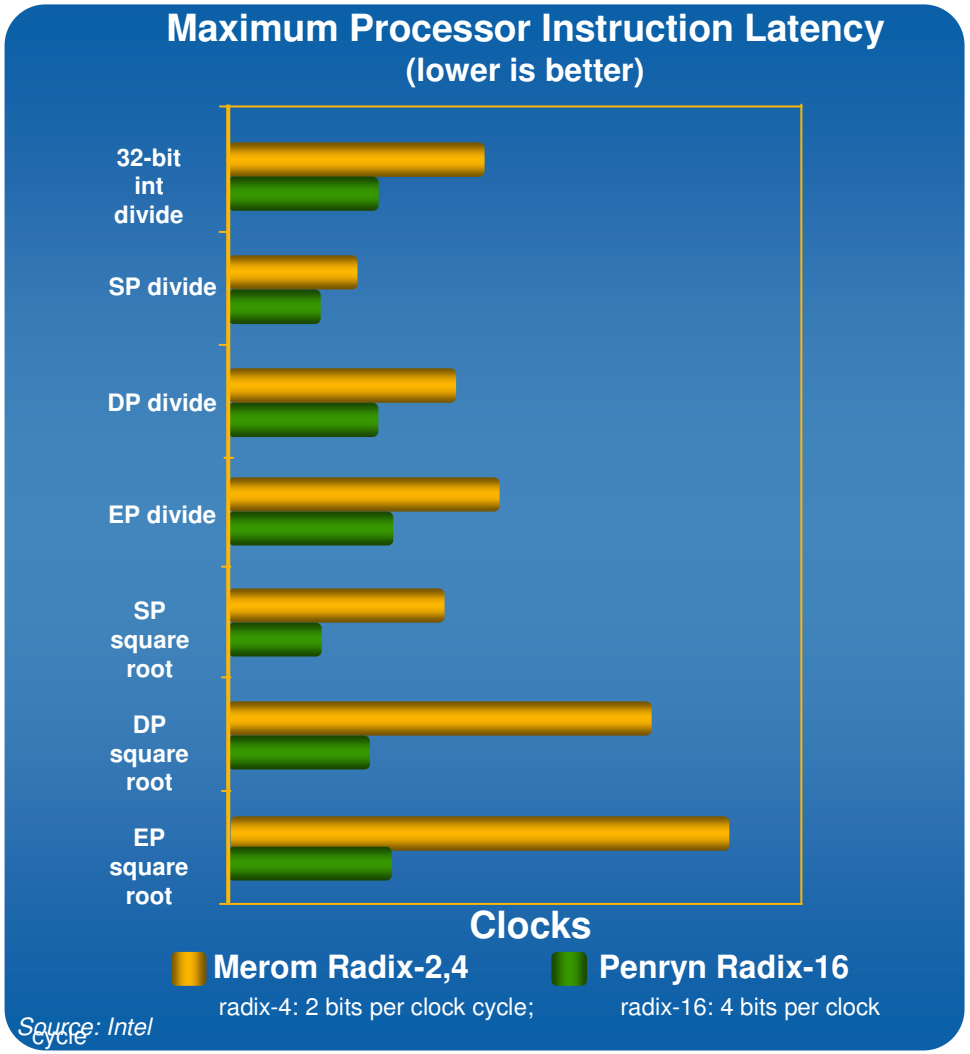
For notes and disclaimers, see legal information slide at end of this presentation.

Enhanced Intel® Core™ Microarchitecture

	Intel® Core™ uArch	Penryn uArch
Intel® Wide Dynamic Execution	- 4 Wide Issue - Micro-Fusion - 3 Full ALU's -Deep Buffers - Adv. Branch Prediction	- Fast Radix 16 Divider - Faster OS Primitive support - Faster Virtualization Context Switching - Intel® VT FlexMigration
Intel® Advanced Smart Cache	- Shared L2 Cache (16-way) - 4MB (per 2 cores)	- 24-way Associative - 6MB (per 2 cores)
Intel® Advanced Digital Media Boost	- 128-bit single cycle SSE	- SSE4 ISA - Super Shuffle Engine
Intel® Smart Memory Access	- Improved Pre-fetch - Memory Disambiguation - Dynamic Power Coordination	- Split Load Cache - Improved Store Forwarding - Higher FSB (1600MHz)
Intel® Intelligent Power Capabilities	- Advanced Power Gating - Split Bus Arrays	- Deep Power Down Tech. - Enhanced Intel Dynamic Acceleration Tech.

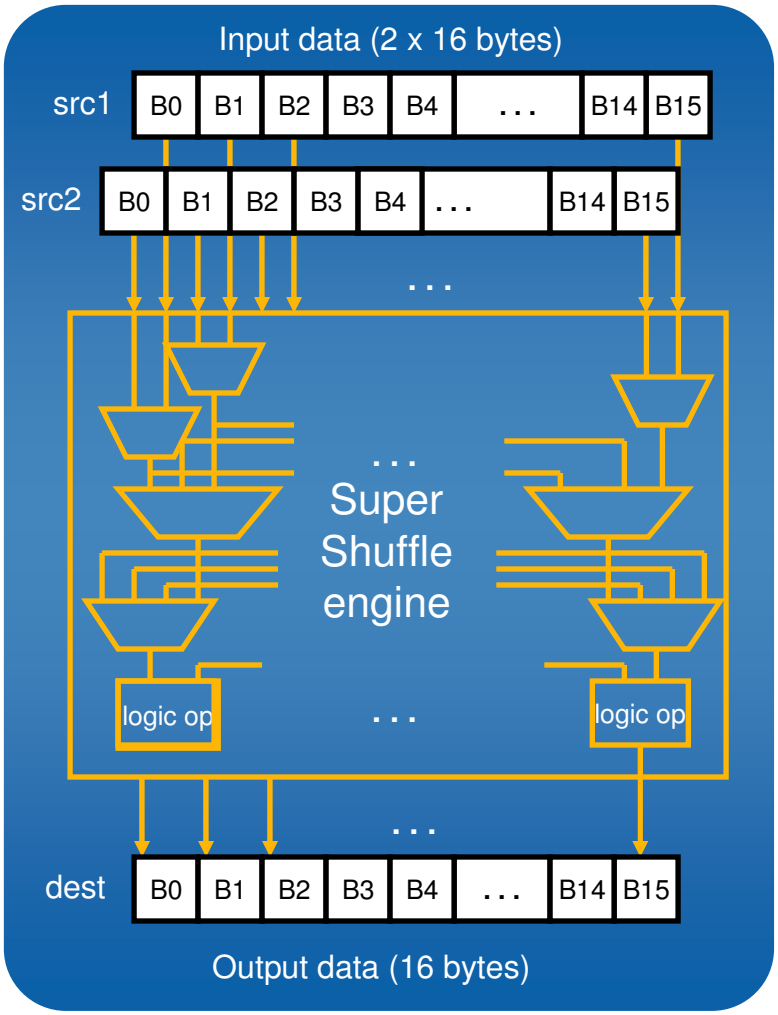
Fast Radix-16 Divider

- Leading edge divider performance
- 4 bits processed per cycle vs. 2 bits per cycle
- Innovative radix-16 based architecture
  - Utilized for both floating-point and integer operations
  - Optimized square root
- Early-out algorithm for both integer and FP data allows lower latency
  - 6 cycle minimum



On Avg: Doubles the Divide Execution Speed

Super Shuffle Engine

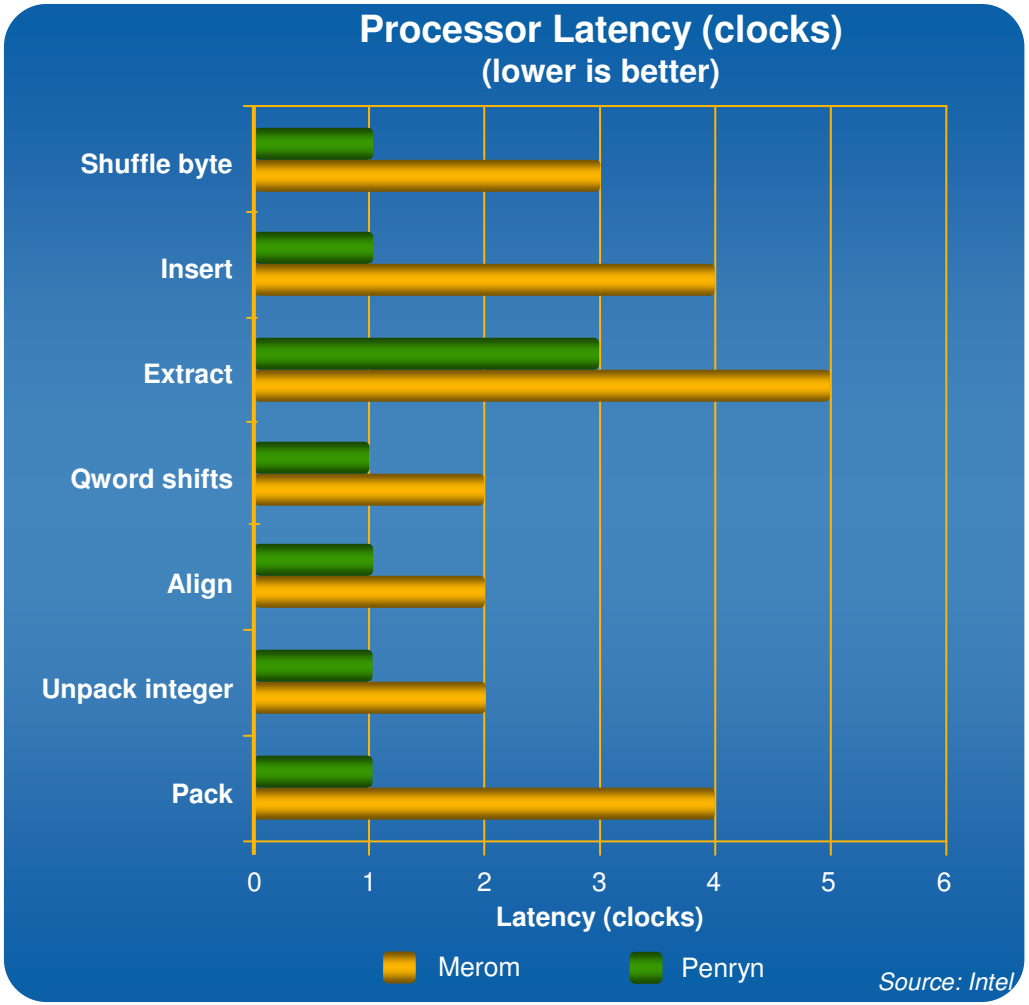


- Shuffle operations required for SSE data formatting operations
  - Unpacking
  - Packing
  - Align concatenated sources
  - Wide shifts
  - Insertion and extraction
  - Setup for horizontal arithmetic functions
- Penryn super shuffle engine performs 128 bit operation in 1 cycle vs. 2
- No software changes required

Doubles shuffle speed

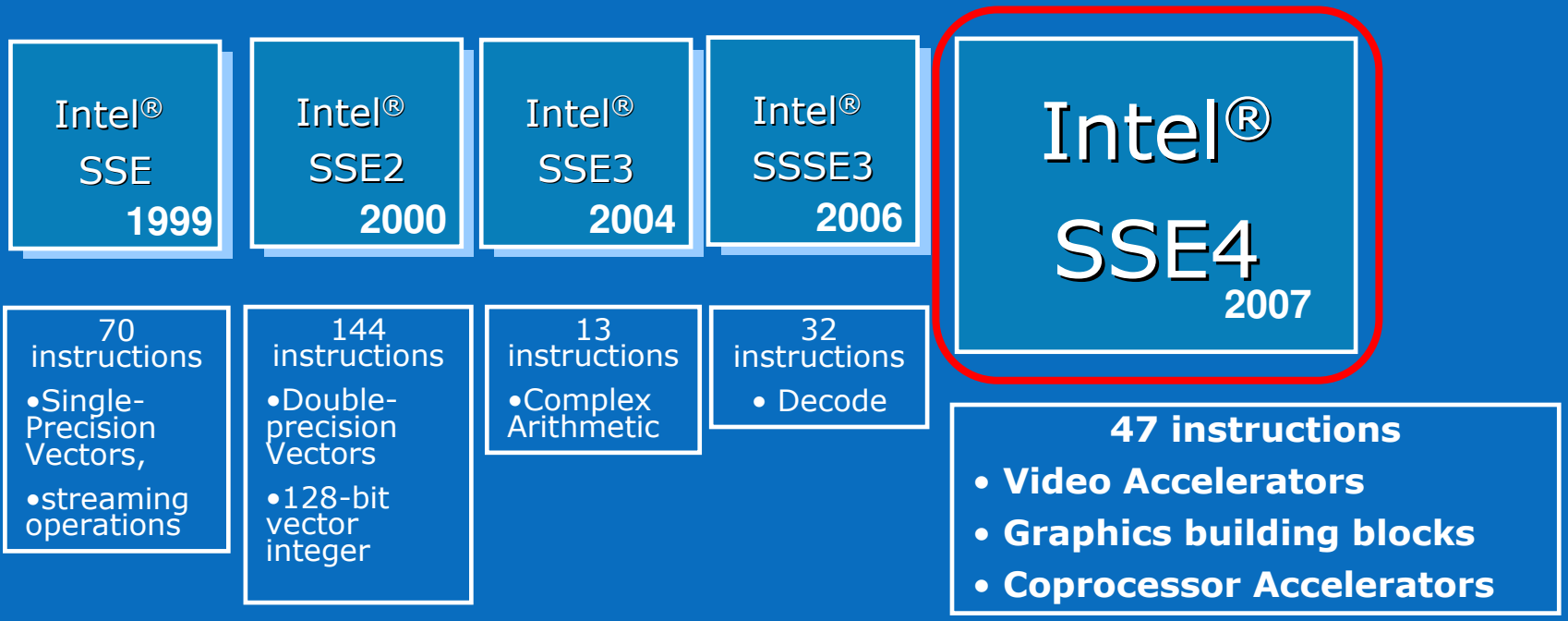
Super Shuffle Engine

- Doubles the speed for most byte, word, and dword granular SSE data shuffle operations
- Also key capability for performance effective enabling of new SSE4 functionality
  - Blends
  - Dot product
  - Multiple sum-of-abs differences



2X Faster SSE Shuffle Instruction Execution

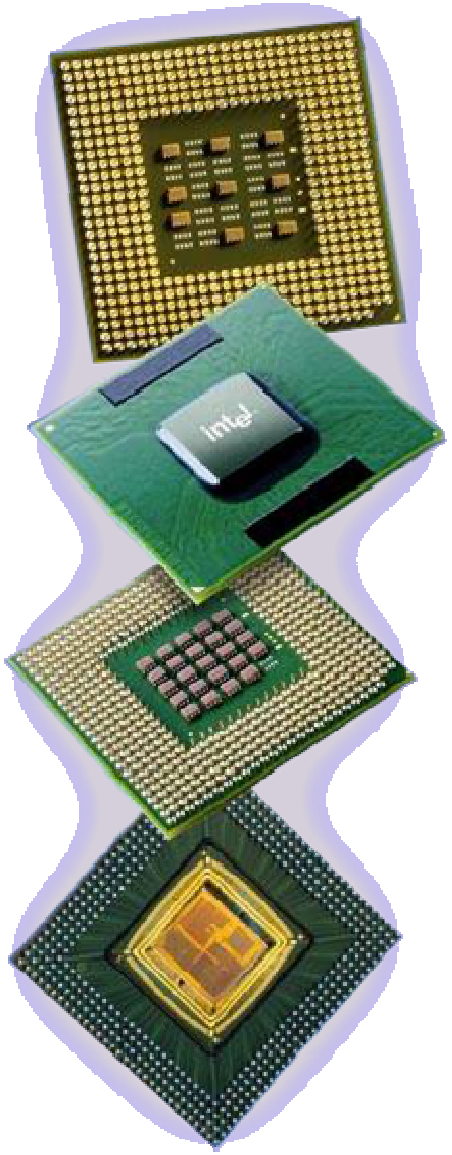
New Intel® SSE4 Instructions



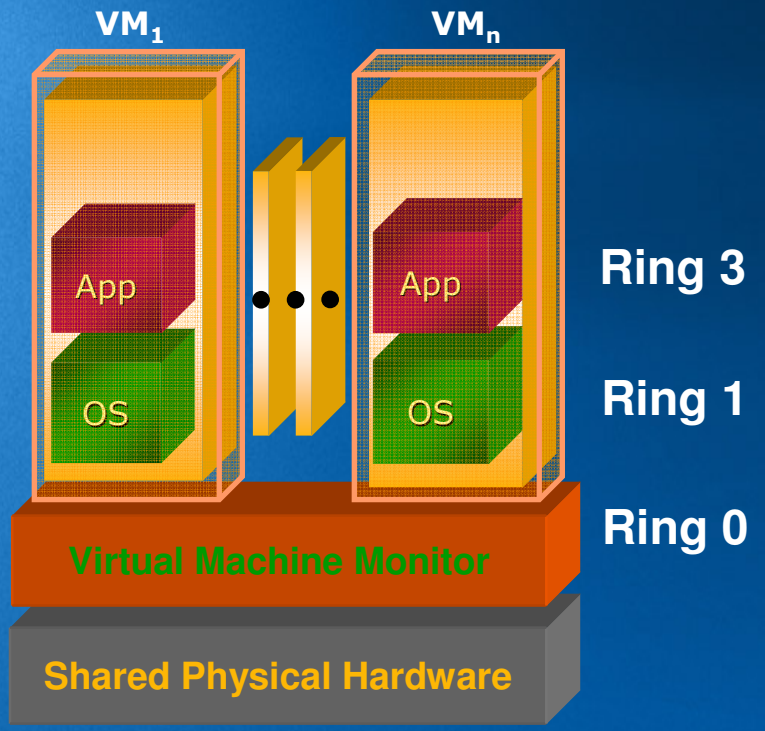
- Penryn supports 47 new instructions
  - Largest set of new instructions introduced since 2000
  - This continues a trend set by SSE, SSE2, SSE3, and SSSE3
- Addresses some popular requests for key functionality
  - Features to improve the compiler's ability to efficiently vectorize code
  - Video Encode acceleration functions
  - Floating-point dot product operation (3D content)
  - Streaming load for high b/w to WC memory (imaging, GPU-CPU sharing)

Virtualization

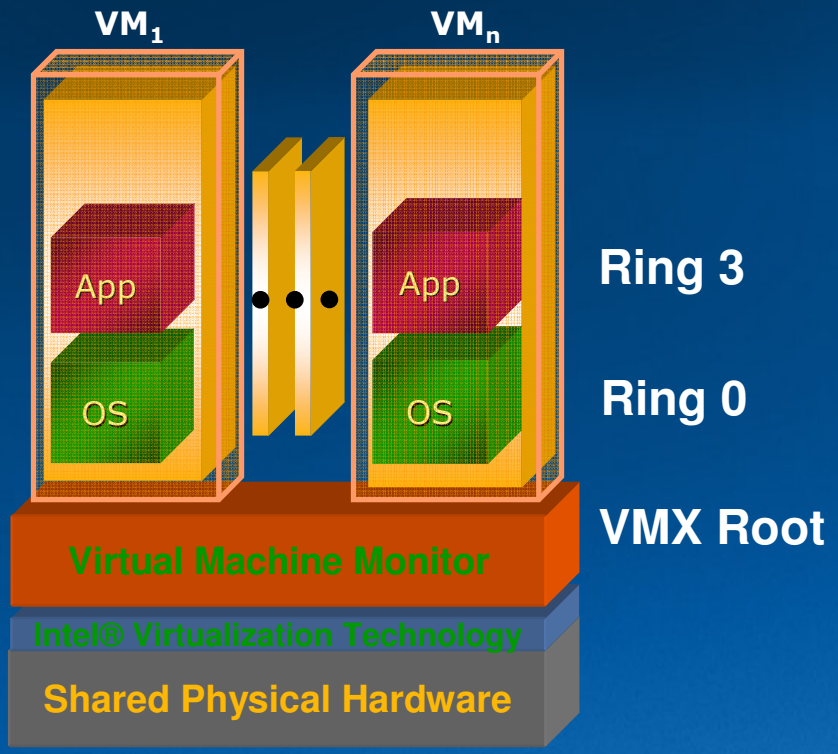
- **Realizing the promise of virtualization requires a multi-faceted approach**
  - **Hardware**
    - ✓ Intel architects processors, chipsets and communications components to support a complete virtualization solution
  - **Software**
    - ✓ Intel's SW Solutions Group aligns with key VMM & manageability vendors for optimized solutions on IA
  - **The End User**
    - ✓ Understand the needs and constraints in IT virtualization
    - ✓ Ease transition from dedicated systems to service levels



Virtualization Solutions:
Pre and Post Intel® Virtualization Technology



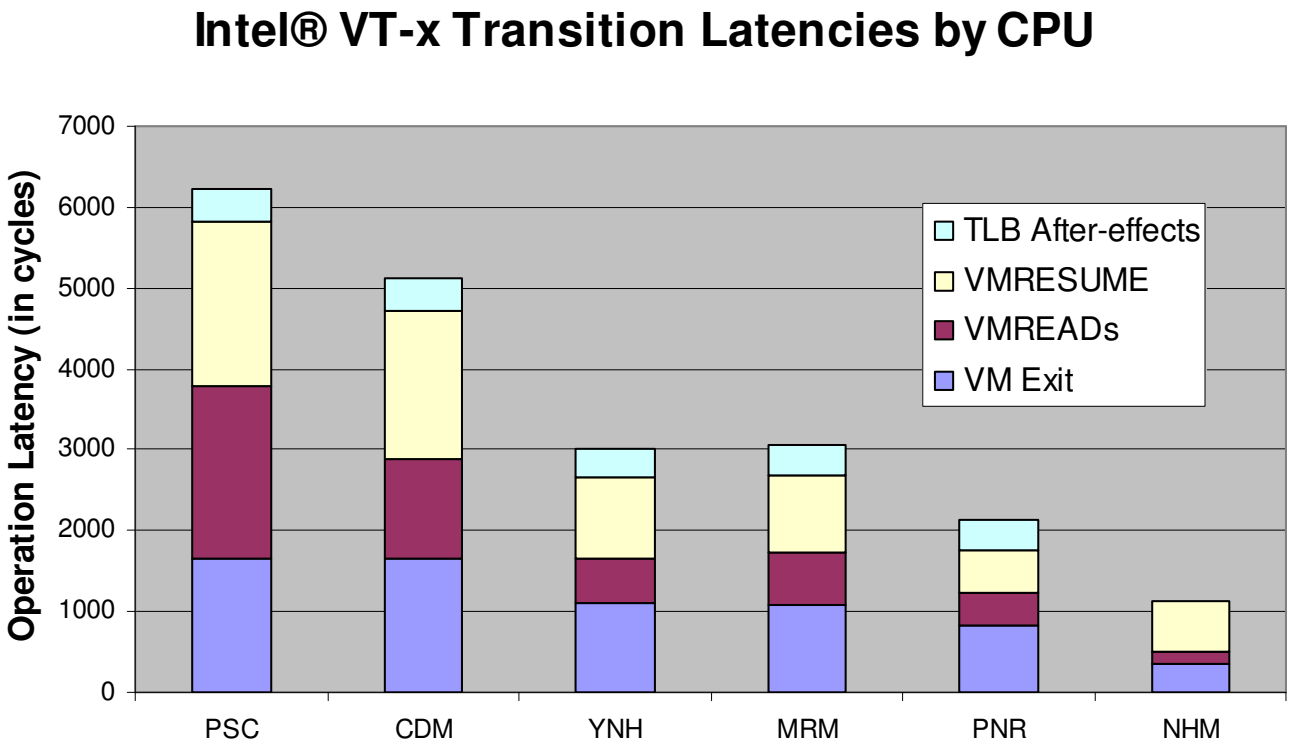
- VMM de-privileges the guest OS into Ring 1, and takes up Ring 0
- OS un-aware it is not running in traditional ring 0 privilege
- Requires complex SW



- VMM has its own privileged level where it executes
- No need to de-privilege the guest OS
- OSes run directly on the hardware
- Page Table Optimization

Intel® Virtualization Technology Simplifies VMM Operation

Latency Reductions by CPU Implementation

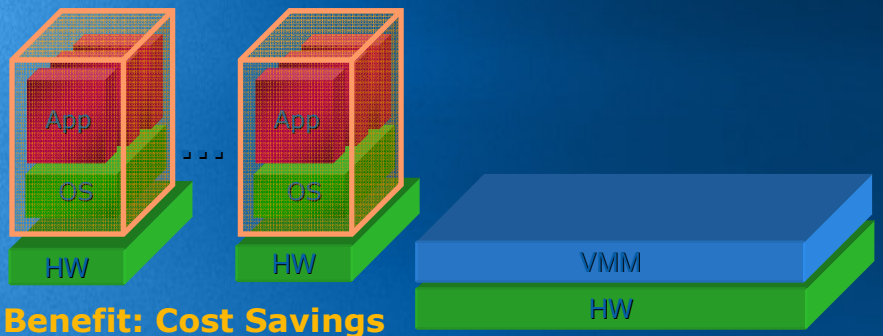


- **Further improvements planned for future implementations**
- **Rule of thumb: every 100-cycle reduction in event cost reduces virtualization overhead by ~0.5%-1.0%**

Server Virtualization Usages

Today

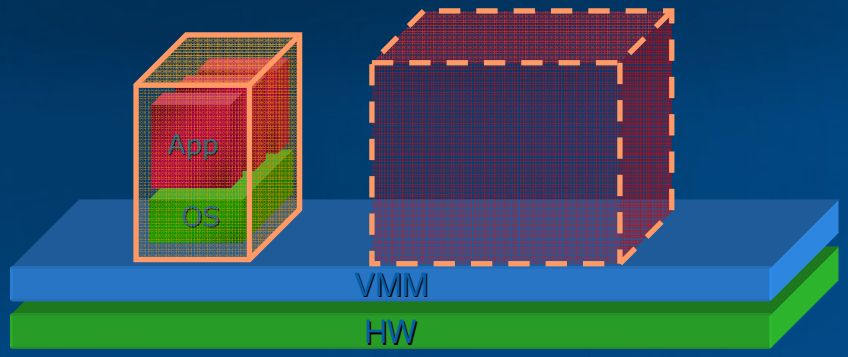
Server Consolidation



Benefit: Cost Savings

- **Power and Cooling**
- **Hardware, Software, Management**

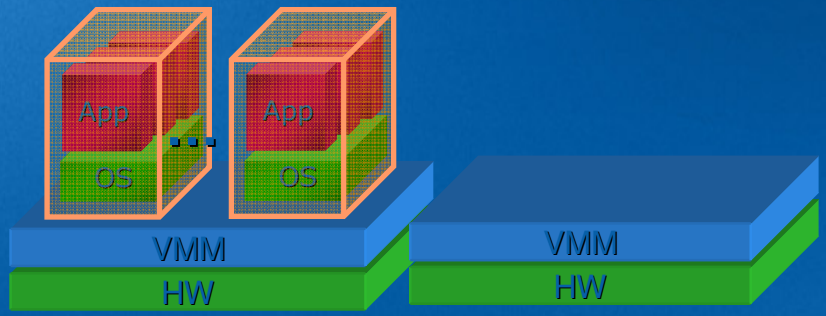
R&D Production



Benefit: Business Agility and Productivity

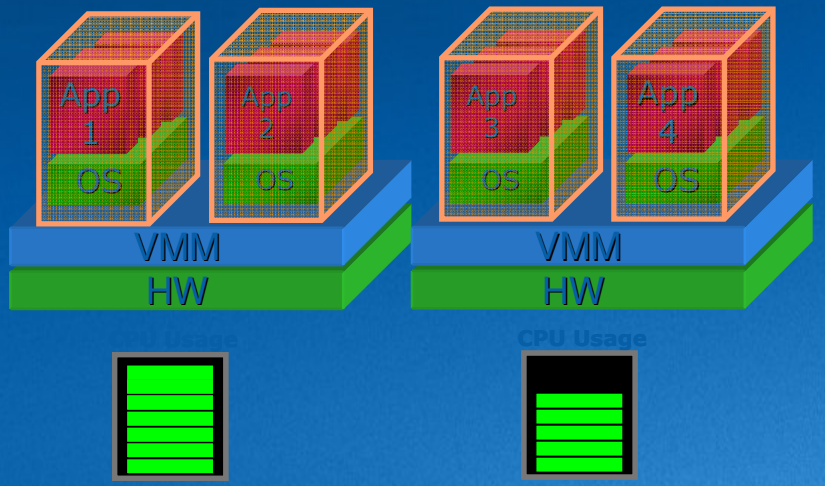
Emerging

Disaster Recovery



Benefit: Business Continuity and Operational Efficiency

Dynamic Load Balancing



Benefit: Productivity

Benefits: Costs, Agility, Productivity

intel

Intel® VT FlexMigration assist

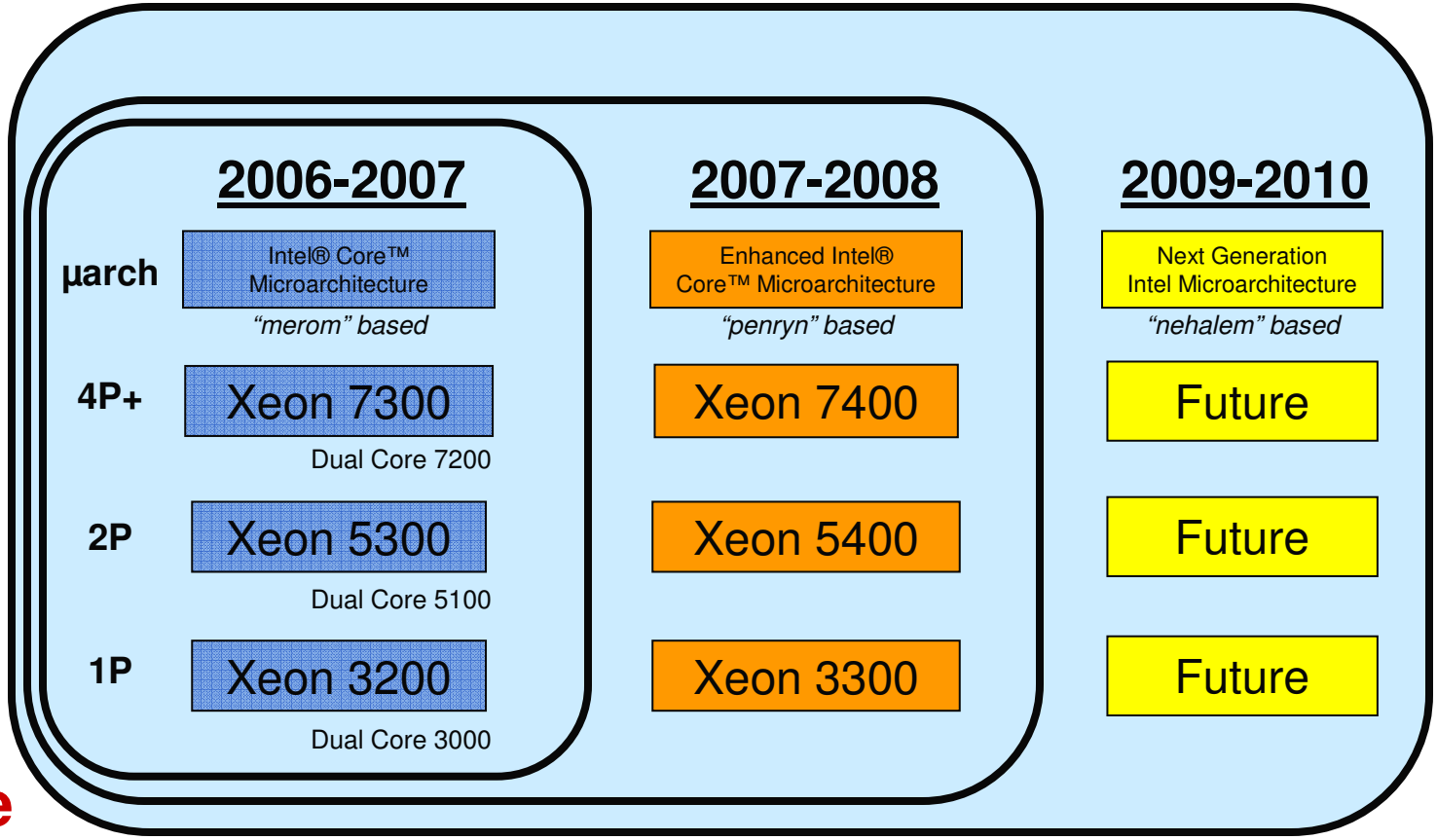
Increased VM Mobility with VMware

Fail-Over

Load Balance

Disaster Recovery

Server Maintenance



IT Investment Protection with Expanding Pools of Hardware Assisted Live VM Migration Compatibility

Maximize Virtualization Flexibility

Intel® VT FlexMigration assist and VMware*

*VMware® ESX 3.5 U2 takes advantage of Intel® VT FlexMigration assist for VMotion ™ & DRS**

Now You Can Build One Virtualization Pool across multiple generations of Intel® Xeon® processors running VMware*

Maximize IT Flexibility and Protect Your Investment today with Quad-Core Technology

- **Intel® and VMware are working together to enable VMotion ™ and DRS across multiple generations of Intel CPUs**
- **Delivered upon request from IT customers and in close collaboration with VMware**
- **IT can maximize flexibility and protect today's server investment**
- **Standardize with Quad-Core Intel® Xeon® Processors and VMware ESX Server based solutions for your virtualized server environment**

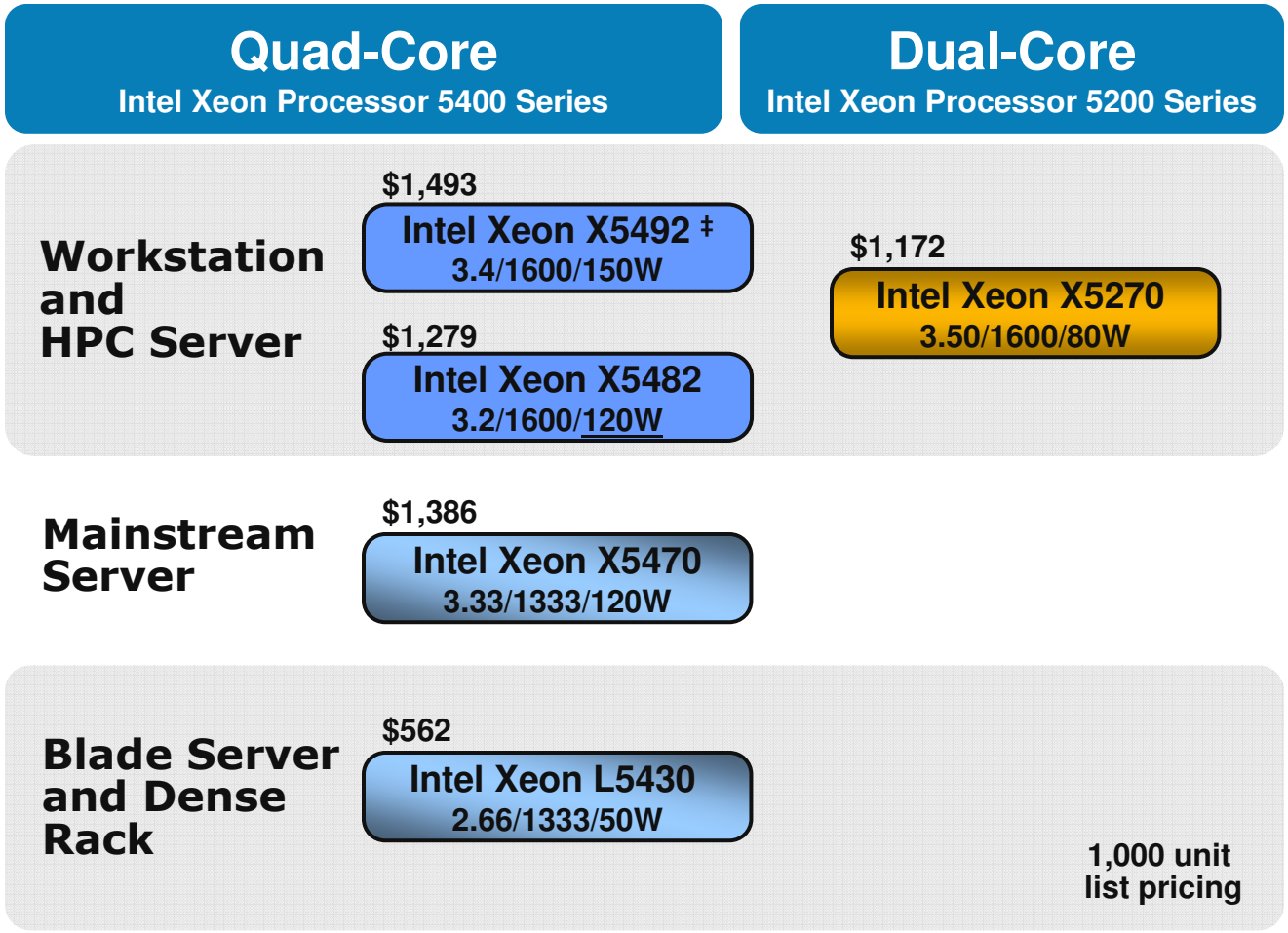
DEMO


intel
Leap ahead™
Live Migration of VMs with VMware®
Enhanced VMotion™ Compatibility
using Intel® VT FlexMigration

Intel® Xeon® Processor 5400/5200 Series

September 2008 Update

- **Four new 45nm processors for existing platforms**†
  - Plus one processor spec change (X5482 lowered to 120W)
- **Eco-Friendly products**
  - Now halogen free, in addition to being lead free
- **Industry leading two-socket performance**



† X5492, X5482, X5470 and L5430 are immediate availability (Sept 8). X5270 expected availability Oct 2008.
‡ 150W X5492 is specifically designed for Workstation applications only

Data Source: Intel. September, 2008. All data, timeframes, products, and dates are subject to change without further notification.

Questions ?

- Thank you for your time


intel®
Leap ahead™

Backup

Quad-Core Intel® Xeon® Processor 5400 series based platforms

Sku Comparison on Integer Throughput Performance on Intel Xeon Processor

Hardware Vendor	System	# Chips	# Cores / Chip	Processor	Memory	Result	Baseline	Published	Disclosure
IBM Corporation	IBM BladeCenter HS21 XM (Intel Xeon E5405)	2	4	Intel Xeon E5405	16 GB (8 x 2 GB DDR2-5300F ECC)	--	86.1	Feb-2008	HTML CSV PDF PS Text Config
Supermicro	Supermicro X7DB8+ (Intel Xeon processor E5405, 2.00 GHz)	2	4	Intel Xeon E5405	16 GB (8 * 2GB DDR2 5300F, 2 rank, CL5-5-5, ECC)	104	86.0	Dec-2007	HTML CSV PDF PS Text Config
Supermicro	Supermicro X7DB8+ (Intel Xeon processor E5410, 2.33 GHz)	2	4	Intel Xeon E5410	16 GB (8 * 2GB DDR2 5300F, 2 rank, CL5-5-5, ECC)	115	94.4	Dec-2007	HTML CSV PDF PS Text Config
Fujitsu Siemens Computers	PRIMERGY TX300 S4, Intel Xeon L5410, 2.33 GHz	2	4	Intel Xeon L5410	16 GB (8x2 GB PC2-5300F, 2 rank, CAS 5-5-5, with ECC)	114	93.3	Mar-2008	HTML CSV PDF PS Text Config
Supermicro	Motherborad X7DB8+	2	4	Intel Xeon E5420	16 GB (8 * 2 GB PC2-5300 FBDIMM, CL-5-5-5, ECC)	120	98.9	Nov-2007	HTML CSV PDF PS Text Config
Fujitsu Siemens Computers	PRIMERGY RX200 S4, Intel Xeon L5420, 2.50 GHz	2	4	Intel Xeon L5420	16 GB (8x2 GB PC2-5300F, 2 rank, CAS 5-5-5, with ECC)	--	98.0	Mar-2008	HTML CSV PDF PS Text Config
Fujitsu Siemens Computers	PRIMERGY TX300 S4, Intel Xeon L5420, 2.50 GHz	2	4	Intel Xeon L5420	16 GB (8x2 GB PC2-5300F, 2 rank, CAS 5-5-5, with ECC)	119	97.4	Feb-2008	HTML CSV PDF PS Text Config
Dell Inc.	PowerEdge M600 (Intel Xeon E5430, 2.66 GHz)	2	4	Intel Xeon E5430	16 GB (4x4 GB 667 MHz ECC CL5 FB-DIMM)	129	104	Mar-2008	HTML CSV PDF PS Text Config
Supermicro	Supermicro X7DB8+ (Intel Xeon processor E5430, 2.66 GHz)	2	4	Intel Xeon E5430	16 GB (8 * 2GB DDR2 5300F, 2 rank, CL5-5-5, ECC)	125	102	Dec-2007	HTML CSV PDF PS Text Config
Dell Inc.	PowerEdge 1950 III (Intel Xeon E5440, 2.83 GHz)	2	4	Intel Xeon E5440	16 GB (8x2 GB 667 MHz ECC CL5 FB-DIMM)	121	107	Nov-2007	HTML CSV PDF PS Text Config
SGI	SGI Altix ICE 8200 (Intel Xeon E5440, 2.83 GHz)	2	4	Intel Xeon E5440	16 GB (8*2GB PC2-5300 FB-DIMMs)	130	106	Feb-2008	HTML CSV PDF PS Text Config
SGI	SGI Altix XE 250 (Intel Xeon E5472, 3.00 GHz)	2	4	Intel Xeon E5472	16 GB (8*2GB PC2-6400 CL5-5-5 FB-DIMMs)	143	119	Jan-2008	HTML CSV PDF PS Text Config
Dell Inc.	PowerEdge 2950 III (Intel Xeon X5450, 3.00 GHz)	2	4	Intel Xeon X5450	16 GB (8x2 GB 667 MHz ECC CL5 FB-DIMM)	125	111	Nov-2007	HTML CSV PDF PS Text Config
Supermicro	Supermicro X7DB8+ (Intel Xeon processor E5450, 3.00 GHz)	2	4	Intel Xeon E5450	16 GB (8 * 2GB DDR2 5300F, 2 rank, CL5-5-5, ECC)	134	109	Dec-2007	HTML CSV PDF PS Text Config
Hewlett-Packard Company	ProLiant BL480c (3.16 GHz, Intel Xeon X5460)	2	4	Intel Xeon X5460	16 GB (8x2 GB PC2-5300F CL5)	--	114	Feb-2008	HTML CSV PDF PS Text Config
Hewlett-Packard Company	ProLiant BL480c (3.16 GHz, Intel Xeon X5460)	2	4	Intel Xeon X5460	16 GB (8x2 GB PC2-5300F CL5)	138	112	Feb-2008	HTML CSV PDF PS Text Config
Supermicro	Motherboard X7DWA-N	2	4	Intel Xeon X5482	16 GB (8 * 2 GB PC2-6400 FBDIMM, CL-5-5-5, ECC)	147	121	Dec-2007	HTML CSV PDF PS Text Config
Hewlett-Packard Company	ProLiant DL380 G5 (1.6 GHz, Intel Xeon processor 5110)	2	2	Intel Xeon 5110	8 GB (8x1 GB PC2-5300F CL5)	43.2	37.8	Oct-2007	HTML CSV PDF PS Text Config
Hewlett-Packard Company	ProLiant DL380 G5 (1.86 GHz, Intel Xeon processor 5120)	2	2	Intel Xeon 5120	8 GB (8x1 GB PC2-5300F CL5)	47.7	41.8	Oct-2007	HTML CSV PDF PS Text Config
Dell Inc.	PowerEdge 2950 (Intel Xeon 5130, 2.00 GHz)	2	2	Intel Xeon 5130	16 GB (8x2 GB 667 MHz ECC CL5 FB-DIMM)	53.1	46.7	Nov-2007	HTML CSV PDF PS Text Config
Hewlett-Packard Company	ProLiant DL380 G5 (2.33 GHz, Intel Xeon processor 5140)	2	2	Intel Xeon 5140	8 GB (8x1 GB PC2-5300F CL5)	58.5	51.3	Oct-2007	HTML CSV PDF PS Text Config
Dell Inc.	PowerEdge 2950 III (Intel Xeon 5148 LV, 2.33 GHz)	2	2	Intel Xeon 5148 LV	8 GB (8x1 GB 667 MHz ECC CL5 FB-DIMM)	58.6	51.1	Mar-2008	HTML CSV PDF PS Text Config
Dell Inc.	PowerEdge 2950 (Intel Xeon 5150, 2.66 GHz)	2	2	Intel Xeon 5150	16 GB (8x2 GB 667 MHz ECC CL5 FB-DIMM)	64.3	56.2	Nov-2007	HTML CSV PDF PS Text Config
Dell Inc.	PowerEdge 2950 (Intel Xeon 5160, 3.00 GHz)	2	2	Intel Xeon 5160	8 GB (8x1 GB 667 MHz ECC DDR2 FB-DIMM)	68.9	60.5	Nov-2007	HTML CSV PDF PS Text Config
Fujitsu Siemens Computers	PRIMERGY TX300 S4, Intel Xeon E5205, 1.86 GHz	2	2	Intel Xeon E5205	16 GB (8x2 GB PC2-5300F, 2 rank, CAS 5-5-5, with ECC)	52.6	45.0	Feb-2008	HTML CSV PDF PS Text Config
Fujitsu Siemens Computers	PRIMERGY RX300 S4, Intel Xeon processor E5205, 1.86 GHz	2	2	Intel Xeon E5205	16 GB (8x2 GB PC2-5300F, 2 rank, CAS 5-5-5, with ECC)	52.6	45.0	Dec-2007	HTML CSV PDF PS Text Config
Dell Inc.	PowerEdge 2950 III (Intel Xeon X5260, 3.33 GHz)	2	2	Intel Xeon X5260	16 GB (8x2 GB DDR2-667 ECC CL5 FB-DIMM)	82.5	70.3	Feb-2008	HTML CSV PDF PS Text Config
Fujitsu Siemens Computers	PRIMERGY TX300 S4, Intel Xeon L5310, 1.60 GHz	2	4	Intel Xeon L5310	16 GB (8x2 GB PC2-5300F, 2 rank, CAS 5-5-5, with ECC)	73.5	64.0	Mar-2008	HTML CSV PDF PS Text Config
Supermicro	Supermicro X7DB8+ (Intel Xeon processor E5310, 1.60 GHz)	2	4	Intel Xeon E5310	16 GB (16*1GB Micron DDR2 4200F CL4-4-4, ECC)	73.6	62.3	Sep-2007	HTML CSV PDF PS Text Config
Dell Inc.	PowerEdge 1950 (Intel Xeon E5310, 1.60 GHz)	2	4	Intel Xeon E5310	8 GB (8x1 GB 667 Mhz ECC CL5 FB-DIMM)	71.7	63.4	Oct-2007	HTML CSV PDF PS Text Config
Supermicro	Motherboard X7DB3	2	4	Intel Xeon E5320	16 GB (8 * 2 GB DDR2 5300, CL-5-5-5, ECC)	80.2	67.8	Nov-2007	HTML CSV PDF PS Text Config
IBM Corporation	IBM System x 3550 (Intel Xeon E5320)	2	4	Intel Xeon E5320	16 GB (8 x 2 GB DDR2-5300F ECC)	78.1	68.6	Mar-2008	HTML CSV PDF PS Text Config
Dell Inc.	PowerEdge 1950 (Intel Xeon E5335, 2.00 GHz)	2	4	Intel Xeon E5335	16 GB (8x2 GB 667 MHz ECC CL5 FB-DIMM)	89.6	79.4	Oct-2007	HTML CSV PDF PS Text Config
Fujitsu Siemens Computers	PRIMERGY BX620 S4, Intel Xeon processor L5335, 2.0 GHz	2	4	Intel Xeon L5335	16 GB (8x2 GB PC2-5300F, 2 rank, CAS 5-5-5, with ECC)	91.1	78.9	Jan-2008	HTML CSV PDF PS Text Config
Supermicro	Supermicro X7DB8+ (Intel Xeon processor E5335, 2.00 GHz)	2	4	Intel Xeon E5335	16 GB (8 * 2GB Samsung DDR2 5300F, 2 rank, CL5-5-5, ECC)	92.2	78.1	Sep-2007	HTML CSV PDF PS Text Config
Dell Inc.	PowerEdge 2950 (Intel Xeon E5345, 2.33 GHz)	2	4	Intel Xeon E5345	16 GB (8x2 GB 667 MHz ECC CL5 FB-DIMM)	98.0	86.5	Oct-2007	HTML CSV PDF PS Text Config
Dell Inc.	PowerEdge 1950 (Intel Xeon E5345, 2.33 GHz)	2	4	Intel Xeon E5345	16 GB (8x2 GB 667 MHz ECC CL5 FB-DIMM)	98.1	86.5	Oct-2007	HTML CSV PDF PS Text Config
Supermicro	Supermicro X7DB8+ (Intel Xeon processor E5345, 2.33 GHz)	2	4	Intel Xeon E5345	16 GB (8 * 2GB Samsung DDR2 5300F, 2 rank, CL5-5-5, ECC)	102	85.7	Sep-2007	HTML CSV PDF PS Text Config
Dell Inc.	PowerEdge 1950 (Intel Xeon X5355, 2.66 GHz)	2	4	Intel Xeon X5355	16 GB (8x2 GB 667 MHz ECC CL5 FB-DIMM)	105	93.3	Oct-2007	HTML CSV PDF PS Text Config
Supermicro	Supermicro X7DB8+ (Intel Xeon processor X5355, 2.66 GHz)	2	4	Intel Xeon X5355	16 GB (8 * 2GB Samsung DDR2 5300F, 2 rank, CL5-5-5, ECC)	109	91.6	Sep-2007	HTML CSV PDF PS Text Config
Dell Inc.	PowerEdge 2950 (Intel Xeon X5365, 3.00 GHz)	2	4	Intel Xeon X5365	16 GB (8x2 GB 667 MHz ECC CL5 FB-DIMM)	112	99.1	Oct-2007	HTML CSV PDF PS Text Config
Supermicro	Motherboard X7DB3	2	4	Intel Xeon X5365	32 GB (8 * 4 GB DDR2 5300, CL-5-5-5, ECC)	117	98.0	Nov-2007	HTML CSV PDF PS Text Config

All results use 64-Bit Suse Linux Enterprise Server 10 w/ SP1 for OS & SPEC binaries built with Intel C++ Compiler for Linux32 and Linux64, Version 10.1

- Single-Core Intel® Xeon® processor 3.80 based platform details: HP* ProLiant* DL380 G5 server platform with two 64-bit Intel Xeon Processor 3.80Ghz with 2M L2 Cache, 800 FSB, 8GB memory, Microsoft Windows Server 2003 Ent. SP1, Intel C++ Compiler 9.1 for 32-bit apps,, Build 20060323Z Package ID: W_CC_P_9.1.020. Referenced as published at 20.9 (SPECint*_rate_base2006). For more information see http://www.spec.org/cpu2006/results/res2006q3/cpu2006-20060513-00027.html