



Новые серверные платформы Intel

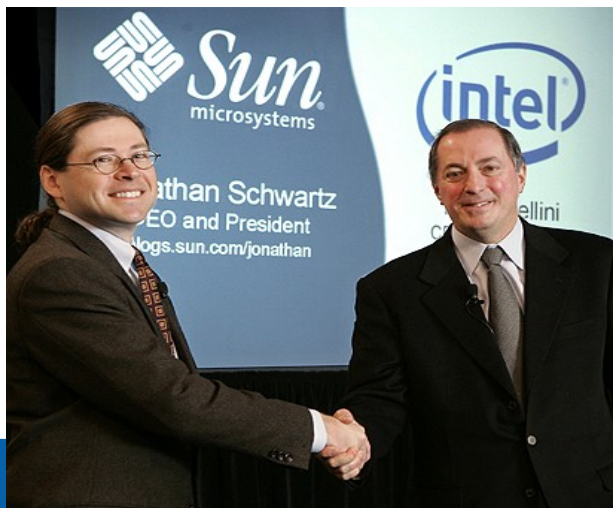
Александр Соркин

Директор по развитию бизнеса

Соглашение между Intel и Sun Microsystems



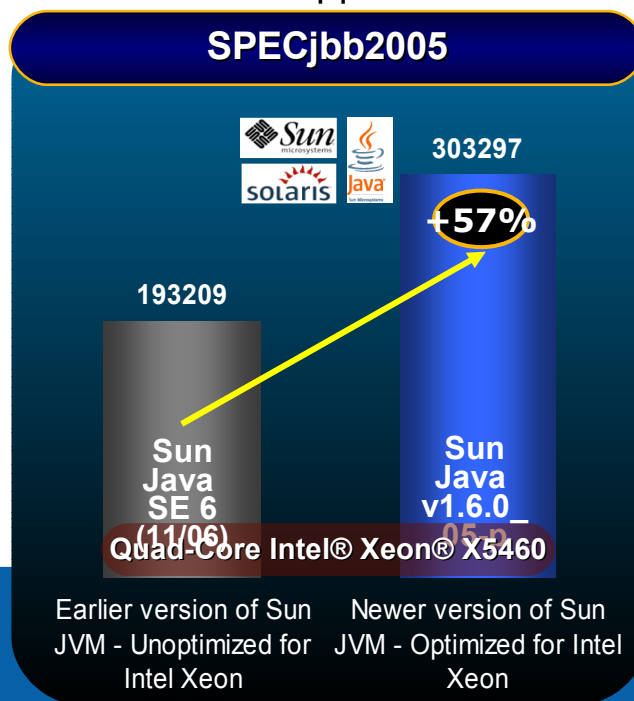
- Разработка полной линейки продукции на основе платформы Intel® Xeon® :
 - Блейд-серверы
 - Серверы, монтируемые в стойку
 - Серверы для телекоммуникационной отрасли
 - Рабочие станции
- Оптимизация ОС Solaris для платформы Intel® Xeon®



Intel



- Поддержка ОС Solaris как среды критически важного уровня
- Оказание поддержки Sun в оптимизации ОС Solaris для платформы Intel® Xeon®
- Совместная оптимизация Java Virtual Environment для IA-32 и Intel® 64



3 стратегии развития ЦОД



Серверы на базе процессоров Intel могут обеспечить рост плотности вычислений...

50x

Ускоренное обновление серверов **5X** Производительность

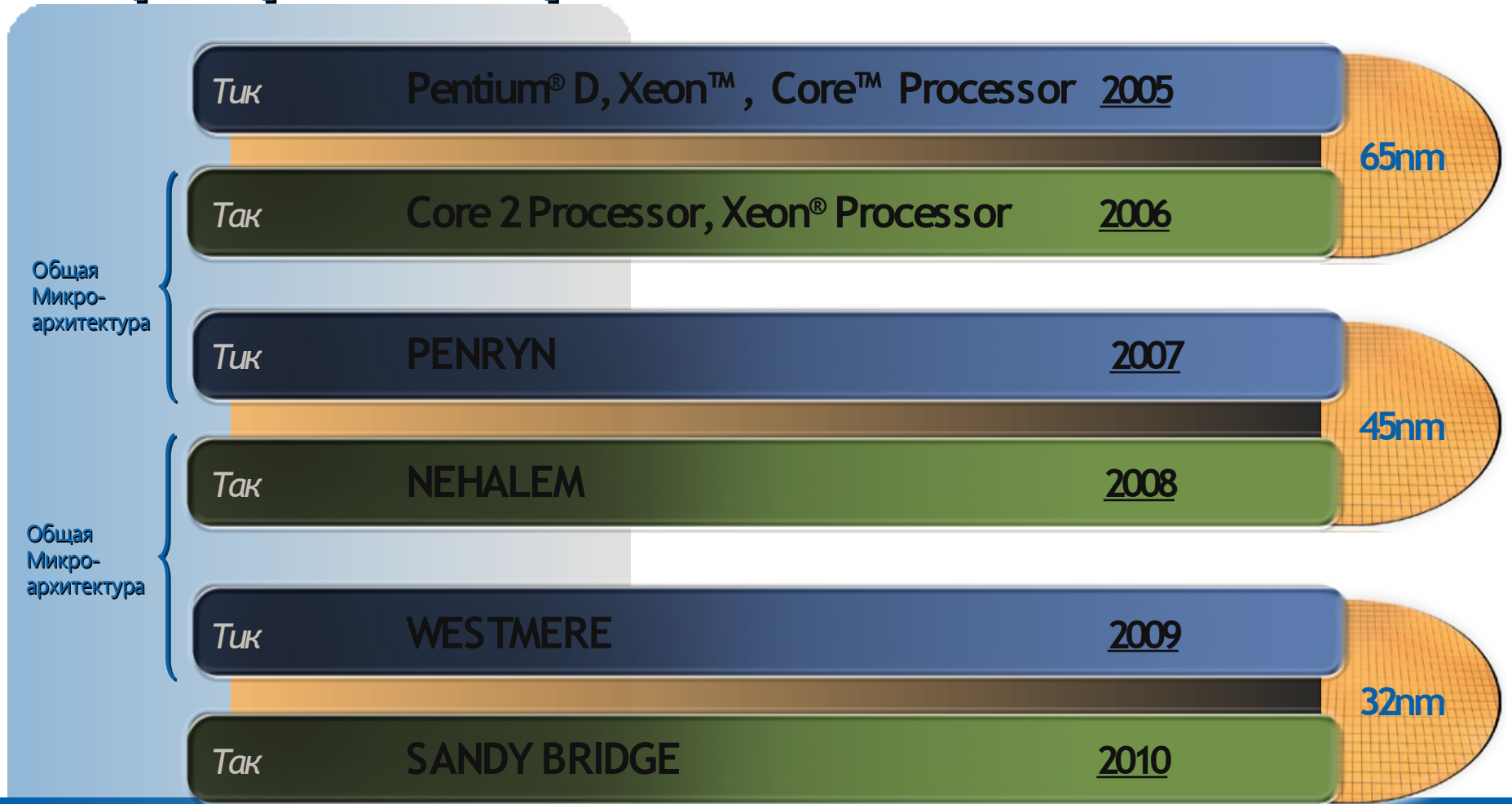
Виртуализация и консолидация **5X** Средняя загрузка

Системы высокой плотности **2X** Плотность компоновки

Results are dependent on applications, stack, and infrastructure age.



Двухтактная модель обеспечения лидерства в производстве микропроцессоров



All dates, product descriptions, availability and plans are forecasts and subject to change without notice.

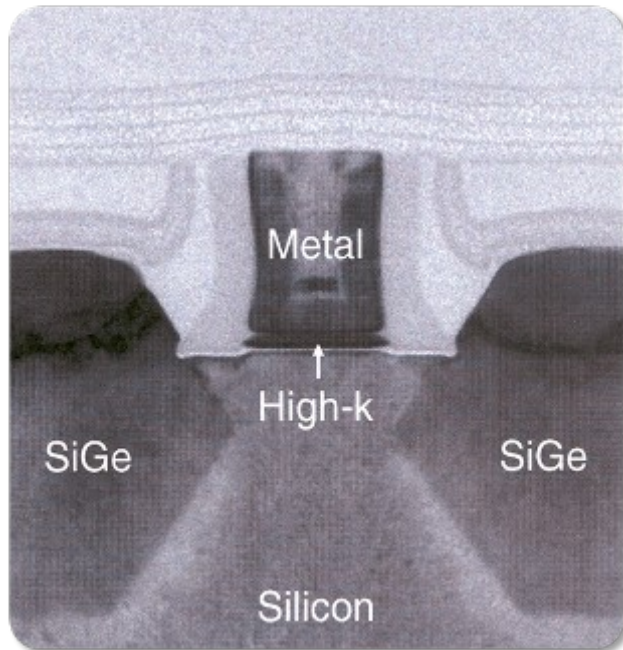


45nm High-K



"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."

—Gordon Moore, Intel Co-Founder



~2x Выше плотность транзисторов

>20% Больше скорость переключения транзисторов

~30% Меньше энергия переключения транзисторов

Source: Intel. Learn more about 45nm technology at <http://www.intel.com/technology/architecture-silicon/45nm-core2/?iid=search>



Решение проблемы:



Необходим рост вычислительных возможностей на тех же площадях и энергопотреблении



2004

- 1 стойка
- **0.85M bops**
- 21 сервер
- 40 Sq Ft
- 8 kW

SPECjbb2005 bops



2008

- 1 стойка
- **6.30M bops**
- 21 сервер
- 40 sq ft
- 7.5 kW

Using 45nm Quad-core Intel® Xeon® processor 5400

Новые платформы: прирост вычислительной мощности в 7 раз

Source: Intel January 16, 2008. Performance comparison using SPECjbb2005 bops (business operations per second) between (2004) 2 socket single core Intel® Xeon® processor (3.6GHz) and (2008) 2 socket Quad-core Intel® Xeon® processor E5450 (3.0GHz, 80W, 1333MHz) measured 8/22/07. 1 Floor space based foot on sq ft reduction. 2 Energy costs based on total solution rack power. 3 Energy Savings based on an electric rate of \$0.10/kWh assuming 33% average server load. 4 ROI is calculated based on cost of new servers (\$6,264 per server pricing based on HP DL 380G5 (32GB RAM) as of Nov 17, 2007, source: www.hp.com) divided by energy savings per year. Actual performance results and savings may vary depending on configuration. See backup for details.



С другой стороны...

Обеспечить 5М операций/сек

2004

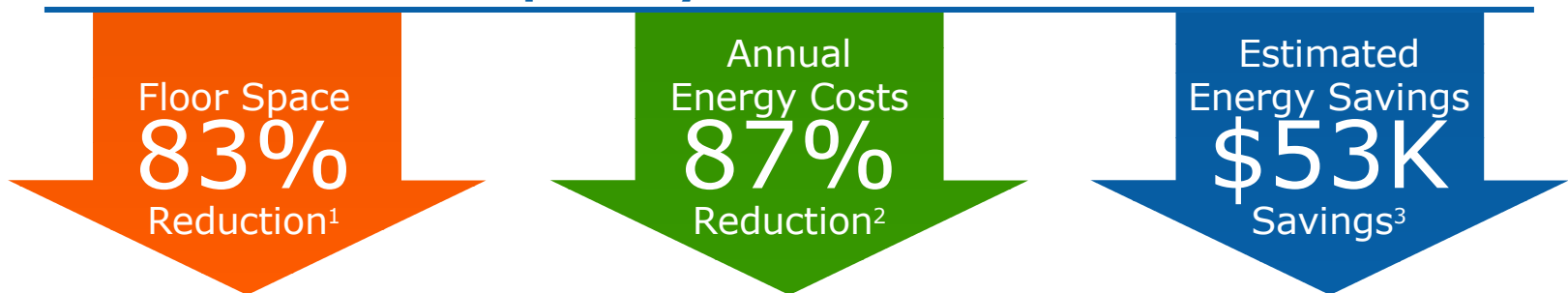
- 5.1M bops
- 6 стоек
- 126 серверов
- 240 sq ft
- 48 kW



2008

- 5.1M bops
- 1 стойка
- 17 серверов
- 40 sq ft
- 6 kW

Срок окупаемости 2 года



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Виртуализация: максимальное использование серверов

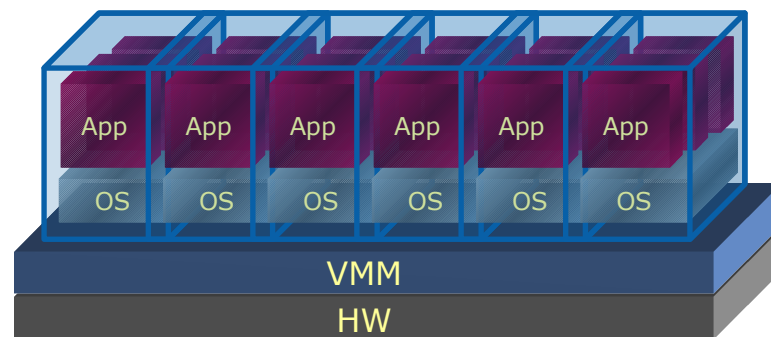
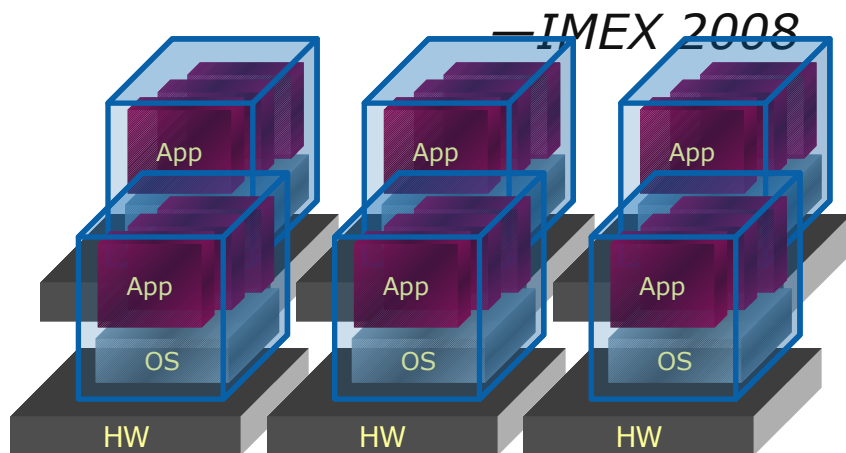


Сегодня **5-15%** Использование

82% установленных ресурсов (сервер, системы хранения, LAN) используются на **10%**

Завтра **30-60%**

- Рост загрузки
- Увеличение гибкости
- Балансировка нагрузки



Виртуализация может увеличить загрузку в 5 раз

Results are dependent on applications, stack, and infrastructure age.



Эволюция аппаратной поддержки виртуализации Intel®

Процессоры



Чипсеты



LAN



Программная
виртуализация

Прошлое

Упрощение VMMs
Intel® VT-x/VT-i

С 2005 года

Новые модели
использования
Intel® VT FlexMigration

Увеличение
производительности
Intel® VT-c
Intel® VT FlexPriority

Улучшенная
надежность
Intel® VT-d for Directed
I/O

2007 и далее

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Процессоры Intel® Xeon для серверов



рабочих станций 2008

Будущее

**Intel® Xeon® EX
7000**

Quad/Dual-core Xeon Processor
Intel® 7300 Chipset

Dunnington

Nehalem Processor
Future EX Chipset

**Intel® Xeon® EP
5000**

Quad/Dual-core Xeon Processor
Intel® 5000 Chipset

Nehalem Processor
Future EP Chipset

Quad/Dual-core Xeon Processor
Intel® 5100 Chipset

Nehalem Processor
Future EP Chipset

**Intel® Xeon® UP
3000**

Quad/Dual-core Xeon Processor
Intel® 3200 Chipset

Nehalem Processor
Future EN Chipset

**Intel® Xeon® WS
5000**

Quad/Dual-core Xeon Processor
Intel® 5400 Chipset

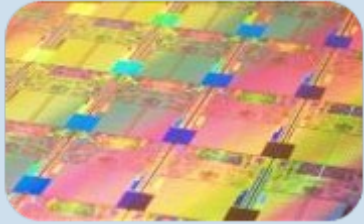
Nehalem Processor
Future WS Chipset

All dates, product features and plans are subject to change without notice.



Новые продукты Intel Xeon

Harpertown-LV



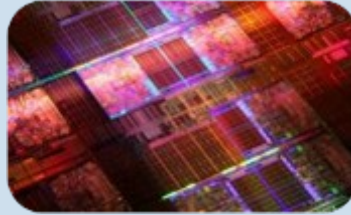
Low voltage version
of 45nm Intel®
Xeon® 5400 series

50W power
envelope

Ideal for dense and
power sensitive
environments

Available March'08

Dunnington



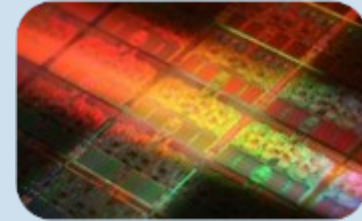
Intel® Xeon® 7300
socket compatible

6-core, built on
45nm Hi-k process

Intel® VT
FlexMigration

Available 2H'08

Nehalem



Integrated memory
controller

Simultaneous
multi-threading

Dynamic power
management

Production Q4'08

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Процессоры Intel® Xeon® 54xx

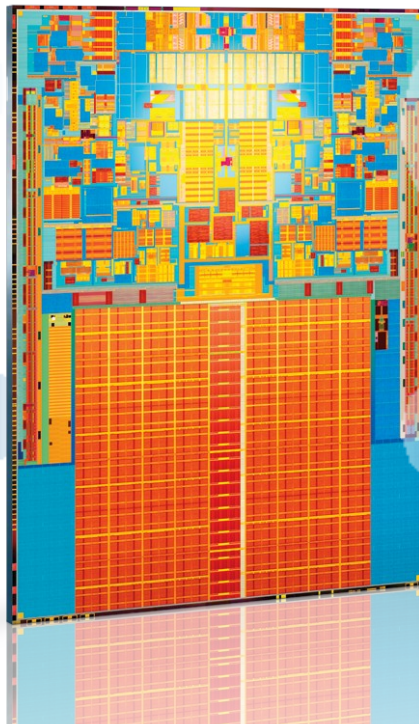


Технологии

**Улучшенная
микроархитектура
Intel Core**

Больше кэш

**Новые
инструкции
SSE4
Технологический
процесс
45 nm High-k**



Преимущества

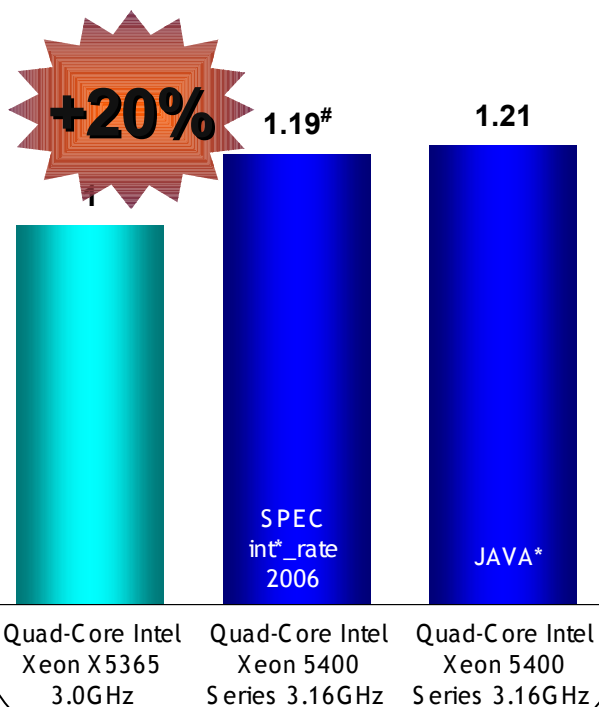
**Выше
производительность**

**Улучшенная
энергоэффективность**

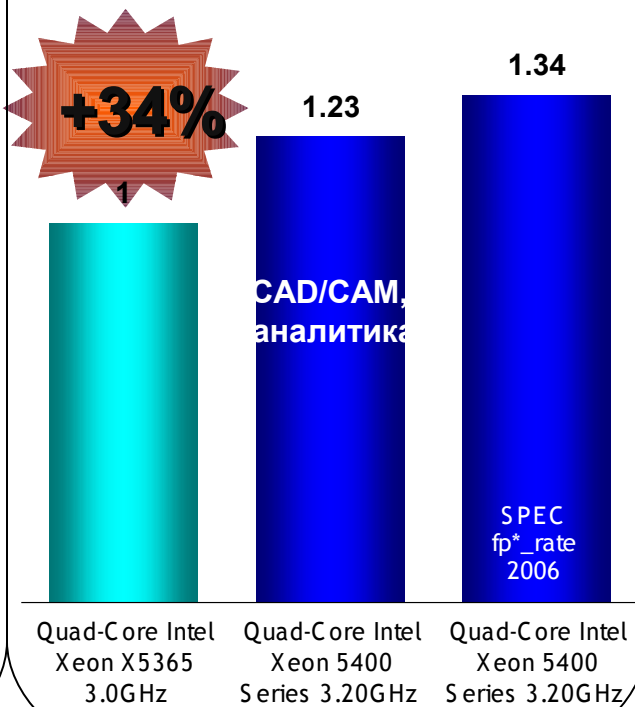
**Второе поколение 4-ядерных
процессоров**

Поднимаем планку производительности..

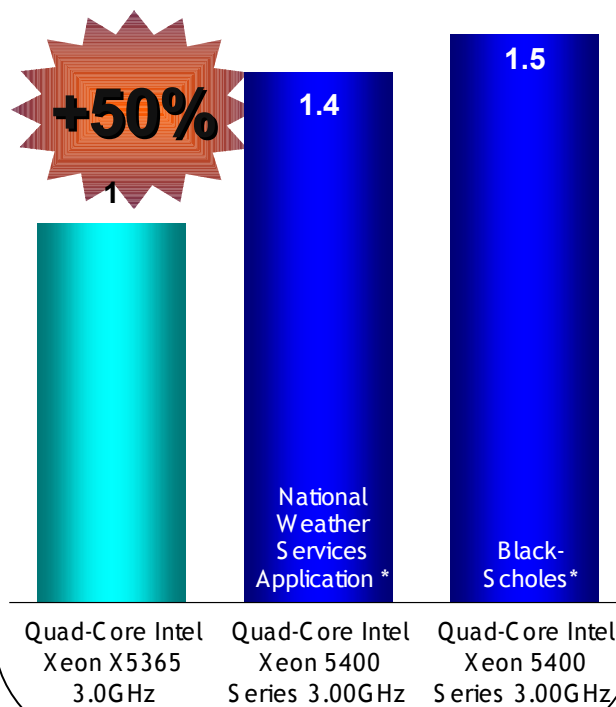
Базовые серверы



Рабочие станции



HPC



¹ Manufacturing Workflow: defined as concurrently running SPECapc* SolidWorks* 2005 and Fluent* 6.3.26 L1/L2, 5x concurrently

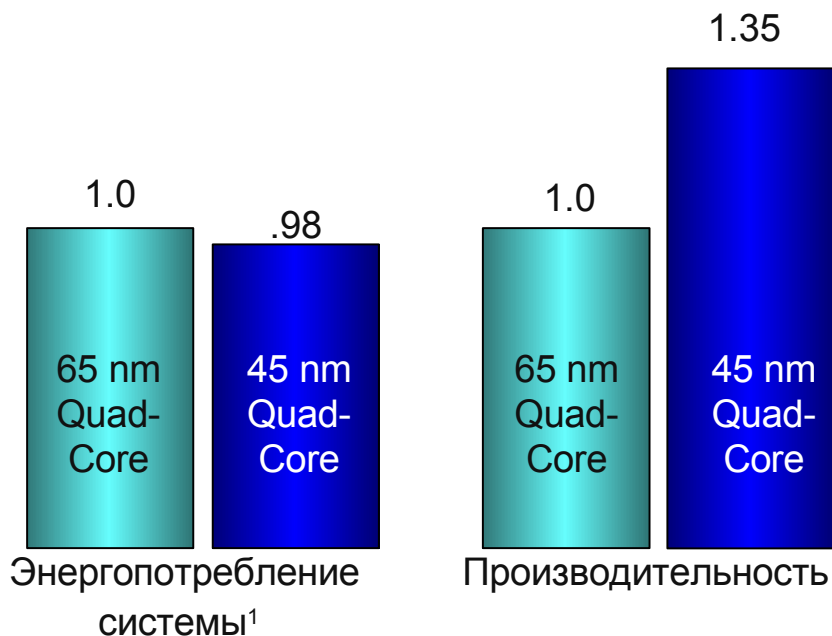
Source: Intel. Results on Quad-Core Intel Xeon 5400 series are Intel internal measured results, October 2, 2007. All other Quad-Core Intel Xeon results are based on measured/published results. Quad-Core Intel Xeon Processor X5365: www.spec.org, Current as of 9/17/2007. Details in backup.

Performance tests and ratings are measured using specific computer systems and/or components and reflect the approximate performance of Intel products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing. For more information on performance tests and on the performance of Intel products, visit Intel Performance Benchmark Libraries.

Лучше энергоэффективность..



**До 38% выше
производительность/
Вт**



**Преимущества
технологии 45nm
High-k/Metal Gate**

**На 2/3 ниже
мощность в
режиме покоя**

**Несколько уровней
энергопотребления
включая 50 Вт**

- Intel Xeon E5345 (2.33GHz/1333/80W)
- Intel Xeon E5450 (3.00GHz/1333/80W)

¹ Measured System Power in Watts during benchmark steady state. Data source: Published/Measured results as of Oct 2, 2007. See backup for details

² 50W 45nm Quad-Core Intel Xeon processor 5400 Series available Q1'08



Платформы на базе Intel® Xeon® 7300

Преимущества микроархитектуры Intel® Core™ и многоядерности в сегменте масштабируемых серверов



**Созданы для
виртуализации и
консолидации серверов**

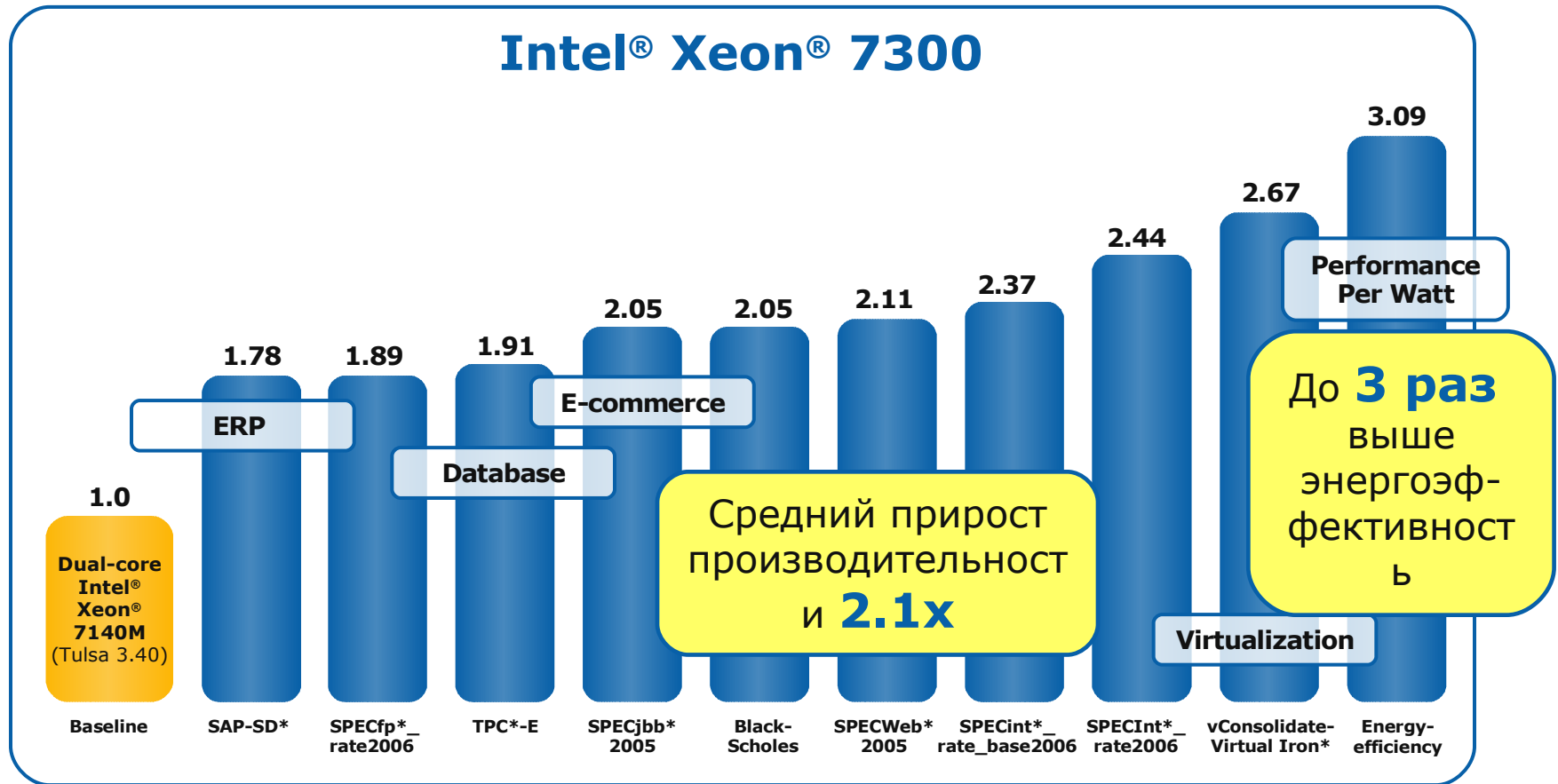


**Наращиваемая
производительность**



**Надежность класса
предприятия**

Рост производительности

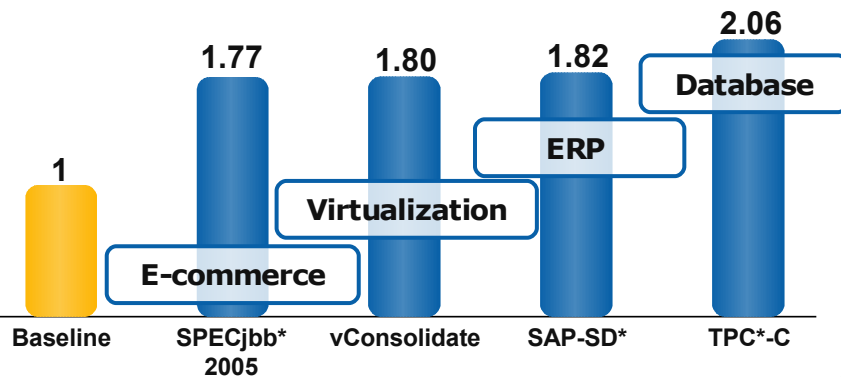


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Масштабируемость

Сравнение 2S и 4S

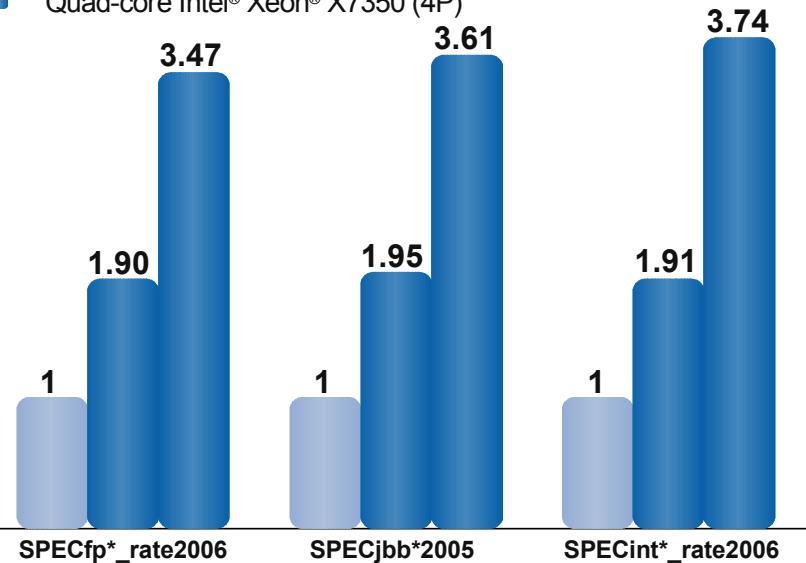
- 2 socket Quad-core Intel® Xeon® X5365 (2P)
- 4 socket Quad-core Intel® Xeon® X7350 (4P)



+75-100%

1, 2 или 4 CPU

- Quad-core Intel® Xeon® X7350 (1P)
- Quad-core Intel® Xeon® X7350 (2P)
- Quad-core Intel® Xeon® X7350 (4P)



Почти линейное масштабирование

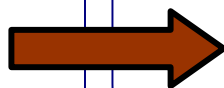
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Intel® Xeon® 7300

Возможности консолидации серверов



ЦОД с серверами 2001 г и ранее



Higher Performance¹
Better
Price/Performance¹
Significant Power Savings²
Improved Reliability²

Lower TCO²
Higher Utilization²
Smaller Footprint
Virtualization Capability



Новый ЦОД на базе серверов с Quad-Core Intel® Xeon® 7300

20-кратный рост за 6 лет

¹Data Source: Published/Measured results on SPECint_rate_base2000 benchmark as of Sept 05, 2007. See backup for details;

²Data Source: Study done at IT@Intel and posted at <http://www.intel.com/it/content.htm> Dec 2006

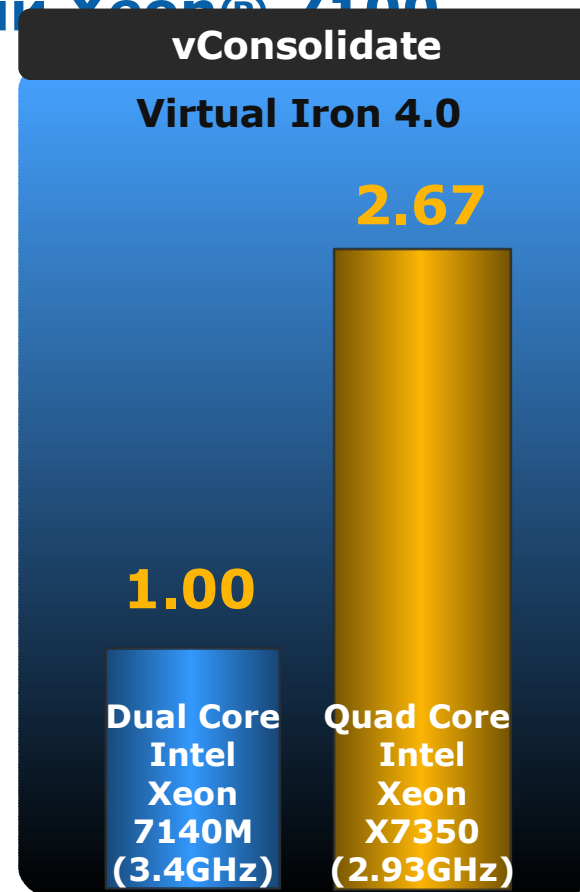
Performance tests and ratings are measured using specific computer systems and/or components and reflect the approximate performance of Intel products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing. For more information on performance tests and on the performance of Intel products, visit <http://www.intel.com/performance/resources/limits.htm> or call (U.S.) 1-800-628-8686 or 1-916-356-3104. Copyright © 2007, Intel Corporation. * Other names and brands may be claimed as the property of others.



Рост производительности при виртуализации

4-ядерный Xeon® 7300 vs. 2-ядерный Xeon® 7100

- Более 2.5X VM
- 4X увеличение памяти
- Запас на случай незапланированных нагрузок и больших VM
- Доказанная надежность



Идеальная платформа для виртуализации/консолидации

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Data Source: Intel Internal Measurements. August 2007. Details in backup

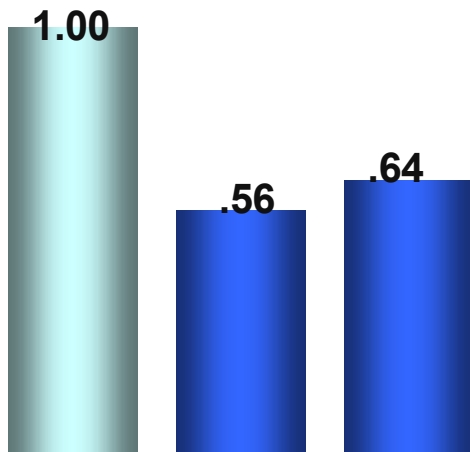


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Рост эффективности вычислений

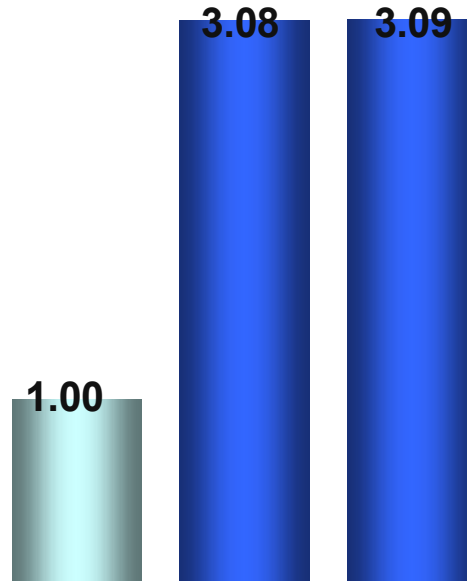
Lower System Power

Lower is better



Tremendous Perf/Watt

Higher is better



- 12.5 Вт/ядро
- Низкое энергопотребление и высокая плотность
- 3-кратный рост производительности/Вт

Note: All data based on SPECint*_rate_base2006 benchmark performance and power measurements

Для построения систем ультравысокой плотности



Надежность класса предприятия

Technology Feature	IT Benefit	Intel® Xeon® Platforms	Other x86 Platforms
Memory ECC	Data Integrity and Availability	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Enhanced Memory ECC	Data Integrity and Availability	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Memory Sparing	Data Availability	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Memory Mirroring	Data Availability	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> ¹
Memory CRC	Continued Operation Data Availability	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Symmetric Access to all CPU's	Server Continuity	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Proven

- Over 45 million servers deployed
- Billions of hours of real application run time
- Over 20 years experience

Protected

- More Built-in Reliability Features
- Fully-buffered DIMM memory

Надежная основа бизнеса

Features current as of November 2006, based on Intel Xeon 5000 Sequence based servers and competitive shipping platforms. Source Intel Corp.
 1 AMD announced Memory Mirroring support for their socket F design, but this support is only for single ranked memory, unlike Intel Xeon that supports both single and dual ranked DIMMs



Выводы

- Соглашение между Intel и Sun нацелено на удовлетворение потребностей пользователей в системах на основе многоядерных процессоров Intel® Xeon® под управлением ОС Solaris
- Ритмичный план выпуска новых процессоров Intel – залог уверенности корпоративных потребителей в доступности самых передовых серверных решений для их ИТ-задач