BRIEF

Intel® Xeon® Processors
and Intel®Solid-State Drives (SSDs)

Data Center Solutions

Innovative Schooner Appliances Deliver Breakthrough Performance for Data-Intensive Applications

Intel® technology-based Schooner appliances outperform traditional data access solutions by up to 800 percent and cut TCO by up to 62 percent.

SCHOONER
INFORMATION TECHNOLOGY

Schooner Information Technology develops state-of-the-art data access appliances that can dramatically boost performance and drive down costs for information-intensive Web 2.0 and cloud computing data centers.

High-volume Web and transactional applications are putting intense pressure on today's data centers. Explosive growth and unpredictable peak loads combine with high user expectations to place extreme demands on traditional server and storage systems. More compute capacity alone is not the answer. IT organizations also need to provide faster access to multi-terabyte data sets, and they need to provide it without costly infrastructure buildouts in already over-taxed data centers.

Today's multi-core Intel® Xeon® processors and Intel® Solid-State Drives (Intel® SSDs) offer a solution to this challenge by providing fundamental breakthroughs in performance, density, and energy-efficiency. Schooner is helping IT organizations take advantage of these technologies with ground-breaking data access appliances that deliver a half terabyte of data each—with up to eight times the performance of traditional server solutions. These plug-and-play appliances enable:

- Up to 8:1 consolidation of existing Memcached and MySQL Enterprise* servers;
- Factor of eight reductions in data center space, power, and cooling requirements;
- Up to 60 percent lower total cost of ownership (TCO);
- Complete compatibility with existing applications and management tools.

With these enterprise-class building blocks, you can easily meet escalating data access requirements, even as you reduce your total costs and ease the load on your data center.

Today's multi-core Intel Xeon processors complement the breakthrough performance of Intel SSDs by delivering one of the biggest leaps in processor performance and energy-efficiency in more than a decade.

Intel® Solid-State Drives—Answering the Data Access Challenge

Processor performance has improved about 175-fold over the last 12 years, while the performance of traditional hard drives has barely increased at all. As a result, hardware and software vendors have been increasingly challenged to compensate for data access latencies in data-intensive application environments. Intel SSDs offer a solution. They improve data access speeds by up to 100x versus traditional mechanical hard drives. A single Intel® Extreme SATA Solid-State Drive can replace up to 50 high-RPM disk drives, while reducing data access latencies from milliseconds to just 75 microseconds.

Unlike mechanical hard drives, Intel SSDs have no moving parts, so they eliminate the primary roadblock to higher performance and energy efficiency. They combine the latest generation native SATA interface with an advanced architecture employing 10 parallel NAND Flash channels that support up to 32 concurrent operations. They feature low write amplification and a unique wear-leveling design for high reliability. As a result, Intel SSDs not only shatter the performance capabilities of today's best hard drives, they also deliver more input/output operations per second and higher throughput performance than other SSDs on the market today, and they do so with exceptional reliability.

Intel® Xeon® Processor 5500 Series—Multiplying Compute Capacity

Today's multi-core Intel Xeon processors complement the breakthrough performance of Intel SSDs by delivering one of the biggest leaps in processor performance and energy-efficiency in more than a decade. The Intel® Xeon® processor 5500 series provides up to 2.25x the performance of previous generation processors[1] and up to 9x the performance per server of single-core processors[2], while reducing idle platform power consumption by up to 50 percent[3].

Combining Intel SSDs with these quad-core processors accelerates data delivery to the processing cores, which can dramatically improve utilization for data-intensive applications. As a result, an optimized server platform based on the Intel Xeon processor 5500 series and Intel SSDs can deliver game-changing improvements in server performance, density, and energy-efficiency.

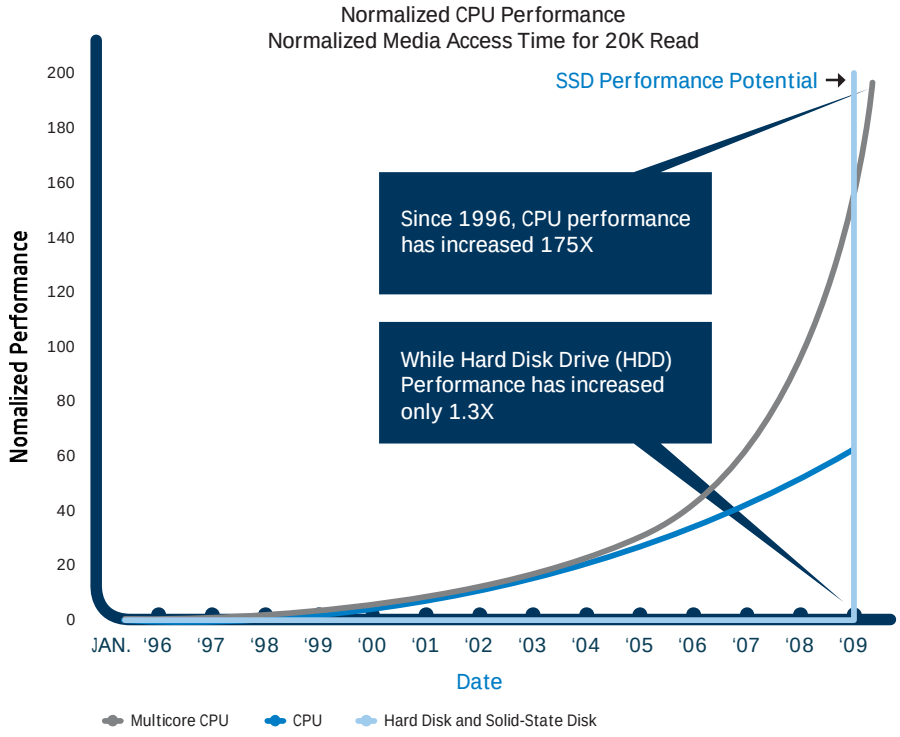

Figure 1. Intel® SSDs boost data access speeds by up to 100x versus traditional hard drives, enabling today's powerful multi-core Intel® Xeon® processors to perform at or near their full potential in data-intensive application environments.

Source: Intel measurements.

Schooner Appliances—Putting it All Together for the Data Center

Schooner has created an optimized, tightly coupled architecture that leverages the strengths of multi-core Intel Xeon processors and Intel SSDs. The company currently offers two appliances that can be used to meet today's most extreme memory access requirements.

- The Schooner Appliance for Memcached provides a distributed data caching solution to accelerate data access for high-volume Web 2.0 and cloud computing applications. (Memcached is already in wide use today. Some of today's busiest Web sites rely on thousands of Memcached servers to provide cutting edge application response times for their visitors.)
- Schooner Appliance for MySQL Enterprise provides a pre-integrated and highly optimized implementation of MySQL, the world's most popular open-source database.

These plug-and-play appliances offer order of magnitude improvements in performance and capacity compared with traditional servers. They are compatible with existing implementations of Memcached and MySQL Enterprise, and can be integrated into most environments without the lengthy integration projects required in traditional server deployments.

Schooner has optimized the hardware platform and the entire software stack to maximize the benefits of Intel Xeon processors and Intel SSDs. This includes extensive code optimization and tuning of the applications, operating system, and middleware to take full advantage of multiple cores, Intel® Hyper-Threading Technology and the highly parallel Intel SSDs. Schooner has also integrated Gigabit Ethernet and 10 Gigabit Ethernet interconnect technologies to enable very low latency communications with application and Web servers.

These highly resilient appliances are designed for business-critical application environments. Integrated persistence, replication, and recovery software deliver enterprise-class reliability; and an easy-to-use administration interface provides global, multi-appliance management from a single control panel. What's more, IBM provides world-wide 24/7/365 single-point-of-contact service and support.

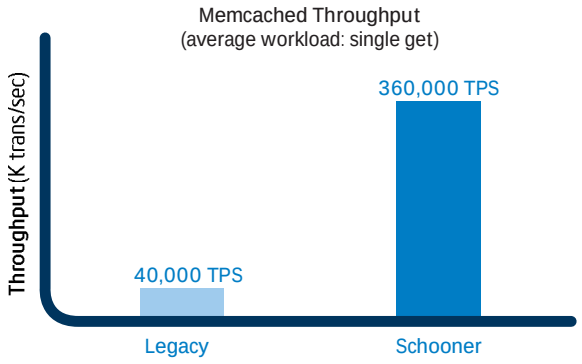

Figure 2. The Schooner Appliance for Memcached outperforms traditional servers by up to eight times to deliver faster access to terabyte-scale data.

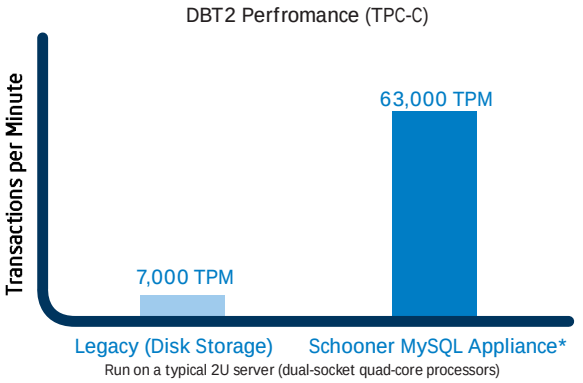

Figure 3. The Schooner Appliance for MySQL Enterprise provides 8x performance increases compared with legacy disks.

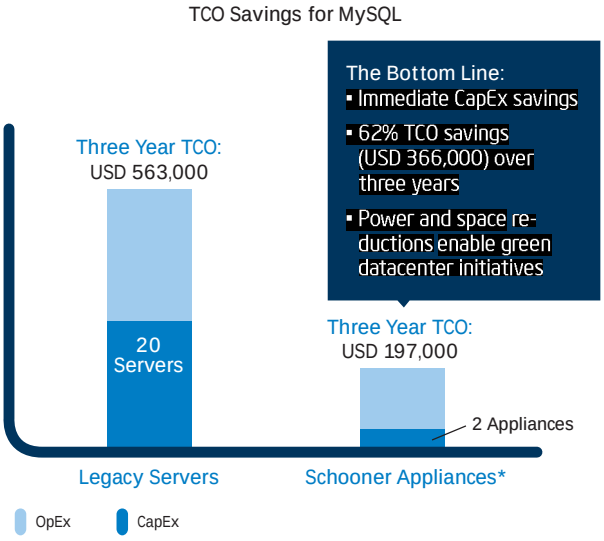

Figure 4. The Schooner Appliance for MySQL Enterprise delivers a 62% TCO savings over three years for a typical mid-sized 1TB Web 2.0 datacenter.

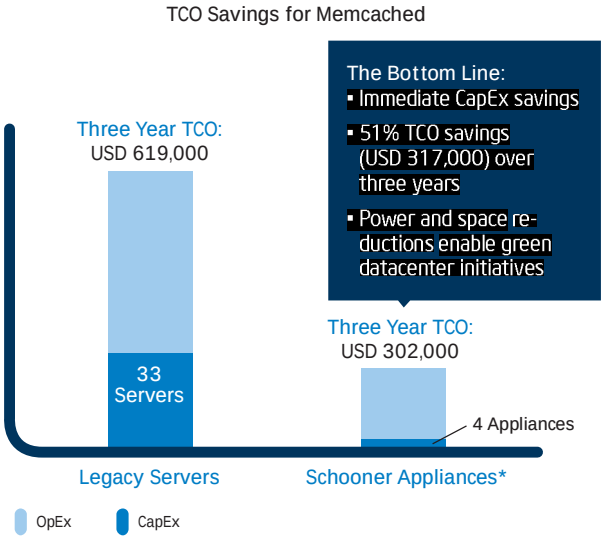

Figure 5. The Schooner Appliance for Memcached delivers a 51% TCO savings over three years for a typical mid-sized 1TB Web 2.0 datacenter.

Opening the Door to Cost-Effective Growth

Schooner appliances eliminate one of the key impediments to growth for data-intensive Web and transactional applications. They can be used to consolidate existing Memcached and MySQL environments or to deploy new, high-speed data access capacity at lower cost and with far less drain on data center resources. Since these data access solutions often directly impact the performance of highly visible, revenue-producing applications, they can free organizations to scale and improve some of their most critical business solutions. Their breakthrough performance can also enable new applications and usage models that simply are not possible using traditional data access technologies.

Multi-core Intel Xeon processors and Intel SSDs open the door to solutions for many other data-intensive applications, as well, in areas such as digital content creation, financial analysis, medical imaging, and high performance computing (HPC). They also provide superior support for server virtualization and consolidation, especially for consolidating high-volume, data-intensive applications.

The move toward a new generation of ultra-fast, dense, energy-efficient server solutions is well underway across all these scenarios and many others. Intel is leading the way by developing next-generation server and storage technologies, and by working with Schooner and other vendors to deliver high-value solutions that can help organizations solve some of their toughest challenges.

Learn more about Schooner Appliances, at:
www.schoonerinfotech.com

Learn more about Intel Solid-State Drives, at:
www.intel.com/design/flash/nand/index.htm

Learn more about Intel Xeon processors, at:
www.intel.com/p/en_US/products/server/processor

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[1]Up to 2.25x performance compared to Intel® Xeon® processor 5400 series is based on multiple performance results including an OLTP database benchmark and a bandwidth intensive scientific computing benchmark (SPECfp_rate_base2006*). Intel internal measurement. (Feb 2009). Configuration details: OLTP benchmark baseline platform—Intel preproduction server platform with two Intel® Xeon® processor X5460, 3.16 GHz, 2x6 MB L2 cache, 1333 MHz system bus, 64 GB memory (16x4 GB FB DDR2-667), Microsoft Windows Server 2008 Enterprise x64 Edition OS* Performance measured in transactions per second. OLTP new platform—Intel preproduction server platform with two Intel® Xeon® processor X5570, 2.93 GHz, 8 MB L3 cache, 6.4QPI, 72 GB memory (18x4 GB DDR3-800), Microsoft Windows Server 2008 Enterprise x64 Edition OS. Performance measured in transactions per second. SPECfp_rate_base2006 benchmark baseline platform—Intel preproduction server platform with two Intel® Xeon® processor X5482, 3.20 GHz, 2x6 MB L2 cache, 1600 MHz system bus, 16 GB memory (8x2 GB FB DDR2-800), SUSE Linux Enterprise Server 10 SP2 OS* Intel C++ Compiler for Linux32* and Linux64* version 11.0. SPECfp_rate_base2006 benchmark new platform—Intel preproduction server platform with two Intel® Xeon® processor X5570, 2.93 GHz, 8 MB L3 cache, 6.4QPI, 24 GB memory (6x4 GB DDR3-1333), SUSE Linux Enterprise Server 10 SP2 OS. Intel C++ Compiler for Linux32 and Linux64 version 11.0.

[2]Up to 9x performance per server based on Intel performance comparison using SPECjbb2005* business operations per second between four-year-old single-core Intel® Xeon® processor 3.8 GHz with 2M cache based servers and one new Intel Xeon processor X5570 based server. 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, visit www.intel.com/performance/server.

[3]Up to 50% lower platform idle power based on Intel internal measurement (Feb 2009). Configuration details: Intel internal measurements of 221W at idle with Supermicro 2xE5450 (3.0 GHz 80W) processors, 8x2GB 667 MHz FBDIMMs, 1x700W PSU, 1x320 GB SATA hard drive vs. 111W at idle with Supermicro software development platform with 2xE5540 (2.53 GHz Nehalem 80W) processors, 6x2 GB DDR3-1066 RDIMMs, 1x800W PSU, 1x150 GB 10k SATA hard drive. Both systems were running Windows 2008* with USB suspend select enabled and maximum power savings mode for PCIe* link state power management.

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