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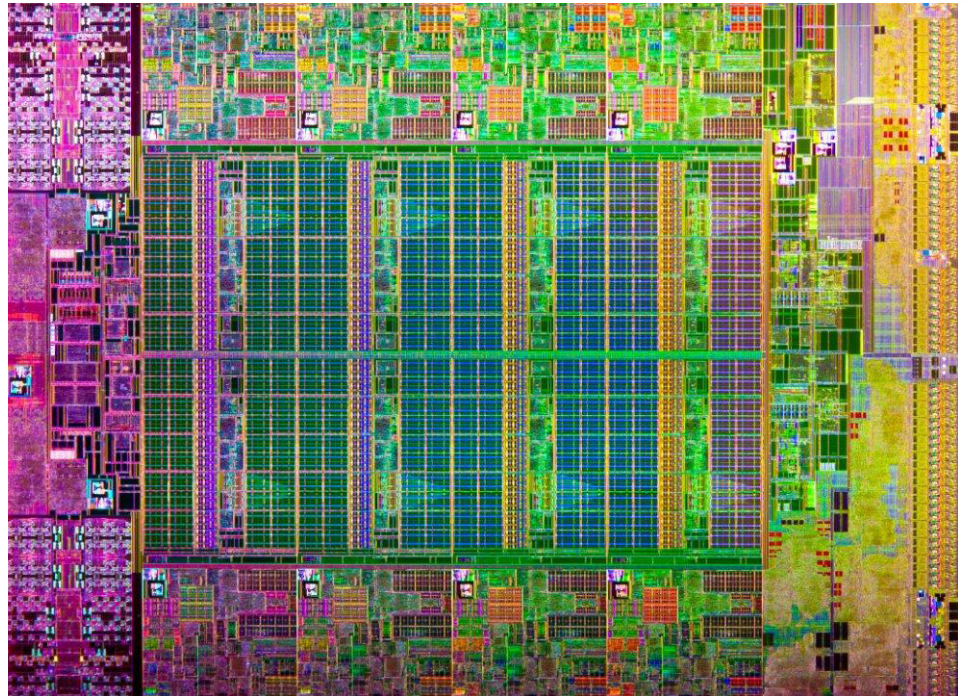
DELL (intel®)

ServerWatch™
Executive Brief

Doing more with less is the mantra that sums up much of the past decade, especially in IT, where the economy delayed infrastructure upgrades and forced many organizations to cut staffing levels. The demands on IT did not decrease, however, which means many businesses are faced with aging infrastructures to support their mission-critical applications.

More users, more devices and more data are a recipe for disaster for an organization with a tight budget. Businesses that are looking to upgrade their server infrastructure need to get the most bang for their buck, with servers that support other cost-saving opportunities like virtualization and the chance to decrease power and cooling costs.

The newest generation of servers from Dell based on Intel® Xeon® processors are designed to deliver the performance, efficiency and flexibility today's businesses need. For Dell, the new 12th generation PowerEdge servers help enterprises deliver critical productivity applications such as Microsoft Exchange 2010 and Microsoft SharePoint Server 2010 with the ability to scale as the number of users and amount of data grows. They can also help power high-performance computing (HPC) applications, as well as scientific and engineering applications that require complex calculations.

Under the hood of the 12th generation PowerEdge servers from Dell, the new Intel Xeon processor E5-2600 product family creates a new standard in performance, manageability and efficiency.

Inside the Intel Xeon Processor E5-2600 Product Family

Because servers are only as powerful as the processor behind them, the new Intel Xeon processor E5-2600 product family is designed to deliver significant performance improvements across a range of workloads compared to the previous generation of Intel Xeon processors.

The Intel Xeon processor E5-2600 product family offers approximately 80 percent higher performance on key industry benchmarks than its predecessor, the Intel Xeon processor 5600 series.[1] This performance increase is the result of a number of physical improvements to the processor. For example, the Intel Xeon processor E5-2600 family gives users up to two additional cores and up to 20MB last level cache; support for up to 32GB DIMMs increasing memory capacity from 288GB to 768GB; up to DDR3 1600 MHz memory; and faster connections throughout the system with support for the PCIe3 specification to increase bandwidth by up to 2X.

For the most complicated workloads, such as those in science and engineering, data mining, visual processing and HPC, Dell's 12th generation PowerEdge servers can take advantage of Intel® Advanced Vector Extensions (Intel® AVX). Intel AVX is a collection of CPU instructions that increase floating point performance by doubling the length of the floating registers to 256-bits and reducing the number of operations required to execute large floating

point tasks. That's the technical way of saying Intel AVX makes the processor do more work every clock cycle.

The Intel Xeon processor E5-2600 product family also improves on Intel Turbo Boost Technology, which was introduced in the Intel Xeon processor 5500 series. Intel Turbo Boost 2.0 Technology allows the processor to increase frequency at the operating system's request to handle workload spikes as well as shift power across the processor. If a processor has one core working hard, for example, and one core idle, the processor could "turbo up" by redirecting power from the idle core to the active core.

The Intel Xeon processor E5-2600 product family offers higher turbo speeds than previous Intel Xeon processors. The Intel Xeon processor X5690 with only one core active could turbo up by approximately 266 MHz, while the top Xeon processor E5-2690 can add 900 MHz.

Preventing I/O Bottlenecks

A processor that delivers 80 percent more performance than previous generations can help with demanding workloads, but only when it includes a plan for handling I/O. If data can't get to the processor then all of the performance improvements won't make a difference. That's why Intel focused on improving I/O, networking and storage in the Intel Xeon processor E5-2600 product family.

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Intel Integrated I/O is a feature that places the I/O controller and connections directly onto the processor—as opposed to a separate component on the motherboard. This reduces latency, as well as the power needed to handle I/O. Intel Integrated I/O reduces the time it takes a server to access I/O up to 30 percent. The Intel Xeon processor E5-2600 product family also supports PCI Express 3.0, which offers up to double the bandwidth of the existing I/O standard.

Intel Data Direct I/O (Intel® DDIO) Technology intelligently and automatically directs I/O packets to the processor cache, skipping main system memory. If the processor is already busy then I/O traffic will be directed to main system memory, but if the processor is waiting for data from I/O, it can get the data into the processor cache directly, potentially increasing transactions per second up to 130 percent compared to a Xeon 5600-based system.

Improved Power Efficiency

Building so many performance enhancements into a processor is a double-edged sword. Today's businesses are keenly aware of the power consumed by their data centers, as well as the energy needed to keep their data centers cool. The challenge for Intel is to deliver raw performance gains while also offering great performance per watt.

Users can get up to 70 percent more performance per watt than previous generations when they use servers based on the Intel Xeon processor E5-2600 product family.[2]

To improve idle power, as well as best match power draw to processor use, the Intel Xeon processor E5-2600 product family will scale the power to memory, cache, I/O and other processor functions to support the compute cores so that servers only consume power to provide the highest possible bandwidth when the cores are also in high demand. This allows

the processor to offer great peak performance when the system is under stress, and then shift down to a high-efficiency, lower-power state when the system does not need to deliver maximum performance.

Intel Node Manager 2.0 provides the data that allows administrators to monitor and control their PowerEdge system through Dell's OpenManage Power Center. Power Center is available with the upgrade from Integrated Dell Remote Access Controller (iDRAC) 7 Express to iDRAC 7 Enterprise. With Intel Node Manager and iDRAC 7 working together, administrators can better control system power and enable up to 40 percent greater rack density. They allow the administrator to set a policy at the rack level so the systems in aggregate never exceed the rack's power budget. In the 12th generation Dell PowerEdge servers, the Dell OpenManage Power Center works with the Intel Xeon processor E5-2600 product family to extract information from the Intel Node Manager firmware and present it in an easy-to-understand form.

Security and Encryption

Intel continues to offer Intel® Trusted Execution Technology (Intel® TXT) and Intel Advanced Encryption Standard Instructions (Intel® AES-NI) in the Intel Xeon processor E5-2600 product family. These technologies help protect systems during the boot-up process and reduce the

performance penalties that occur when using encryption.

Intel TXT addresses a critical security need for all servers, especially those used in virtual and cloud-based environments, by helping protect the server prior to OS or hypervisor launch. It complements other runtime malware protections such as antivirus and intrusion detection to help ensure that only trusted, "known good" software is controlling the platform.

Intel AES-NI is a set of instructions for enhancing the performance for cryptography using the widely accepted Advanced Encryption Standard (AES) algorithm. It offers significant reductions in the processing time to encrypt and decrypt data to add another layer of defense against cyber crime.

Conclusion

Today's data center administrators need the tools that help them

increase computing capacity, reduce risk, control costs and increase return on investment. Dell's 12th generation PowerEdge servers are designed to deliver these capabilities and help businesses power their most demanding workloads.

Dell's latest PowerEdge servers are built on the Intel Xeon processor E5-2600 product family, which replaces the Intel Xeon processor 5600 series. The Xeon E5-2600 product family is designed to deliver high performance, optimized I/O, flexible power management and robust security using a number of new and improved features.

The Intel Xeon processor E5-2600 series can be used for a range of uses, including enterprise infrastructure, workstations, public and private cloud installations, storage systems, high performance computing as well as some embedded devices. ■

[1] The claim of more than double I/O performance is based on Intel internal measurements comparing 1 socket data for an L2 forwarding test using 8X10 GbE ports for the Intel Xeon processor E5-2600 product family versus the Intel Xeon processor 5600 series

[2] Performance comparison using SPECfp*_rate_base2006 benchmark result at the same TDP. Baseline score of 271 on prior generation 2S Intel® Xeon® processor X5690 based on best publication to HYPERLINK "http://www.spec.org" www.spec.org using Intel® Compiler 12.1 as of 17 January 2012. For details, please see: http://www.spec.org/cpu2006/results/res2012q1/cpu2006-20111219-19195.html. New score of 466 based on Intel internal measured estimates using an Intel® Canoe Pass platform with two Intel® Xeon® processor E5-2680, Turbo Enabled, EIST Enabled, Hyper-Threading Enabled, 64 GB RAM, Intel® Compiler 12.1, THP disabled, Red Hat* Enterprise Linux Server 6.1.