Solution Brief

Intel® Xeon® Processor
E7-8800/4800/2800
Product Families

Mission-Critical Solutions

Serious About Mission Critical

Why Enterprise Data Centers are increasingly shifting to Intel® processor-based solutions for Mission-Critical deployments

Executive Summary

Enterprise IT departments around the world face growing challenges to deliver new levels of service, performance, security, and data reliability for their Mission-Critical transactional and analytics systems.

Data is growing exponentially, and user expectations of uptime and responsiveness are increasing. An online transaction processing (OLTP) system going down for an hour can translate to lost revenue and a direct hit to a company's market image. Not delivering line-of-business managers analytics information quickly and effectively can lead to lost market opportunities. These Mission-Critical systems are indeed the lifeblood of an organization; they are required to be available and responsive 24/7.

But all this needs to be accomplished with IT budgets that are stagnant or even shrinking.

In the past, the capabilities IT needed to deliver these services were usually associated with mainframe and RISC-based systems. Now, these same proprietary systems have become high-cost, aging monoliths.

At the same time, Intel® processor-based systems have delivered on the capabilities Mission-Critical systems need – performance, RAS, and scalability – all with a breakthrough economic model.

The Mission-Critical eco-system has paid attention to this shift and the focus of industry innovation has shifted to Intel processor-based systems. Software innovation from key Mission-Critical players, such as IBM, Microsoft, Oracle, and SAP, among others, is being delivered on Intel processor-based solutions at an accelerating rate.

These end-to-end solutions offer a way forward for Enterprise IT, meeting increasing requirements, yet staying within budget realities.

Large Fortune 500 shops are reaping the benefits today. Welcome to the new era of Mission-Critical computing.

IT's Mission-Critical Challenges

Today's IT departments face enormous challenges and pressures from opposing forces:

- Exploding data volumes that must be managed and secured
- Expanding requirements to service a wide range of customers' needs and demands – online
- The need to manage a continuous stream of social interactions and mobile transactions
- Rising line-of-business expectations to turn data into actionable knowledge, leading to greater business value

Yet, IT must respond to these demands in the face of flat budgets, inflexible and aging infrastructure, and enterprise software innovation that has moved away from low-volume, proprietary hardware server solutions.

Sitting in the midst of these challenges, IT managers must consider innovative solutions that give them the tools they need within their operational constraints.

Mission-Critical Solutions Making a Difference

The world's leading enterprise software providers, including IBM, Microsoft, Oracle, and SAP, are increasingly offering their industry-standard applications optimized for Intel® Xeon® processor-based solutions. Their Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Business Intelligence and Analytics (BI), and enterprise database environments, including IBM DB2,* Microsoft SQL Server* 2008 R2, and Oracle 11g* R2, are central to helping enterprise IT departments manage and deal with data growth and make better business decisions.

In addition, ground-breaking new solutions designed for innovative business operations are entering the market.

- IBM DB2 pureScale* software, previously only available on mainframe and RISC systems, now runs on IBM System x* servers powered by Intel Xeon processors. This solution provides near-limitless capacity and continuous availability, enabling customers to scale Mission-Critical, performance-sensitive databases simply, incrementally, and almost without limit, using affordable, industry-standard servers.
- Microsoft SQL Server 2008 R2 together with Intel Xeon processor-based servers delivers a robust foundation for enterprise-grade solutions to data management challenges. End customers can enjoy scalable performance with new RAS capabilities, providing a powerful, yet cost-saving alternative to costly proprietary architectures. Business Intelligence innovations in SQL Server 2008 R2 take advantage of scalable Intel Xeon processor-based servers to deliver the performance and responsiveness to enable near real-time analysis and complex queries on very large data sets to help customers get the view of the data they need to make effective business decisions.
- The Oracle Exadata Database Machine X2-8,* built on Intel Xeon processor-based servers, delivers extreme performance and scalability for large – and growing – database applications, including Online Transaction Processing (OLTP), Data Warehousing (DW), and consolidation of mixed workloads.
- The SAP High-Performance Analytic Appliance (SAP HANA) keeps data in main memory, enabling complex calculations and operations directly on data local to CPUs. As a result, this technology eliminates disk I/O as the limiting factor from modern data intense applications, enabling users to manipulate data more freely than traditional data warehouses. This functionality is dramatically improved as SAP HANA is optimized and exclusively built on the Intel Xeon processor-based servers.

Integrated Mission-Critical Capabilities

Intel® Xeon® processor E7-8800/4800/2800 product families servers deliver the scalability, performance, advanced reliability, and data protection that IT departments expect for their most data-intensive, enterprise applications – but at a total cost of ownership (TCO) that radically improves on traditional, proprietary solutions. The widest range of scalable blade and rack server hardware ever assembled is based on Intel Xeon processors, offering new levels of choice and flexibility for Mission-Critical enterprise solutions. Bull, Cisco, Cray, Dell, Fujitsu, HP, Hitachi, IBM, Inspur, NEC, Oracle, SGI, and Unisys all offer scalable Intel Xeon processor-based platforms.

The new Intel Xeon processor E7-8800/4800/2800 product families deliver **top-of-the-line performance**, featuring up to 10 cores that support up to 20 threads and up to 30 MB of last level cache per processor. Four advanced, high-bandwidth interconnect links allow multiple processors to directly connect to each other, reducing latency and increasing performance.

Encryption is basic to data protection, but its cost is often measured in computing resources, and it traditionally levies a significant performance "tax" that can dissuade use throughout the enterprise. New microprocessor instructions called Intel® Advanced Encryption Standards-New Instructions (Intel® AES-NI)[1] dramatically reduce this encryption overhead and make pervasive encryption possible, allowing widespread data protection that does not impact user productivity, slow application performance, and reduce system responsiveness.

Mission-Critical environments need to utilize untapped **capacity, and they must scale** quickly to support new and expanded workloads, enabling IT to instantly support new business opportunities. Platforms based on the Intel Xeon processor E7-8800/4800/2800 product families come with scalability features, like Intel® QuickPath Interconnect, which enables scaling of processors from two to eight sockets – and higher with use of third-party node controllers.

The Quad-Channel Integrated Memory Controller in the Intel Xeon processor E7-8800/4800/2800 product families offers high bandwidth, while supporting up to 16 DIMM slots per processor socket. IT managers can deploy systems with up to 2 TB of memory in a four-socket system, providing them with the headroom to handle database growth and peak demands. This scalability enables IT to place an entire database in memory and run queries in real-time, accelerating the path from data to decision to action, and making Mission-Critical services much more valuable across the enterprise.

Mission-Critical applications must be available and secure at all times. The Intel Xeon processor E7-8800/4800/2800 product families are designed to offer **reliability, security, and availability** that can meet the needs of the most demanding workloads. The Intel Xeon processor E7-8800/4800/2800 product families include self-healing features to allow for continued operation in case of component failures, as well as giving IT technicians the tools to maintain the system in smaller partitions to reduce the amount of downtime. Such features include the following:

- Machine Check Architecture-recovery (MCA-R) works with the operating system to recover from uncorrectable memory errors, which would have caused a system crash in prior generations.
- Double Data Device Correction (DDDC) extends reliability, by recovering from two DRAM device failures, instead of a single device failure of SDDC, helping maximize uptime.
- Partial Memory Mirroring enables more flexible, effective, and cost-efficient memory mirroring of critical areas instead of all memory, reducing server energy demands, while protecting the most important data.

Keeping Up With Today's Business Models

In today's connected world, businesses are not only expected to do things faster, but to do things innovatively. The impact of not being able to respond instantly with a sure solution can mean significant loss of revenue, market share, or service value.

Critical among Mission-Critical capabilities is *scalability*. Consider the following scenario:

> *An endorsement by a leading celebrity sends a sudden rush of online orders to a publishing company, which needs to fulfill them immediately. Is the company capable of responding quickly enough to a massive flood of online transactions?*

Mission-Critical solutions also need to deliver compute performance on demand, so IT can meet service level agreements (SLAs), protect growing amounts of sensitive data accessed by users around the world, and maintain high availability. For example:

> *Predictive analytics can help an insurance company identify potentially fraudulent claims as early as the first notice of loss and be able to analyze claims costs to better understand negative trends – but the company's computing infrastructure must be able to offer the performance to handle the processing demand of massive data sets.*

Global competition and real-time business models require Mission-Critical computing environments to be *interoperable* and based on open, industry standards, so they can integrate with external business partners for greater service levels, better efficiencies, lower costs, and improved returns on investments. Consider this scenario:

> *For a higher level of care, a physician wants to access a patient's entire record from previous admissions to other hospitals in her region and have all the relevant diagnostic and treatment data at her fingertips. This level of connectivity, especially within a mobile, clinical environment, requires a modern, standards-based, and connected infrastructure. Can the healthcare systems deliver?*

Fortunately, enterprise solutions offered by the world's leading providers are now optimized for and in some cases exclusively developed on Intel® Xeon® processor-based systems in order to deliver on these, and other, kinds of business demands.

These reliability and high availability features, in addition to robust security features, allow IT managers to meet their SLAs, reduce operating costs, and focus on innovation instead of maintenance.

Global IT Leaders Trust Intel® Xeon® Processors for Mission-Critical Computing

Some of the world's most successful companies across a variety of industries transitioned their most Mission-Critical business productivity applications and database deployments to Intel Xeon processor-based servers.

Sabre Holdings, the owners of Travelocity, needed an infrastructure that was faster, more scalable, and allowed them to contain growing costs in order to capitalize on enormous growth from Internet-based travel bookings. Moving off their proprietary solution enabled them to increase performance by 3X and at a fraction of the cost.[2]

NCH, a leading global provider in industrial maintenance solutions, needed to establish a new instance of its global Oracle database for its European operation. By deploying on Intel Xeon processor-based platforms instead of their existing proprietary IBM AIX* RISC-based systems, they expect to save over $5M in 5 years.[3]

BMW, world-renowned auto maker, needed to do more with less. More performance, more efficiency, and more scalability with less energy and less cost for their large databases that support the company's financial management, sales, marketing, customer relations, and logistics operations. So, they moved their data warehousing and SAP applications from RISC-based hardware to Intel Xeon processor-based servers. BMW expects a 20 percent reduction in energy used, which will lead to 10 percent cost savings.[4]

iMDsoft, a global leader in hospital clinical information systems, uses Intel Xeon processor-based platforms to offer large hospitals support for over 16,000 concurrent users, who now have their workflows for intensive-care, pre-op, operating theatres, and general in-patient beds automated.[5]

How can you improve your Mission-Critical IT infrastructure to meet the challenges and pressures you face from ever-increasing and opposing forces? Engage with Intel and learn more about how Intel is transforming Mission-Critical computing for companies in your industry.

Learn More

To learn more about Mission-Critical solutions, please visit: www.intel.com/itcenter/topics/missioncritical

[1] Intel® AES-NI requires a computer system with an AES-NI enabled processor, as well as non-Intel software to execute the instructions in the correct sequence. AES-NI is available on select Intel® Xeon® processors. For availability, consult your reseller or system manufacturer. For more information, see http://software.intel.com/en-us/articles/intel-advanced-encryption-standard-instructions-aes-ni/

[2] See the Red Hat document at http://www.redhat.com/f/pdf/blog/RH_SabreHoldings_CS_734891_0808_cw_web.pdf.

[3] See full story in NCH Case Study: http://www.intel.com/references/pdfs/nch.pdf.

[4] See full story in BMW Case Study: http://www.intel.com/references/pdfs/bmwdriving.pdf.

[5] See full story in iMDsoft Case Study: http://www.intel.com/references/pdfs/imdsoft.pdf.

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