Manufacturing Organizations Increase Performance and Reduce Costs with Intel and Microsoft Technology

Introduction

Organizations depend on IT to execute key business processes to generate revenue, manage the business, and sustain long term success. At the heart of the IT infrastructure are mission-critical applications that require the most reliable and scalable IT platform to achieve maximum performance and business agility.

For manufacturing organizations, maintaining constant connectivity to the supply chain and real-time visibility to critical information is vital to their businesses. Companies that are connected to their strategic partners and customers can quickly act on real-time information about product requirements, customer needs, and order fulfillment status. With this level of insight, manufacturing organizations can achieve two objectives: improve customer satisfaction and increase operating efficiencies and effectiveness. This results in increased profits and helps differentiate them from their competition.

Manufacturing companies that understand the relationship between technology, supply chain connectivity, and their entire value chain are better positioned to be more competitive in the global marketplace.

Over the years, manufacturers have relied on RISC-based or mainframe systems to provide the performance and reliability they need to run their most demanding and data-intensive workloads. But as IT has become an increasingly critical part of the long term business strategy in a rapidly changing environment, scalability and cost control are every bit as important as performance. Microsoft and Intel-based server platforms combine intelligent and expandable performance with advanced reliability and massive scalability to offer a more flexible and cost-effective alternative to RISC-based or mainframe systems.

Intel® Xeon® processor 7500 series-based servers provide an enterprise-ready alternative to more expensive platforms for mission-critical applications that require high availability and are essential to revenue generation, security and compliance, or management of life-critical services and public safety.

Intel® Xeon® processor 5600 series-based servers deliver an energy-efficient platform for enterprise computing for the most demanding business-critical applications that impact important business processes and communications.

Microsoft® Windows Server® 2008 R2 and Microsoft SQL Server® 2008 R2 powered by the Intel® Xeon® processor 7500 and 5600 series provides manufacturers the required levels of performance, scalability, and reliability to support mission-critical business functions. All while offering significantly lower overall total cost of ownership and the ability to standardize on a flexible IT environment.

This white paper outlines the business benefits of choosing the Microsoft and Intel platform to support the technology needs of manufacturing organizations to meet their mission-critical requirements over more expensive, RISC-based or mainframe systems.

Business- and Mission-Critical Needs for Manufacturers

For manufacturing organizations, mission-critical is about maintaining 24/7 connectivity to the supply chain and real-time access to the business information that is vital to meet and exceed market expectations. To maintain constant connectivity and real-time visibility, manufacturing organizations need

a highly available and scalable IT infrastructure to support their Supply Chain Management (SCM), Customer Relationship Management (CRM), and Enterprise Resource Planning (ERP) solutions. Successful integration of these solutions allows them to improve delivery times, reduce costs, improve inventory, increase insight, and react quickly to dynamic market conditions.

Meeting the Needs with the Microsoft and Intel Platform

Historically, manufacturers have relied on more expensive mainframe systems to support business- and mission-critical applications. These systems generally consist of hardware, software, and management tools and services delivered by a single vendor. Although this may simplify the initial deployment process, it also limits software, hardware, and support choices. This reduced flexibility can often mean increased initial capital costs and higher ongoing operating expenses.

Windows Server 2008 R2 with SQL Server 2008 R2 running on Intel Xeon processor 7500 series-based servers provides an enterprise-ready alternative to more expensive platforms, providing equal or greater performance for much less cost. With this platform, manufacturers can:

- Utilize groundbreaking server processing power to handle increased transactions, data volumes, and other essential functions vital to optimizing the supply chain.
- Use advanced reliability, availability, and serviceability (RAS) features to ensure SCM, CRM and ERP applications keep running.
- Speed insight and innovation by supporting large volumes of customer and operational information across multiple data streams in less than a second.

Arçelik, one of the largest appliance manufacturers in Europe, migrated its SAP ERP solution from a Sun/Solaris/Oracle technology stack to the Microsoft Application Platform including Windows Server 2008 and SQL Server running on HP server computers. Selection criteria included Arçelik's stated need to find a solution that provided better performance, a more secure infrastructure, lower total cost of ownership, and a strong vendor commitment to continued technological innovation.

"With the new Microsoft Application Platform and HP infrastructure, our SAP system performance is 3 times faster than our previous Sun/Solaris/Oracle solution."

Ahmet Ihsan Ceylan
Chief Information Officer, Arçelik

More information is available at:
http://www.microsoft.com/casestudies/Case_Study_Detail.aspx?casestudyid=4000002932

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Groundbreaking Processing Power

Working with Windows Server 2008 R2, the Intel Xeon processor 5600 series delivers intelligent performance that adapts system frequency and power to provide a solid foundation for demanding business-critical manufacturing workloads. With Intel Xeon processor 5600 series, Windows Server 2008 R2 can automatically maximize system performance when workload demands are high and maximize energy savings when they are not. Additional features include:

- Intel® Turbo Boost Technology allows processor cores to run faster than the base operating frequency and provides processing power on demand.
- Intel® Hyper-Threading Technology (Intel® HT Technology) delivers greater throughput and responsiveness for multithreaded applications.

For mission critical scenarios, the Microsoft and Intel platform delivers a quantum leap in enterprise computing performance to run data-demanding applications faster than RISC-based or mainframe systems. Windows Server 2008 R2 and SQL Server 2008 R2 powered by the Intel Xeon processor 7500 series combines intelligent and expandable performance with world record-breaking scalability to run the largest and most demanding manufacturing workloads.

- Windows Server 2008 R2 and SQL Server 2008 R2 powered by the Intel Xeon processor 7500 series have been benchmarked as the fastest 2, 4, and 8-socket machines in the world[1].
- Windows Server 2008 R2 supports up to 256 logical processors per server, which helps manufacturers harness the power of multisocket Xeon 7500 processors to run mission-critical applications.
- Take full advantage of the massive 2TB of memory capacity to keep business data highly accessible while running the most demanding applications with ease.

Massive Scalability and Performance

Microsoft, working with Intel and Dell, completed a workload test of virtualized Microsoft Dynamics CRM 4.0 on 20 virtual machines on two Dell PowerEdge™ servers equipped with Intel Xeon processors 7500 series and solid state drives (SSDs). In this test environment, Microsoft Dynamics CRM 4.0 demonstrated the following performance characteristics:

Concurrent Users	Avg Response Time	Web Requests	Business Transactions
100,000	**.29 Seconds**	**5.1 M/hr.**	**778,000/hr.**

This workload demonstrates that five Microsoft Dynamics CRM 4.0 instances can achieve sub-second response times with 100,000 concurrent users executing a heavy workload in a virtual environment. These results reflect its ability to scale on the Microsoft and Intel platform that is ideal for large-scale application consolidation projects.

More information is available at: http://blogs.msdn.com/crm/archive/2010/04/13/new-benchmark-100-000-concurrent-users-with-virtualization.aspx

[1] Configuration Details - http://www.intel.com/performance/server/xeon_mp/config/summary_config.htm

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Uncompromising Levels of Availability

Windows Server® 2008 R2 and SQL Server® 2008 R2 powered by the Intel® Xeon® processor 7500 series feature automatic detection and recovery from many types of otherwise uncorrectable errors.

Mission-critical applications require around-the-clock availability. Windows Server 2008 R2 and SQL Server 2008 R2 take advantage of Intel Xeon processor 7500 series capabilities to provide support for high availability that is unprecedented in industry-standard hardware.

Windows Server 2008 R2 comes with 20 additional new RAS features to automatically detect errors, then work with the Intel Xeon 7500 series processor to correct them. Features include:

- Intel® Machine Check Architecture Recovery – Detects and recovers from otherwise uncorrectable hardware and software errors
- Intel® QuickPath Interconnect – Heals failing data connections and helps ensure data is available
- Dynamic Processor Socket and Memory Migration – Migrate workloads from at-risk components to maintain server availability
- Memory Thermal Throttling – Prevents circuit level memory errors so data integrity is preserved
- Corrected Machine Check Interrupt – Indentifies components with recurring errors for preemptive replacement, increasing reliability and improving uptime

Kimball International, a $1.2 billion manufacturing company with diverse operations ranging from electronics to furniture to medical devices, moved its business-critical SAP applications from a UNIX/RISC infrastructure on an Oracle database to a Windows environment on a Microsoft SQL Server database with great success. Today, the company finds that its Windows infrastructure has proven itself with virtually no unplanned downtime in the past year, running on an infrastructure that saves the company hundreds of thousands of dollars per year.

When Ken Kemker, Director of Enterprise Architecture, was asked how much unplanned downtime there was in the past year, his answer was "I don't know that we had any."

More information is available at:
http:/download.microsoft.com/download/5/B/D/5BD5C253-4259-428B-A3E4-1F9C3D803074/IDC_Business_Critical_Workloads.pdf

Speed Insight and Innovation

With advanced business intelligence capabilities to access mission-critical information in real time, manufacturing organizations can improve responsiveness and drive innovation to meet the evolving demands of the business ahead of the competition.

The powerful data mining and management tools in Windows Server 2008 R2 and SQL Server 2008 R2 powered by the Intel Xeon processor 7500 and 5600 series help manufacturers:

- Accelerate collaborative product development across global design teams and bring products to market faster.

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- Analyze customer data for insight into their changing needs to produce innovative new products that drive revenue growth.
- Reconfigure production and manufacturing lines in real-time to meet changing market demands.

Radio Flyer's aging AS/400 business intelligence system was failing to deliver timely, detailed reports and was costing too much in IT time and maintenance. The company adopted a custom solution based on Microsoft SQL Server and Windows Server 2008 that provides an end-to-end solution from the data warehouse to the user interface, which features dashboards and scorecards for at-a-glance views of data, standard reports for more in-depth information, and ad hoc reporting for advanced business analysis.

"Dashboards and scorecards give us insight on a real-time basis. Our executive team looks at this information first thing in the morning and whenever we need to. It's allowed us to react more quickly to changing business conditions."

Robert Pasin
President and Chief Executive Officer,
Radio Flyer

More information is available at: http://www.microsoft.com/casestudies/Case_Study_Detail.aspx?casestudyid=4000006144

Virtualizing Applications

Today, more and more manufacturing companies are using Microsoft- and Intel-based solutions to provide a trusted, productive, and intelligent platform for running the most demanding mission- and business-critical applications in a mixed physical and virtual environment. With servers featuring powerful multi-core processors, these organizations experience high availability and better performance with fewer servers, recognizing significant benefits including increased resource utilization, enhanced server flexibility, and reduced up-front and ongoing costs.

The Microsoft and Intel platform solution includes:

- Intel® Virtualization Technology FlexMigration to enable you to add cross-generation Intel Xeon processors to server pools. This allows data centers to run virtualized mission-critical applications efficiently by running additional virtual machines during peak volumes and powering off unused servers during times of lower demand.
- Microsoft Hyper-V™ Live Migration to enable you to move running virtual machines between hosts with no perceptible downtime. It also allows data centers to deliver the level of availability necessary for mission-critical applications while minimizing downtime caused by hardware or power failures or natural disasters.
- Intel Xeon processor 7500 series built into eight-socket and larger servers with the reliability and large memory capacity needed to meet the demands of running multiple virtual machines.

PING, manufacturers of custom-fit golf clubs, expand the benefits of an existing Microsoft virtualization solution to include running mission-critical, resource-intensive applications with the Hyper-V virtualization technology in the Windows Server 2008 operating system.

"For PING, a Microsoft virtualization solution provides the right mix of features, functionality, and value for our money. Hyper V provides a cost-effective solution to virtualizing 64-bit operating systems and RAM-intensive applications"

Eric Hart
End-User Computing Manager, PING

More information is available at: http://www.microsoft.com/casestudies/Case_Study_Detail.aspx?casestudyid=4000004243

Cost Benefits of the Intel Xeon Processor 7500 and 5600 Series and the Windows Platform

In evaluating a solution for critical applications, it is important to take into account all the costs associated with each platform. The Windows and Intel platform brings lower hardware acquisition costs, software costs, administrative and technical support, and energy costs – resulting in significantly lower TCO and a higher return on investment (ROI).

Reduced Hardware Acquisition Costs

The Microsoft and Intel platform runs on industry-standard servers, which are significantly less costly than servers with closed architecture. Additionally, using the Hyper-V virtualization technology in Windows Server 2008 R2 can reduce the number of physical machines you need to run your mission- and business-critical applications, giving you better productivity with fewer servers.

Reduced Software Licensing Costs

Manufacturing organizations can reduce software licensing and support costs by using the virtualization technologies built into the Intel hardware and the Windows Server 2008 R2 operating system. Because UNIX-based software is typically priced per processor core (instead of per socket), the savings multiply with scale. Using an open and standardized platform also reduces the amount of testing required before deployment in comparison to an RISC-based system or mainframe, which can impact the cost significantly.

- A study by the analyst firm the Aberdeen Group found that Windows Server delivers a 46 percent overall cost advantage when compared to UNIX.[i]
- SQL Server 2008 R2 running on Windows Server 2008 R2 can be less costly than Oracle because Microsoft doesn't charge extra for Online Analytical Processing (OLAP), data mining, data compression, partitioning, encryption, and other features.[ii]

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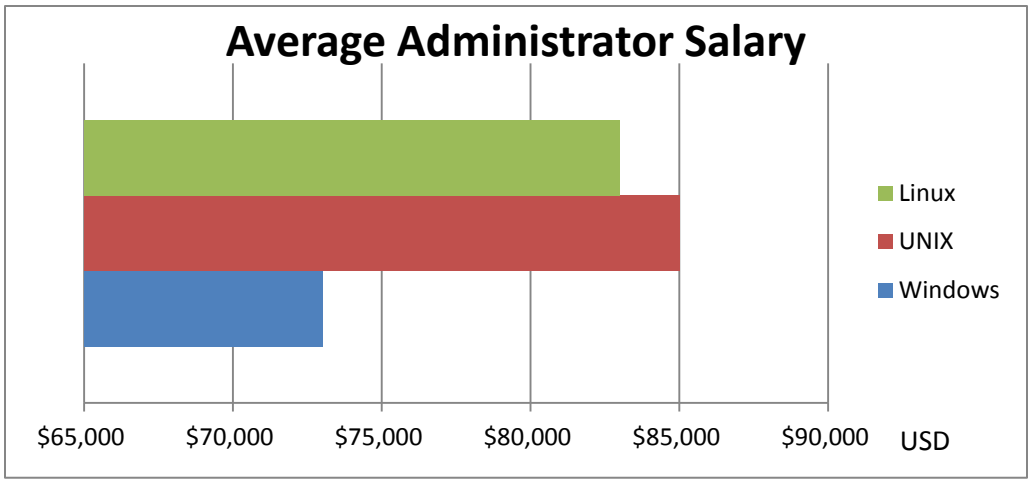
Reduced Administrative Support Costs

The cost of hiring qualified personnel to administer Intel Xeon processor-based servers that are running Windows Server is lower than the cost of hiring of RISC and UNIX administrators. Multiple salary surveys have documented those who manage mainframe and other UNIX systems are paid much higher salaries than their Windows counterparts.[iii]



Reduced Energy Costs

Energy costs make up a significant portion of a large company's ongoing expenses for server operations. Reducing energy consumption not only positively impacts the bottom line, it also helps meet goals for "green IT" in keeping with government standards, corporate policies, and societal mandates. The Intel Xeon processor 7500 and 5600 series works with Windows Server 2008 R2 to automatically regulate and reduce power consumption by dynamically increasing consolidation ratios and powering off unused cores during times of lower demand. Additionally, replacing legacy servers with those powered by Intel Xeon processor 7500 and 5600 series allows for server consolidation through virtualization, providing additional facility and energy cost savings.

Summary

Gain an enterprise-ready alternative to expensive and inflexible RISC-based and mainframe platforms at significantly lower cost. Microsoft and Intel have worked together for more than 20 years to ensure the highest levels of reliability, availability, and serviceability for business- and mission-critical computing. With scalable servers powered by the Intel Xeon processor 7500 and 5600 series running Microsoft Windows Server 2008 R2 and SQL Server 2008 R2, manufacturing organizations can run the most demanding SCM, CRM, and ERP applications and stay constantly connected to the supply chain with confidence. All while enjoying significant cost savings without sacrificing reliability, performance, or scalability.

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[i] The Business Value of Migrating from UNIX to Microsoft Windows Server System http://download.microsoft.com/download/d/4/9/d490c96f-a070-4878-8779-109d03fffb23/BusValueMigfromUNIX.doc

[ii] SQL Server 2008 Ups Pressure on Competitors http://www.microsoft.com/presspass/itanalyst/docs/09-22-08SQLServer2008UpsPressureOnCompetitors.PDF

[iii] Indeed.com: Average Salaries of Windows, UNIX, and Linux Administrators http://www.indeed.com/salary?q1=windows+administrator&l1=&q2=unix+administrator&l2=&q3=Linux+administrator&l3=&tm=1