

**Microsoft**



# Financial Services Organizations Increase Performance and Reduce Costs with Intel and Microsoft



## 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.

In a multi-channel world, maintaining availability for core applications is vital to financial institutions that are required to operate 24 hours a day, 7 days a week. With functionality ranging from basic point of sale to peak trading, the financial services industry is often considered to have the full spectrum of demands for mission-critical technology.

For financial organizations, running and maintaining mission-critical solutions is not only about high-availability or redundancy. It is about transaction and data integrity, consistency, predictability and balancing proactive prevention versus effective recovery. Many financial firms have relied on RISC or mainframe-based systems to provide them security, performance and reliability over the years. But just because something has worked well in the past does not make it the shape of the future.

There is no doubt the mainframe has offered the levels of performance many financial firms need. But as IT has become an increasingly critical part of business strategy in a challenging and competitive financial market, scalability, cost control and support are every bit as important as performance. Microsoft and Intel-based server platforms offer a scalable, flexible, and cost-effective alternative to the mainframe and can open up a world of business opportunities.

A new generation of scalable servers powered by the Intel® Xeon® processor 7500 series or 5600 series with Microsoft Windows Server® 2008 R2 and Microsoft SQL Server® 2008 R2 can deliver the high levels of performance, scalability, and reliability financial organizations require to support critical business functions while reducing total cost of ownership (TCO).

This white paper outlines the business benefits of choosing the Microsoft and Intel platform to support the technology needs of financial organizations to meet their mission-critical requirements over more expensive 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.

## Mission- or Business-Critical Needs for Financial Institutions

For financial organizations, maintaining 24/7 availability of core applications and real-time access to critical information is vital to meeting and exceeding market expectations. Banks and other financial institutions typically handle high transaction volumes across a large number of accounts and in many locations. These organizations also need fully integrated solutions with the flexibility to enable the development of new products quickly and cost-effectively. These priorities and the mission-critical nature of the world of finance places a burden on the ability of systems to:

- Provide constant availability of critical business information
- Maintain data integrity, consistency, predictability
- Complete complex calculations of high data volumes and transactions
- Maintain fast response times to continual requests for information 24 hours a day
- Reduce compliance complexity

To meet their needs, financial organizations need a highly available and scalable IT infrastructure to support their heterogeneous IT systems and multiple business applications. Successful integration of these solutions enables them to streamline transactions with customers and partners, improve response times, increase insight, and react quickly to dynamic market conditions.

## Meeting the Needs with the Microsoft and Intel Platform

Historically, financial institutions have relied on more expensive RISC-based or 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, financial organizations can:

- Utilize groundbreaking server processing power to handle increased transactions, data volumes, and other essential functions.
- Use advanced reliability, availability, and serviceability (RAS) features to ensure key business applications keep running.
- Speed response times by supporting large volumes of customer and operational information across multiple data streams in less than a second.

## 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 financial 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 financial applications faster than RISC or mainframe based 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 financial services 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<sup>1</sup>.
- Windows Server 2008 R2 supports up to 256 logical processors per server, which helps financial services organizations 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.

## Optimizing Mission Critical Computing

Windows Server 2008 R2 and SQL Server 2008 R2 powered by the Intel Xeon processor 7500 series allows financial organizations to migrate mission-critical applications from RISC-based systems with confidence. Designed for maximum performance and reliability, this platform features improvements over previous generations to provide exceptional scalability and processing power for the most data-demanding mission critical applications.

- Enjoy improved price performance over RISC systems while supporting powerful and data-intensive applications with up to **9X** the memory bandwidth.
- Achieve massive throughput while running heavy database workloads with greater than **2.5X** database performance.
- Boost performance and accelerate complex calculations on financial applications with greater than **1.7X** integer throughput.

\* Comparisons with single core Intel® Xeon® based on pre-production measurements of Intel® Xeon® 7500 compared to 7400 Series

- More information on database performance can be found at: [http://www.tpc.org/tpce/results/tpce\\_perf\\_results.asp](http://www.tpc.org/tpce/results/tpce_perf_results.asp).
- More information on integer throughput can be found at: [http://www.intel.com/performance/server/xeon\\_mp/server.htm?iid=perf\\_server\\_lhn+mp\\_server](http://www.intel.com/performance/server/xeon_mp/server.htm?iid=perf_server_lhn+mp_server).
- More information on floating point throughput can be found at: [http://www.intel.com/performance/server/xeon\\_mp/hpc.htm?iid=perf\\_server\\_lhn+mp\\_hpc](http://www.intel.com/performance/server/xeon_mp/hpc.htm?iid=perf_server_lhn+mp_hpc).

<sup>1</sup> Configuration Details - [http://www.intel.com/performance/server/xeon\\_mp/config/summary\\_config.htm](http://www.intel.com/performance/server/xeon_mp/config/summary_config.htm)

## Uncompromising Levels of Availability

Mission-critical financial 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.

The Intel Xeon 7500 series processor comes with 20 additional new RAS features to automatically detect errors and then work with Windows Server 2008 R2 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 – Identifies components with recurring errors for preemptive replacement, increasing reliability and improving uptime

*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.*

## Speed Response Times

Financial institutions that can more quickly manage higher data volumes, more easily address greater data complexity, and more quickly extract business insights will compete more effectively and prosper in today's financial environment. Scalable servers powered by the Intel Xeon processor 7500 series with Windows Server 2008 R2 and SQL Server 2008 R2 enable financial organizations to make fast, intelligent trading decisions. With advanced business intelligence and data analytics capabilities to access and process mission-critical information in real time, financial organizations can:

- Execute trades more quickly and cost-effectively in response to sometimes wild market volatility.
- Analyze customer data for insight into their changing needs to produce innovative new products that drive revenue growth.
- Reduce compliance complexity by addressing a multitude of compliance requirements through a single, flexible platform.

## Virtualizing Critical Applications

Today, more and more financial organizations 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 better productivity and performance with fewer servers, recognizing significant benefits including increased resource utilization, enhanced business continuity, and reduced up-front and ongoing costs.

The Microsoft and Intel platform solution includes:

- Intel® Virtualization Technology FlexMigration enables seamless migrations of workloads among current and future Intel processor-based servers. The result is a more flexible and unified pool of server resources that functions seamlessly across multiple hardware generations.
- 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 financial and accounting 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 large memory capacity needed to provide the processing power to meet the demands of running multiple virtual machines.

### 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>

# 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 that are 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-Intel platform runs on industry-standard servers, which are significantly less costly than servers with mainframe or RISC-based systems. 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.

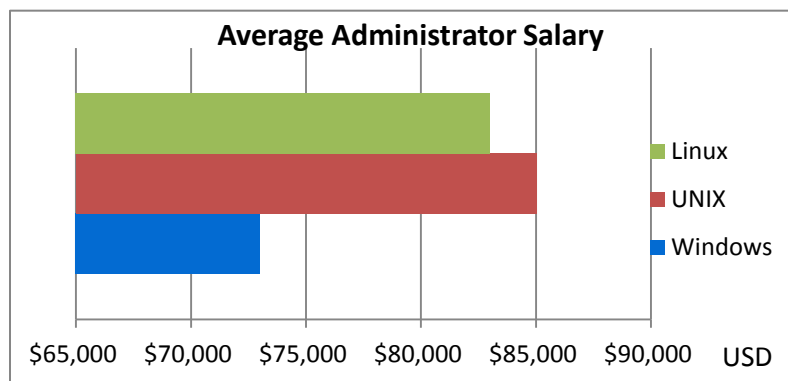
## Lower Software Licensing Costs

Financial 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 a standardized platform also reduces the amount of testing required before deployment in comparison to a proprietary platform, 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.<sup>i</sup>
- 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.<sup>ii</sup>

## 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 or UNIX administrators. Multiple salary surveys have documented those who manage mainframe and other UNIX systems are paid much higher salaries than their Windows counterparts.<sup>iii</sup>



Source: Indeed.com: Average Salaries of Windows, UNIX, and Linux Administrators

## Lower Energy Costs

Energy costs make up a significant portion of a 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 servers 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 mainframe-based 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 mission- and business-critical computing. With scalable servers powered by the Intel Xeon processor 7500 series or 5600 series running Microsoft Windows Server 2008 R2 and SQL Server 2008 R2, financial services organizations can run the most demanding accounting and business applications with confidence. All while enjoying significant cost savings without sacrificing reliability, performance, or scalability.

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<sup>i</sup> 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>

<sup>ii</sup> SQL Server 2008 Ups Pressure on Competitors

<http://www.microsoft.com/presspass/itanalyst/docs/09-22-08SQLServer2008UpsPressureOnCompetitors.PDF>

<sup>iii</sup> 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>