



Web Applications

Windows Server® 2008 on Intel® Xeon® Processor-based Servers

SOLUTION GUIDE

Windows Server® 2008 and Intel® Xeon® processor-based servers combine strengths to enhance capabilities for multifaceted Web applications and services.

Today's businesses are increasingly turning to the Internet to connect with customers and increase worker productivity through content and applications that connect users to the business, to each other, and to their data. Consequently, enterprise sites are growing ever larger and more complex. Administrators and developers must be able to accommodate this increasing density of distributed applications securely and affordably.

The flexibility of Windows Server® 2008, running on Quad-Core Intel® Xeon® processor-based servers, meets these challenges by enabling developers to rapidly create, deploy, and manage the latest in distributed applications. Further, Intel Xeon processors offer a powerful, modular platform for powering administration, diagnostics, and development and application tools, while at the same time lowering infrastructure costs. The end result is an extremely robust platform for complex Web hosting.



Microsoft®

Intel and Microsoft: Leading Innovation, Lasting Advantage

IT systems cannot keep pace with business demands simply by continuing to increase the processing capacity of a silicon die, or by dropping more servers into a data center. The new surge in rich Web interfacing demands flexible solutions. Intel and Microsoft are meeting that challenge with new hardware architectures that are optimized for scalable, multi-core processing, as well as software that uses these new capabilities. Together, these dual technologies can deliver faster, more supple performance and capacity where and when they are needed.

Intel and Microsoft share a long-time commitment across engineering, sales, and service to deliver innovations in hardware and software that make business more powerful, efficient, and flexible. These platform improvements provide a foundation for Microsoft to further optimize its software IT infrastructure.



Complementary Web Technologies

The common vision of Intel and Microsoft is being fulfilled in their collaboration on advanced technologies that achieve higher levels of performance, reliability, scalability, and efficiency. With regard to large-scale Web hosting, the pair confronts modern challenges in server management, transaction load support, and hosting cost reduction.

Maintaining an efficient and reliable Web presence that can cope with the pressures of business – both today and in the future – requires a host of improved software and hardware capabilities. The current environment of sprawling physical Web servers, and the management burden of having to handle so many, is problematic for many businesses. Further, servers are handling more concurrent transactions, and Web user expectations are high. Businesses require greater transactional throughput in Web servers as well as Web workload consolidation to improve efficiency and lower total costs.

Sophisticated Web designers also demand more from their hosting platforms. As they are asked to produce ever richer Web sites, they must be able to install and run the most complex scripts and programs on their servers – smoothly and securely.

The pairing of Intel and Microsoft Web server technologies meets these challenges. With Microsoft, the key Web-related improvements in Windows Server 2008 are the complete integrated web stack, improved development framework and information services, and sleek new power management features. Intel then provides the necessary backbone for Microsoft's improved platform. Whether Web professionals use Windows Server 2008 features to develop applications for a database server, a Web server, or Web services, Quad-Core Intel Xeon processors supply

breakthrough performance, reliability and energy efficiency at the same low cost as earlier versions. The hardware is remarkably enhanced by Intel's newest breakthrough in Intel® Core™ microarchitecture, 45-nm fabrication technology, which improves performance through increased transistor density and expands power management capabilities for new levels of energy efficiency. The new processor family also includes tools for speeding up the performance of media and cutting-edge computing applications.

Double the Impact on Enterprise Web Applications and Infrastructure

Simplified Web Workload Management

Organizations must be able to deploy and manage their applications rapidly if they expect to effectively serve timely, high-density Web-based content. Windows Server 2008 offers a complete Web stack that can quickly address the entire Web workload on hosted servers – from Internet to intranet to extranet Web applications. In addition, Internet Information Services (IIS) 7.0 provides Web administrators and developers with an unprecedented degree of control over the Web server through a powerful, modular Web platform.

Modular architecture enables the IT professional to customize exactly which features are installed and running on the Web server, and who specifically can control them. IIS 7.0 now comprises more than 40 feature modules. With IIS 7.0, less than half of the installation options are installed by default, and most can be independently installed. This dramatically reduces the potential attack surface and lowers the footprint requirements of the server. An extension of this modular approach is the addition of Windows Web Server 2008. Inexpensive and streamlined, Windows Web Server 2008 is perfect for hosting even the heaviest Web workloads.

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Further improving reliability and security are the improved diagnostics and error tracing of the Application Pool Isolation feature in IIS 7.0. Application Pool Isolation automatically isolates up to 4,000 new sites in their own pools by default. This provides sandboxed configuration and identity and prevents sites and applications from interfering with one another. Thorough diagnostic information is provided through in-depth runtime-state data, and error messages are more detailed where failed request are automatically traced for more rapid troubleshooting. By helping administrators quickly triage issues, IIS 7.0 eliminates hours of potential downtime.

The simplified, task-based management interface in IIS 7.0 streamlines common administration tasks, such as copying Web site settings across multiple Web servers without additional configuration by using the Distributed Configuration Model and Xcopy Deployment. New task-oriented user interface and command-line tools are helpful for managing and administering Web servers, Web sites, and Web applications. These features provide a comprehensive managed-code application programming interface so that developers can manipulate XML configuration files and conveniently access server objects. These rich administration capabilities make deploying and managing compelling Web applications on IIS 7.0 more straightforward and efficient than on any other Web server.

IIS 7.0 also provides a rich and reliable foundation for application development. First, Windows Server 2008 contains functionality that supports running the PHP scripting language on the operating system. Combine this with both kernel and user caching support, and developers have a flexible and powerful platform upon which to create all types of compelling and dynamic content.

The productive, agile new Web platform in Windows Server 2008 is boosted by the leading performance and flexibility of Intel Xeon processor-based servers to optimize the hosting environment for unique business requirements. Simply put, Windows Server 2008 runs more reliably, securely, and quickly on Quad-Core Intel Xeon processors.

With tremendous 64-bit performance and the broadest 32-bit application support, Intel Xeon processor-based servers offer fast Dedicated High-Speed Interconnects (DHSI) – point-to-point intersections between each of the four processors and the chipset. This increases throughput to support more requests, faster page loads, and timely application processing. For multi-threaded applications and heavy multi-tasking scenarios, Quad-Core Intel Xeon processors increase performance and threading headroom, allowing a greater number of simultaneous Web workloads. Functions are further enhanced by allowing systems to address extended memory with more than 4 GB of both

Intel I/OAT improves processor utilization and lowers latency to deliver twice the data movement, plus more reliable I/O.

virtual and physical memory. For greater responsiveness to fluctuating Web workload demands, Intel Xeon processor-based servers provide up to 12 MB shared, on-die L2 cache with efficient L2 cache-to-processor data transfer. This keeps more needed data closer to the cores for faster access than off-chip memory, maximizes main memory-to-processor bandwidth, and reduces latency.

One very noteworthy benefit is the greater scalability – each Intel Xeon processor-based Web server readily adapts to fluctuating site capacity as well as to variable transactional volume. And Intel® I/O acceleration Technology (Intel® I/OAT) further enhances this benefit. Intel I/OAT improves processor utilization and lowers latency to deliver twice the data movement, plus more reliable I/O. Together, these features support more requests and process network traffic faster.

Complementing these high-performance features is energy and cost efficiency. Intel Core microarchitecture increases responsiveness and productivity of multiple, simultaneous workload environments, while at the same time yielding better performance per-watt for ultra-dense deployments. The energy efficiency gained from the Intel Core microarchitecture helps enable highly dense 80-watt or 50-watt processor-based rack and blade form factors. This allows you to take back control of data center cooling, power limitations, and space constraints caused by server sprawl. Quad-Core Intel Xeon processor-based servers running Windows Server 2008 reduce overall space and electricity burdens in the data center, leading to lower energy and footprint costs.

Intel's rapid cadence continues with 45nm Hi-K silicon technology. Available in Intel Xeon processor 5400[^] series, this next evolution in Intel Core microarchitecture includes an extensive array of improvements, including further energy efficiencies, increased transistor density, and

improved transistor switching speed. 45nm Quad-Core Intel Xeon processors provide up to 12 MB of on-die, L2 cache, a dedicated high-front side bus, and fully-buffered DIMM Memory to minimize bottlenecks and errors within the memory subsystem. Furthermore, the shared memory bus in these processors has been replaced with a serial point-to-point lane and a dedicated buffer for each memory module, allowing dramatically improved memory efficiency and performance.

Enhanced Web Development

Organizations today need scalable, flexible development platforms to keep up with growth and the rapidly evolving Web industry. Windows Server 2008 meets this challenge with IIS 7.0 and the Microsoft® .NET Framework 3.0. These tools provide a comprehensive platform for building and deploying applications that connect users to each other and their data—enabling them to visualize, share, and act on information.

IIS 7.0 enables developers to provide custom functionality in new, more powerful ways. With the new core server application programming interface (API) set, developers can develop feature modules in both native code (C/C++) and managed code (languages such as C# and Visual Basic that use the .NET Framework). In fact, much of the IIS 7.0 feature-set for request and application processing has been implemented by using these same APIs. IIS 7.0 also enables extensibility for configuration, scripting, event logging, and administration tool feature-sets, providing software developers with a complete server platform on which to build Web server extensions. By using the Xcopy Deployment tool in IIS 7.0, developers can easily duplicate applications across multiple Web servers. IIS 7.0 allows configuration settings to be stored in web.config files. Thus, developers can avoid costly, error-prone replication, manual synchronization, and additional configuration tasks.



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The .NET Framework 3.0 is the managed code programming model from Microsoft for building applications on Windows® clients, servers, and mobile or embedded devices. Developers can use the .NET Framework to build applications that have visually compelling user experiences, integrated communication across technology boundaries, support for a wide range of business processes, and easier online management of personal information.



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To support this variety, the .NET Framework includes a broad set of supporting class libraries:

- Windows Presentation Foundation for visually stunning user experiences on Windows-based clients
- Windows Communication Foundation for enabling fast, flexible communications among applications across an enterprise
- Windows Workflow Foundation for building workflows into any application
- Microsoft® ASP.NET for high-performance and interactive Web-based applications
- Libraries for handling XML, data, IO, cryptography, text-to-speech, and more

Add to this the new caching support from IIS 7.0, both kernel-caching and user-caching, and developers can allow for all types of dynamic content.

Intel Xeon processor-based servers ensure that users consistently receive full functionality and a rich viewing experience of even the most complex Web applications. Quad-Core Intel Xeon processors provide leading support for multi-threaded Web applications. The 12 MB shared, on-die L2 cache, combined with DHSI and Intel I/AOT, provide for speedy data access, effective bandwidth utilization, and less latency for the ultimate streaming experience. End users can experience an “always-on” viewing experience thanks to streaming content with minimal buffering and downtime, even over high-latency network connections such as wireless and satellite.

Intel Xeon processors also provide enhanced Reliability, Availability and Serviceability (RAS) features such as Memory Error Correction Code (ECC), Memory Sparing, and Memory Mirroring. These RAS features reduce the cost and complexity of high-availability solutions while improving recovery speed and reliability. Coupled with the Windows Server 2008 features of hot-pluggable component support and simplified clustering, Intel Xeon processor-based servers offer a more optimized IT infrastructure and improved server availability. This combined platform also fortifies disaster recovery strategies by doubling performance and redundancy features.

Reduced Total Cost of Ownership

When it comes to technology infrastructure components like Web servers and software, product acquisition is often less than 10 percent of the five-year Total Cost of Ownership (TCO). Many factors contribute to this TCO, including staff recruitment and training, consultant

services, labor costs for installation, administration, and operations, and ongoing system management costs. Windows Server 2008 is designed to win organizations a great reprieve of total Web service costs by reducing total management effort, down-time, and more.

Now, Intel carries the Microsoft goal of decreased overhead to the next level. With Intel Xeon processor-based servers, providers can decrease the number of servers needed, reduce energy costs, and cut back on cooling requirements without sacrificing performance. Low-voltage options, like the 50-watt Intel Xeon processor use 35% less processor power consumption while maintaining the same performance level as the standard quad-core versions.

Even better, Intel's latest 45nm processor architecture provides a huge boost to performance (up to 20% faster transistor switching speeds and up to 50% larger L2 caches) while simultaneously expanding power management capabilities for new levels of energy efficiency. That means better performance in the same footprint at lower power.

The following Intel Xeon processor features also serve to reduce TCO:

- Demand-Based Switching (DBS) with enhanced Intel SpeedStep® technology for lower power and footprint costs
- Fully-buffered DIMM technology for a three-fold increase in memory bandwidth and a four-fold increase in memory capacity (up to 64 GB)
- New memory controller features including Error Correction Code (ECC) system bus, new Memory Mirroring, and I/O hot plug, for improved platform reliability

Simply put, Intel Xeon processor-based servers keep Windows Server 2008-based web systems performing and reliable without prohibitively consuming energy.

Summary

Windows Server 2008 running on Quad-Core Intel Xeon processor-based servers empowers organizations to optimize the benefits of this robust next-generation platform. Intel Xeon processors magnify the power of Windows Server 2008 for Web, virtualization, and enterprise-class solutions. Quad-Core Intel Xeon processors running Windows Server 2008 deliver enhanced energy efficiency, performance, utilization, and reliability. Together, Windows Server 2008 and Quad-Core Intel Xeon processors enable businesses to grow their computing solutions more efficiently while helping to keep data centers cool. Individually, the new Web server technologies from Microsoft and Intel offer outstanding performance, reliability, and scalability. Together, they create an ideal platform, not only for virtualization and enterprise workload balancing, but also for branch office and Web application serving.

For More Information

For more information about Intel Xeon processors, visit: www.intel.com/products/server/processors/index.htm

For more information about the Intel and Microsoft Solutions, visit: www.intelalliance.com/microsoft

For more information about Windows Server 2008, including Windows Server virtualization, visit: www.microsoft.com/windowsserver2008/default.mspx

^Δ Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. See www.intel.com/products/processor_number/ for details.

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