



Key Considerations for Improving Performance And Virtualization in Microsoft® SQL Server® Environments



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For small and mid-sized businesses, the performance of their databases has never been more important. Companies of all sizes are producing data in record numbers and, in today's information-driven society, those companies that are most adept and quick at managing, manipulating, analyzing and acting upon that information are able to achieve significant competitive advantage.

As part of this drive for competitive advantage, companies are also recognizing that they must be able to control database sprawl by using technology solutions – such as virtualization – to improve efficiencies in integrating and managing databases. By achieving efficiencies in their databases, organizations can be more agile at deploying applications that span across the business, such as customer relationship management (CRM) and enterprise resource planning (ERP), which are no longer just the realm of the large enterprise.

Reducing database sprawl through virtualization can not only lead to improved operations and more business agility, it could also lead to lower licensing fees and lower energy consumption. In addition, one of the important goals for any IT organization is to reduce complexity and this is where database sprawl presents a huge challenge: If there are many different databases, each one has to be accounted for and this makes it difficult for IT to ensure that data is accurate and up-to-date across the business. It also poses greater challenges and risks when deploying new business services and applications.

For most businesses, the reality is that they are asking their databases to accomplish more with less: More transactions, more data to manage, more integration and more sophisticated uses of business intelligence – all with a server base that is being consolidated through increased virtualization. In this type of environment, focusing on server costs and performance are absolutely critical.



In fact, for many small and mid-sized businesses reducing database sprawl and cutting costs without sacrificing performance has become one of the most important and difficult imperatives of the IT department. And, while the goal of cutting costs without sacrificing performance has been pretty much unachievable in the past, servers with the latest generation of processors from AMD are enabling organizations to achieve breakthrough gains in price/performance to support their database consolidation efforts.

Maximizing Performance in SQL Server Environments

In addressing the key challenges in managing the heavier workloads and increased transactions demanded in today's database environments, it is important to recognize that for many small and mid-sized businesses the database platform of choice has long been Microsoft SQL Server.

The popularity and ease of deployment of SQL Server is one of the main factors that led to the proliferation of SQL Server databases throughout many businesses: Departments have often been able to install and deploy their own databases without necessarily going through the normal controls of the IT organization. But this type of approach is no longer tenable.

Organizations, large and small, need to be able to centrally manage their SQL Server environments to ensure that company-wide information is current and shared where needed throughout the organization. Reducing database sprawl is also essential to putting in place the processes to ensure that critical information is secure, properly backed up, fully compliant and available on time to those who need access to it and can act upon it, whether employees, managers, customers or partners.



Focusing on Hardware

While the thinking of IT professionals in managing databases is often focused on software performance, one of the most effective ways to ensure the highest levels of database performance in SQL Server environments is in choosing the right hardware platform.

By deploying the latest generation of servers that deliver the most current advances in power management, performance, bandwidth and memory, organizations of all sizes can address today's database requirements and also be in a position to scale up quickly as demands increase on the database, which they certainly can be expected to do.

Perhaps even more importantly, with the latest generation of servers using the AMD Opteron™ 6000 Series platform, IT decision-makers no longer have to choose between cost efficiency and performance. This has traditionally been one of the biggest questions in server deployment: Whether to scale out with commodity servers and sacrifice performance, or to scale up with higher-performing servers and pay the price, literally. With the AMD Opteron™ 6000 Series platform the paradigm has shifted and now world-class performance is available on servers at commodity prices.

In choosing a hardware platform, it is important to identify some of the key criteria, such as:

- An increased number of cores to handle heavier workloads
- Increased memory capacity to drive efficiency improvements throughout the database infrastructure
- Increased memory speed and a larger memory I/O subsystem to drive greater speed and higher bandwidth performance in memory-intensive environments such as virtualization



- Industry-leading power efficiency
- A consistent platform that can scale up as your database requirements scale up, and also provides the capability of leveraging existing hardware investments in next-generation servers

For example, servers powered by the AMD Opteron™ 6000 Series platform enable breakthrough performance for SQL Server environments at industry-leading price points that can lead to dramatic improvements in total cost of ownership. AMD delivers the world's first 8-core-and 12-core x86 server processors enabling the highest core density¹ for incredible scalability to handle demanding multi-threaded workloads such as SQL Server databases. Also, with four channels of DDR-3 memory per processor, AMD delivers the memory scalability for memory intensive-environments such as databases and virtualization.

Focusing on Virtualization

In addition to hardware performance, the other important consideration in SQL Server environments is to determine how much to consolidate your database environment through virtualization. Consolidation and virtualization can provide a number of benefits to the IT department: Cost and space savings, improved performance, reduced energy consumption, reduced management complexity and potential improvements in business continuity, availability, security, disaster recovery, IT governance and compliance. Gartner notes that organizations can reduce costs by as much as 25 percent through consolidation of redundant databases and database workloads².

¹ Comparison of 12-core AMD Opteron 6100 Series processor with 6-core Intel Xeon 5600 series and 8-core Intel 7500 series processors

² Gartner, Gartner Recommends Key Cost-Cutting Tactics in Data Management and Integration, <http://www.gartner.com/it/page.jsp?id=619108>, accessed 5 May 2011.



If you're looking at virtualization as a means to consolidate SQL Server databases, you should also look at your hardware infrastructure and upgrade it where necessary. For example, if your server infrastructure is more than three years old, you might want to think about an upgrade or a refresh. Today's servers are more powerful and energy efficient than prior generations, and an upgrade or a refresh can result in significant savings – particularly in a more highly virtualized environment where higher performance- and high-density servers may be required to deliver maximum levels of consolidation, optimization and performance.

Servers powered by the AMD Opteron™ 6000 Series platform not only deliver industry-leading performance in a SQL Server environment, they also offer unprecedented value. When virtualizing a SQL Server environment, one of the important points to consider is the impact of the database on your applications. With servers powered by the AMD Opteron™ 6000 Series platform, you can reach near-native performance. Power efficiency is also a major benefit of utilizing the latest-generation servers. The AMD Opteron™ 6000 Series platform features a range of technologies to reduce power consumption, including Dual Dynamic Power Management™, AMD CoolCore™ Technology, Enhanced AMD Power Now!™ Technology, and others. The result is maximum performance per watt.

Optimizing Hyper-V™ Environments

One more important consideration in consolidating SQL Server databases through virtualization is in making sure that your hardware platform leverages the benefits delivered by your hypervisor environment. Now that Microsoft is including Hyper-V™ as part of Windows Server® 2008 R-2, many small and mid-size businesses that are predominantly Microsoft shops are increasingly turning to Microsoft as their virtualization platform of choice.



Embracing Hyper-V makes sense for a number of reasons: Certainly there are potentially dramatic savings in licensing fees by using Hyper-V, but there are also benefits because IT departments and users are extremely comfortable using Microsoft products and also because key Microsoft solutions – such as SQL Server and SharePoint® – may simply work better in Hyper-V environments.

The hardware considerations in deploying Hyper-V are considerable: Because Hyper-V R2 now supports greater memory and core counts, virtualized environments can now take advantage of the increased core and memory capabilities delivered through the AMD Opteron™ 6000 Series platform. By delivering the highest core density¹ in the industry, AMD allows customers to consolidate more VMs per platform when using the industry standard of one VM/core. With greater VM density and a much lower platform cost than servers powered by competitive solutions,³ AMD is able to deliver one of the lowest cost-per-VM metrics in the industry.

AMD and Microsoft: Delivering Superior Performance and Virtualization

Overcoming database sprawl and improving the performance of corporate databases is a significant challenge for IT organizations, but a major opportunity as well. With database consolidation and virtualization – particularly in SQL Server environments – organizations can be more responsive to customer needs and can deliver the types of services-based IT solutions that are part of the next-generation cloud-based computing environments.

³ Based on 2P AMD Opteron-based Dell PowerEdge R715 (24 cores) @ \$16,546 and 2P Intel-based Dell PowerEdge R710 (12 cores) @ \$16,451. Both include 32GB memory, 2 146GB hard drives, RAID 0, standard warranty. R715 includes VMware vSphere Enterprise Plus 4.1 2-CPU license, R710 price includes VMware vSphere Enterprise 4.1 2-CPU license. Utilizing 1 VM per core AMD = \$689/VM (\$16,546 / 24), Intel = \$1,370 (\$16,451 / 12)



But, in order to turn these challenges into opportunities, IT professionals must make sure that they are focusing on the full solutions – and, while most IT pros think of virtualization as a software effort, it is important to understand that hardware decisions are equally important. Choosing the right hardware platform will enable optimal performance and choosing the right hardware platform means thinking about key issues of performance, bandwidth, number of cores, memory, power efficiency and a scalable platform that provides consistency and compatibility from generation to generation.

In summary, consolidation and virtualization in SQL Server environments works best with:

- World-class processor performance that is able to tackle memory- and compute-intensive workloads with both cost- and energy- efficiency
- A highly scalable processor platform with built-in, low-overhead virtualization technologies developed in collaboration with the leading database and hypervisor software vendors

AMD and Microsoft have worked together for many years to create combined hardware and database solutions that deliver superior performance and scalability while providing low total cost of ownership. In addition, the technology solutions delivered by the two companies work closely together to create a powerful and efficient virtualization platform to run heavy SQL Server workloads. In today's environment, where the entire business is often dependent upon the performance, availability, scalability and reliability of corporate databases, choosing the right solution can have a long-lasting and far-reaching impact on the overall success of the organization.



Whatever applications your organization is building on top of the SQL Server database – whether it's ERP, CRM, customer-tracking, financial management, HR or sales – look to AMD for the right blend of hardware features, performance, energy efficiency and low total cost of ownership. With IT departments under pressure to deliver greater performance on tighter budgets, this certainly addresses IT's most critical needs in the critical area of database consolidation and virtualization.

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