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WHITEPAPER

Microsoft SQL Server Databases Thrive in the Cloud

Virtualizing Data-Intensive Applications for High Availability and Cost-Savings

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Overview

As more and more organizations embrace cloud computing to save money, increase productivity, and to gain the ability to scale their infrastructures up or down at a moment's notice, concerns remain around the level of performance, availability, and overall security of their databases once they move to a hosting vendor.

Many of the fears organizations have with moving their databases from a dedicated environment to the cloud start with the overall comfort level of managing their data in a virtual environment. A few years ago, performance degradation issues gave companies plenty of reasons not to move their critical business applications to the cloud. However, advancements in both Microsoft SQL Server and cloud infrastructures have changed all that.

More specifically, combining SQL Server with a proven hosting service provider offers highly scalable, flexible and cost-effective solutions. These services enable companies with little to no experience working in the cloud to not only use virtual environments beyond internal testing and development, but to manage production-ready, high-volume and robust database solutions and applications in the cloud.

Leveraging an IT service provider's knowledge and expertise to manage databases in the cloud directly addresses industry concerns around performance, manageability and security to deliver significant customer benefits that include:

- Avoiding capital investments and reducing overall TCO

- Greater flexibility and simplified database administration

- Ability to instantly scale resources up or down, as needed

- Increasing overall performance, availability and agility

Running SQL Server databases in the cloud allows organizations the flexibility to upgrade or downgrade their environments to meet changing database demands, unlike dedicated environments, where companies face overbuying technology to meet peak demands or downtime during unpredictable spikes in utilization.

This whitepaper will demonstrate how companies that have moved their SQL Server databases to the cloud have overcome past performance and security concerns to increase operational efficiency, improve availability and scalability, reduce costs, gain a faster time to-market, and achieve a better return on investment.

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How SQL Server and
Hosting Providers Address Cloud Concerns

Many organizations' aversions for moving from a dedicated server environment to running SQL Server databases in the cloud have largely been based around concerns with degradation in performance, giving away administrative control of their core systems and applications, and maintaining optimal security for critical business data. Until

> "We can post data to a common repository that has huge scalability and redundancy, and we can port that worldwide almost instantly."
>
> Jason Popillion
> GCommerce

recently, it was not uncommon for organizations testing database applications in the cloud to see significant levels of performance degradation. However, advancements in SQL Server and cloud infrastructures, combined with a hosting service provider's knowledge and expertise managing databases in the cloud, now address many of the security and performance issues that have prevented companies from deploying more high-volume, data-intensive applications to the cloud beyond testing and development.

Here are some of the primary concerns businesses have had with running more robust solutions and applications in the cloud, and how SQL Server and hosting providers work together to address them:

- **Performance** – In the days when hardware had no virtual bits and the virtual layer had to simulate more because it did not have direct access to the CPU, disk I/O performance was so slow that it simply was not worth running an application on a virtualization platform. Those days are over. Running SQL Server in the cloud drives speed and allows companies to move up-stack without experiencing any downtime. As a result, performance degradation drops significantly, and in some instances, has proven to run faster than in a dedicated environment.

- **Manageability** – When it comes to managing critical business data and applications in the cloud, companies are concerned about how they can access and manage their information. SQL Server's built-in tools allow organizations to more efficiently scale and manage servers, instances, database applications, and resource utilization through a single user console. Combined with a hosting provider's expertise in building, scaling and managing databases in the cloud, organizations gain greater control and increase oversight and management of their database environments.

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- **Security** – Although an organization may physically remove data or applications from its immediate control, it does not relinquish the responsibility to ensure its business data remains safe when stored on a third-party server where multiple tenants have access. SQL Server has built-in security and compliance capabilities that allow organizations to manage how people access data, as well as audit information to help with their regulatory compliance needs (e.g., HIPAA, PCI Data Security Standard Compliance). For businesses that need to secure sensitive data because they collect credit card or social security information, SQL Server has database encryption so people cannot query, steal or recover it somewhere else.

- **Expertise** – Moving SQL Server databases to the cloud requires higher levels of expertise to deploy and manage their applications, something many organizations do not have in-house. Due to a lack of experience and confidence, businesses are often reluctant to virtualize applications that are at the heart of their business operations where there is no tolerance for performance degradation or downtime. A hosting service provider offers virtualization expertise that gives businesses the confidence they need for managing SQL Server databases in the cloud.

Business Values of Running SQL Server Databases in the Cloud

Despite the fact that organizations are giving some control away, many are starting to understand the business value of moving SQL Server databases from their more traditional, dedicated environments to the cloud. IT service providers offer management services and engine capabilities as part of Microsoft's SQL Server analysis and database services that directly address concerns around performance, manageability, scalability and security.

Even for businesses that have little to no experience working in the cloud, SQL Server only requires a small learning curve to get started. For example, when GCommerce implemented its cloud-based solution[1], it had not worked with a cloud platform before. Despite the lack of experience moving critical business applications to the cloud, the company was able to complete a seamless, 90-day transition while avoiding capital investments and reducing deployment costs.
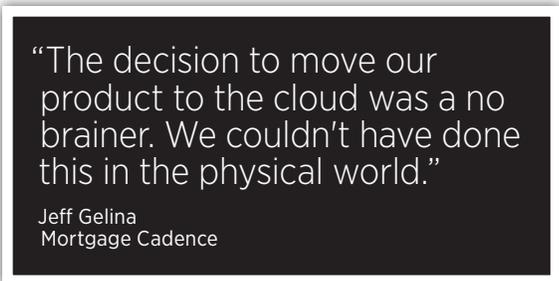
"We had many pleasant surprises when developing the Virtual Inventory Cloud," said Jason Popillion, chief technology officer at GCommerce. "We found we could develop a cloud-based application using our existing development skills and database partitioning models—the learning curve was very small."

1 — Case Study: Service Provider Transforms Special-Order Process with a Hybrid Cloud and On-Premises Inventory Solution, http://www.microsoft.com/india/casestudies/Case_Study_Detail.aspx?casestudyid=4000007733

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Starting with non-core business applications, the cloud can allow companies to get comfortable with the solutions available. As they gain more confidence and learn how things work, they are able to do more as it fits their approach.

For organizations looking for this type of value, here's what a hosting service provider can offer in a cloud for SQL Server databases:

- **Scalability** – For companies that go through major growth periods, the ability to scale up or down as their business grows or shrinks has both an operational and monetary impact on their organization. Running SQL Server in the cloud with an IT outsourcer managing the provisioning engine allows companies to either upgrade or downgrade their CPU and RAM to handle whatever loads are needed. In a dedicated environment, organizations are looking at significant downtime and less predictability because they do not have the level of transparency and visibility into their application needs that they would get in a cloud.

> "The decision to move our product to the cloud was a no brainer. We couldn't have done this in the physical world."
>
> Jeff Gelina
> Mortgage Cadence

- **Cost Effectiveness** – The pay-as-you-go subscription model for cloud computing services provides organizations with on-demand, pay-as-you-go computer and storage to host, scale and manage web applications. This enables businesses to reduce monthly recurring charges by paying only for the resources they use. Companies that take advantage of the subscription model increase their return on investment because they do not have to purchase on-premise hardware, software and support personnel. Additionally, for some companies service providers can offer additional licensing options through their partnership with Microsoft and expertise with SQL Server.

- **Data Availability** – SQL Server offers a broad range of capabilities including log shipping, database mirroring, replication and failover clustering. There are a number of techniques that managed service providers offer companies, who can decide if they want it deployed at the database level, the instance level, or the hardware level. For example, businesses with multiple datacenter sites can use replication to keep their datacenters synchronized. Additionally, multi-national companies can access their data in the same manner wherever they are located.

- **Predictability** – Costs are always a black hole when managing data-intensive applications within a dedicated environment. With internal IT engineers constantly being pulled into different directions, it is

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difficult for companies to understand how much time is dedicated to their database applications. Utilizing cloud infrastructure services as part of SQL Server makes it much easier to predict the exact cost of the IT environment and project their monthly recurring operating expenses.

- **Flexibility** – While there is not necessarily a single approach to moving to the cloud, flexible hosting providers have the expertise that allow businesses to start small with something that is not core to their business, overcome a specific pain point, or take what they have and evolve it into a deeper, more dynamic and comprehensive solution that drives innovation to meet the ever-changing needs of the market. It depends on how sophisticated the customer is. As they get more comfortable and learn how things work, they are able to do more as it fits their approach.

- **Manageability** – As a whole, customers that move to a cloud are hoping to take the entire manageability aspect out of the equation because the cloud offers that for them. Within SQL Server are analysis and database services that help manage their systems. Organizations can leverage Microsoft's management software, CCM, or choose to have their own in-house management software that helps maintain their environment and SLAs.

- **Ease of Use** – SQL Server's self-service business intelligence and reporting capabilities allow organizations to easily create, share and analyze millions of dynamic reports that are stored in easily accessible libraries. This enables companies running SQL Server databases in the cloud to accelerate reporting and analytical processes, and improve the management of critical data across diverse systems and collaboration with their colleagues.

- **Simplicity** – Companies no longer have to worry about a large percentage of their IT environment. They do not have to think about what vendor is supplying their hardware. They do not have to keep spare equipment on hand in case something goes wrong, and they do not have to worry about how much capital needs to be raised to purchase additional hardware to meet uncertain future IT demands.

Maintaining, administering and monitoring databases is an intensive process. That is where a typical IT organization spends a significant amount of time and resources. That drops drastically when businesses leverage the knowledge and expertise of a hosting provider that has the experience and established best practices to provide a streamlined, process-oriented workflow that enables them to realize the many benefits of running SQL Server databases in the cloud and gain a better return on investment.

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Examples of Running SQL Server Databases in the Cloud

Microsoft SQL Server offers a broad range of flexible solutions that allow businesses to put in the cloud what works for them. By working with a managed service provider, companies are able to leverage their expertise and get an actual solution, not just a dial-tone service. In terms of flexibility, company employees can be anywhere in the world and so can their data. For organizations looking for traditional database offerings for both on-premise and the cloud, SQL Server, in partnership with hosting service providers, is a viable alternative solution. Microsoft SQL Azure is the first cloud-based relational and self-managed database service built on Microsoft SQL Server 2008 technologies.

As an experienced hosting provider, and a company that understands infrastructure as well as anyone else, Hosting. com helps businesses realize the advantages of virtualizing data-intense applications beyond test and development. That is why we have put most of our best-of-business SQL Server applications within the cloud. In doing so, we have measured the scalability, performance and cost variance of running a database in the cloud versus a dedicated environment. But don't take our word for it. Learn how our clients have benefited from moving their SQL Server databases to the cloud from a more traditional server environment.

Client Case Study:
Mortgage Cadence Migrates to the
Cloud to Address Downtime Issues

Mortgage Cadence, a SaaS provider to the mortgage industry, was using its own physical servers to roll out various product offerings to customers. With business booming, the company was putting too many clients on physical boxes that could not handle the loads. As a result, the dedicated environment was going down 3-4 times a day. Despite downtime periods that ranged anywhere from 5 minutes to 4 hours at a time, client perception was that the network was always down. With network uptime levels across all of Mortgage Cadence's product offerings averaging between 60-70%, and on the verge of losing several customers, the company had to consider an alternative approach.

Already using virtualization for its back-office applications, Mortgage Cadence was uncomfortable virtualizing its customer-facing products after performance testing showed a 30-40% performance degradation when running their products on a virtualization platform. However, when testing a physical box with Windows 2008 and comparing it with the same physical box with SQL Server 2008, average performance degradation for all of its

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products dropped to 5%, and in some instances, they found applications at the applications layer running faster than in its dedicated environment. That is when Mortgage Cadence decided to virtualize its entire product line.

"At that point, it didn't make any sense to stick with our physical servers," said Jeff Gelina, vice president of IT at Mortgage Cadence. "The level of performance degradation was negligible when weighing it against all the positives the virtualization world brings to you. The decision to move our entire product line to the cloud was a no-brainer."

With Hosting.com managing the provisioning engine, Mortgage Cadence is leveraging two Hosting.com datacenters, its Cloud Enterprise virtualization technology, and a mix of data platforms including SQL Server Express, SQL Server Web Edition, SQL Server Standard and SQL Server Enterprise. With 30% of its infrastructure database-related, the company is taking advantage of the many benefits around flexibility, redundancy, no upfront investment in infrastructure, and the scaling of multiple virtual machines in separate locations without the additional SQL Server licensing costs.

Moving its database infrastructure to the cloud has allowed Mortgage Cadence to re-architect its applications and has completely eliminated any downtime issues. "At the end of the day, the big thing putting our critical business applications in the cloud does for us is eliminate downtime," said Gelina. "We couldn't have done this in the physical world."

Key benefits Mortgage Cadence has experienced since moving to the cloud include:

- Increased network uptime by 40%

- Achieved 100% on all uptime SLAs

- Improved overall level of performance and availability

- Elastic computing automatically scales resources up or down, as needed

- Ability to move back and forth between hosts for maintenance

- Grow high-density infrastructure dynamically with zero downtime

- Maintained a more cost-predictive operational environment

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Client Case Study:
GCommerce Uses a Cloud Platform to Ensure Scalability of its Automotive Inventory Application

GCommerce, a leading SaaS provider that offers electronic services that improve supply chain efficiency, wanted to develop an application for the automotive aftermarket, which relies on special-order drop shipment for most transactions. To centralize inventory access, automate procurement, and scale its operations with its cloud-based solution, it needed to find a way to scale its mapping process. After considering several cloud computing options, GCommerce chose the Windows cloud services operating system and Microsoft SQL Azure for the flexibility it needed to meet the unique requirements of the automotive aftermarket industry.

"SQL Azure is a perfect solution for housing inventory data, in contrast with a traditional data warehouse model," said Jason Popillion, chief technology officer at GCommerce. "We can post data to a common repository that has huge scalability and redundancy, and we can port that worldwide almost instantly."

The highly scalable virtual cloud environment provided on-demand computer and storage through Microsoft datacenters, superior flexibility and simplified administration. "One of the biggest technical benefits we saw with Windows Azure and SQL Azure was the ability to maintain and grow our solutions without the distraction of implementing new infrastructure," said Popillion. "Microsoft cloud services are very important parts of the GCommerce technology stack because we can scale out solutions worldwide at a moment's notice."

GCommerce deployed a large-scale data warehouse called the Virtual Inventory Cloud solution that gave buyers immediate online access to a global inventory of aftermarket parts. The solution is highly scalable, and the company pays only for services consumed. As a result, GCommerce can scale up or down as needed to handle traffic spikes without needing to purchase infrastructure that would sit idle during off-peak times. "With the solution we created using Windows Azure and SQL Azure, we can populate our data in such a way that we can scale the load up or down as needed," says Popillion. "We can scale across multiple nodes and keep data easily accessible, and the pricing model accommodates fluctuating transaction rates."

Along with enhancing the scalability of an exacting and time-consuming mapping process it must complete for each new customer, the Windows cloud platform enables GCommerce to quickly process high volumes of inventory data through leveraging the full power of cloud computing and ability to auto-scale on demand.

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"Now people can have access to an almost infinite supply without adding costs to their existing operations," said Steven Smith, president and CEO at GCommerce. "The Virtual Inventory Cloud with SQL Azure and Windows Azure is the best of both worlds—it drives top-line revenue and reduces bottom-line costs. We can collectively change an entire industry and move it from a random process to a systematic solution in a tenth of the time, with a tenth of the people, at a tenth of the cost."

Key benefits GCommerce has achieved running SQL Server in the cloud:

- End-to-end special orders are 60-times faster (from 15 minutes to 15 seconds)

- Ability to maintain and grow solution without implementing new infrastructure

- Streamlines the supply chain by reducing manual processes

- Reduced abandon transactions and improved retention rates

- Reduced overhead has increased profitability of special orders

Conclusion: Embracing Cloud Computing

For companies considering moving their SQL Server databases to the cloud, a hosting service provider can offer massive aggregations of computing power to eliminate the headaches of IT and embrace cloud computing for its many benefits around productivity, scalability and overall cost-savings without worrying about the security of their data. Organizations can leverage a team that is experienced in the cloud to assess their needs and recommend things they may not have been thinking about to increase performance, decrease costs, and make a high availability solution at possibly the same costs of doing it in a dedicated environment. This is why companies considering running SQL Server-anything should consider placing it into a cloud environment as frequently as in a dedicated environment for their own internal infrastructure.

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