Want More out of SQL Server?
Consider Hyperconverged Infrastructure

SQL Server is one of the industry's most successful software products. For more than two decades, Microsoft's flagship relational database management system has served the needs of large enterprises and smaller organizations across a wide variety of industries.

The product's cost efficiencies and ease-of-use advantage over the two leading data center products—Oracle and IBM's DB2—have made it immensely popular with a wide range of IT professionals, developers and channel partners.

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But IT decision-makers in large enterprises have always sought even more functionality, better performance and greater scalability from the product in order to use it as their sole or primary database for mission-critical requirements.

SQL Server 2014 provided a major upgrade over earlier releases in the form of performance, security and availability. And it looks like there's more yet to come with SQL Server 2016, including improved analytics and further in-memory enhancements. These upgrades and enhancements are particularly timely, as Microsoft prepares to end support for the widely installed SQL Server 2005 in April 2016.

So, while Microsoft has continued to enhance the product to make it even more enterprise-ready, there's another way for organizations to get more from SQL Server: hyperconverged infrastructure.

Hyperconverged infrastructure (HCI) is designed as tightly integrated, pre-validated and performance-optimized hardware and software components, engineered with a slick and highly automated unified management framework. HCI represents a great option for database administrators looking for more—more performance, more scalability, more support for virtualization and cloud, more manageability, more resilience and better data protection.

Earlier iterations of converged infrastructure, which typically focused on the integration of compute and storage components, usually failed to sufficiently boost performance and scalability for Tier 1 workloads like SQL Server. Integration of additional infrastructure components such as deduplication and data protection functionality, as well as a unified management framework, now enables hyperconverged infrastructure to give SQL Server a big lift in functionality. This has been a major step forward in further positioning SQL Server for enterprise-wide utility.

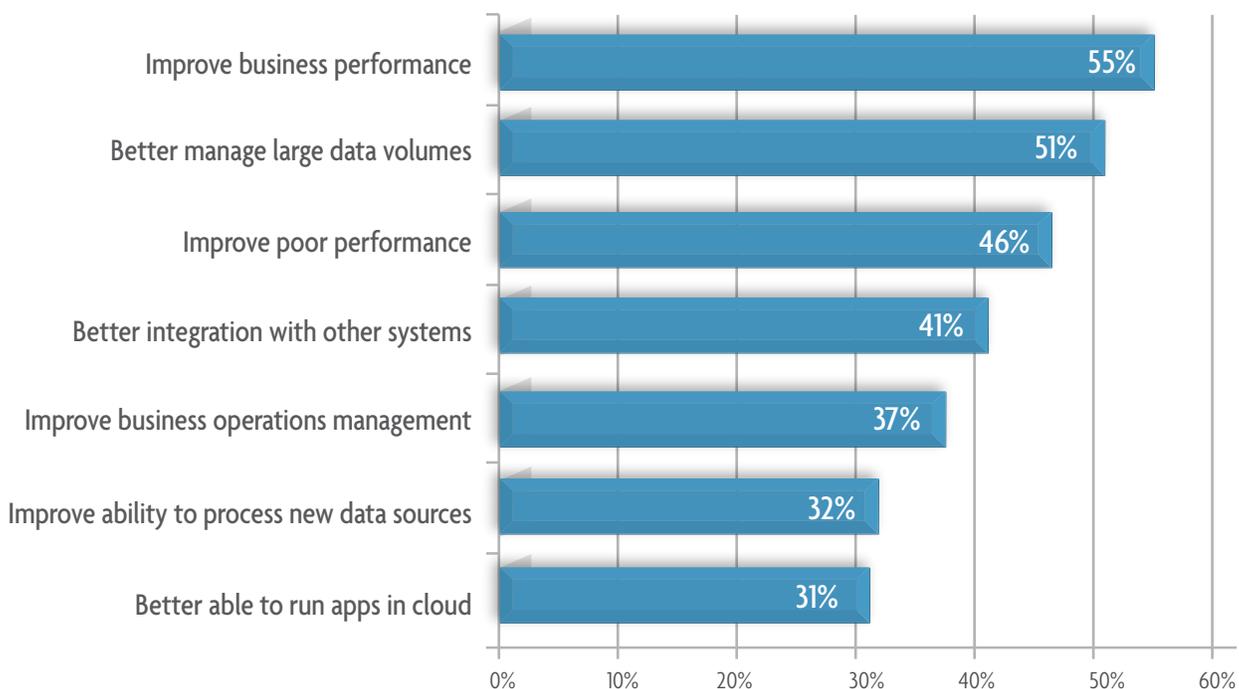## Why SQL Server Needs Hyperconvergence

What is it about SQL Server that lends itself to a different approach for infrastructure? There are several big challenges SQL Server DBAs and IT professionals face:

- Managing increasingly large volumes of data.

- Inadequate performance, such as slow querying, especially at scale.

- Ensuring higher levels of availability and resilience, especially for mission-critical workloads.

- Getting control of storage-related Capex due to greater amounts of data and the addition of deduplication and backup appliances.

- Escalating management complexity, especially in traditional infrastructure stacks.

Of course, there are even more potential headaches for SQL Server environments. SQL Server buyers recently surveyed by TechTarget noted a mix of both technical and business challenges associated with their most recent SQL Server upgrade, driven primarily by three issues: big data-related growth, big data support and a pressing need to improve database performance.[1]

1   "Purchasing Intentions Survey," TechTarget, 2015. Unpublished data.

What challenges are you trying to solve with this database upgrade? (SQL Server buyers)

Challenge	Percentage
Improve business performance	55%
Better manage large data volumes	51%
Improve poor performance	46%
Better integration with other systems	41%
Improve business operations management	37%
Improve ability to process new data sources	32%
Better able to run apps in cloud	31%

Source: 2015 Purchasing Intentions Survey (SQL Server buyers)

As data volumes have exploded, and as organizations have asked enterprise database management systems to do more, SQL Server administrators have scrambled to come up with new approaches. For many, the initial fix was to ask for more Capex: more spinning disks, more servers, and more network capacity.

DBAs also have had to become incredibly nimble in adjusting on a dime to shifting business priorities. In fact, SQL Server shops must have the agility not only to change with the business, but to actually get ahead of the capabilities of traditional IT infrastructure to respond to real-world business challenges such as postponing one project but suddenly adding two new ones.

But few organizations were able to either secure enough Capex to make a difference, or to turn that added spending into a sustainable solution. Not only that, traditional infrastructure was becoming more and more untenable from a management perspective. It put greater responsibility on undersized and over-stretched IT staffs to manually tune SQL Server for optimal performance. Additionally, it often required the implementation of specialized appliances for deduplication, backup and recovery to deal with the mission-critical nature of these greater data volumes. This added even more management complexity, as well as greater Capex.

Instead, more and more organizations turned to virtualization, and SQL Server quickly become the Tier 1 application most likely to be virtualized. It was this virtualization-centric deployment and operational model that led to a tight alignment between SQL Server and HCI's virtualization-friendly, modernized infrastructure model.

What to Look for in a Hyperconverged Solution Optimized for SQL Server

Because SQL Server has become such a mainstay in IT circles and optimizing its performance and cost efficiency is such a priority, organizations are aggressively searching for better and more modernized platforms for the database. Many technology suppliers are actively pitching their converged solutions as a good fit for SQL Server, and some are even using the "hyperconverged" moniker to position their products in the most advantageous way possible.

However, not all solutions deliver hyperconvergence in the same way—or really are hyperconverged by the true sense of the definition: tight integration of all infrastructure components under the hypervisor with data efficiency, VM-centric management and built-in data protection.

When evaluating potential hyperconverged solutions, there are a number of key features and capabilities you should look for in order to ensure its best fit for SQL Server environments. These include:

- **Built-in data protection.** Many solutions billing themselves as converged or even hyperconverged lack this key feature, which is essential as SQL Server is increasingly tasked with mission-critical data and is being subjected to more demanding service-level agreements related to recovery point and recovery time objectives (RPO and RTO). Unexpected downtime in SQL Server environments can cost huge amounts of money and seriously disrupt essential operations. While Microsoft has continued to upgrade its own native backup tools in the database, most organizations have sought extra safeguards by purchasing specialized data protection appliances. This adds cost and complexity for deployment and ongoing management. Native data protection in an HCI solution is the better way to go.

- **VM-centric management.** Many converged solutions are based on reference architectures that specify how organizations can integrate hardware components such as storage and compute, while others may integrate those components and sell them as a single SKU. In either case, this approach does not enable the ability to view and treat these systems as a collective, integrated pool of resources, which is key to reducing complexity, a critical goal for DBAs and IT professionals alike. SQL Server DBAs much prefer to manage VMs rather than data stores or logical unit numbers associated with physical infrastructure. VM-based architecture allows DBAs to move virtualized resources and their data in a single click.

- **Data efficiency.** Ideally, your HCI solution should include a virtualization layer that handles deduplication, compression and data optimization inline to reduce IOPS, storage capacity and network bandwidth. If done correctly, this type of approach can deliver data efficiency and improved performance.

- **Enterprise-class performance at scale.** As SQL Server workloads grow and expand, so do demands for faster performance. While Microsoft has taken important steps to improve the database's native performance, your HCI solution needs to be innovative in accelerating application performance through both hardware and software techniques.

Case Study:
NewPage

As a large manufacturer of paper used in printing and specialty applications, NewPage had a decidedly VM-centric approach to infrastructure. Its 10 systems administrators supported 350 VMs running Tier 1 enterprise applications such as ERP, data warehousing and SAP, and the organization was striving for the most efficient IT infrastructure to support its virtualization philosophy.

Although NewPage had virtualized 95% of its infrastructure using VMware's vSphere, it knew it could enjoy greater financial and operational benefits by finding new ways to hit full virtualization. A key requirement would be updating its aging legacy infrastructure, which was costly and inefficient, with many silos of servers and SAN-based storage that inhibited scalability.

By deploying SimpliVity's OmniCube HCI solution, NewAge was able to quickly and easily move 350 applications—including a 3.4-terabyte SQL Server data warehouse application—to a vSphere infrastructure. The result: a 25% increase in performance, 92% reduction in cycle times, capacity savings of 628 terabytes and a one-week time to value.

Why SimpliVity for SQL Server

DBAs working with SQL Server are increasingly utilizing the database for a wide variety of workloads, and in recent years have taken advantage of improvements Microsoft has made to the database by deploying it for mission-critical requirements such as OLTP, business intelligence and other performance-intensive use cases.

But these DBAs have to work in harmony with infrastructure administrators who allocate the proper resources to support DBA service-level agreements. They also demand high availability and rock-solid data protection—even above and beyond what Microsoft offers natively within SQL Server.

SimpliVity addresses DBAs' needs through its OmniCube and OmniStack HCI platforms, running on industry standard x86 infrastructure that tightly integrates all infrastructure under the hypervisor, including compute, storage, deduplication appliances, backup software, replication, WAN optimization technology and cloud gateways. The SimpliVity solutions are modular, 2U building blocks optimized for VM environments. The solution runs on enterprise-grade, white-labeled servers under the SimpliVity OmniCube brand name, or on third-party servers under the SimpliVity OmniStack name. At the time of publication, supported third-party servers included Cisco UCS.

SimpliVity's value proposition for SQL Server environments is based on three key principles: accelerated data efficiency, VM-centric unified management and built-in data protection. Each of these is extremely valuable to SQL Server DBAs because they help address the critical challenges of predictable and peak performance, scalability, resiliency, data protection, and cost efficiency.

SimpliVity's approach to hyperconverged infrastructure gives a dramatic boost to database performance through inline deduplication, compression and data optimization at ingest across primary and backup storage. These processes are handled by the OmniStack Accelerator Card, which enables predictable and peak performance at scale, without manual tuning by DBAs.

A recent study noted that SQL Server is the application most likely to be running on SimpliVity hyperconverged infrastructure. That study pointed out that a third of respondents experienced at least 100:1 data efficiency, and half of respondents saw performance improvements of at least 50%.[2]

SimpliVity solutions also address essential cost issues often faced by DBAs by helping to eliminate legacy infrastructure silos that must be managed individually—these silos require additional Capex investment to support workload scalability. SimpliVity hyperconverged

2   "TechValidate Research on SimpliVity OmniCube," TechValidate, July 2015

Case Study:
Westmoreland Intermediate Unit

Another real-world example of an organization that saw tangible benefits from deploying SQL Server on a SimpliVity HCI platform is Westmoreland Intermediate Unit (WIU), a regional educational service agency.

WIU was running into a common problem with their virtualized SQL environment: how to deal with the increased need for more frequent backup and more stringent retention policies in the face of storage infrastructure limitations. WIU migrated 30 VMs to an OmniCube HCI cluster without any end-user performance degradation.

The SimpliVity OmniCube solution saved more than 240 terabytes of data storage, and dramatically reduced RTOs and RPOs for their SQL workloads.

infrastructure solutions integrate with existing management consoles such as VMware vCenter, and orchestration and automation software from a variety of vendors. Policy management is handled at the VM level and promotes VM mobility.

Finally, DBAs benefit from SimpliVity's built-in data protection because it allows for fast, reliable backups at the VM level without impacting production workloads or user productivity. Financial decision-makers also benefit from the built-in data protection feature because it helps to eliminate the need for dedicated backup appliances and data protection software that add cost.

Conclusion

Hyperconverged infrastructure is revolutionizing information technology from the data center to the small branch office. The industry-wide movement toward virtualization, combined with the increased need for data efficiency, built-in data protection and VM-centric management, makes HCI an attractive solution for organizations looking to increase performance, ease complexity and enhance scalability for SQL Server environments.

As Microsoft continues to ramp up SQL Server's functionality, database administrators and other IT professionals are rapidly adopting HCI as the foundation for a new, more facile and performance-optimized database environment. The increased virtualization of SQL Server workloads adds more impetus for organizations to evaluate HCI vendors who have architected their infrastructures to be VM-centric.

SimpliVity has designed its HCI solutions to overcome traditional challenges and pitfalls associated with SQL Server, including over-provisioning, performance challenges, management complexity and gaps in data protection coverage. The combination of SimpliVity HCI solutions with modernized versions of SQL Server helps to dramatically enhance data protection with improved RPOs and RTOs, as well as simplify management and create sustainably high performance at scale with improved data efficiency.

If you've virtualized Tier 1 applications like SQL Server, or are considering doing so, SimpliVity hyperconverged infrastructure solutions should be at the top of your consideration set.

For more information on why and how to make SimpliVity your hyperconverged solution for SQL Server environments, please go to: www.simplivity.com/wpcontent/uploads/Microsoft_SQL_Server_Solution_Brief.pdf.