



White Paper

Optimize Microsoft SQL Server Workloads with NetApp Solutions

Unleash the Power of Your Data and Gain a Competitive Advantage with NetApp Cloud and All-Flash Solutions

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Abstract

Manage your SQL Server data with NetApp® storage and data management technology. Learn how SQL Server database workloads running on NetApp systems can help you grow your business, make actionable decisions faster, and deliver a consistent user experience, on your premises and in the cloud. Discover how you can improve data center economics and accelerating your return on investment.

TABLE OF CONTENTS

| | |
|--|-----------|
| 1 Accelerate Your IT Transformation..... | 3 |
| 1.1 NetApp and Microsoft SQL Server: A Winning Combination | 3 |
| 2 Keep Your Business Running..... | 4 |
| 2.1 Speed Application Response Times | 4 |
| 2.2 Maximize Availability..... | 4 |
| 2.3 Enable 24/7 Operations | 5 |
| 2.4 Protect Your Data Across Edge, Core, and Cloud | 5 |
| 3 Accelerate Innovation | 7 |
| 3.1 Deploy New SQL Server Databases in Minutes..... | 7 |
| 3.2 Accelerate Development Cycles | 7 |
| 3.3 Maintain Optimal Storage and VMware Performance | 7 |
| 3.4 Reduce Management Complexity | 7 |
| 3.5 Reduce Risk..... | 7 |
| 3.6 Make Better-Informed Decisions..... | 8 |
| 4 Move to the Cloud at Your Own Pace..... | 8 |
| 4.1 Enable Consistent Performance | 8 |
| 4.2 Scale Seamlessly and Without Limit..... | 8 |
| 4.3 Lower TCO..... | 9 |
| 5 Summary | 9 |
| 6 Learn More | 10 |

LIST OF FIGURES

| | |
|---|----|
| Figure 1) NetApp has the deepest integration with the three largest hyperscalers, making it easier to implement a hybrid cloud environment for production, dev/test, backup, archive, and DR..... | 4 |
| Figure 2) NetApp Cloud Volumes Service supports the Always On Availability Groups in SQL Server, helping to maximize availability..... | 5 |
| Figure 3) From edge to core to cloud, NetApp integrated data protection helps safeguard your data..... | 6 |
| Figure 4) Why NetApp for SQL Server—on the premises or in the cloud..... | 10 |

1 Accelerate Your IT Transformation

IT organizations face constant change. There's the overarching transition to cloud, which raises questions about what workloads to move when. And there are application-level transitions imposed by vendors when they end support for older versions of software, forcing companies to upgrade. Microsoft SQL Server is swept up in both of these transitions. Organizations rely on SQL Server for everything from ERP to analytics, and thousands of them are running the 2008 or older versions that are now end of support.

Leaders who are responsible for business-critical infrastructure must decide whether to migrate to the cloud now or remain on the premises with the ability to move to the cloud in the future. Many application vendors recommend moving to the cloud, but IT organizations may lack the skills to seamlessly manage this jump. Instead of focusing their efforts on innovation and moving the business forward, IT departments are left to struggle with how to:

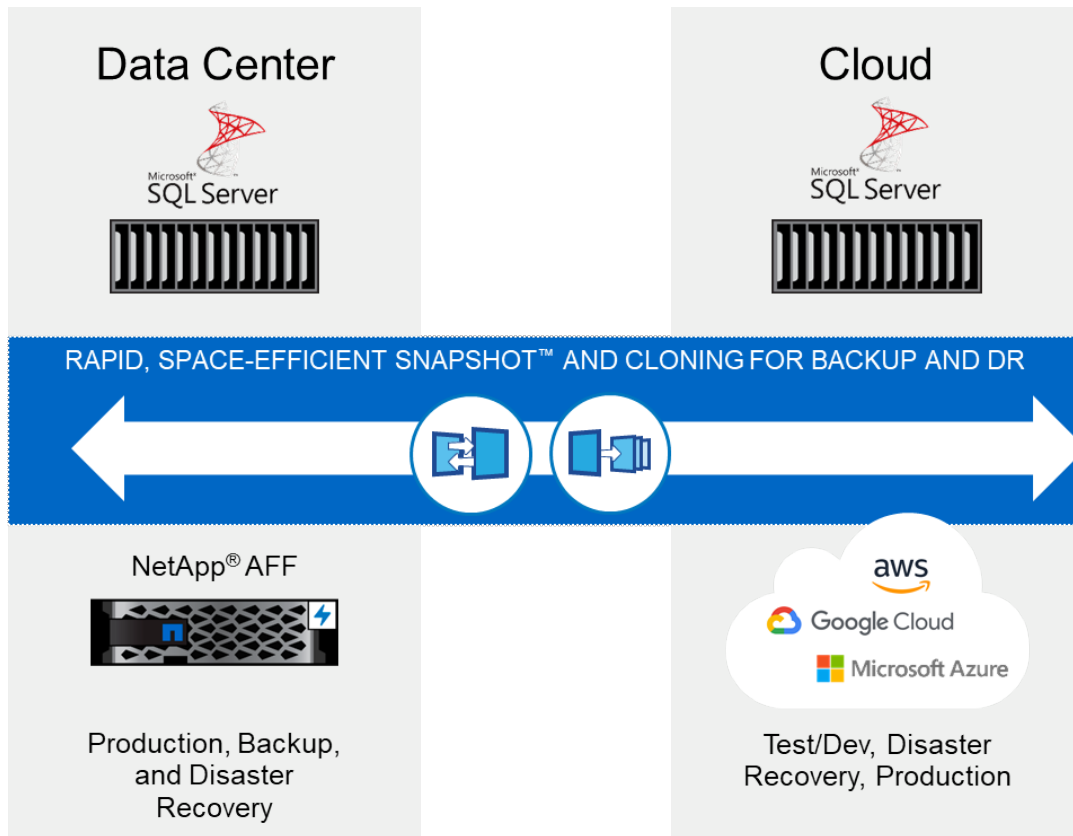
- Support this transition along with emerging applications while preparing for a cloud future—without introducing extra cost, risk, or time
- Stay ahead of accelerating performance and availability demands, while continuously protecting and getting more value from data across on-premises, edge, and cloud resources
- Provide a responsive, uninterrupted experience for the applications that rely on SQL databases, the engines that power their business

1.1 NetApp and Microsoft SQL Server: A Winning Combination

To help ease your transition and get the most value from your SQL Server data, NetApp offers a broad portfolio of solutions that support hybrid multicloud capabilities. From edge to core to cloud, our solutions provide choice and flexibility—without compromise. NetApp® cloud-connected all-flash systems, Azure NetApp Files, and Cloud Volumes Service are all designed to help organizations accelerate their infrastructure transformation and fuel data-driven strategies. Powered by NetApp ONTAP® data management software, NetApp solutions deliver the industry's highest performance and resilience, superior flexibility, best-in-class data services, and integration with the world's leading clouds—Microsoft, Google, and Amazon. NetApp's broad portfolio of solutions enables you to adopt the cloud at a pace that works for your business.

Optimized setup for Microsoft SQL Server means that you can start realizing the benefits of your NetApp investment quickly. Those benefits include fast database response time, the ability to back up and restore data in seconds, and instantaneous cloning for dev/test and analytics. NetApp solutions are built for change, enabling you to scale dynamically and move data and applications freely to where they run best—on your premises or in your choice of cloud providers. You can be confident that your business will have the agility and innovation you need to keep up in a dynamic digital world.

Figure 1) NetApp has the deepest integration with the three largest hyperscalers, making it easier to implement a hybrid cloud environment for production, dev/test, backup, archive, and DR.



2 Keep Your Business Running

Resilience is key to winning the race against your competitors. With NetApp solutions for SQL Server, you can keep your business running by making sure that you have the performance and data protection your business requires. You will have peace of mind knowing that your data is safe and accessible only by authorized users. Also, you're protected against unplanned outages and data loss, so your SQL Server data will be available whenever and wherever it's needed.

2.1 Speed Application Response Times

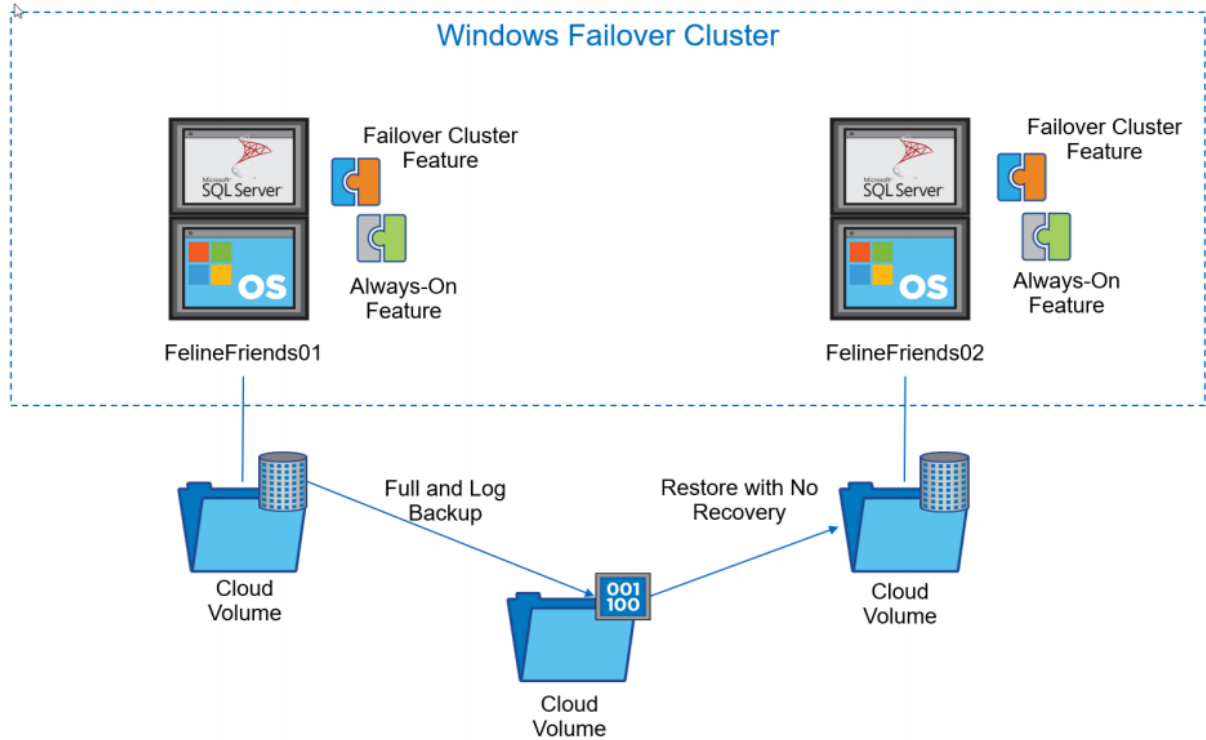
Consistent low latency provides an enhanced user experience and helps reduce customer/employee churn, with throughput that enables the generation of reports in hours instead of days. NetApp all-flash storage systems speed up your SQL Server environment with the fastest unified scale-out all-flash array on the market, with up to 1 million IOPS and latency of about 100 microseconds. Combining the industry's fastest end-to-end all-flash arrays with a truly end-to-end NVMe, NetApp high-performance, highly scalable all-flash solutions enable you to cut application response times in half, so that you can easily support peak usage demands.

2.2 Maximize Availability

Availability is crucial to your SQL Server environment. NetApp all-flash systems deliver 99.9999% availability (~31.5 seconds per year of pausing). Nondisruptive software updates and hardware maintenance help deliver nonstop operations. NetApp Active IQ® uses predictive analytics to expose and address risk factors before they can affect your business, leading to improved system health and

increased availability. If an outage does occur, NetApp solutions deliver up to 98% faster data recovery than traditional solutions for planned and unplanned system, site, and regional outages. Support for SQL Server Always On Availability Groups through NetApp Cloud Volumes Services helps maximize availability for one or more user databases.

Figure 2) NetApp Cloud Volumes Service supports the Always On Availability Group feature in SQL Server, helping to maximize availability.



2.3 Enable 24/7 Operations

Any interruption to SQL Server workflows can bring the business to a halt. To maintain business continuity, a disaster recovery plan that meets RPOs and RTOs is essential. For seamless data protection, you can build SQL Server solutions that are fully integrated with NetApp Snapshot™ and SnapMirror® replication technologies.

Most organizations have a disaster recovery plan, but they might not know whether the plan actually works until it's too late. Halting the production environment for disaster recovery testing is not a viable option for most businesses. With NetApp solutions, you can easily use current data to test your disaster recovery plan. Using NetApp FlexClone® technology to clone the disaster recovery site, you can carry out a failover test without influencing or interrupting ongoing replication to the active disaster recovery site. Because FlexClone delivers up to 90% savings in time and effort compared to traditional solutions, you can perform more tests in less time, and you'll feel better knowing that your data is protected.

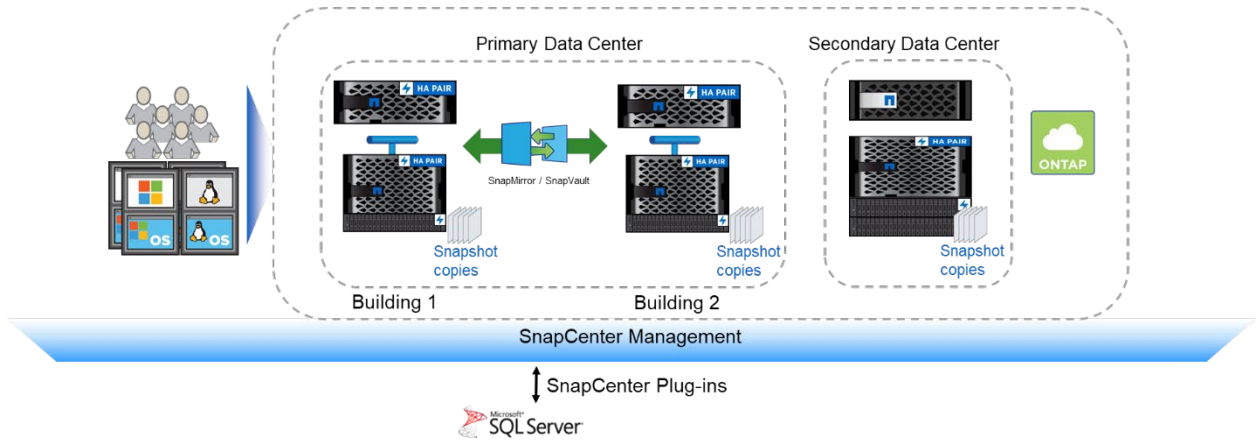
2.4 Protect Your Data Across Edge, Core, and Cloud

NetApp integrated, automated data protection helps safeguard your data no matter where it resides or moves. SnapCenter, with its single-pane-of-glass management interface, automates and simplifies the manual, complex, and time-consuming processes associated with the backup, recovery, and cloning of multiple databases and other application workloads.

NetApp Snapshot copies and SnapMirror replication software (both of which are built into SnapCenter) send only changed blocks over the network, enabling faster, more complete backups that use less

bandwidth and consume less storage space to enable more cost-effective disaster recovery. To get more value from your backup and disaster recovery sites, you can use those secondary data copies for development and testing or for analytics and reporting.

Figure 3) From edge to core to cloud, NetApp integrated data protection helps safeguard your data.



| NetApp Solution in Action: Danske Fragtmænd | |
|---|--|
| Company Description | Danske Fragtmænd is a major Danish player in transport of goods, with 22 offices across Denmark and 6 primary freight centers around the country. |
| Industry | Transportation |
| Challenge | Providing forwarders and planners with real-time information for accurate shipment scheduling and truck planning; nondisruptive operations, and robust performance were key requirements for staying a step ahead in a very competitive marketplace. |
| Solution | NetApp AFF A700 MetroCluster™ solution, with active-active on-site data mirroring |
| Benefits | <ul style="list-style-type: none"> • Accelerates SQL Server database transactions with 0.7 millisecond latency, even during peak times • Provides real-time data availability across all freight centers • Keeps business flowing with no unplanned downtime Learn more |

3 Accelerate Innovation

NetApp solutions offer intelligent operations features that help you derive greater value from your SQL Server data and accelerate business innovation. These features can help you get to market faster, with higher-quality products. Automation of redundant tasks helps to streamline IT operations and reduce risk of errors.

3.1 Deploy New SQL Server Databases in Minutes

With the Application Aware Data Management (AppDM) feature embedded in ONTAP 9, you can easily deploy, manage, and monitor NetApp storage for your SQL Server databases. AppDM enables you to describe the SQL Server database that you want to deploy over ONTAP in terms of the application, rather than in storage terms. Your SQL Server database can be configured and ready to serve data quickly with minimal inputs by using ONTAP System Manager and REST APIs. The simple, repeatable application workflow helps reduce risk and accelerate provisioning time, a process that takes just minutes rather than days or weeks required for typical manual provisioning. Cloud volumes up to 100TB can be provisioned in just 8 seconds with NetApp Cloud Volumes Service.

3.2 Accelerate Development Cycles

Cloning your SQL Server data for testing and development can add hours (even days or weeks) to the development cycle. With NetApp FlexClone thin-cloning technology, you can clone the largest volumes in seconds. Because FlexClone uses just a small amount of space for metadata and uses additional space only as data is changed, you don't incur the added expense of purchasing large amounts of extra storage capacity. You can create as many copies of your full production dataset as you need. If a test corrupts the data, you can start again in seconds, with almost no delay in development. And, because you can clone data from a primary site, an off-site backup, or a disaster recovery location, your test data is always up to date, enabling better results in less time.

3.3 Maintain Optimal Storage and VMware Performance

Predictive analytics and actionable intelligence using NetApp Active IQ monitoring keep your NetApp systems operating at peak performance. Active IQ Unified Manager predicts and detects problems with performance and capacity and makes configuration recommendations to help optimize your storage and VMware environment. By following Active IQ recommendations and mitigation plans, you can avoid bottlenecks and deal with issues proactively.

3.4 Reduce Management Complexity

Solutions built on NetApp all-flash storage systems streamline SQL Server operations with up to 90% savings in time and effort compared with existing solutions. NetApp solutions for SQL Server offer proven value with fewer components, greater return on investment, and lower TCO. With the most options for private, public, and hybrid cloud deployments, NetApp solutions allow you to put your SQL Server data wherever it makes the most sense. As business needs change, you can easily and nondisruptively move your data between cloud and on-premises environments. NetApp ONTAP data management efficiencies simplify management and data protection across your entire SQL Server environment, in the data center and in the cloud.

3.5 Reduce Risk Associated with Manually Configuring Databases

NetApp solutions are fully tested and proven to operate seamlessly with SQL Server applications. Capacity monitoring through NetApp Active IQ predicts when you will need more storage, eliminating overprovisioning and overpurchasing. Proactive monitoring from Active IQ predicts potential issues to help reduce downtime and resolve issues quickly, with minimal troubleshooting time.

3.6 Make Better-Informed Decisions

With a data fabric powered by NetApp, data is accessible where it's needed most, helping you to realize its full potential. Because the data fabric enables you to access your data across your entire IT infrastructure—on your premises and in the cloud—you gain better insights into your business. These insights can help you make better-informed decisions to guide your business.

| NetApp Solution in Action: Vital Energi | |
|---|---|
| Company Description | Vital Energi designs, builds, supplies, and maintains new methods of low-carbon, renewable energy generation. Founded in 2000, the company has more than 400 employees. |
| Industry | Energy |
| Challenge | To keep pace with tremendous growth, the company needed to overhaul its IT infrastructure and create a platform that would help sustain and drive the business forward. In particular, the company needed a solution that would enable them to quickly generate reports that help them identify new business opportunities. |
| Solution | NetApp AFF |
| Benefits | <ul style="list-style-type: none">• Reduces generating time for reports from 3 to 5 hours to just 10 minutes• Accelerates SQL Server database and other enterprise applications by up to 20 times• Simplifies management by enabling the IT team to clone, restore, and back up databases with one click Learn more |

4 Move to the Cloud at Your Own Pace

NetApp supports SQL Server on premises and in the world's leading clouds: Microsoft Azure, Google Cloud, and Amazon AWS. We offer the largest range of options so you can adopt the cloud at the pace that works for your business. Our data fabric unifies data management across cloud and on-premises resources, enabling you to run your data and applications in the environment that best suits your business requirements. Our flexible cloud options allow you to move data and applications from on your premises to any cloud of your choosing (or between different clouds) and back again as your business need dictate.

4.1 Enable Consistent Performance

Many organizations are reluctant to move their business-critical applications to the cloud because they can't afford unpredictable performance. With Azure NetApp Files and NetApp Cloud Volumes Service, you get consistent high performance and maximum availability. Your SQL Server environment will run in the cloud at peak performance and availability with consistent 250K IOPS and millisecond latency.

4.2 Scale Seamlessly and Without Limit

By combining on-premises and cloud resources, your company can grow seamlessly as business needs dictate. For example, you can instantly spin up a testing and development site in the cloud, and spin it down when the project is complete.

Because NetApp offers a truly unified storage architecture with a single data management system (ONTAP) across all platforms, you can scale capacity and performance without requiring data migration or a change of operating system. You can start small and grow the system with your business by using

high-capacity SSDs or HDDs to scale your storage environment. Storage systems that run NetApp ONTAP can handle SAN and NAS workloads that range from a few terabytes to up to 176PB. You can scale by adding capacity to existing storage controllers or scale out by adding controllers to seamlessly expand your cluster up to 24 nodes. With NetApp solutions for SQL Server, storage no longer becomes a bottleneck for projects. Your business is free to expand without limits, across on-premises and cloud resources.

4.3 Lower TCO

NetApp solutions for SQL Server can help you improve IT economics, on the premises and in the cloud. NetApp offers the lowest \$/MBps for all-flash arrays in the SPC-2 top ten list, occupying three of the places on the list. Because NetApp solutions allow you to scale compute and storage independently, you pay only for the SQL Server licenses you really need.

FabricPool can automatically tier cold data blocks to any S3 container on any cloud, significantly reducing the cost of your on-premises storage. And, because SnapMirror can replicate data to ONTAP volumes in the cloud, you can eliminate the expense of building and managing a secondary data center for disaster recovery.

| NetApp Solution in Action: Atasay Jewelry | |
|---|---|
| Company Description | Atasay is the leading brand in the Turkish jewelry sector. It serves customers in 131 brick-and-mortar stores around the world and through an online store. |
| Industry | Retail |
| Challenge | Solve data storage issues around manageability, performance, and data protection while consolidating data and virtualizing servers to build a private cloud. |
| Solution | Three NetApp FAS systems |
| Benefits | <ul style="list-style-type: none"> • Reduced storage operations costs by 45% • Lowered administration efforts by 40% • Accelerated backup time from 1.5 hours for a 380GB SQL Server database to just 2 minutes Learn more |

5 Summary

Data-driven enterprises depend on business-critical applications that run on Microsoft SQL Server databases. Line-of-business application owners must provide a responsive, uninterrupted experience for employees, customers, and partners who rely on the applications and the SQL Server databases that underpin them. This ability requires predictability and high levels of performance and availability, even in the face of shrinking budgets. At the same time, as SQL Server 2008 reaches end of support, businesses are forced to upgrade. The cloud looks promising, but many companies lack the skills to make that jump.

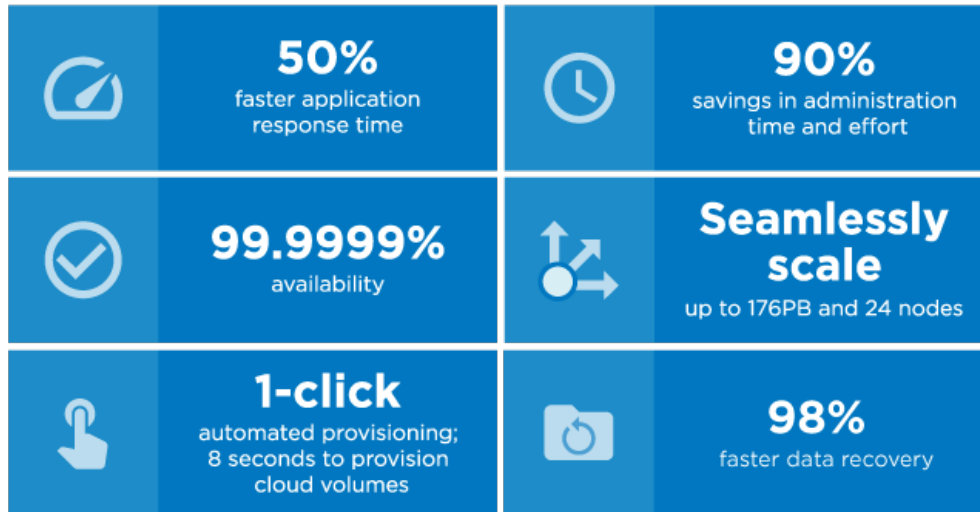
By building a hybrid cloud infrastructure with NetApp solutions, you can create a data fabric that enables you to meet business demands and gain a competitive edge now and in the future. From edge to core to cloud, NetApp solutions for SQL Server enable you to:

- **Keep your business running.** Boost application response times and deliver 99.9999% availability to provide access to SQL Server data when and where it's needed, no matter where it resides. Integrated data protection helps make sure that your data is safe and protected against loss if an outage occurs.

- **Accelerate innovation.** Rely on intelligent operations features to help you deploy new SQL Server databases in minutes and speed development cycles.
- **Move to the cloud at your own pace.** Choose the deployment model and cloud provider that best meet your business needs now, and easily change as your business requirements evolve.

Whether you choose to deploy your SQL Server environment on your premises or in the cloud, NetApp has the solutions to help you transition faster and more easily. Our solutions deliver the resilience, intelligent operations, and cloud flexibility your business requires to get the most value and insight from your SQL Server data.

Figure 4) Why NetApp for SQL Server—on the premises or in the cloud.



6 Learn More

The following resources provide more detailed information about NetApp solutions for SQL Server:

- Customer success story: [Vital Energi](#)
- Customer success story: [Danske Fragtmænd](#)
- Customer success story: [Atasay Jewelry](#)
- [Microsoft solutions from NetApp](#)
- [Cloud Volumes for SQL Server](#)
- [Gain Data Intelligence for SQL Databases: Azure](#)
- [Gain Data Intelligence for SQL Databases: AWS](#)
- [Gain Data Intelligence for SQL Databases: Google Cloud](#)
- [SnapCenter Backup Management](#)
- Solution brief: [FlexPod Datacenter with Microsoft SQL Server 2017 Always On Technology](#)
- Datasheet: [NetApp SnapCenter](#)
- Infographic: [NetApp Solutions for Microsoft](#)
- Blog: [Determining What Enterprise Apps Go Cloud as Part of Building a Cloud Aware Enterprise](#)
- PeerPaper Report: [How All-Flash Storage Transforms Enterprise Applications](#)
- TR-4532: [All-Flash Business Processing: SAN and ONTAP 9 Verification Tests Using Microsoft SQL Server Workloads](#)
- TR-4764: [Best Practice Guide for Microsoft SQL Server with NetApp EF-Series](#)

Refer to the [Interoperability Matrix Tool \(IMT\)](#) on the NetApp Support site to validate that the exact product and feature versions described in this document are supported for your specific environment. The NetApp IMT defines the product components and versions that can be used to construct configurations that are supported by NetApp. Specific results depend on each customer's installation in accordance with published specifications.

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