ESG WHITE PAPER

How Cloud Storage Infrastructure Can Make or Break Your SAP Migration

Azure's PaaS Cloud Storage for SAP with Azure NetApp Files Offers Breakthrough Gains in Simplicity and Performance

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Introduction

In today's data-driven economy, enterprises worldwide rely on SAP to intelligently optimize operations, reduce risk, and improve productivity. In fact, SAP is central to the operations of so many enterprise businesses it is now a significant front in the worldwide migration of IT operations to the public cloud.

As more organizations seek to harness the benefits of cloud infrastructure for SAP workloads, the limitations of native public cloud services compared to data center infrastructure have put a spotlight on specific challenges with SAP cloud migration projects and ongoing operations. Nowhere are those limitations more acute than in the integration of cloud compute and storage services, and yet storage service is among the least deliberated decisions during migration planning for many SAP customers.

While storage is certainly a recognized priority for high performance workloads, it's typically a secondary consideration for most business workload migrations. The game-changing realization for those grappling with SAP migrations is that selecting the right storage infrastructure can mean the difference between acheiving business objectives or refactoring workloads.

In this brief white paper, we'll look at common storage service options typically available for running SAP on native public cloud services, IaaS and SDS, and how they present limitations for achieving the business agility, performance, and productivity managers expect when migrating SAP workloads to the cloud. We'll also look at PaaS as a storage service option, available today with Azure NetApp Files (ANF), and why Microsoft and NetApp have partnered to deliver a native cloud storage solution on Azure with design characteristics that hit the sweet spot for accelerating SAP workloads and migrations.

Whether you're planning an SAP migration or trying to triage a migration that isn't standing up, it's essential to take extra care to ensure the cloud environment meets the needs of your SAP environment. To achieve the objectives of reducing the risk and cost of supporting SAP in the cloud, while improving business agility and productivity, the storage service you select can make all the difference.

Complexity of Native Cloud Storage Options for SAP

Over the years, SAP has earned its reputation as an application that can strain and quickly overwhelm weaker storage solutions. As a result, selecting the right cloud storage infrastructure is essential for SAP. When cloud users were asked about their biggest challenges using public cloud infrastructure services, nearly one-third (31%) of IT professionals cited the high cost of moving data, while 27% cited implementing security off-premises, and 23% said sizing workloads properly for cost prior to cloud deployment. In addition, 22% answered that ensuring necessary availability /redundancy is one of their biggest challenges (see Figure 1).1 To maximize the value of a cloud-based SAP environment, organizations need to leverage cloud storage technology that addresses these common challenges of more traditional public cloud infrastructure storage.

In addition, the complexity of leveraging cloud infrastructure extends to the process of migrating applications from an established data center environment as well. For example, ESG research shows that, on average, 38% of rehosting cloud migrations projects miss deadlines, along with an average 45% when refactoring applications

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1 Source: ESG Master Survey Results, *2019 Data Storage Trends*, November 2019.

for cloud migrations. 93% of respondents agreed that cloud migration processes at their organizations can be meaningfully improved.2

Figure 1. Top 11 Storage-related Challenges When Using Public Cloud Infrastructure Services

In general, what would you say are your organization's biggest challenges with leveraging public cloud infrastructure services (IaaS/PaaS)? (Percent of respondents, N=314, multiple responses accepted)

High cost of moving data back and forth (egress fees)	31%
Challenges implementing security off-premises due to lack of visibility to devices and workloads	27%
Backup, archive, disaster recovery of data located in multiple locations with multiple copies.	25%
Lack of coordination/cooperation/integration of cloud teams with traditional IT functional teams	25%
Sizing workloads properly for cost prior to deployment on the cloud	24%
Difficulty managing a rapidly evolving environment	24%
Time and effort associated with moving data back and forth	23%
Little control over the deployment to implement new technology since the infrastructure is not owned by the IT organization	23%
Sizing workloads properly for performance prior to deployment on the cloud	23%
Meeting budget constraints since pricing is elastic	22%
Ensuring necessary availability, redundancy	22%

Source: Enterprise Strategy Group

For SAP workloads that are critical to business operations, the cost and risk associated with cloud initiatives increase significantly. The organization must apply additional scrutiny to ensure that the resulting cloud environment suits the needs of the workload, while the migration process must also go smoothly. Delays and missteps with workloads like SAP often impact the business in a significant way.

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2 Source: ESG Research Insights Report commissioned by NetApp, *How Hybrid Cloud Environments are Changing IT Architecture Priorities*, April 2021.

SAP Requirements for Cloud Deployments

There are three popular deployment options for SAP: scale-up (single-node), scale-up with high availability (HA), and scale-out (multi-node). According to SAP, scale-up consists of one physical machine leveraging the amount of RAM for processing. Scaling up with high availability means the system will continue to operate regardless of server failure. Scale-out involves combining multiple independent computers into one system to expand the system, overcoming hardware limitations of one server.

Different organizations can have different priorities for their SAP environments and as a result may leverage different deployment options. When selecting cloud storage for SAP, ensure that the storage solution can support any of the three SAP deployment options for greater flexibility.

Supporting scale-out SAP environments, for example, often requires greater performance in the form of multiple compute nodes, while presenting a highly available shared storage platform that can scale with demand. This is in addition to other expected storage capabilities for protection, availability, and management.

Cloud storage for SAP should:

- **Improve the risk posture of the SAP environment**: Cloud offers incredible benefits to agility and flexibility, but these should not come at the expense of security and resilience. The resulting cloud environment should improve the risk posture of SAP, in addition to reaping the rewards of cloud.

- **Optimize cloud economics:** Cloud strategy is predicated on the idea that it optimizes TCO. The resulting SAP environment should not only reduce infrastructure spending but should also reduce the cost and complexity of managing the environment.

- **Improve business agility and productivity.** Businesses run on SAP. The resulting environment must be able to empower organizations, allowing them to deliver faster and superior results, while improving productivity.

Azure NetApp Files for SAP Workloads

Microsoft, a leader in data center technology and public cloud services, offers Azure NetApp Files (ANF)—a fully managed cloud service with complete Azure portal integration and access via REST API and Azure SDKs. Microsoft's global Azure data center team operates the complete environment. Azure personnel sell, manage, maintain, and support the entire service.

Organizations can easily migrate and run applications in the cloud without having to endure the challenges associated with procuring, managing, and maintaining storage infrastructure.

Currently, ANF is the sole native enterprise-grade shared file storage service with the latency and throughput capabilities required for core business applications and listed by Azure as a native storage service. ANF is delivered as a highly available platform-as-a-service (PaaS) and presented as a file system, simplifying a slew of configuration and management issues. With ANF, organizations don't need to deal with the time and expense of manually piecing together various cloud components to achieve consistent high availability and peak performance.

### The Value of a PaaS Model versus IaaS

Azure PaaS services are vital for simplifying cloud storage for business-critical applications. Azure NetApp Files is exactly that enterprise-grade PaaS storage service that can help transform one's SAP deployment in the cloud. ANF conforms to

industry standards for cloud application deployment as well as Microsoft's Azure's Well-Architected Framework.3 In addition, Microsoft recommends the prioritization of Paas over IaaS when possible.4

Think about it this way: How easy is it, or how few steps are required, to create a highly available storage environment that is protected with a remote copy?

Using IaaS solutions, cloud teams frequently need to create individual disks and then create virtual machines for the file services, often duplicating (or further multiplying) efforts to ensure resilience and scalability. Every unnecessary step and component added by IaaS opens the door for multiple problems—slowing operations, reducing efficiency, adding expense, and generating new risk (see Figure 2).

Figure 2. SAP S/4 HANA HA without Azure NetApp Files
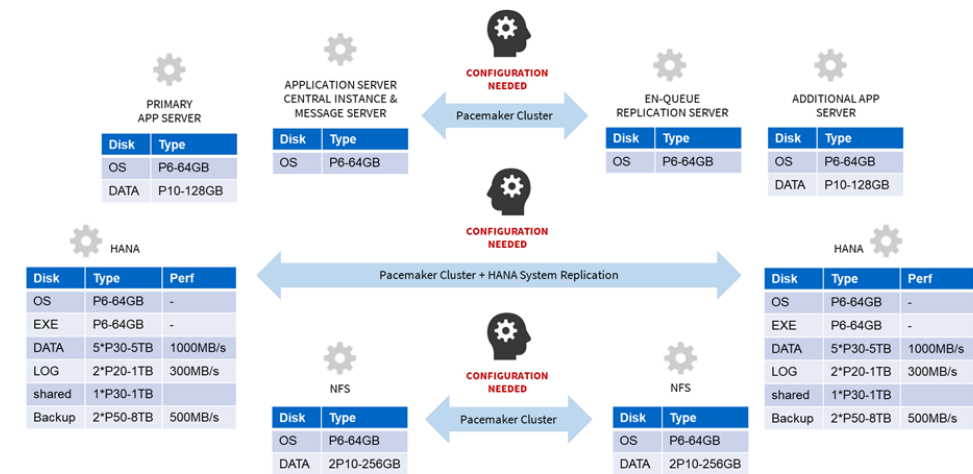
Source: NetApp

With its highly available PaaS architecture (see Figure 3), ANF greatly simplifies the cloud management and configuration. According to NetApp, leading SAP systems integrators estimate that, with ANF PaaS, there is a 50% reduction effort to build out their SAP environments (Sandbox, Dev, Pre-Prod, Prod, and QA) while experiencing an over 80% reduction in infrastructure management through and beyond post-go live support. The result is a single highly available shared cloud storage volume that can scale quickly with application demands and deliver the low-latency performance essential for SAP environments. With fewer components, the risk profile of the solution is reduced as well. Further reducing risk, SAP has validated that ANF is certified for use with SAP HANA, and ANF is the only Azure PaaS storage service supported for SAP HANA certification.

IaaS and SDS Options

In the Azure Marketplace, third-party storage providers offer IaaS options or software-defined storage (SDS), which can be used to support SAP HANA test and development environments. These IaaS storage solutions, however, typically are not appropriate for SAP HANA production workloads. Why? Typically, IaaS and SDS

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[3] Source: Microsoft Documentation, *Microsoft Azure Well-Architected Framework*, November 2019.
[4] Source: Microsoft Documentation, *Use platform as a service (PaaS) options*, August 2018.

solutions are not supported for SAP HANA by the provider or recognized by SAP as a certified platform. Prior to deploying any production SAP environment, it is absolutely essential to ensure that the storage platform is supported for SAP HANA by the provider as well as recognized by SAP as a certified platform.[5] In addition, these architectures often add increased layers of complexity. For example, SAP system refresh, backup, and recovery can be far more complex and time consuming,

Figure 3. SAP S/4 HANA HA Using Azure NetApp Files
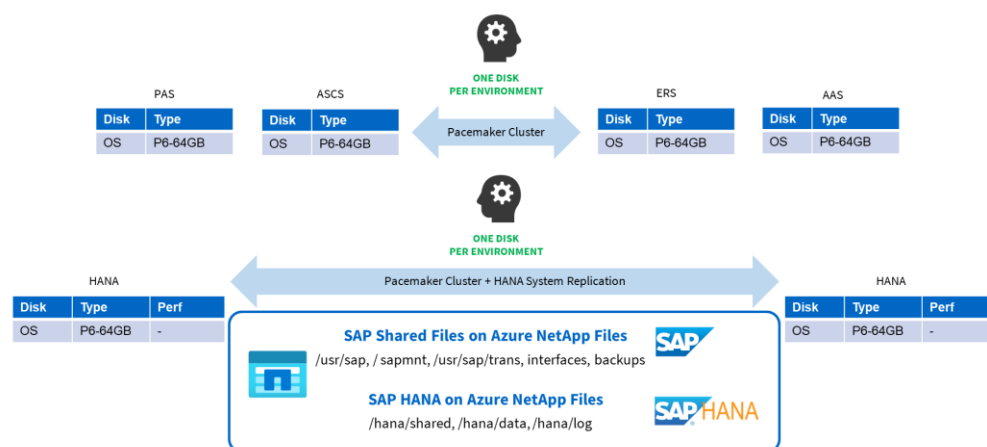
Source: NetApp

as IaaS options often require a full copy out and full copy recovery of the entire volume. With the Azure NetApp Files PaaS option, however, the same backup and restore operation takes minutes since it leverages NetApp's snapshot technology. When that difference is multiplied across the complex activities involved in SAP migration, optimization, and automation, the improvement in time and agility becomes exponential.

Benefits of Azure NetApp Files for SAP Workloads

From its simple architecture to consistent low-latency performance and its ease of managing data (for re-use and protection), to flexible, low-risk cloud storage, Azure NetApp Files checks the boxes for delivering business-critical workloads.

Used for underlying shared file storage services, ANF offers a number of performance tiers that enable IT to more closely align with specific workload requirements—ensuring maximum reliability and performance. ANF offers sub-millisecond latency and integrated data management for complex workloads such as SAP HANA, high performance computing, and line-of-business applications. When it comes to security, organizations can enjoy Microsoft's comprehensive security and compliance portfolio—ANF complies with recognized industry certifications across industries, including HIPAA and GDPR.

Azure NetApp Files Reduces Risk and Cost of the Cloud for SAP, While Improving Business Agility and Productivity

Azure NetApp Files for SAP offers organizations comprehensive support and security in the cloud, based on their own unique business requirements. ANF helps organizations lower overall risk, attain higher availability and reliability, optimize cloud economics, enhance business agility, and achieve greater operational efficiency.

Improve Your Risk Posture for SAP Workloads

- **Supported by Azure for SAP Storage.** Organizations that choose to leverage unsupported infrastructure for business-critical applications can potentially find themselves courting disaster. However, ANF is different—it is the only Azure PaaS storage service that has support from Microsoft for running SAP production applications and SAP has validated

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[5] Source: Microsoft Documentation, *SAP HANA certifications*, July 2021.

that ANF is certified for use with SAP HANA. This crucial feature ensures that the environment optimally functions as it should—but if issues do surface or questions arise, organizations can look forward to receiving full and timely support.

- **High availability and reliability.** ANF provides an effective foundation to streamline SAP migration and management, offering high reliability and 99.99% availability. With fewer moving components and elements to configure, there are fewer chances for human error, making it easier and more predictable to efficiently scale, monitor, and protect workload (and system) integrity.

- **Lowering risk and meeting compliance.** As organizations journey to the cloud, they must protect and manage their data. Strict regulatory requirements are mandated for many industries, and businesses must show compliance for protecting and securing financial, personal, and healthcare data. ANF offers secure FIPS140-2 compliant data encryption at rest. With its uncompromising built-in data management, ANF can ensure that protection is always in place, lowering risk and ensuring that data is always protected.

Optimize Cloud Economics

- **Simplified management.** ANF simplifies configuration and management of business-critical workloads, not only saving time, resources, and expenses, but also mitigating potential risk.

- **Leverage multiple storage tiers.** ANF supports multiple storage tiers to enable IT to more closely tune the cloud environment with specific workload requirements for performance or cost. Moreover, ANF has dynamic QOS features that allow basis administrators to instantaneously move performance (throughput and IO) around to different volumes on demand. This ensures optimal price for performance economics of the solution over time.

- **Flexible, low-risk cloud storage.** With ANF, organizations can scale storage on demand, using established practices for file capacity expansion, off-site storage, and data archiving. Costs align with native cloud storage with incremental capabilities.

Improve Business Agility and Productivity

- **Support for SAP scale-up and scale-out configurations.** ANF is able to support SAP scale-up (single-node), scale-up with high availability, and scale-out (multi-node) configurations, with support for Dynamic Performance tools and offers simple data re-use, data protection, and cross-region replication.

- **Effortless database quiescing.** Leveraging Microsoft's AzAcSnap tool,[6] ANF allows Basis teams to quickly quiesce the database, easily capturing an application consistent snapshot of the HANA database to protect it or reallocate the snaps for SAP system refreshes to be used by developers or analytics teams.

- **Delivery of sub-millisecond latency.** Azure NetApp Files has the ability to deliver sub-millisecond latency. It is common for workloads, such as SAP, to impact network performance, slowing it significantly if network latency is at or above single digital millisecond latency. Azure NetApp Files is able to produce ~473k IOPS on a 50/50 Read/Write workload with 8KiB Reads. For HANA specifically, the HANA KPIs are met with sub-millisecond latency times.[7]

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[6] Source: Microsoft Documentation, *What is Azure Application Consistent Snapshot tool*, April 2021.
[7] Source: NetApp, *Azure NetApp Files: Getting the Most Out of Your Cloud Storage*, March 2020.

- **Support for real-world performance tuning.** ANF offers three different service levels to ensure maximum throughput and performance based on specific workload requirements. This enables IT to easily tune on the fly—up or down—to improve response times and substantially boost throughput without touching the operating system or the application.

The Bigger Truth

Today, organizations are using cloud in some form—hybrid, distributed, multi-cloud, etc. But in a marketplace teeming with cloud solutions offering data protection and storage efficiency features, it's not always easy to determine which solution will fit your unique business needs. As organizations move SAP workloads to the cloud, it's essential to think about the resulting IT environment in its entirety, particularly storage infrastructure. Since IT is already complex, why exacerbate matters with a solution that adds more complexity?

Azure NetApp Files offers simplicity, as there are limited features to configure as a native Azure PaaS offering. This adds tremendous value—not only in performance and capabilities—but in the fact that ANF reduces the overall risk to the environment. To put it simply—with fewer components, you have fewer moving parts, which in turn presents fewer chances for human error due to the fact it's easier to scale.

NetApp and Microsoft Azure are both leaders in enterprise cloud solutions, working together to offer integrated compute and storage solutions that provide a powerful combination of performance and simplicity that is essential to accelerating the migration of demanding workloads like SAP. Azure NetApp Files offers data protection and storage efficiency features and a crucial level of consistency across all major cloud environments—as well as for hybrid and multi-cloud deployments. Whether you're in the planning stages for SAP migration or trying to improve SAP workloads that are underperforming, it's essential to take a deeper look at storage infrastructure as key performance feature. Selecting the right combination of cloud compute and storage services can make all the difference.

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