

Using NetApp Cloud Volumes for Microsoft Workloads on AWS

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CONTENTS

Microsoft Workloads Can Succeed in the Cloud	2
Running Microsoft Workloads on AWS.....	2
Enterprise-Grade Cloud Storage.....	3
Cloud Volumes ONTAP.....	4
Cloud Volumes Service.....	5
Get Started Today.....	6

IN THIS PAPER

Nearly every organization uses Microsoft products on premises. And increasingly, they're using them off premises as well, leveraging the cloud's inherent advantages. The challenge is making operations with Microsoft workloads in the cloud as seamless as those in your local data center. NetApp has a solution.

The Hype Is Real

Although it may seem like the public cloud receives a lot of marketing hype, it's important to recognize the available benefits. Programmatic deployment of resources can speed the development of your new projects. Having different tiers of virtual machines (VMs) means that you can easily experiment with different hardware combinations to find your ideal performance level. Virtual networking also means that configuration changes and increased network security are much easier to implement.

Migrating Microsoft workloads to the cloud is rarely a simple lift-and-shift operation, and it can result in unnecessary effort and cost.

Finally, storage is effectively limitless and extremely cost effective. For all of these reasons, the cloud is an ideal place to run SQL Server, Active Directory, and other Windows workloads.

Microsoft Workloads Can Succeed in the Cloud

Migrating Microsoft workloads to the cloud is rarely a simple lift-and-shift operation, and it can result in unnecessary effort and cost. Companies must plan for common cloud transition challenges to maintain storage, networking, and security in the cloud. Amazon Web Services (AWS) and other cloud architectures have shown rapid growth, which indicates that an increasing percentage of workloads are moving to the cloud.

Active Directory and SQL Server are two critical infrastructure workloads that can take advantage of migrating to the cloud. You can use the Always On availability group feature of SQL Server to provide highly available database solutions as part of a quick-start deployment. Other solutions such as SharePoint and .NET web applications that rely on file services can also be easily deployed in the cloud.

For the past decade, AWS has been the leading cloud platform for running Windows-based applications. [According to IDC](#), AWS runs more than half of all Windows Servers in the public cloud. It may sound counterintuitive to run Microsoft workloads on AWS, but the reality is that for many workloads it's the preferred option.

Running Microsoft Workloads on AWS

Many organizations typically move their business-critical workloads to AWS to take advantage of scalability, flexibility, security, and ease of use. Windows on Amazon Elastic Compute Cloud (EC2) enables you to increase or decrease capacity within minutes, and you can commission one or hundreds of server instances simultaneously.

Another challenge companies face when moving from on-premises data centers to the cloud is the different paradigms of storage and networking. For instance, many Microsoft applications require the file services CIFS and SMB shares for file access.

To move these workloads into Amazon Simple Storage Service (S3) or Elastic Block Store (EBS), firms must typically refactor their storage architecture to switch support to the different protocols and storage models on AWS. This leads to an inefficient file services architecture, and requires storage administrators to learn an entirely new platform. In many cases, it requires changes in application code to support these new storage paradigms, which can be quite costly—or even not possible.

Beyond the technical issues of moving to the cloud lies a resources hurdle—there simply aren't enough knowledgeable workers. Gartner reports that through 2022, insufficient skills with IaaS components will delay half of enterprise IT organizations' move to the cloud by 2 years or more. And the people with those skills will be expensive, given [how rare they are](#).

THE AWS ANSWER

Achieving an identical experience on and off premises would offer organizations a true hybrid cloud experience, with the IT team deploying workloads in a cloud

service or on premises based on what's best for the given workload. To achieve this goal, IT needs to have a consistent storage infrastructure that features uniform capabilities, uniform management interfaces, and uniform levels of performance and availability.

Take advantage of cloud innovations faster with enterprise-grade data services consistently delivered across your choice of cloud.

AWS offers native solutions for some of these workloads in Elastic File System (EFS) and FSx, which provides file storage. However, workloads like Active Directory and SQL Server tend to require feature sets that are greater than the norm. These workloads often demand more flexibility and control around performance, resilience, and costs than is offered in standard cloud storage.

UBIQUITOUS CLOUD STORAGE

Take advantage of cloud innovations faster with enterprise-grade data services consistently delivered across your choice of cloud. NetApp began its journey to the cloud about 7 years ago with AWS, when NetApp decoupled its ONTAP® data management system from bare metal and installed it inside an instance of an Amazon EBS. This enabled it to deliver a fully integrated and supported Windows file system on the AWS cloud.

NetApp has the only cloud storage platform that seamlessly handles multicloud environments with the same architecture on premises or on any cloud. NetApp® Cloud Volumes supports block data, file data, and multiprotocol workloads running on top of EBS and S3—consuming those services and Amazon EC2 services, all with NetApp's management software nestled inside.

Enterprise-Grade Cloud Storage

NetApp Cloud Volumes for AWS combines the intelligence and capabilities of [industry-leading](#) NetApp ONTAP [block and file storage](#) with the scale and flexibility of the public cloud. Because NetApp allows you to leverage NFS or SMB file services with enterprise management and functionality, you can rapidly deploy terabytes of storage in a consistent fashion on the cloud of your choosing. Whether you're dealing with high-performance computing workloads that demand low latency, high IOPS storage, or Windows file shares, you can quickly deploy and manage your data.

NetApp can make your migration much easier by eliminating the need to refactor your storage. NetApp Cloud Volumes offers the tools and services to easily manage and maintain all of your data in a secure fashion at a lower cost.

There are a couple of options for running NetApp on AWS: You can use the Cloud Volumes Service, which

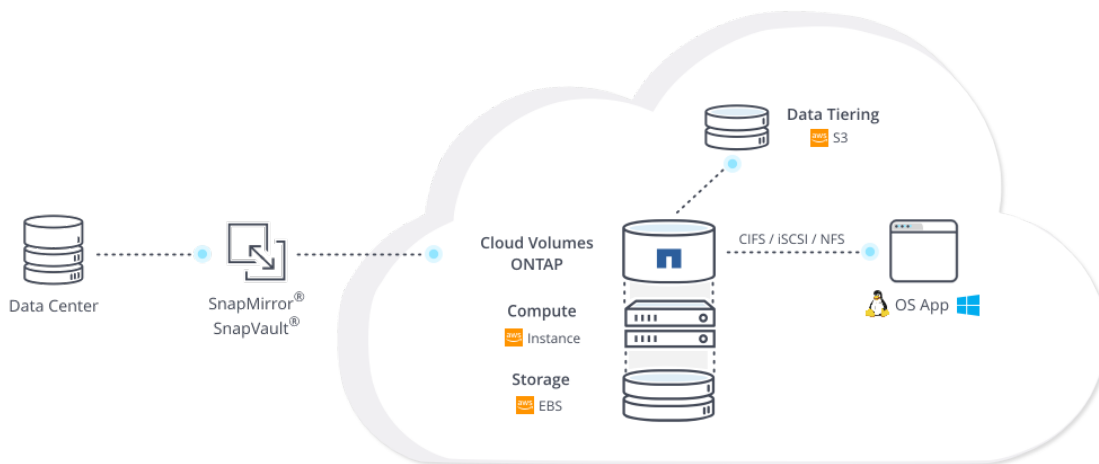


Figure 1: NetApp Cloud Volumes ONTAP architecture

offers a fully managed storage solution, or you can choose Cloud Volumes ONTAP, which offers a hands-on cloud storage experience for IT admins and storage architects to configure, manage, and fine-tune their cloud resources associated with it.

ENTERPRISE-GRADE DATA SERVICES

NetApp Cloud Volumes provides a unified management solution for all of your storage, whether in your own data center or on AWS. Cloud Volumes works the same whether you're 100% on AWS or you're managing a hybrid environment.

The [Cloud Compliance feature](#) includes privacy and audit controls to meet privacy regulations, like the General Data Protection Regulation (GDPR) and the California Consumer Privacy Act (CCPA). This AI-driven service scans your data over time and provides a dashboard with reporting tools to help you understand the data and what steps you need to take to remain compliant.

The feature is deployed into a VM in the same virtual private cloud as your Cloud Manager and scans your SMB and NFS volumes to look for a range of personal information. It then maps your organization's data and categorizes each file, aggregating the data to your Cloud Manager dashboard.

Cloud Volumes also offers other value-added features like Cloud Insights, which provides performance and cost monitoring, optimization, and security across your entire infrastructure. Cloud Sync allows you to sync files between your on-premises shares and into your cloud storage solution.

[Global File Cache](#) can modernize distributed storage by allowing distributed enterprises to securely consolidate silos of Microsoft file servers into one cohesive global cloud storage footprint.

Cloud Volumes ONTAP

Cloud Volumes ONTAP is a software-defined storage solution that provides a full on-premises NetApp ONTAP experience on AWS, while leveraging Amazon EC2 services and native S3 and EBS storage (see **Figure 1**). Your VMs are deployed using Amazon Machine Images (AMIs) in

a highly available manner to protect against unplanned cloud outages.

You can use Cloud Volumes ONTAP to provision NAS and SAN storage to support NFS, SMB, and iSCSI, meeting all your application needs. This service gives the admin granular control over storage allocation. You can also leverage Cloud Volumes ONTAP Snapshot™ copies to create an online read-only copy of your source data, to provide an additional layer of protection against data corruption or ransomware attacks.

NetApp Cloud Manager is the management and automation platform used to deploy and operate your cloud and hybrid environment. Cloud Manager eases the day-to-day requirements of operating your AWS cloud storage environment, including configuring, provisioning, and monitoring each of your cloud services and their virtual and hardware storage nodes.

One of the most common use cases for Cloud Volumes is disaster recovery for on-premises workloads. Cloud Volumes ONTAP goes beyond typical offsite storage and can deliver results for migrating, extending, and developing Microsoft-based applications on the cloud.

NetApp is the only cloud storage platform to seamlessly handle multicloud environments with the same architecture on premises or in any cloud.

Cloud Volumes ONTAP helps businesses migrate applications for building .NET-based applications, file services with Active Directory, search and workflows (Microsoft SharePoint), optimized communications management (Microsoft Exchange), and DevOps.

NetApp Cloud Volumes ONTAP for AWS also allows organizations to consolidate their unstructured data in distributed file servers at branch office environments to a centralized single set of data.

As a self-managed storage software layer, Cloud Volumes ONTAP offers a number of other benefits, including SnapMirror® replication, which can help you

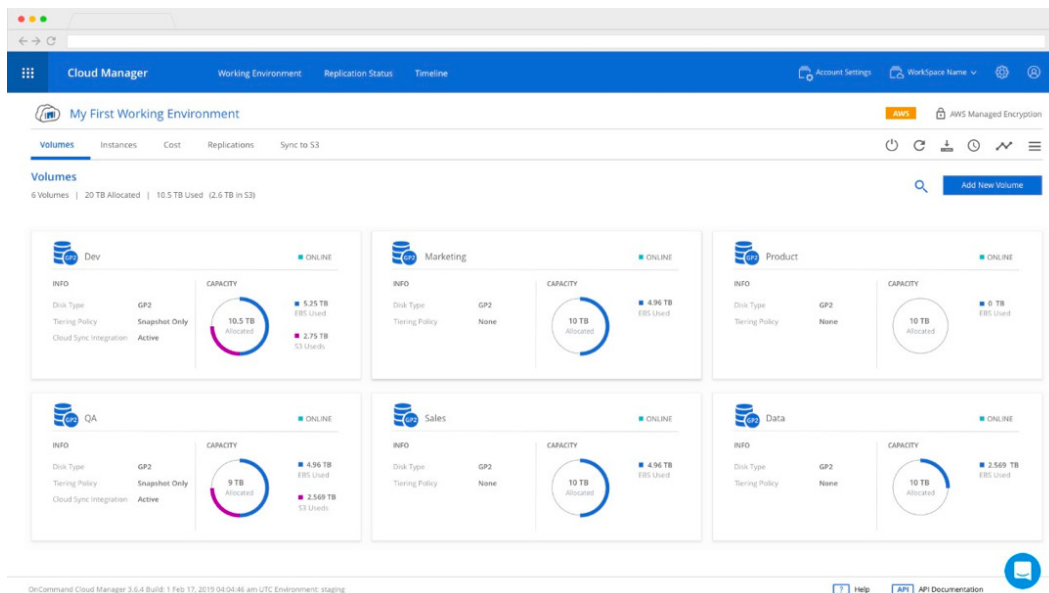


Figure 2: The Cloud Volumes ONTAP dashboard

migrate your data, protect your on-premises FAS storage, and also deploy as a secondary copy of data in separate availability zones or AWS regions—or even cloud (see **Figure 2**). This is significantly easier and more cost effective than any other solution available.

Cloud Volumes ONTAP includes the integrated Cloud Backup Service, which keeps a backup of the volumes on Amazon S3. In addition to the cost savings, no setup or experience is required for storage backup. You just switch it on and set the backup schedule.

Another benefit that you can leverage in cloud is tiering, which allows you to automatically and seamlessly move less frequently used files into different storage tiers, reducing the total cost of ownership for your cloud data. For example, with AWS, block storage is more expensive (and more responsive) than Amazon S3 object-based storage.

Cloud Volumes ONTAP gives you three options related to tiering—auto, snapshot-only, and disaster recovery (DR). In auto mode, cold data is tiered to object storage after 31 days or after a user-defined period. When the data is requested again, ONTAP automatically transfers it back to block storage.

Snapshot-only moves data to object storage with a default cooling period of 2 days. As in auto mode, if

the data is needed, it's automatically returned to block storage. Finally, the DR policy is designed for archiving and disaster protection. Data is gradually moved to block storage if activated in response to a failover or a data restore.

Cloud Compliance is an included, AI-driven feature that scans your data over time and provides a dashboard and reporting tools to help you understand the data and what steps you need to take to remain compliant.

Cloud Volumes ONTAP has a fully documented RESTful API that supports modern deployment tools like HashiCorp TerraForm, as well as state configuration tools like Puppet and Chef. This API allows easy integration with your DevOps processes.

Cloud Volumes Service

The NetApp Cloud Volumes Service for AWS is a fully managed storage service that NetApp uses to create and manage your infrastructure for both storage and compute, offering NFS and SMB support for file services. Cloud Volumes Service offers the POSIX-compliant file shares required by many file-based workloads like websites and databases, and delivers the same ONTAP management layer to provide a unified storage architecture. It's easy to deploy and provides file and

high-performance storage for your Microsoft workloads in a matter of minutes.

One of the target workloads for the Cloud Volumes Service is high-performance computing. Workloads that process massive amounts of data, whether for video production or machine learning, need very fast, very reliable storage.

NetApp offers three performance tiers—Standard, Premium, and Extreme—with throughput ranging from 4,000 IOPs and 16MB/sec to 32,000 IOPs and 128MB/sec, per allocated terabyte. Scaling across these volumes has been shown to improve performance. The Extreme performance tier can scale up to 466,000 IOPs to meet the needs of the most demanding workloads. The cost of this performance is surprisingly affordable, with the Extreme tier costing only US\$.30/GB per month.

Two workloads that see tremendous benefits from this solution are SQL Server workloads and file servers. SQL Server is a relational database system that powers mission-critical applications for which performance is highly dependent on low latency, high throughput, and high IOPs storage. Being able to provision 460,000 IOPs at 128MB/sec can deliver the performance that a busy online transaction processing system demands.

For file server workloads, being able to rapidly expand volumes at a predictable price is a tremendous benefit—no more long lead times to get new storage or high fixed costs for storage expansion.

The Cloud Volumes Service provides financially backed service level agreements based on performance, availability, and durability. You can also easily switch volumes between service tiers to meet the requirements of the workload's lifecycle.

For example, you could use the Standard tier for initial testing of a database application, move to Premium as you undertake more intensive testing, and then move on to Extreme as your production workload grows. You can also take advantage of the cloning feature to move data to a more appropriate environment as your project evolves.

The service leverages the scalability and availability of the cloud to provide high availability and nearly limitless

scale. This is especially beneficial for the SMB and NFS file systems, which come with a complete range of supporting features, like read-only and read-write client access, and Active Directory integration for SMB file systems.

Additionally, synchronization services can speed up your cloud migration effort. And just as with all NetApp solutions, you have the option to take Snapshot copies to create instant backups, which can be scheduled.

Get Started Today

NetApp Cloud Volumes for AWS solutions include a pay-as-you-go hourly subscription, which is great for work related to DevOps or any other immediate or short-term need, as well as longer-term subscriptions with increased discounts.

NetApp Cloud Volumes ONTAP provides a robust infrastructure-as-a-service solution, allowing you to manage your own storage environment in either a hybrid or a public cloud model. You can get started with the service on the [AWS Marketplace](#).

NetApp Cloud Volumes Service offers a different approach with a managed storage services approach that meets your file service needs and can support high-performance workloads such as databases or machine learning. As with Cloud Volumes ONTAP (and all NetApp cloud solutions), it's available on the [AWS Marketplace](#).

ABOUT NETAPP

NetApp is the leader in cloud data services, empowering global organizations to change their world with data. Together with our partners, we are the only ones who can help you build your unique data fabric. Simplify hybrid multicloud and securely deliver the right data, services, and applications to the right people at the right time. Learn more at www.netapp.com.

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