E-book

# The cure for the file share blues

Your multiprotocol
file system solution

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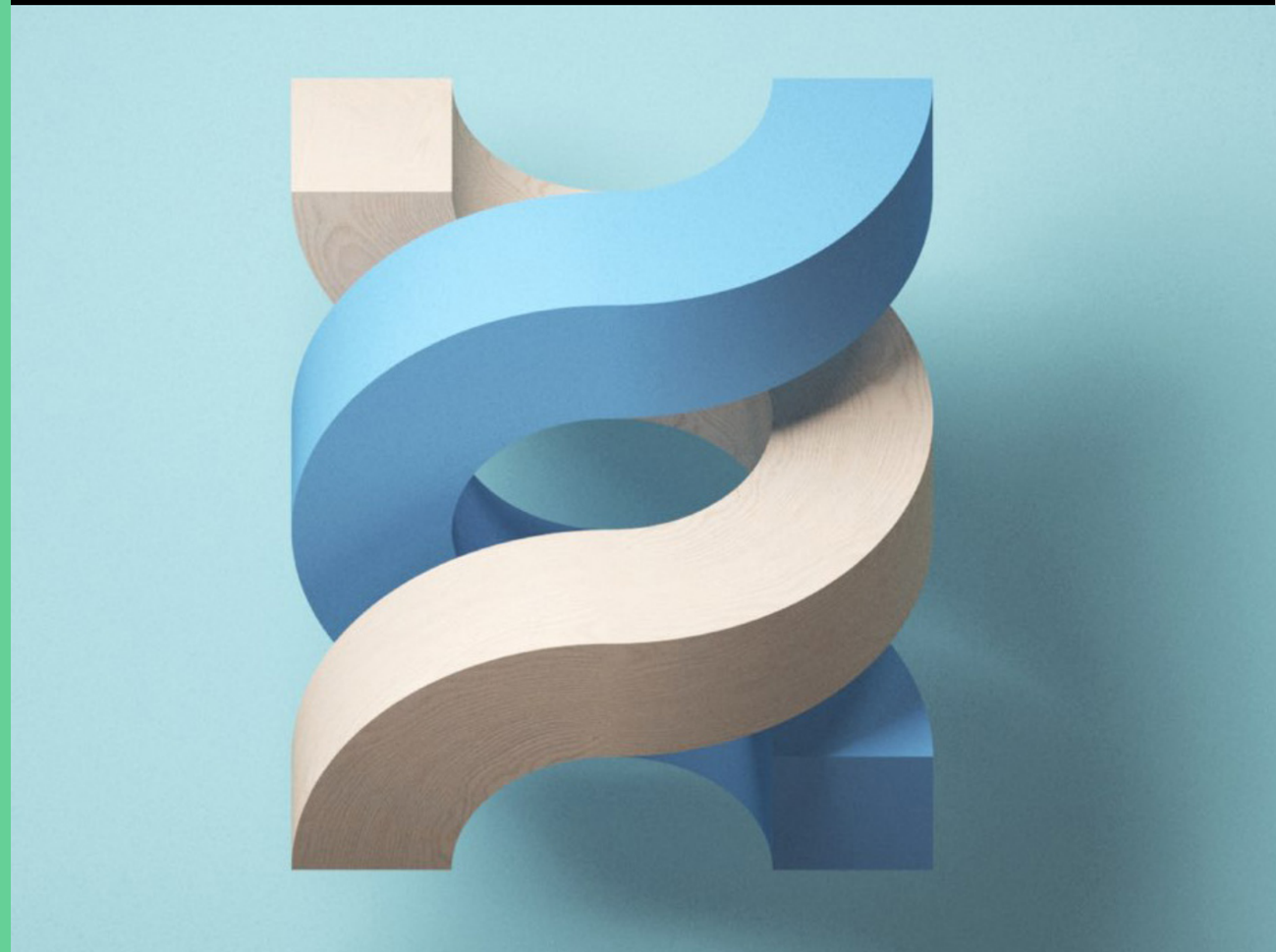

# Executive summary

Windows file shares make up well over half of the workloads running in AWS. Unfortunately, Windows-based (SMB/CIFS) workloads can be hard to manage for availability, scalable performance, and dynamic capacity. Any of these requirements can cause extra complexity in a cloud-based Windows file share environment. If there are too many problems, the deployment fails.

File-based storage is the fastest-growing storage service in the public cloud. Cloud-scale shared file services can help you address challenges in the public cloud, such as the need for dual-protocol support, delays in data protection, high storage costs, and management overhead.

And there is good news. Whatever deployment model you decide on, NetApp gets your NFS (Linux) and Windows file shares where they should be—quickly and cost-effectively.

In this e-book, we give you an overview of SMB (Server Message Block) in the cloud. We dig into some challenges of running Windows files shares and how to overcome them with NetApp® Cloud Volumes ONTAP®. We also share a customer example with best practices.

The goal is to provide you with the best information to help you manage your environments with the highest performance at the lowest cost.

# SMB in the Cloud

**Beyond the definition**

The definition is the easy part. It's what you do next that matters.

Shared file storage in the cloud can be unpredictable and costly. You need to be able to run large workloads in the cloud, scale up to unlimited amounts of storage, and scale down when it's not needed. You have to ensure that your file shares are compatible with host client data formats and operating systems. And be confident of your data's availability.

One of the most important factors in a flexible and highly available file share environment is whether you can seamlessly integrate SMB and the UNIX/Linux protocol, NFS. When you can support both protocols at the same time, things get lots better.

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# Four common objections to running Windows file shares in the cloud

## Objections

There are four common objections to fully entrusting Windows file shares to the cloud: no dual-protocol support, delays in data protection, high storage costs, and management overhead. (And in case you're wondering, "management overhead" is not hovering micromanagement. Ummm, yeah… that we could deal with.)

- **No dual-protocol support.** Public clouds, including AWS, support NFS and SMB. On AWS, NFS is available through the Amazon Elastic File System (Amazon EFS) service, and SMB/CIFS is available through Amazon FSx. But the separate services require separate subscriptions and interfaces and cannot combine in a single volume.
- **Delays in data protection.** It takes time to create volume backups when the service starts with a full source copy.
- **High storage costs.** Storage efficiencies like thin provisioning, compression, deduplication, efficient point-in-time snapshots, and data cloning significantly lower storage costs. However, these services are not easily available in EFS or FSx.
- **Management overhead.** Provisioning shares, authentication, and lifecycle management in EFS and FSx may require significant management overhead.

## Solutions with NetApp Cloud Volumes ONTAP

NetApp Cloud Volumes ONTAP for AWS supports multiprotocol volumes, data protection, and storage efficiencies with lower costs and management overhead. Cloud Volumes ONTAP is a single solution that serves NFS, SMB/CIFS, and multiprotocol data interchangeably.

At the same time, the solution's powerful storage efficiencies reduce cloud storage footprint and costs. Cloud Volumes ONTAP offers a broad range of storage optimization and protection features, including a single-pane-of-glass data management platform that keeps you in control no matter where your data is. And it uses extremely efficient NetApp Snapshot™ technology.

Additional features include Kubernetes integration as well as Multi-AZ and multi-region choices for AWS users. By the way, we know that was a lot of information. Feel free to raise your hand if you have questions—yes, this will be on the quiz later.

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# Four common objections to running Windows file shares in the cloud (cont.)

**NFS and SMB : Unify file sharing with NetApp Cloud Volumes ONTAP**

NetApp Cloud Volumes ONTAP combines NFS and SMB/CIFS protocols natively, making it very easy to support more of your workloads.

Once you connect your AWS account to your NetApp account, you can use the Cloud Manager UI or its RESTful API to create NFS, SMB, and dual-protocol volumes in AWS.

To create an NFS volume, use Cloud Manager to create a volume attached to a single AWS instance or to an instance that is mirrored to another instance to provide high availability. Next in the Volumes tab, click Create New Volume and then select single or HA and enter details like name, size, disk type, Availability Zone, and NFS export policy. You are then ready to mount the new volume from your Amazon Elastic Compute Cloud (EC2) instance. Creating an SMB volume is similar. But instead of entering an NFS export policy, you enter volume access permissions with Microsoft Active Directory or AWS Managed Microsoft Active Directory. Your SMB volume is then ready for mounting.

To create dual-protocol volumes, simply enable access for both NFS and SMB clients in the volume creation screen. Then enter the export policy for NFS and the Active Directory information for SMB, and you're done.

**Dual-protocol benefits**

- Migration without refactoring: Simple lift-and-shift migration to AWS
- Continuous improvements: Supports NVSv4.1, NFSv3, and SMB mulitchannel
- On-demand provisioning: Dynamic servie levels
- Cost savings: Flexible volume creation and simplified management

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# Customer case study: A simplified Windows migration to AWS

A large UK-based firm, Cordant Group, was an early private cloud adopter and had built a large on-premises infrastructure. But massive data growth threatened to overrun their internal storage, so the firm decided to move their IT infrastructure to the AWS cloud.

This migration was not a simple lift and shift and not just a matter of replacing in-house Office applications with Microsoft 365. (But had it been, NetApp SaaS Backup could've help with that situation.) The migration involved moving entire websites, thousands of Citrix thin clients, proprietary SQL-based applications, and petabytes of data.

The actual migration, which Cordant carefully planned with AWS, went smoothly. Once on AWS, Cordant planned to use Microsoft Distributed File System (DFS) Namespaces to manage their Windows server resources. But they found that DFS had its own set of problems. So, they decided to replicate their on-premises Windows infrastructure in the cloud.

This move presented another problem: AWS lacked the services Cordant needed to recreate their large Windows storage environment. There were four major concerns for the firm:

1. No dua-protocol support
2. Moderate snapshot capabilities
3. High storage costs
4. Heavy management overhead.

**The firm turns to NetApp for help**

Cordant wanted to stay on AWS, so it adopted NetApp Cloud Volumes ONTAP for AWS to recreate its Windows infrastructure at lower complexity, risk, and cost.

NetApp Cloud Volumes ONTAP cost-effectively simplified the firm's Windows apps. The firm chose to automate file share operations for even more efficiency. Cloud Volumes ONTAP provided dual-protocol support, rapid snapshots for high service levels, lower costs with storage efficiencies and dynamic storage tiers, and greatly simplified managed services.

# Customer case study: A simplified Windows migration to AWS (cont.)

## Migration benefits

**Efficient operations with multiple protocols**

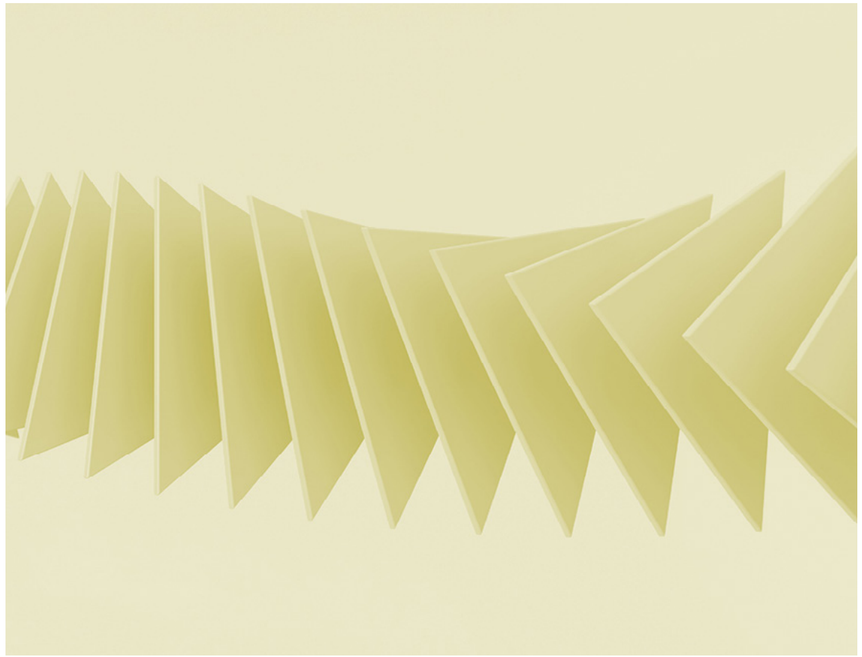
Cloud Volumes ONTAP enables on-demand volume provisioning by allowing you to easily choose NFS, SMB, or dual-protocols at volume creation. With multiple protocols, you can provide both NFS and SMB protocol access to the same file. This access enables workloads to easily share files between Linux and Windows clients in the cloud.

ONTAP supports all versions of NFS and SMB protocols on AWS and on premises, which adds efficiency and value to hybrid cloud infrastructures. Also, NetApp easily integrates with Active Directory, which protects your existing domain credentials and your authorized users and groups.

**High availability and data protection with efficient Snapshot technology**

NetApp Snapshot technology rapidly backs up files without pausing the source file for an initial backup. The 4KB Snapshot copies take up minimal storage space, and they can be quickly restored to protect RTO and RPO service levels. And cloning of Snapshot copies allows developers to quickly clone volumes for rapid deployment and environment testing.

NetApp SnapMirror® data replication leverages Snapshot technology for disaster recovery. SnapMirror uses Snapshot copies to transfer data from the primary dataset to a disaster recovery (DR) copy. SnapMirror copies an entire dataset to the DR instance once, then continually syncs the DR copy by updating delta changes.



# Why resource efficiency matters

**Reduce cloud waste**

A significant advantage of Cloud Volumes ONTAP is the ability to apply a full set of resource-efficient technologies, including data deduplication, compression, thin provisioning, and cloning. These technologies have been designed to complement one another. Used together or separately, they greatly reduce the amount of cloud storage you need. The technologies reduce the time you have to spend supporting your applications and your development and test environments running in the cloud, further lowering your costs. For datasets you intend to replicate, data deduplication and compression can also save you significant time and bandwidth:

- **Data deduplication:** Any dataset contains a certain amount of duplication at the file and block levels. Deduplication detects when a block being written is identical to an existing block and saves a pointer rather than writing the block again. Savings can be substantial, especially in virtualized environments and for backup and archive data.
- **Compression:** ONTAP has been designed to efficiently read and write compressed data to minimize system overhead. Enabling compression can yield significant space savings for database files where deduplication may be less beneficial.
- **Thin Provisioning:** Any time you provision a new application or database instance, it's normal to provision a certain amount of storage space up front. That capacity sits idle until it's consumed, so you end up paying for resources you're not using. By not allocating capacity until it's actually needed, thin provisioning eliminates paying for what you don't need. And, because all workloads on an instance of Cloud Volumes ONTAP for AWS share a single pool of storage, capacity planning is simplified.
- **Cloning:** NetApp ONTAP FlexClone® technology allows you to make a space-efficient clone of a volume, LUN, or file. A clone has a near-zero capacity footprint and only consumes additional storage space when changes are made. Cloning can be particularly advantageous in development and test, or DevOps, environments where many identical workspaces and many copies of test datasets are required.

# Why resource efficiency matters (cont.)

**Lower costs**

Storage efficiency features enable Cloud Volumes ONTAP to significantly decrease the amount of storage you use and to decrease your costs. These features include thin provisioning, data compaction, data compression, and deduplication.

As if those savings weren't enough, ONTAP further lowers computing costs by simplifying decisions about performance and cost ratios. For example, high-performance computing (HPC) can be costly, because high performance requires fast data access. To achieve high performance, users either store active data on a higher-level AWS storage tier or incur data transfer charges by moving between tiers.

With the NetApp Cloud Tiering service, Cloud Volumes ONTAP for AWS allows you to automatically tier your infrequently accessed data to a cost-effective tier on Amazon Simple Storage Service (S3). Storing data forever on high performance SSDs can be very expensive. You need a way to easily move infrequently accessed (aka cold) data to cost-effective storage. This tiering storage technology allows you to save an average of 70% on storage costs.

**Simplified management**

NetApp Cloud Manager simplifies Cloud Volumes ONTAP instance deployment and management. Cloud Manager's simple interface walks admins through creating and provisioning volumes, setting up new storage systems, creating schedules for Snapshot copies and cloning environments, and creating new file shares. Cloud Manager integrates with leading automation software like Jenkins, Ansible, and OpenStack.

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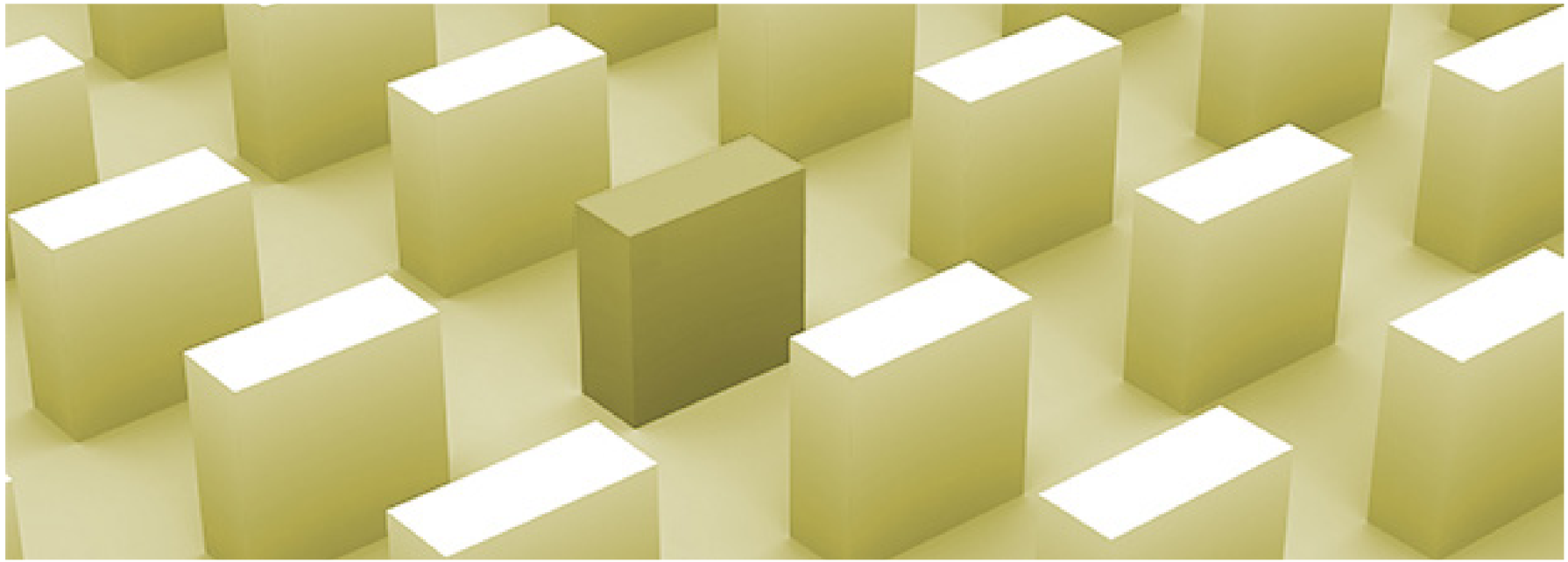
# Conclusion

It's simple enough to define a cloud file share. A file share is a folder and its subfolders that reside in your cloud file system. Run NFS or SMB protocol file shares on AWS accessible to cloud compute instances. You can create and manage as many file shares as you need.

While easily defined, shared file storage in the cloud can be unpredictable and costly. In addition to running large workloads on AWS, your shared file storage must be able scale up to unlimited amounts of storage—and scale down when it's not needed. Your shared file storage needs to be compatible with your host and client data formats and your operating systems so that you can be confident of data availability.



# Getting started

NetApp brings to AWS the enterprise-grade data services you grew to rely on in the data center with a shared file storage platform. Cloud Volumes ONTAP for AWS provides a unified solution that serves NFS, SMB/CIFS, and multiprotocol data interchangeably, whether self-managed or as a service. This solution comes with a variety of tiers designed for primary and secondary workloads; purpose-built, powerful data services; and simple deployment that includes Snapshot technology, multi-region protection, backup, compliance, and caching.

Unlock the best of AWS with NetApp. Natively run legacy and cloud applications—without re-architecting code or redesigning processes—while optimizing capacity and costs. Enable collaboration and cutting-edge application development. NetApp's comprehensive data management services are designed for durable performance, high availability, 99.999% reliability, intelligent capacity management, privacy compliance, and data mobility:

**Cloud Insights**
Resource monitoring with complete visibility that lets you manage, troubleshoot, and optimize more effectively. With this monitoring, you can easily meet sales-level objectives (SLOs) and SLAs and stop ransomware in its tracks with actionable intelligence.

**Cloud Sync**
An easy-to-use cloud replication and synchronization service for transferring NAS data between on-premises storage and cloud object stores.

**SaaS Backup**
Guarding of your Microsoft 365 data with secure backup and restore.

**Cloud Backup Service**
Seamless and cost-effective block level backups based on NetApp Snapshot technology.

**Global File Cache**
Consolidation of unstructured data in the cloud, allowing real-time global file sharing for your distributed workforce.

**Virtual Desktop Service**
A SaaS-delivered global control plane that lets you deploy, manage, and optimize your virtual desktop environments.

**Spot by NetApp**
Optimize your infrastructure costs for containers by proactively scaling compute resources to maximize utilization up to 90% lower cost with Spot Ocean. In addition, use an AI-driven prediction engine to run containers without the headache of managing servers while Spot Elastigroup provisions, scales and right-sizes your workload requirements.

# Getting started (cont.)

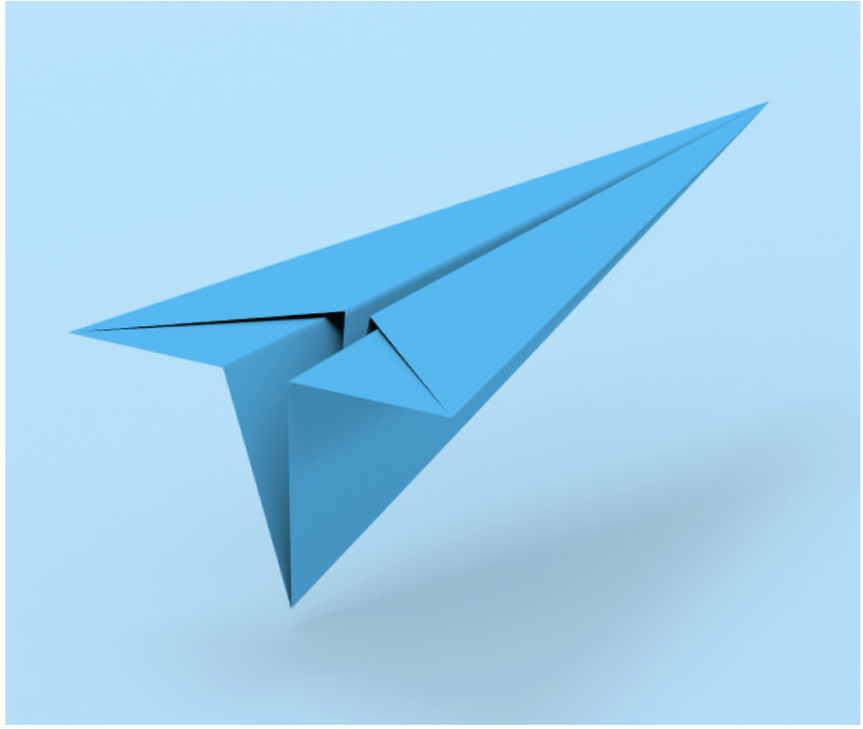
Get started with Cloud Volumes ONTAP for AWS and gain access to enterprise-class data management in minutes.

Cloud Volumes ONTAP is offered in multiple purchase models. You can purchase it in the AWS Marketplace, with an hourly model, or directly from NetApp using the bring-your-own-license (BYOL) option in an annual license. NetApp software support is included with all pricing options.

Cloud Volumes ONTAP for AWS choices include:

- **Cloud Volumes ONTAP Explore**
  Suitable for smaller capacity applications (up to 2TB of underlying AWS storage)
- **Cloud Volumes ONTAP Standard**
  Flexible performance and larger capacity for a wider range of applications (up to 10TB of underlying AWS storage)
- **Cloud Volumes ONTAP Premium**
  Flexible performance and larger capacity for a wider range of applications (up to 368TB of underlying AWS storage)
- **Cloud Volumes ONTAP BYOL**
  Flexible performance and expanded capacity, offered as a longer-term subscription

To get started, start a free trial and deploy Cloud Manager from NetApp Cloud Central. After an easy deployment, use the wizard-based Cloud Manager interface to deploy Cloud Volumes ONTAP instances. Boom, you are ready to start serving data.



# About NetApp

In a world full of generalists, NetApp is a specialist. We're focused on one thing, helping your business get the most out of your data. NetApp brings the enterprise-grade data services you rely on into the cloud, and the simple flexibility of cloud into the data center. Our industry-leading solutions work across diverse customer environments and the world's biggest public clouds.

As a cloud-led, data-centric software company, only NetApp can help build your unique data fabric, simplify and connect your cloud, and securely deliver the right data, services, and applications to the right people—anytime, anywhere.

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