Technical White Paper

Cloud Volumes ONTAP for AWS: Storage for the Cloud Era

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Businesses understand the benefits of cloud computing. What is not always clear is the correct path to take to get to the cloud. This paper discusses some of the challenges with moving on-premises data to cloud-based storage and highlights how NetApp Cloud Volumes ONTAP can help solve these problems and ease the transition.

aws | NetApp®

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Introduction

Data is the most important part of an application. It's what turns a generic invoicing system or contact list into a key component of a business. Data is also the most troublesome part to manage because it requires care, consideration, and control.

New organizations that were born in the cloud have been able to take advantage of new approaches to creating applications and managing data. For everyone else, there are on-premises applications performing business-critical functions. Rewriting all those applications or completely changing an organization's workflows to use cloud-based systems overnight isn't feasible. Organizations need a way to adjust infrastructure to suit their applications, rather than the other way around, so existing applications and data storage solutions run in tandem.

By extending trusted enterprise storage technology to the cloud, NetApp® Cloud Volumes ONTAP for Amazon Web Services (AWS) enables enterprises to seamlessly move data and applications to the cloud. It also creates new opportunities to marry AWS agility with ONTAP features for rapid testing and development of applications.

Introducing Cloud Volumes ONTAP

NetApp Cloud Volumes ONTAP is a data management solution that provides protection, visibility, and control for your cloud-based workloads in a hybrid cloud environment. From a single pane interface, users can efficiently control a mix of NAS, SAN, and Amazon Simple Storage Service (Amazon S3) data across their on-premises and AWS storage resources.

By integrating directly with AWS services, Cloud Volumes ONTAP enables users to seamlessly extend their on-premises data center data management capabilities to the cloud, giving you the power to manage data across its entire lifecycle. Through storage efficiency technologies and a highly available design, Cloud Volumes ONTAP significantly reduces your storage footprint and helps facilitate enterprise-class application availability.

These same technologies can be used to establish business continuity, with end-to-end disaster recovery (DR) plans, and improve DevOps through FlexClone® technology, discussed later in this paper.

Bringing Your Enterprise Data Center to AWS

Cloud Volumes ONTAP uses the same trusted software built into all of NetApp's on-premises storage appliances. The software runs in the cloud as an Amazon Machine Image (AMI) on Amazon Elastic Compute Cloud (EC2) instances.

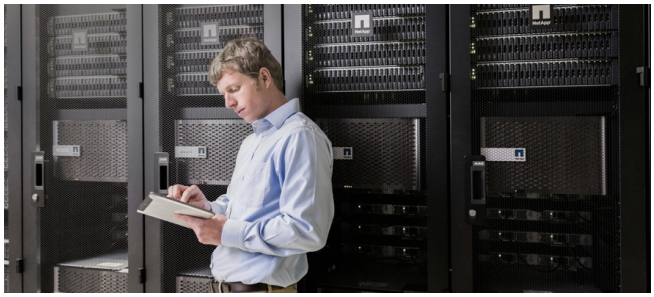
This fact means that most ONTAP features found in physical NetApp arrays have been brought to AWS, with some additional benefits. Cloud Volumes ONTAP instances can be accessed and managed just like on-site NetApp storage arrays. Both file and block storage protocols are supported, including NFS, SMB/CIFS, and iSCSI.

OnCommand® Cloud Manager, a centralized management console, gives users a single-interface view into their on-premises and cloud data. Drag-and-drop features make it extremely easy to move data between on-premises and cloud environments, as well as between different AWS regions.

With OnCommand Cloud Manager, you have the flexibility to develop your hybrid cloud strategy by moving data in any direction. You can begin your journey to the cloud by backing up on-premises data to the cloud. On the flip side, you can run your enterprise applications in the cloud and use your on-premises infrastructure as a disaster recovery site. With AWS and Cloud Volumes ONTAP, you're in control.

It's All About the Information

Applications are just a way of accessing information and helping to make sense of it. It's why we have applications in the first place: to organize and manipulate data. It is the data that transforms a common piece of application software into something of unique value to an organization.



For example, an empty Excel spreadsheet isn't very useful, but a fully populated model with complex logic and charts can be the thing that determines the success of a sales campaign. Similarly, anyone can sign up for software-as-a-service customer relationship management, but it's the unique set of contact information that turns a generic tool into something of tremendous value.

To achieve the full value of moving applications to AWS requires moving your data, too. AWS is well suited to new ways of building applications. The question becomes what do you do about the business-critical applications and datasets that already exist on the premises? Rewriting applications to be cloud native is neither simple nor fast. The trick is to effectively leverage your existing on-premises infrastructure with the flexibility and scalability of AWS resources.

There are real advantages to the operational model that AWS provides. New systems can be provisioned quickly, without waiting for physical hardware to arrive and be installed. Unused systems can be decommissioned immediately, cutting costs in real time. Developers can experiment rapidly, spinning up new environments on demand and quickly shutting them down if they don't work out. New opportunities can be quickly seized as they present themselves.

Similar Interface: Maintain Existing Processes

For organizations that are committed to being responsive to changing business requirements, it doesn't make sense to rewrite applications from scratch. Seamless integration with AWS makes it easy for organizations to maintain existing processes, minimizing the need for engineers to learn new methods of programming and allowing them to stay focused on the business-critical tasks at hand.

Just as virtualization of servers meant we could turn on new servers more quickly, the same is true of virtualized storage arrays. Like virtual servers, virtual arrays run the same operating system as they do on physical devices, meaning they work in the same way organizations are already used to. By abstracting away from the physical hardware, they are able to concentrate on the logical functions of systems and the benefits they provide.

NetApp Cloud Volumes ONTAP brings the benefits of an enterprise storage array to AWS and makes it easy to use the cloud for enterprise applications.

The reasons for virtualizing storage arrays are the same as those for virtualizing physical servers. An organization can continue to use existing processes, treating the new Cloud Volumes ONTAP systems just like existing on-site storage. The cloud-based systems can be used to receive data using SnapMirror®, serve data to applications, and keep the data secure with at-rest encryption.

Establish Control over Hybrid Cloud Storage

Cloud Volumes ONTAP provides the benefits of trusted enterprise storage systems, with flexibility and scalability of AWS.

One advantage of AWS is the ability to spin up new instances quickly. Instead of waiting for physical infrastructure to arrive, AWS has preprovisioned infrastructure that has already been delivered, racked, and cabled. A net-new storage system based on Cloud Volumes ONTAP can be up and running in as little as 30 minutes.

AWS resources can also be shut off when they are no longer needed. This can be done in two ways: permanently and temporarily.

Permanently shutting down an AWS storage system—as in completely decommissioning it—can be done significantly more quickly than for a physical system, which is ideal for a short-lived project. When infrastructure spending is aligned with the life of a project, business case accounting becomes much simpler.

Temporarily turning off a storage system is also possible for intermittent workloads on AWS. For example, a testing or analysis system might only be needed once per week, but building one from scratch is impractical, even with substantial automation. Instead, a prebuilt system can be powered off, waiting to be brought online. With NetApp SnapMirror technology, users can perform a rapid data synchronization using existing known processes. This is ideal for regular but infrequent data processing.

Cloud Volumes ONTAP tiering features facilitated through OnCommand Cloud Manager, enable customers to reduce Amazon Elastic Block Store (EBS) storage costs by augmenting their underlying storage with Amazon S3. Cloud Volumes ONTAP automates the tiering process through predefined NetApp policies. After tiering is established, users no longer have to take any action. Data that is currently being accessed lives on Amazon EC2 instances, so that data is readily available. There are two policies for snapshots to be tiered: when the aggregate is 50% full and the snapshots are truly cold and for backup to send SnapMirror data to Amazon S3.

Data Protection

Common AWS use cases include backup, recovery, and disaster recovery. NetApp Cloud Volumes ONTAP directly integrates with Amazon S3 storage as a destination for backup data. Full disaster recovery (DR) sites can be stored on Amazon S3 and be on standby until they are needed. This approach significantly cuts costs, because users no longer need to invest in secondary data centers to protect against outages and other instances. Linkage with off-site systems, where you would replicate DR locations, bypasses the performance tiers (for example, Amazon Elastic Compute Cloud [EC2] or Amazon EBS) entirely and can go into colder tiers of storage until the DR site needs to be activated to optimize storage costs. In case of a disaster, SnapRestore® can leverage Snapshot® copies to restore entire file systems or data volumes on AWS.

Overall, storage efficiency technologies such as incremental Snapshot backups, deduplication, and compression minimize network latency, shorten transfer times, and depending on workload type, can save users up to 90% on storage capacity compared to on-premises storage.

To meet strict compliance requirements, users can easily and efficiently protect their data with NetApp managed encryption for at-rest protection.

For high-availability standards, NetApp Cloud Volumes ONTAP offers a high-availability option (NetApp Cloud Volumes ONTAP HA). You can simultaneously write data into two storage environments. Should the primary environment experience downtime, the secondary environment immediately takes over until the issue is resolved. This takeover can be implemented for any occurrence of downtime, whether planned maintenance or an unexpected outage.

Flexibility and Portability

Consider the option of cloud-based disaster recovery. Adding a Cloud Volumes ONTAP instance to existing configuration and data copy processes means an organization can quickly and easily add a remote recovery option for its data. The data can be protected just like a regular off-site DR, only now the data can be located anywhere in the world, thanks to the AWS global infrastructure.

Cloud Volumes ONTAP extends an organization's presence into another site in a compatible way. There is now an ecosystem of data locations, each chosen based on how well it matches requirements.

The primary location for data could be on AWS with physical, on-premises environments used for failure scenarios. Multiple primary locations could be used, each for different sets of applications, with failover locations determined by business requirements, diversifying risk.

Data is the lifeblood of the modern organization. It is everything from customer lists to financial data, intellectual property to outstanding invoices, sales reports, and market research. Without its data, a company ceases to exist.

Movement of data between locations is made easier, because they all work in the same logical way. The same tools can be used to move and manage data at any site, be it local, remote, or cloud based. AWS acts as an extension of organizations' current data centers.

Control the Pace of Change

As applications are replaced, processes can be updated and tools changed. That said, organizations are in control of how, and at what rate, they change. It is important to innovate in a way that prioritizes organizations' business objectives. Making changes to processes and infrastructure strictly for the sake of implementing new technology is a disservice to organizations and their customers. Infrastructure serves the needs of data, applications, and the people who rely on them, not the other way around.

Cloud Volumes ONTAP makes it easy to roll back data from cloud targets. When experimenting, if a developer happens to choose a region that turns out to not be the most effective location, moving the data to a different place is simple.

With Cloud Volumes ONTAP, there is no migration into one proprietary data format, only to migrate back out again. This lowers risk to organizations because the price of failure is reduced. Experimentation can then be encouraged and potential upside maximized, while reducing risk. This is a key feature of a modern, nimble organization seeking to quickly adapt to a changing market.

Cloud Volumes ONTAP also accelerates DevOps processes by utilizing FlexClone technology to instantaneously deploy thousands of dev/test environments without expanding on your storage footprint. When developers deploy clones, those clones don't take up any additional storage space until changes are made to the cloned data. This enables developers to rapidly experiment without affecting costs. These resources can be shut down with a single click, in case the experiment does not deliver the desired results. In contrast, if the test is successful and the developer wants to put the instance into production, the developer can use SnapMirror to quickly replicate the instance back to production environments on the premises or deploy the environment into production on AWS resources.

Cloud Volumes ONTAP Performance

Workloads that require scale-up-style performance are still suited to physical high-spec infrastructure. Cloud Volumes ONTAP is not a replacement for all existing solutions, nor is it attempting to be.

This is all about choosing the right tool for the job, and the job here isn't the physical line speed of the device. It's the logical functionality that that device provides. Having an enterprise storage system available on the cloud is typically more important than the absolute level of performance it provides.

Getting Started

Cloud Volumes ONTAP is available in the AWS Marketplace. Pay-as-you-go pricing makes sure that you don't have to overprovision resources, and you pay for only what you use. Hourly, annual, and bring-your-own-license (BYOL) options are available.

Summary

AWS presents a tremendous opportunity for companies to get more out of their data and to continue innovating on new and cost-effective ways to leverage it. The key is identifying the optimal balance between existing processes, on-premises infrastructure, and AWS cloud-native services.

NetApp Cloud Volumes ONTAP provides a way for organizations to continue to benefit from years of investments in infrastructure while capitalizing on the benefits of AWS as well. Instead of replacing one with the other, both can work together, providing greater benefits than either one on its own.

About the Authors

Justin Warren is managing director of independent analyst and consulting firm PivotNine. He has over 20 years' experience consulting to enterprises and startups, including ANZ bank, Australia Post, IBM, Nutanix, Rubrik, Symantec, Telstra, VMware, and others. He is a regular contributor at Forbes.com, iTNews.com.au, and CRN.com.au and host of the popular podcast The Eigencast. He holds an MBA degree from Melbourne Business School.

Stephen Foskett is an active participant in the world of enterprise information technology, currently focusing on enterprise storage, server virtualization, networking, and cloud computing. He organizes the popular Tech Field Day event series for Gestalt IT and runs Foskett Services. A long-time voice in the storage industry, Stephen has authored numerous articles for industry publications and is a popular presenter at industry events. His contributions to the enterprise IT community have earned him recognition as both a Microsoft MVP and VMware vExpert.

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About NetApp

NetApp is the data authority for hybrid cloud. We provide a full range of hybrid cloud data services that simplify management of applications and data across cloud and on-premises environments to accelerate digital transformation. Together with our partners, we empower global organizations to unleash the full potential of their data to expand customer touchpoints, foster greater innovation and optimize their operations. For more information, visit www.netapp.com. #DataDriven

About AWS

For 10 years, Amazon Web Services has been the world's most comprehensive and broadly adopted cloud platform. AWS offers more than 90 fully featured services for compute, storage, databases, analytics, mobile, Internet of Things (IoT) and enterprise applications from 42 Availability Zones (AZs) across 16 geographic regions in the U.S., Australia, Brazil, Canada, China, Germany, India, Ireland, Japan, Korea, Singapore, and the UK. AWS services are trusted by millions of active customers around the world monthly -- including the fastest growing startups, largest enterprises, and leading government agencies -- to power their infrastructure, make them more agile, and lower costs. To learn more about AWS, visit https://aws.amazon.com.

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