Technical White Paper

ONTAP Cloud: Storage for the Multicloud 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 stored data to cloud-based storage and highlights how NetApp® ONTAP Cloud® can help solve these problems and ease the transition.

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Table of Contents

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. While the cloud has brought us new ways to write applications that can stay running at all times, that ability is predicated on the application being stateless: having no data. A stateless application with no data is just a generic application without much value, at least not by itself. It needs the data to come alive.

New organizations that started in the last five years might be able to use this new way of writing applications exclusively. For everyone else, there are existing applications that are performing useful, important functions. Rewriting all those applications or completely changing an organization's workflows to use cloud-based systems overnight isn't realistic. What is needed is a bridge to the cloud, enabling existing applications to run with existing data storage solutions.

Enterprise storage hasn't had a place in the cloud. Until now. By moving trusted enterprise storage technology to the cloud, NetApp ONTAP Cloud enables enterprises to move data, and thus applications, more easily. It also creates new opportunities to leverage cloud computing for testing and rapid development.

Introducing ONTAP Cloud

NetApp ONTAP Cloud brings the benefits of an enterprise storage array to the cloud and makes it easy to use cloud in an enterprise manner. ONTAP Cloud creates a virtual NetApp storage array running on cloud infrastructure with all of the features found in the data center. Virtual compute instances can be activated in the cloud alongside this new storage solution, acting as a bridge for applications but also enabling cloud benefits.

Because data is so critical to applications, enterprises have always been careful about which storage devices they trust. NetApp has been at the core of the enterprise data center for more than two decades, and the ONTAP® storage operating system has evolved to be one of the most trusted in the industry.

ONTAP Cloud uses the same trusted ONTAP software, running virtually in the cloud as an Amazon Machine Image (AMI) in Amazon Web Services. It is scale-out ONTAP® running on Amazon EC2 instances. That is the same software found in the data center, only with added drivers enabling it to communicate with Amazon's virtual machine abstraction and Elastic Block Store (EBS) storage.

This means that all of the ONTAP features found in physical NetApp arrays have been brought to AWS, with some additional benefits. ONTAP Cloud instances can be accessed and managed just like on-site NetApp storage arrays. The same storage protocols are supported, including NFS, SMB/CIFS, and iSCSI. NetApp Snapshot® capabilities make it simple to save and share point-in-time copies of data, and SnapMirror® replication software can be used to move data between arrays, even from the data center to the cloud.

Running ONTAP Cloud in AWS requires coordination with the underlying components, EC2 and EBS, just as a physical storage system needs to coordinate with disk shelves and drives. NetApp provides a software component for this, called OnCommand® Cloud Manager, which uses AWS credentials to automatically configure all of the underlying elements required for a ONTAP Cloud instance.

The combination of ONTAP, Cloud Manager, and Amazon AWS brings trusted and feature-rich NetApp storage systems to the cloud.

Cloud Manager

In order to get ONTAP Cloud working in AWS, Cloud Manager is needed to manage AWS credentials and to mediate the setup of all the pieces that sit beneath the ONTAP instance itself. There must be an EC2 instance running on which ONTAP can boot. NetApp provides Cloud Manager, which can be driven from a GUI or REST API, to do that.

Having an API means Cloud Manager can integrate the setup and teardown steps into automation tools, such as VMware vRealize Operations, Puppet, Chef, or Ansible. Advanced IT departments could add cloud options to the mix of what they offer their own internal customers, and developers could spin up an instance of ONTAP that connects to the corporate datastores as part of their regular development work.

Imagine being able to develop in the cloud; test things out; and, if it all goes well, just use SnapMirror to copy the data back on-site and spin up some application instances inside the firewall. Or perhaps run in the cloud and use on-site as a DR copy for use on the rare occasion AWS has an outage. With Cloud Manager, an enterprise storage solution is waiting in AWS, just like in the data center.

It's All About the Information

Data is the most important part of a system. 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: as a way 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.

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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. Anyone can sign up for software-as-a-service CRM, but it's the unique set of contact information that turns a generic tool into something of tremendous value.

Organizations also have specialized, proprietary applications that have been developed to solve particular business problems unique to that organization. In this case, the applications both use data and are data, as anyone who has had to hunt for lost source code can attest.

Moving to the cloud means moving data, not just applications. Cloud is well suited to new ways of building applications, but what about all the specialist applications that already exist and provide real value to the business? Rewriting those applications to be cloud native is neither simple nor fast, and is the end value worth it? Do cloud-centric storage solutions offer the necessary features, such as Snapshot copies, clones, replication, scalability, performance, and reliability?

Data is also valuable. Keeping the data safe with enterprise features such as encryption and audit trails is vital at a time when major security breaches are happening so frequently, and these are just the ones we know about. Moving data outside the organization's boundaries and trusting the security of data to an external third party are not things to be taken lightly.

There are real advantages to the operational model that cloud systems provide, so the option cannot be dismissed out of hand. New systems can be provisioned quickly, without waiting for physical hardware to arrive and be installed. Unused systems can be turned off, immediately reducing spending. Experiments can be tried and quickly stopped if they don't work out. New opportunities can be quickly seized as they present themselves.

ONTAP Cloud provides a way to take advantage of the benefits of cloud without losing the benefits of existing systems and approaches. Instead of creating, where you may be forced to choose between one of two suboptimal choices, ONTAP Cloud provides a way to use cloud if and when it is useful, and in a known, controllable way.

NetApp ONTAP: Strength of the Known

The NetApp ONTAP operating system is a known and trusted storage solution for a reason: It has been tested for many years by thousands of companies, from the smallest to the very largest, in truly enterprise production environments. New file systems are always tricky, because a bug can corrupt or destroy data stored on them. Fear of data loss is one reason storage has historically been a very conservative field.

ONTAP also has a long list of enterprise features that exist because enterprise customers need them. Features such as data deduplication, at-rest encryption, and site-to-site mirroring bring peace of mind, whereas cloning and multiprotocol support enhance usability. Cloud storage vendors are rapidly adding new features, but it will take years for them to catch up to existing enterprise storage solutions such as NetApp.

One of the most important aspects of using known and trusted systems is that they already work with existing systems. Imagine having to replace Active Directory and SCOM simply because Windows servers were now virtual instead of physical devices. ONTAP has evolved alongside open systems servers for two decades, and this is something no cloud storage solution can boast.

Similar Interface: Maintain Existing Processes

Rewriting applications to be totally cloud native isn't simple. There is a learning curve that existing enterprises have had trouble facing. It also takes a great deal of time and skill to write—and debug—cloud applications. For organizations that are committed to being responsive to changing business requirements, rewriting an application from scratch would take tremendous additional investment without a clear upside. In many cases, the best result is that no one notices the change, while the downside is disruption and failure.

What if the benefits of cloud could be achieved without having to completely change the way the organization works? Just as virtualization of servers meant we could turn on new servers more quickly, so it is with a virtualized storage array. And, just like virtual servers, they run the same operating system as they do on physical devices, so they work the same way organizations are already used to. By abstracting away from the physical hardware, we are able to concentrate on the logical functions of systems and the benefits they provide.

All the good reasons for virtualizing physical servers apply to virtualizing storage arrays as well. An organization can continue to use existing processes, treating the new ONTAP Cloud systems just like existing on-site storage. They can be used to receive data using SnapMirror, serve data to applications, and keep the data safe with at-rest encryption.

Rather than lose features, new capabilities are added, extending the existing maturity of the organization's processes into the cloud era. Nothing is lost; there is only gain.

Cloud Specific Benefits

Using ONTAP Cloud provides the benefits of the trusted enterprise storage systems, but with additional benefits not possible with physical systems.

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

A second underappreciated virtue of cloud systems is that systems can be turned off when they are not needed. Importantly, this can be done in two ways: permanently and temporarily.

Permanently turning off a storage system means it can be completely decommissioned much more quickly than a physical system, ideal for a short-lived project. This aligns infrastructure spending with the life of a project and makes business case accounting much simpler.

Temporarily turning off a storage system is also possible for intermittent workloads. For example, a testing or analysis system may only be needed once per week, but building one from scratch is too time-consuming, even with substantial automation. Instead, a prebuilt system can be powered off, waiting to be brought online and its data synchronized quickly with SnapMirror using existing known processes. This is ideal for regular but infrequent data processing.

Flexibility and Portability

Consider also the option of cloud-based disaster recovery. Adding a ONTAP Cloud instance to an 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 that has an AWS presence.

ONTAP Cloud 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 in the cloud, with physical, owned data centers used for failure scenarios. Multiple primary locations could be used, each for a different set of applications, with failover locations determined based on business requirements, spreading risk in a portfolio approach.

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. The cloud becomes just another data center location to manage.

Instead of having to replace what is done today with a completely new, cloud-centric way of doing things, an organization can keep using existing processes, reaping the benefits of investments in training and tools, while simultaneously augmenting them with the benefits of cloud. The cloud adds new value instead of merely replacing existing value.

Control the Pace of Change

As applications are replaced with new methods of working, processes can be updated and tools changed, but without a forced march to a single, cloud-only way of working. Changes can be made at the pace required to achieve business outcomes instead of arbitrary technical ones. Infrastructure serves the needs of data and applications and the people who rely on them, not the other way around.

The flexible approach also permits experimentation with new ways of working. If a choice is made to move data to a cloud location, and that choice turns out to be wrong, then moving the data to a different place is simple with ONTAP Cloud. There is no migration into one proprietary data format only to migrate back out again.

This lowers risk to an organization because the price of failure is reduced. Experimentation can then be encouraged and potential upside maximized, while reducing the downside risk. This is a key feature of a modern, nimble organization seeking to quickly adapt to a changing market.

On Performance

The performance of ONTAP Cloud is slightly below that of a FAS2500, but thanks to the scale-out clustering abilities of ONTAP, more instances can be clustered together for added performance. Workloads that require scale-up style performance are still better suited to physical, high-spec infrastructure. ONTAP Cloud is not a replacement to 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 it provides. Having an enterprise storage system available in the cloud is typically more important than the absolute level of performance it provides.

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Summary

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.

The cloud presents a tremendous opportunity for a company to get more out of its data, to use it in new and cost-effective ways. However, it also presents a challenge: how to get there without throwing out everything that came before, much of which still works perfectly well.

NetApp ONTAP Cloud provides a way for organizations to continue to benefit from years of investment in working systems while adding the benefits of cloud as well. Instead of replacing one with the other, both can work together, providing greater benefits than either one on its own.

Take control of the cloud storage agenda with ONTAP Cloud.

About the Authors

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