PeerPaper Report

Best Practices for Enterprise Cloud Storage Management

Based on Real User Reviews of NetApp Cloud Volumes ONTAP

IT Central Station
Unbiased reviews from the tech community

InfoWorld
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ABSTRACT

While the idea of cloud storage is nothing new, IT managers are finally getting to use enterprise-grade cloud storage solutions. Enterprise cloud storage comes with its own share of novelty and challenges, however. Best practices are emerging to help storage professionals get the most from their enterprise cloud storage. This paper explores such best practices, based on user reviews of NetApp Cloud Volumes ONTAP published on IT Central Station. Areas of focus include architecting for High Availability (HA) and focusing on data protection, as well as leveraging automation tools and storage efficiency features that drive cost savings. File shares, hybrid architecture and cloud migration also figure into best practices for enterprise cloud storage management.

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INTRODUCTION

Can the public cloud meet the storage needs of the enterprise? Today, the answer is definitely “yes.” IT managers are finally getting to use enterprise-grade cloud storage solutions. However, enterprise cloud storage presents a number of distinct storage management and architectural challenges. To get the most from enterprise cloud storage solutions, storage professionals are now developing best practices.

This paper explores these practices, as they are articulated in user reviews of NetApp Cloud Volumes ONTAP on IT Central Station. Areas of focus include architecting for High Availability (HA) and data protection as well as leveraging automation tools and storage efficiency features that drive cost savings. File shares, hybrid architecture and cloud migration also figure into best practices for enterprise cloud storage management.

An Overview of Enterprise Cloud Storage

Enterprise cloud storage comprises public cloud storage services purchased from cloud service providers (CSPs) such as Amazon Web Services (AWS), Microsoft Azure and Google Cloud for enterprise use. It contrasts with consumer-grade cloud storage, which is usually free or low-cost and offers minimal storage management functionality. Enterprise cloud storage is designed for the storage needs of a large organization. It has advanced management features. Enterprise cloud storage is able to facilitate enterprise storage workloads like content distribution, disaster recovery and application data storage.

NetApp Cloud Volumes ONTAP falls into the enterprise cloud storage category. It is a fully managed cloud storage solution available on AWS, Azure and Google Cloud Platform (GCP), providing for enterprise-grade storage management requirements.

Best Practices for Enterprise Cloud Storage

What does it take to succeed with enterprise cloud storage? Like any enterprise technology, decisions about architecture, deployment and management affect outcomes. IT Central Station members have weighed in on this issue. Based on their experiences using NetApp Cloud Volumes ONTAP, they recommend a number of best practices. These include functional parameters that should influence the selection of an enterprise cloud storage solution.

1. Architect for High Availability

High Availability (HA) is an attractive feature of cloud storage. It is thus a best practice to architect HA into the enterprise cloud storage solution. Figure 1 shows a reference architecture for this approach to storage availability. It's not an automatic feature. It has to be set up specifically based on the user's requirements. A Storage Supervisor at an energy/utilities company with over 10,000 employees spoke to this issue by saying, "ONTAP has been very stable for us, specifically in the cloud environment. It allows us to have high availability as well as standalone systems if that's what we want within our specific workloads."

An Architect, Storage Services at a tech services company with more than 1,000 employees also valued Cloud Volumes ONTAP's high availability. He said, "We use the HA version to run two instances. That way there is no downtime for our services when we do any maintenance on the system itself." Each organization will have its own unique HA needs. An insurance company, for example, runs an HA environment that will scale up to 358 terabytes. "That's not bad per-system," remarked their Lead Storage Engineer.

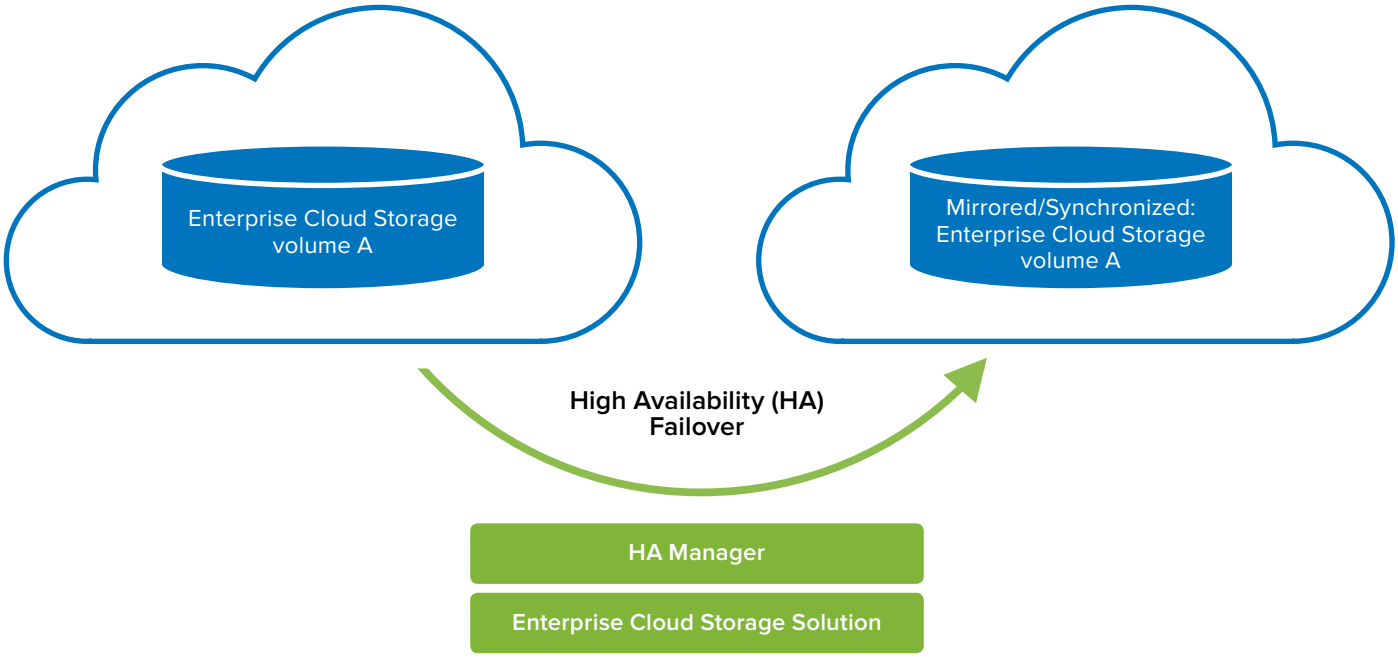

Figure 1 - Reference Architecture for High Availability (HA) in Enterprise Cloud Storage

He added that Cloud Volumes ONTAP enables him to manage multiple petabytes of storage with a small team. This includes single node and HA instances. As he explained, "We've gone into doing HA. It's the same as what's on-prem, and HA on-prem is something we've always done. When we would buy a filer for on-premise, we'd always buy a two-node HA filer with a switch back-end to be able to maintain the environment."

He further noted, "The other nice thing, from an on-prem perspective with a switched environment, is that we can inject and eject nodes. We can do a zero-downtime lifecycle. We can inject new nodes and mirror the data to the new nodes. Once everything's on those new nodes, eject the old nodes and we will have effectively lifecycled the environment, without having to take any downtime."

2. Implement Data Protection

Data protection is another enterprise cloud best practice, as exemplified by data snapshots and comparable processes. The Senior Manager, IT CloudX at the manufacturing company shared, "We're using snapshots as well and it's a pretty useful feature. That is one of the main NetApp benefits." The Architect, Storage Services at the tech services company similarly noted, "We've been taking advantage of the data protection provided by the snapshot feature for many years in our on-prem storage systems. We find it very good. And we offload those snapshots as well to other instances, or to other storage systems."

Other comments related to data protection use cases in enterprise loud storage include:

- Disaster Recovery: "The data protection

provided by the solution's disaster recovery technology is cost-effective and simple." - Senior Manager, IT CloudX at the manufacturing company.

- Data Archive: "The [SnapMirror] snapshot ability we're using is very good. For example, we have a vault account and we can SnapMirror our volumes to that vault account. It has a NetApp that sits on it as three buckets and acts as our offset backups." - Sr. Manager at a tech vendor with over 10,000 employees.

- Backup and Recovery: "The data protection provided by the Snapshot feature is a crucial part of being able to maintain our environment. We stopped doing tape-based backups to our NAS systems. We do 35 days of snapshots. We keep four 'hourlies,' two dailies, and 35 nightly snapshots. This gives us the ability to recover any data that's been accidentally deleted or corrupted, from an application perspective, and to pull it out as a snapshot." - Lead Storage Engineer at the insurance company.

3. Use the Technology to Realize Greater Efficiencies and Savings

By its very nature, cloud storage can help cut costs for on-premises storage. IT Central Station members are pleased with Cloud Volumes ONTAP's ability to realize this result and reduce storage footprint and costs with NetApp efficiency features: thin provisioning, data compression, deduplication and compaction. The manufacturing company's Senior Manager, IT CloudX noted, "The storage efficiency has reduced our storage footprint because we are offloading all the data to the storage account. So, it has reduced the cost of corporate storage."

Data compression is part of this story, as the Storage Supervisor at the energy/utilities company explained. He said, "NetApp ONTAP, easily, in our environment, allows for a 3:1 compression ratio on average. That's really helped, whether it be on-premise or in the cloud, to help drive down cost utilization in our systems. There's a number of systems that we have that run pretty high utilization. That data reduction

> **"The data protection provided by the solution's disaster recovery technology is cost-effective and simple.**

helps us prevent from having to continue to expand those systems." A Systems Programmer at a university with over 10,000 employees had a comparable experience. He shared, "Dedupe and compression save us significant space; it's so cost-effective we're considering reducing what we charge."

4. Save Costs with Data Tiering

If a cloud storage solution has data tiering functionality, it's a good practice to take advantage of it. Data tiering involves moving data into different storage tiers, each of which offers a given level of performance for a matching price point. The highest priority data should go to the highest performing and highest cost tier. The Senior Manager, IT CloudX took this approach and found that Cloud Volumes ONTAP' data-tiering saved his company money. The Architect, Storage Services at the tech services company said, "The data tiering saves us money because it offloads all the code data to the Blob [Binary Large OBject (BLOB)] Storage."

5. Leverage Enterprise Cloud Storage for File Shares and File Services

File shares and file services are a staple of enterprise storage management. They work well in the cloud, too, as users of Cloud Volumes ONTAP found. The Storage Supervisor at the energy/utilities company shared, "We use ONTAP in the public cloud for Linux NFS mounts, as well as Windows CIFS volume shares. A lot of times multiple applications or systems will need to share that data and NetApp ONTAP in the cloud really allows for all those applications to utilize shared data in their application communication."

It gives us the ability to do a lot, to do more with less.

The cloud can be efficient for file shares, as well. The insurance industry Lead Storage Engineer said, "It [Cloud Volumes ONTAP] gives us the ability to do a lot, to do more with less. Those three people manage our entire NAS environment. I've got two intermediate and one senior storage engineer in our environment who handle things. They're handling those multiple petabytes of on-prem and I'm just starting to get them involved in the cloud version, Cloud Volumes ONTAP."

One IT Central Station member, the Lead Storage Engineer at the insurance company, recommended locking down the provisioning of file shares. As he put it, "We don't want them running us out of space." His solution: "We have a ticketing system where users request storage allocation and the NAS team, which supports the NetApp infrastructure, will allocate the space with the shares, to start out. After that, our second-level support teams, our DSC (distributed service center) will maintain the volumes from a size perspective."

6. Consider a Hybrid Architecture

Hybrid cloud architecture, which combines public cloud and on-premises infrastructure, is considered an overall best practice in enterprise IT. Storage should follow this pattern, according to IT Central Station members. For example, the insurance company Lead Storage Engineer said, "For the most part, we're using it [Cloud Volumes ONTAP] to move data off-prem. We have the ability to do mirrors from on-prem to Cloud Volumes ONTAP and we also have both single-node instances and HA instances. We are running it in both AWS and Azure."

He also takes a hybrid approach to HA and disaster recovery, leveraging the similarity between NetApp Data ONTAP, which runs on-premises, with Cloud Volumes ONTAP. As he noted, "Cloud Volumes ONTAP in the cloud, versus Data ONTAP on-prem, are the exact same products. If you have systems on-prem that you're migrating to the cloud, you won't have to retrain your workforce because they'll be used to everything that they'll be doing in the cloud as a result of what they've been doing on-prem."

The Storage Supervisor at the energy/utilities company offered another perspective. He said, "The primary use case for ONTAP is both on-premise and in the cloud. For on-premise, we utilize it for hosting our virtual infrastructure environment through VMware, as well as hosting personal and shared drives. Then, in the cloud, we also host personal and shared drives within AWS and Azure." On a related front, a Director of Applications at a financial services firm with more than 1,000 employees praised Cloud Volumes ONTAP flexibility for Virtual Machine (VM)

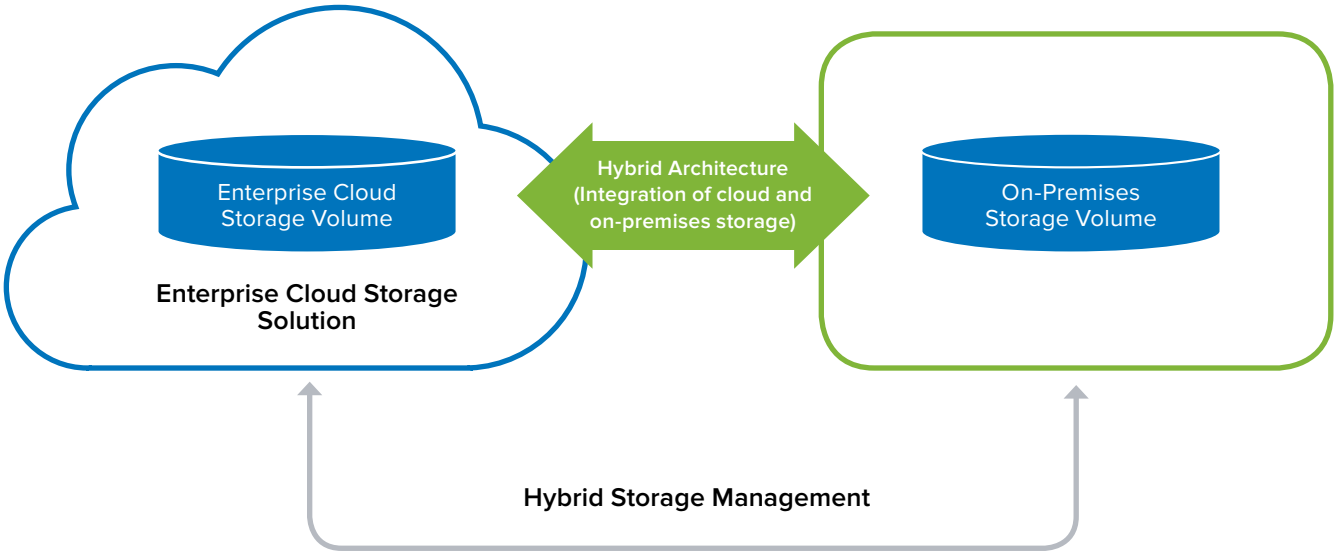

Figure 2 - Hybrid Architecture for Storage

environment. He said, “We use it to transport data between on-premise systems and the cloud.” Figure 2 shows a simple reference architecture for this kind of setup.

7. Set Up and Migrate Your Way

There is no one right way to implement enterprise cloud volumes. IT Central Station members shared their individual approaches. The Sr. Manager at the tech vendor commented, “In terms of an implementation strategy, we get the requirements from the business. Whenever we need a new environment, for example, my team sets it up really fast. We can set all the configuration like any other systems we have: with our monitoring tools, the backup, snapshots; everything the same way. It’s easy to manage and replicate things to look the same.”

In terms of migration, he added, “Migration was pretty easy. We could use SnapMirror or we could use NetApp’s XCP Migration Tool. That was pretty awesome. It replicated the data faster than any other tool that I’ve seen. That was a big help.” The Senior Manager, IT CloudX at the manufacturing company, who described Cloud Volumes ONTAP as “very simple,” advised starting with a small implementation and then adding more. He said, “We started with just one desktop and then added additional ones and then added tiering.”

> **It replicated the data faster than any other tool that I’ve seen.**

The Architect, Storage Services at the tech services company had a distinct implementation strategy based on determining what SAP systems and what services they wanted to deploy in the cloud. He said, “Our strategy was that if Cloud Volumes ONTAP made sense in any use case, we would want to use it because it’s, again, highly automated and we could use it with our scripting

already. Then we had to look at what is supported by SAP itself. We mixed that together in the end and that gave us our concept."

8. Take Advantage of Advanced Management and Automation

Enterprise cloud storage benefits from automation, so it's a best practice to employ automation and other advanced storage management capabilities whenever possible. For example, the insurance company Lead Storage Engineer, who does disaster recovery (DR) testing on his Cloud Volumes ONTAP environment, uses workflow automation. As he described, "We do scripted cut-overs to build out. We use the mirroring to mirror our volumes to our DR location."

Similarly, the Senior Manager, IT CloudX at the manufacturing company uses the solution's Cloud Manager to automate the scheduling of data synchronization. As he put it, "It's almost impossible to do that manually. Compared to an engineer doing it manually, it's about 90 percent faster."

> **Compared to an engineer doing it manually, it's about 90 percent faster.**

The Architect, Storage Services at the tech services company shared why automation works so well, noting, "NetApp's Cloud Manager automation capabilities are very good because, again, it's REST-API-driven, so we can completely automate everything. It has a good overview if you want to just have a look into your environment as well."

CONCLUSION

The public cloud is a viable resource for enterprise storage. Storage managers can take advantage of cloud economics and the cloud's essentially infinite storage capacity. Success relies on the adoption of best practices, though. Enterprise cloud solutions do not automatically solve all storage challenges. As members of IT Central Station shared, it's necessary to architect for High Availability (HA) and employ data protection processes.

To save money in storage, the best practice is to focus deliberately on how enterprise cloud storage can shrink the physical storage and reduce storage footprint. To this end, storage efficiency features such as thin provisioning, data compression and deduplication, along with data tiering, can make a big difference. Hybrid architecture, too, enables flexibility and savings, especially when coupled with innovative use of automation features in the enterprise cloud storage solution. Enterprise storage is going to play a major role in storage in the coming years. By embracing best practices, it will be possible to realize the potential benefits of this exciting technology.

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