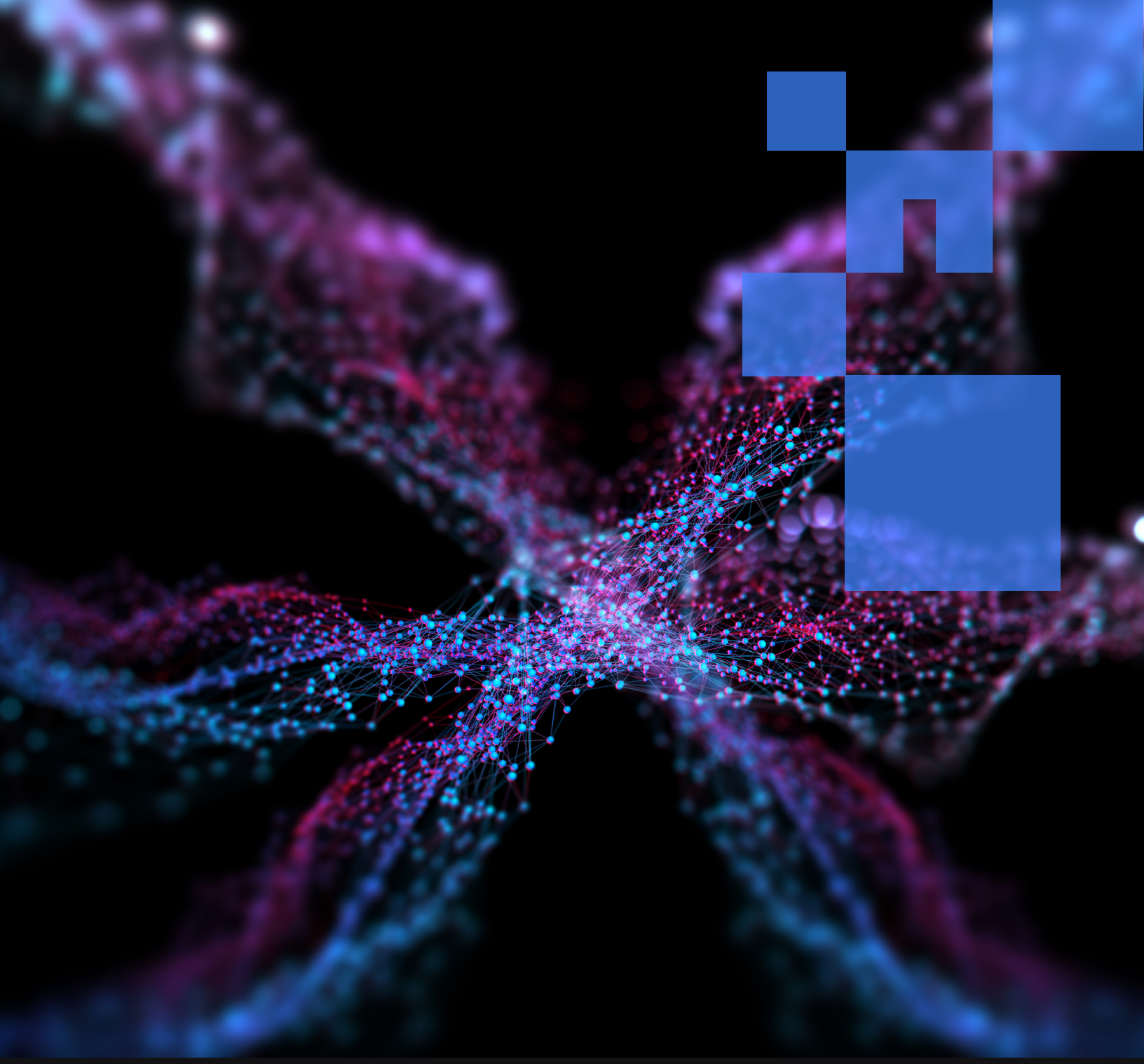

VDI AND CLOUD VOLUMES ONTAP:

The Key to Virtualizing Workplaces During a Time of Disruption

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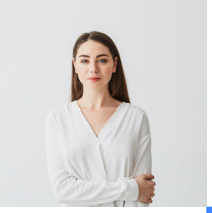

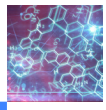

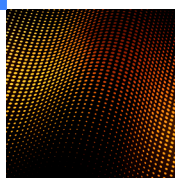

Introduction

Virtual Desktop Infrastructure (VDI) technology decouples the workplace environment from the device used to access it. Rather than apps, data, user profile, and operating system all being installed, secured, and maintained on a dedicated device such as a PC or laptop, at logon a VDI spins up a user-customized workplace instance hosted in a central data center or in a cloud and terminates the instance upon logoff.

VDI technology addresses a number of compelling business trends such as the growing adoption of bring your own device (BYOD), the pressing need for more streamlined and flexible business processes, and the spread of geographically distributed organizations. Although VDI does not have to be cloud-based, the almost universal penetration of cloud technologies has also spurred its growth.

The recent events however has reshuffled the deck. VDI plays a central role in enabling the WFH (work from home) strategy that has been adopted by every sector for which it is feasible—from government to software, healthcare, education, and many more. IT teams, who are themselves often working from home, are tasked with ramping up VDI platforms overnight in order to securely and reliably meet the dramatic increase in demand.

This guidebook explains the differences between self-hosted and cloud-hosted VDI deployments and then explores the data management challenges of cloud hosted VDI deployments. Through five hands-on customer success stories, it shows how NetApp's feature-rich Cloud Volumes ONTAP solution provides powerful data management tools and automated processes to ensure highly available, secure, and scalable cloud-based VDI.

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Table of Contents

The Different Flavors of VDI Solutions

What is VDI?

With VDI, a connected end-user device securely connects to a backend infrastructure of file, app, and content servers, becoming a personalized virtual workstation that behaves as though the apps and data are installed and stored locally. When the session is terminated, files and other persistent data are stored so that, at the next logon, the workstation can be restored seamlessly. The infrastructure resources then return to the centralized pool to serve the needs of other users.

Like cloud file sharing, VDI allows easy access to always-synced shared files from any connected device. Centralization of these shared files also makes it easier to protect data through backup and disaster recovery processes. However, VDI goes beyond cloud file sharing to also provide a complete desktop user interface environment.

The connection can be through either a public or private network. Similarly, the virtual desktop infrastructure can be either self-hosted in a on-premises data center or it can be hosted in the cloud.

In the case of self-hosted VDI, the company must provide the physical servers as well as install and maintain the VDI hypervisor software. The company must also provision and maintain the network resources required to uphold performance SLAs as well as the redundant resources required for high availability, backups, and disaster recovery. In short, self-hosted VDI provides a great deal of control but its CAPEX and administrative costs can be very high.

One way of mitigating the complexities and costs of self-hosted VDI is to leverage a hyperconverged infrastructure system that tightly integrates all required compute and storage resources in commodity server nodes. Hyperconverged virtual desktop infrastructures are easier to deploy, scale well, and are more cost effective to operate and maintain.

In the next section we look at the opportunities and challenges of cloud-hosted VDI.

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The Opportunities and Challenges of Virtual Desktop Infrastructure in the Cloud

Cloud-hosted VDI takes advantage of public cloud economics, scalability, and security to lower the total cost of VDI ownership. However, VDI in the cloud is not without its challenges, all of which have been dramatically magnified by the unprecedented growth in WFH demands.

Performance reliability can be impacted by the wide range of access devices, types of connectivity, and diverse VDI devices (gateways, brokers, etc.). Typical end-user problems that may be encountered due to these complexities include not being able to connect, poor latency, user interfaces not working properly after connection, and the inability to access certain applications. Now more than ever, an employee forced to work from home during a time of great uncertainty needs and expects stress-free VDI performance.

In the best of times, unpredictable VDI usage patterns place significant storage scalability demands on the organization's environment. The current WFH tsunami means that enterprises must be able to agilely scale cloud storage capacity up and out, without impacting performance.

The company has less visibility into the underlying infrastructure resources, which can make monitoring and control a challenge. This challenge is further magnified in the multicloud and hybrid cloud environments that are the prevailing trend in organizations of all sizes today. Multicloud scenarios can also introduce interoperability issues. Beleaguered IT teams are struggling with these monitoring and control challenges as they strive to avoid VDI downtime altogether—and to remediate incidents that do occur as quickly as possible and with zero data loss.

VDI solutions rely heavily on SMB file shares and this capability is not yet mature in all public cloud environments. AWS' recently launched managed Windows file storage service (Amazon FSx) is certainly a step in the right direction but it is not a simple plug-and-play solution.

Last but not least, without careful management and monitoring, VDI cloud costs can soar.

VDI Challenges

PERFORMANCE

- **Poor connectivity**
- **Application inaccessibility**

VISIBILITY

- **Difficult to monitor**
- **Limited in multicloud and hybrid deployments**

SMB ACCESS

- **Considerations with native cloud options**

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New Challenges for VDI

- Enormous uptick in usage and site traffic
- Existing infrastructure needs immediate upgrading
- More usage=more data loss in failure

Many of the public cloud providers offer Desktop as a Service (DaaS) solutions, such as Amazon WorkSpaces or Windows Virtual Desktop from Microsoft Azure. DaaS is a secure cloud-based VDI solution that frees up administrators from infrastructure management issues. However, the other cloud VDI challenges noted above are relevant to DaaS solutions, which can also be expensive. The costs of running an on-premises VDI solution are estimated to be ~$300/user/year, while the cost for Amazon WorkSpace is $500/user/year.

An alternative option to solve some of these challenges is for VDI users to turn to Cloud Volumes ONTAP.

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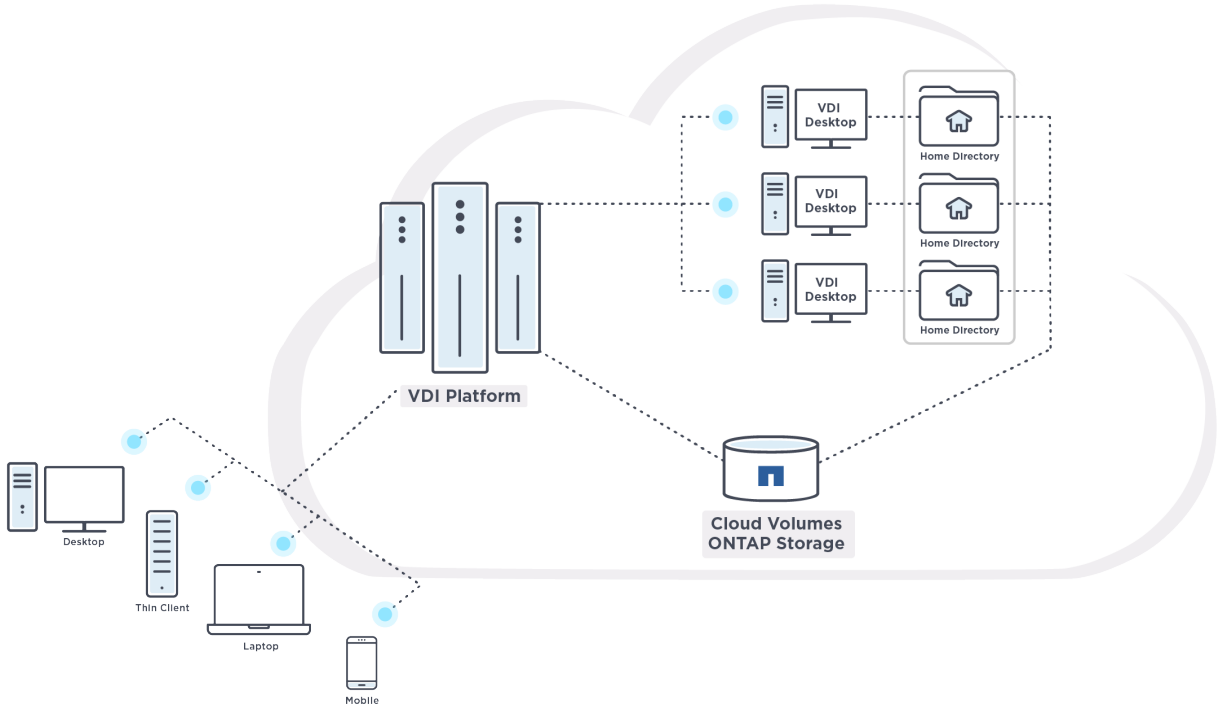
How Cloud Volumes ONTAP Supports VDI Shared Storage in the Cloud: Customer Case Studies

NetApp Cloud Volumes ONTAP, the leading enterprise-grade storage management solution in the cloud, delivers secure, proven storage management services on AWS, Azure and Google Cloud. Cloud Volumes ONTAP has compelling value propositions for cloud-hosted VDI, and supports a strong set of features including data protection, high availability, storage efficiencies, file share services, cloud automation, Kubernetes integration, and more.



VDI Shared Storage with Cloud Volumes ONTAP

Let's take a look at five customer case studies to see how this flexible platform benefits the VDI use case.

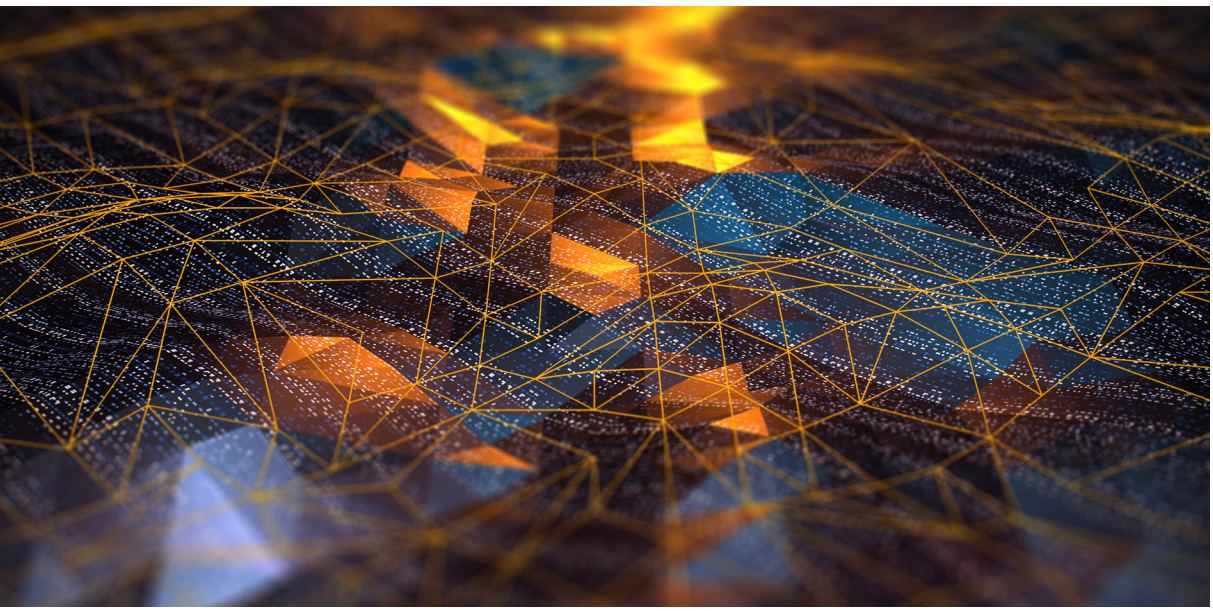
Global Company Scales VDI Capacity Infinitely in 24 Hours

This company is a prominent US financial advisory enterprise that serves 140+ countries and markets with a global workforce of 45,000. They had already been using Cloud Volumes ONTAP for Azure to meet their data retention, backup, disaster recovery (DR) and availability use cases, while their self-hosted VDI solution was using NetApp on-prem arrays to handle the SMB/CIFS file sharing element. With the increased WFH demands, the company's internal IT team had to expand overnight the capacity of their self-hosted VDI environment in order to meet the needs of thousands of employees beginning to work from home. That's when they turned to Cloud Volumes ONTAP.

Using the flexible and cost-effective pay-as-you-go (PAYGO) model, it took the company's IT team just over **24 hours** to deploy three new instances of Cloud Volumes ONTAP across three different Azure regions, replicate their on-premises VDI data to the cloud instances, and configure the instance parameters to match their on-premises environment, ensuring that the company's global standards are maintained.

The **immediate benefits** the company gained from deploying their VDI with Cloud Volumes ONTAP include:

1. Being able to burst into Azure quickly and agilely to meet the WFH VDI demands when the capacity of the self-hosted environment reaches its limit.
2. Seamless transfer of VDI data to and from the cloud with no need for re formatting, using SnapMirror® data replication.
3. Enterprise-grade protection of VDI data in the cloud: Encryption of data at rest as well as automated backups using point-in-time incremental NetApp Snapshot™ technology.



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Global Architectural Firm Migrates VDI to the Cloud

This US-based architectural firm operates fifteen offices worldwide. Its multidisciplinary, distributed teams of architects, engineers, industry specialists and builders execute innovative large-scale projects such as commercial buildings, education and sports facilities, multifamily residences and convention centers.

Their self-hosted VDI infrastructure had already proven itself as a productivity enabler that allows their employees to work seamlessly from anywhere at any time with any device. As part of their strategic decision to shift their business- and mission-critical applications to the cloud, they decided to use Cloud Volumes ONTAP for Azure to host their file shares and their entire VDI infrastructure.

The benefits:

1. Ease of migration: Using Cloud Volumes ONTAP powerful point-in-time NetApp Snapshot technology and data replication features they were able to lift and shift their applications to the cloud, with minimal need for refactoring.
2. Multi-protocol file sharing for SMB/CIFS as well as NFS and iSCSI protocol access.
3. Reduced CAPEX by shifting their hosted VDI costs to OPEX.
4. An enhanced disaster recovery solution as a cost-effective secondary data center.

Travel Industry Giant: Shared Storage Solution for VDI Users

This US company owns and operates some of the world's best known online travel brands. They operate several hundred travel booking websites in ~75 countries, with listings for hundreds of thousands of hotels and hundreds of airlines.

Seeking a highly available shared storage solution for their 1000+ VDI users, they deployed Cloud Volumes ONTAP HA for AWS. Seeing that the solution was easy to deploy, with only minimal support required from NetApp's cloud experts, the company has decided to make Cloud Volumes ONTAP the backbone for their VDI infrastructures worldwide. Using this dual-node configuration, they are able to prevent data loss (RPO=0) and recover in under sixty seconds (RTO<60).

CRM SaaS Provider: Migrate VDI Environment to AWS

This US software company was a SaaS pioneer and its enterprise SaaS applications continue to dominate the market. As part of a strategic direction to migrate their own production workloads to the public cloud, they sought to migrate their on-premises VDI that was running on NetApp FAS systems. Looking for a cloud-based VDI solution that would provide the same enterprise-grade storage features as their current data center deployment, they decided to test **Cloud Volumes ONTAP for AWS**.

After a successful proof of concept, the company is moving to production while scaling requirements and tuning the solution accordingly. Cloud Volumes ONTAP lets them change instance types, rightsize their VDI instances, and cut down their storage costs using NetApp storage efficiencies. Ultimately their VDI migration will go global, serving 3,000 internal users across the US, Europe, and Asia.

Building Products Manufacturer: Disaster Recovery for VDI Environments

This publicly traded enterprise is a leading manufacturer of building products and materials for the construction industry.

Their head of Enterprise Infrastructure was an IT manager at JP Morgan during 9/11 and thus a firm believer in the business-critical importance of a disaster recovery solution. With the company having only a single data center, he decided to implement a cloud-based DR strategy for their file systems, databases and VDI environments. Deploying **Cloud Volumes ONTAP on Azure** they were able to quickly build out a reliable DR environment for their file systems, databases and VDI environments that leverages NetApp SnapMirror® data replication technology.

Cloud Volumes ONTAP Benefits for VDI

Multi-protocol Shared File Storage

NFS, SMB/CIFS, and iSCSI accessibility

High Availability

Ensuring reliable, uninterrupted access to virtual desktops and associated data.

Data Protection

Point-in-time Snapshot technology has minimal impact on performance and storage space.

Disaster Recovery

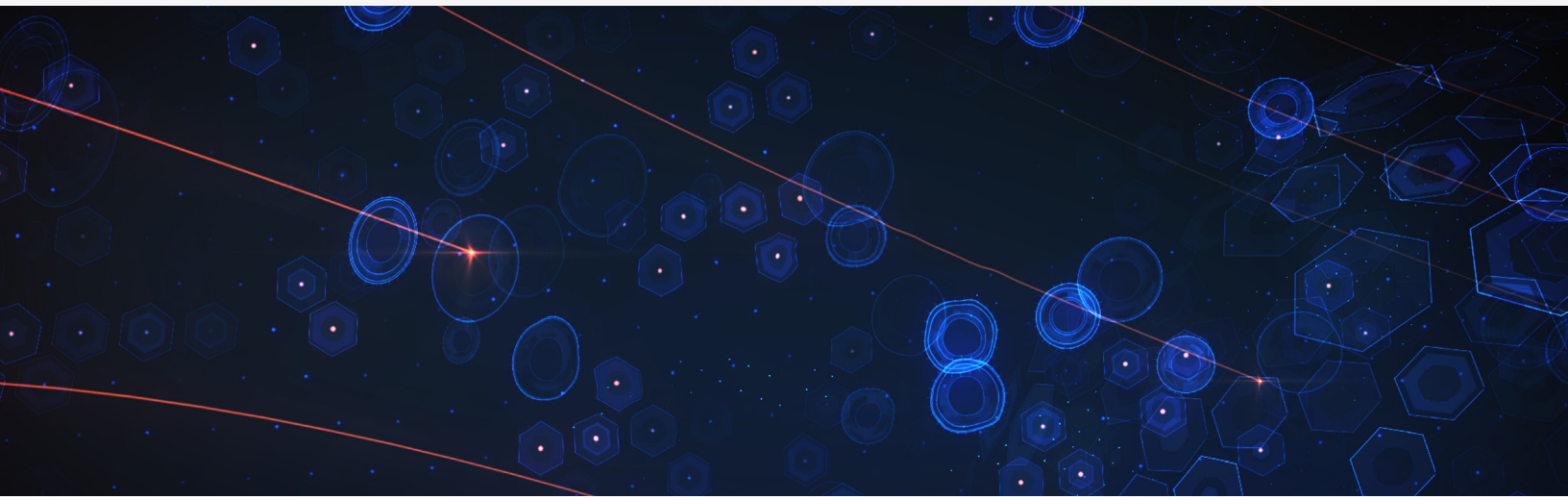
Efficient DR copies and reliable failover and failback processes.

Built-in Storage Efficiencies

Reduce VDI environment footprint and cost through thin provisioning, data compression, deduplication, and data tiering.

Single-Pane Management & Automation

NetApp Cloud Manager provides single-pane data storage management across hybrid and multicloud infrastructures.



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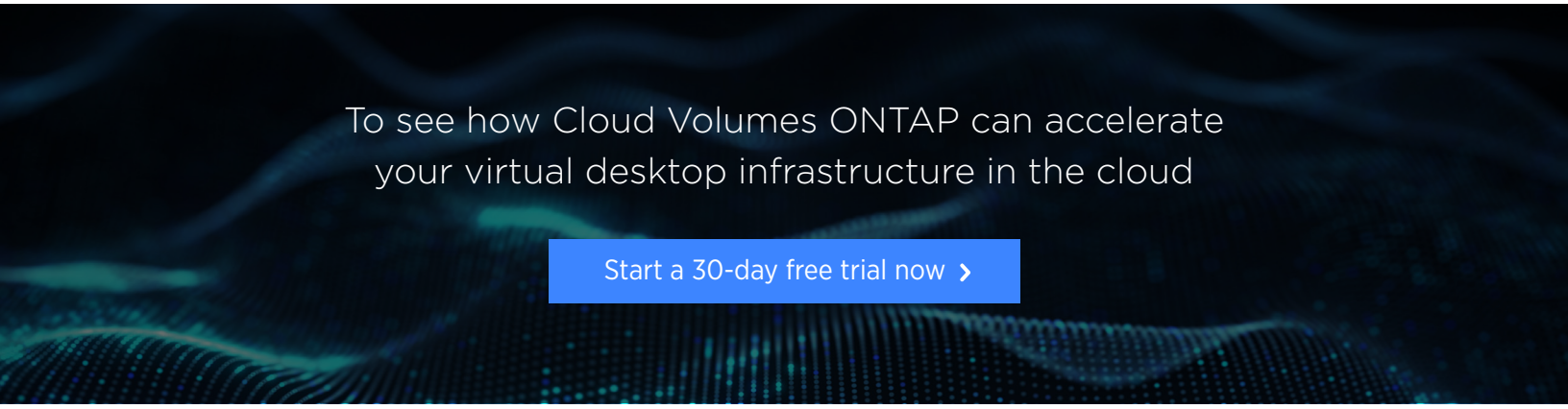
Conclusion

Business continuity during times of turmoil and uncertainty might seem like mission impossible. Ramping up VDI capabilities is one way that companies can meet the needs of its employees working from home. However, VDI deployed across complex multicloud and hybrid cloud environments can be difficult to monitor, manage, and control. Rather than being empowered by VDI, end-users may experience operational and performance issues. And administrators may find that costs related to VDI cloud usage soar out of control.

When unexpected circumstances arise, you have to respond by immediately mobilizing to support your employees, while preparing for what might happen next. NetApp is at the ready to support companies and their remote workers by helping to ensure the availability of data and applications, and help you prepare for and avoid disruptions.



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Refer to the Interoperability Matrix Tool (IMT) on the NetApp Support site to validate that the exact product and feature versions described in this document are supported for your specific environment. The NetApp IMT defines the product components and versions that can be used to construct configurations that are supported by NetApp. Specific results depend on each customer's installation in accordance with published specifications.

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