

Veritas Alta™ Storage Resiliency

Improve your application performance,
increase resiliency, and reduce costs
in the cloud.

Executive Summary

Cloud services have transformed the IT landscape and have become mainstream alternatives to operating IT infrastructure in traditional data centers. With several private and public cloud options available, 78 percent of organizations now have workloads deployed in multiple clouds¹. However, there are several challenges involved in building an operating environment in the cloud that is suitable for enterprise applications, which typically have more complex deployment architectures. Workloads that require enterprise-grade Storage Resiliency depend on advanced storage management solutions that are typically not natively available from cloud services providers.

Veritas Alta Storage Resiliency delivers enterprise-grade shared storage in the cloud for business-critical applications. Veritas offers integrated resiliency and data mobility designed to ensure smooth and seamless operations for your business-critical applications. With Veritas Alta Storage Resiliency, you can run your enterprise workloads in the cloud with several advanced features focused on three key principles:

- **Performance:** Improve application performance while reducing cloud costs
- **Resiliency:** Ensure your applications are protected against failures and can be quickly recovered if needed
- **Data mobility:** Avoid platform lock-in and easily adopt hybrid and multi-cloud deployment architectures

This solution brief will provide an overview of how Veritas Alta Storage Resiliency enables organizations to deploy enterprise IT applications in the cloud with the advanced storage management functionality they need to meet operational requirements. Veritas Alta Storage Resiliency delivers highly performant and scalable software-defined shared storage using cloud-native storage services that help you achieve maximum application uptime and performance in the cloud.

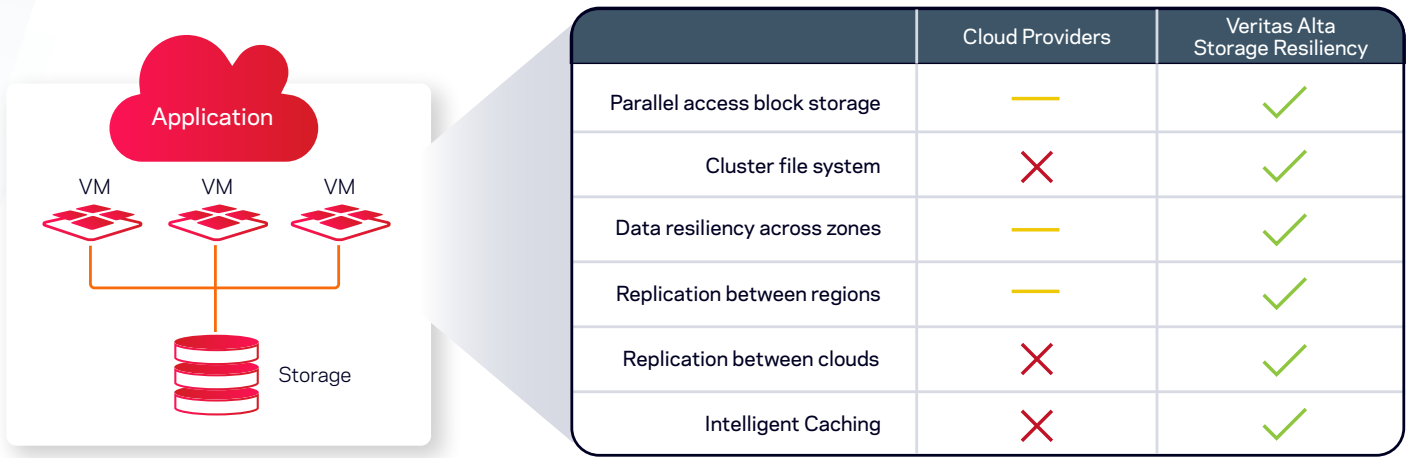
Solution Value

Veritas Alta Storage Resiliency has several unique features that offer significant value to organizations looking to deploy business-critical applications in the cloud. It can help improve application performance and reduce costs while maximizing flexibility of architecture—to help avoid being locked in to a specific technology or cloud provider. Running your business-critical applications in the cloud involves several challenges that cannot be resolved with cloud-native tools or services. Veritas Alta Storage Resiliency integrates with cloud provider infrastructures and delivers high performance parallel access storage with integrated resiliency for your IT services.

With Veritas Alta Storage Resiliency, your IT services will realize the following benefits:

- **Application performance:** High performance parallel access storage in cloud networks is delivered using native cloud block storage services. Intelligent data caching keeps frequently accessed data on SSD volumes which are used in conjunction with direct-attached cloud block storage services for maximum performance in the cloud, while potentially reducing operating costs.
- **Resiliency:** An advanced cluster file system designed for enterprise IT workloads allows you to deploy your applications in the cloud with local resiliency and additional resiliency that spans availability zones—without sacrificing performance. You can also deploy persistent storage for Kubernetes, which can optionally be configured to provide full disaster recovery capability for your containerized workloads.
- **Data mobility:** Optimized replication allows you to easily move your data between cloud regions, different cloud service providers, and to on-premises systems if needed. You can also replicate persistent data for container workloads between Kubernetes clusters from on-premises environments to the cloud.

Storage services available from cloud providers will typically not provide all the features you need to confidently run enterprise IT workloads in the cloud. Figure 1 shows an overview of some of the features that Veritas Alta Storage Resiliency offers to support enterprise IT workloads that have more demanding performance and resiliency requirements.



✓ Resilient, enterprise-grade solution based on cloud-native block storage
 — Basic with limitations
 ✗ Requires 3rd party solution

Figure 1. Veritas Alta Storage Resiliency provides enterprise functionality for cloud environments

Veritas Alta Storage Resiliency and the full Veritas Alta™ Enterprise Resiliency solution can be deployed using cloud marketplaces to help simplify the deployment experience and reduce the time to value. Solution templates are available in the AWS Marketplace (AWS CloudFormation template), the Azure Marketplace (Azure ARM template), and the Google Cloud Marketplace (Deployment Manager template).

Shared Storage in the Cloud

In many cloud environments, NFS is used to provide shared storage for multi-system applications that require parallel access to their data. However, NFS has several drawbacks and is often not suitable for enterprise applications. Veritas Alta Storage Resiliency is designed to provide maximum storage performance and resiliency for applications that have higher availability requirements. It also eliminates security concerns that arise with NFS storage, which is inherently less secure and is visible by default to all systems across the network, which can expose your data to unauthorized users who may be able to gain access to your cloud environment.

Veritas Alta Storage Resiliency includes Flexible Storage Sharing (FSS) which allows you to use cloud-native block storage services such as AWS EBS, Azure managed disk, and Google Cloud persistent disk to create secure, enterprise-grade shared storage that can be used within an application cluster. Veritas Alta Storage Resiliency is designed for the cloud and is ideal for enterprise applications, as it can decrease your storage costs, and improve your application performance and resiliency. It also enables you to easily move your data between cloud zones and regions, to other cloud services, or back on-prem if you want to or run your IT services in a multi-cloud or hybrid-cloud model. This gives you flexibility to run your IT services using the architecture that best suits your needs, without being locked in to any cloud service or provider.

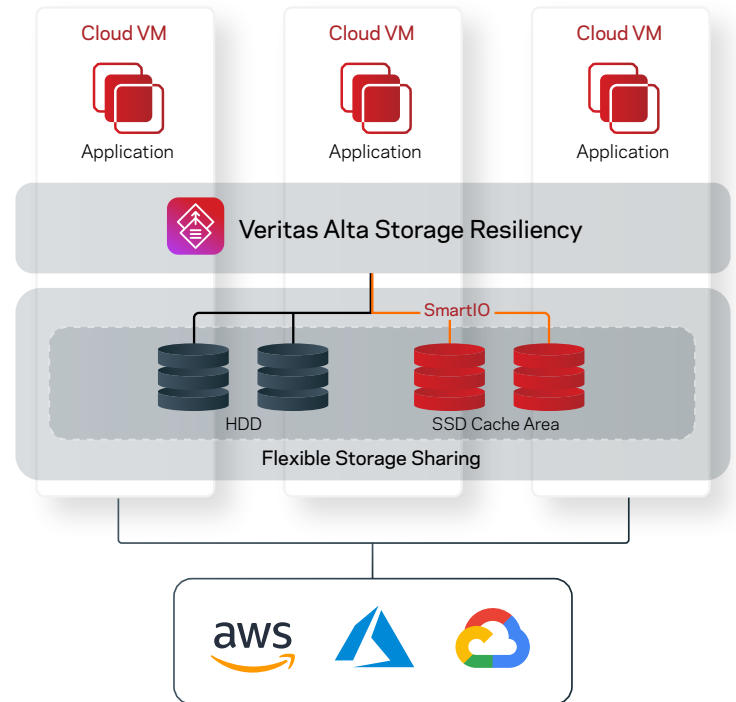


Figure 2. Veritas Alta Storage Resiliency overview

Solution Components

Veritas Alta Storage Resiliency is an enterprise-focused software-defined storage management solution designed to manage cloud-native block storage services and provide advanced features and functionality. The following are the main components of the Veritas Alta Storage Resiliency solution:

- **Veritas File System (VxFS):** An extent-based POSIX-compliant journaling file system capable of managing large volumes of data, designed to provide high performance and availability for applications. VxFS is fully supported in the cloud, with several advanced features including a cluster file system option designed to provide secure and reliable parallel access to data by multiple systems.
- **Cluster File System (CFS):** Cloud-native multi-access block storage services depend on a cluster file system to support parallel access to data by multiple cloud compute instances. CFS is a feature of VxFS that provides highly available parallel access to files across all nodes in a cluster. CFS provides better lock management than NFS-based storage services, and makes failover more reliable.
- **Flexible Storage Sharing (FSS):** Veritas Alta Storage Resiliency FSS is a feature of CFS that allows you to use cloud-native block storage services to create parallel access storage volumes in the cloud. FSS allows logical volumes to be created using cloud-native block storage, enabling a common storage namespace without requiring physically shared storage. FSS is transparent to file systems and applications, and can be implemented using most cloud-native block storage services.
- **Veritas Volume Replicator (VVR):** Enables platform-independent disaster recovery by intelligently managing the replication of data. VVR has several advanced features including Adaptive Sync, which improves sustained throughput for latency-sensitive applications by automatically switching from synchronous to asynchronous mode and vice versa based on latency. VVR can replicate data between cloud zones, regions, from on-premises data centers to the cloud, and between different cloud providers. When integrated with the Veritas Alta Enterprise Resiliency Global Cluster option, VVR provides optimized data replication between geographically dispersed sites.
- **Veritas InfoScale™ Operations Manager (VIOM):** VIOM is a platform and vendor-agnostic centralized management console for Veritas Alta Storage Resiliency that also provides some visibility into other third-party infrastructure. VIOM is used for monitoring, visualization, and management of system and storage resources. VIOM is also a reporting engine that can generate multiple reports, including a risk analysis report summarizing issues that may arise within an environment that could reduce high availability and disaster recovery readiness of Informatica.

Figure 3 is an example of how Veritas Alta Storage Resiliency can be used to support enterprise applications in the public cloud. In this example, SAP S4/HANA is shown deployed in Microsoft Azure, with Veritas Alta Storage Resiliency providing parallel access storage for the SAP systems using block storage provided by Azure managed disks.

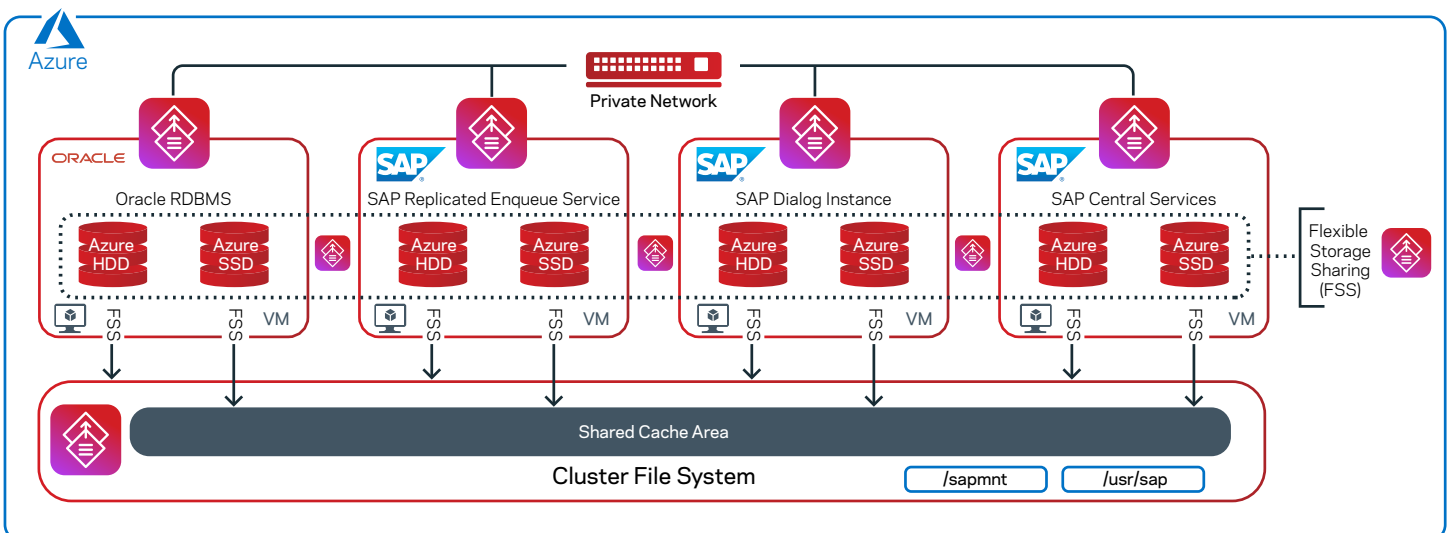


Figure 3. SAP S4/HANA running on Veritas Alta Storage Resiliency in Microsoft Azure

Resiliency

Veritas Alta Storage Resiliency manages fault tolerance for your data; it can be configured as shared storage within an availability zone and across availability zones. Veritas Alta Storage Resiliency delivers a sub-minute recovery time objective (RTO), as you do not have to detach and reattach storage volumes in the event of a failure. It also provides advanced data fencing, ensuring that your data is protected in the event of a system or network failure within an application cluster—commonly known as a split-brain scenario.

Performance and Scalability

Veritas Alta Storage Resiliency can significantly improve the performance and efficiency of the underlying cloud-native storage services with FSS, and an intelligent data caching feature called SmartIO. It also provides enterprise functionality for cloud environments beyond what is available with native cloud services. This offers some key benefits:

- **Performance:** While public cloud infrastructure offers higher performance storage options, there are limitations at the system level that minimize overall performance (IOPS). With Veritas SmartIO intelligent caching, application reads can be served from faster volumes using SSD storage, while writes can be served from a less expensive storage tier. This significantly improves application performance with minimal additional cost. Veritas SmartTier can transparently move data between cloud SSD and HDD storage depending on I/O activity, which helps reduce cloud storage costs.
- **Scalability:** With FSS, you can create the resilient shared storage volumes needed to horizontally scale enterprise applications using public cloud infrastructure. Veritas Alta Storage Resiliency enables granular resource scaling—when an application needs additional resources, either compute or storage, they can be scaled dynamically and independently to help reduce costs, while benefiting from on-demand usability of cloud resources.

Persistent Storage for Kubernetes

Veritas Alta Storage Resiliency is also a storage provider for Kubernetes. Veritas Alta Storage Resiliency includes a container storage interface (CSI) plug-in that can be used in Kubernetes environments. This allows you to create Veritas Alta Storage Resiliency volumes using cloud-native block storage services that are managed by the integrated cluster volume manager and cluster file system. This storage is then presented to pods as persistent storage for your stateful containerized applications running in Kubernetes. Veritas Alta Storage Resiliency is transparent to the application, as the application pod is only aware that it is writing to a persistent volume claim (PVC) presented by Kubernetes. The CSI plug-in workflow is shown in Figure 4.

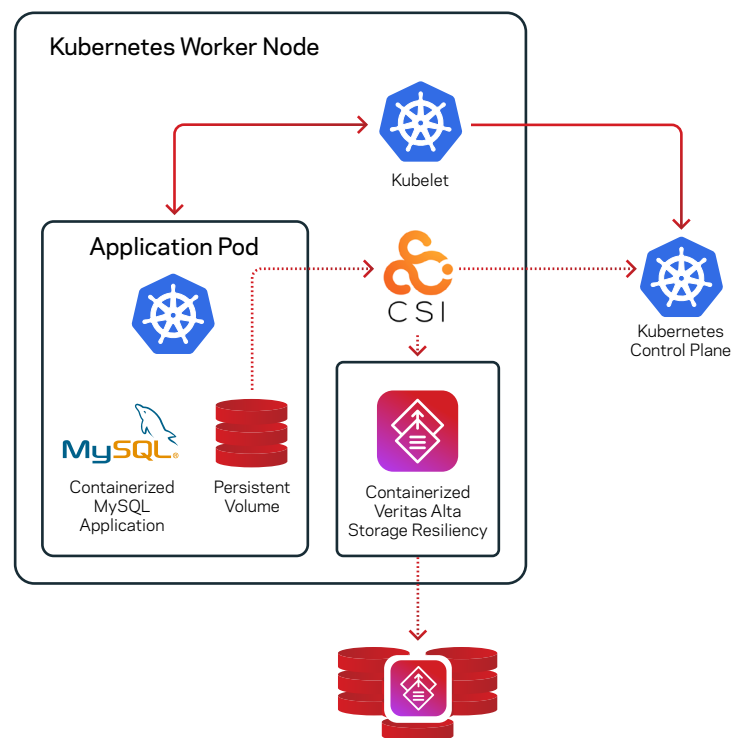


Figure 4. Veritas Alta Storage Resiliency CSI plug-in overview

Persistent Volumes

Kubernetes storage classes are used to manage the attributes of Veritas Alta Storage Resiliency persistent volumes that are mounted by Kubernetes inside application pods using the Veritas Alta Storage Resiliency CSI plug-in. Veritas Alta Storage Resiliency provides different storage class configuration options that can be used to create persistent storage volumes. Storage classes are defined for performance, resiliency, and security, and can be customized to meet application requirements.

Veritas Alta Storage Resiliency persistent volumes are provisioned by Kubernetes using the CSI plug-in, either dynamically or statically:

- **Dynamic provisioning:** Volumes are created at the same time as the container and application pod using Kubernetes with the Veritas Alta Storage Resiliency CSI plug-in and management container installed. A Veritas Alta Storage Resiliency persistent volume claim binds the storage accessible to the application pods to the Veritas Alta Storage Resiliency persistent volume that is available to Kubernetes cluster nodes.
- **Static provisioning:** Volumes are created within the Kubernetes cluster by directly accessing the Veritas Alta Storage Resiliency containers, creating a volume, and exposing this volume to containerized applications within the cluster. Veritas Alta Storage Resiliency statically provisioned volumes can also be used to simplify the process of migrating traditional applications into containers. Application data volumes outside a Kubernetes cluster can be migrated to volumes within the cluster and then managed by Veritas Alta Storage Resiliency within the cluster using the CSI plug-in. Veritas support should be contacted to help validate requirements and environmental variables involved in the migration process.

Figure 5 shows how the Veritas Alta Storage Resiliency persistent volumes and persistent volume snapshots are provisioned and used by application pods in a Kubernetes cluster.

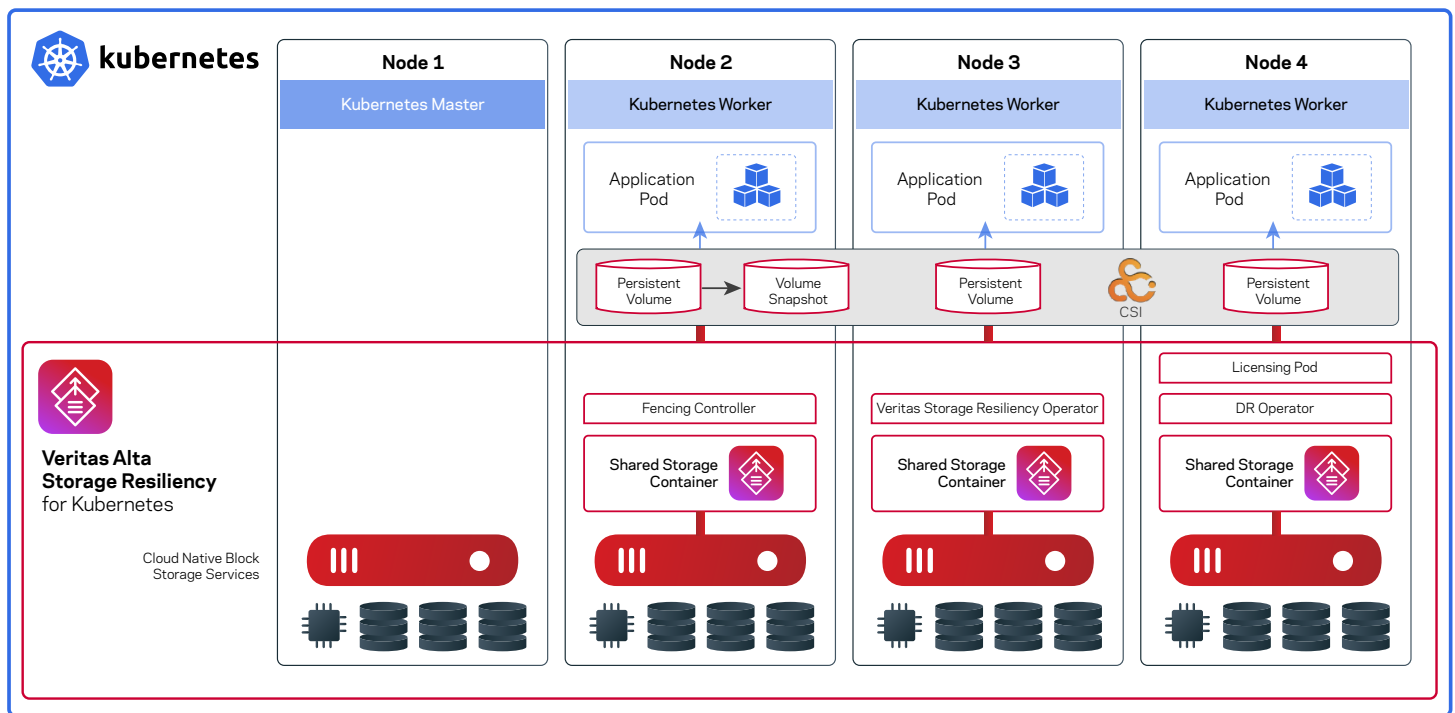


Figure 5. Veritas Alta Storage Resiliency persistent volumes supporting containerized applications in Kubernetes

Veritas Alta Storage Resiliency is included as part of the Veritas Alta Enterprise Resiliency solution that has several additional enterprise features for Kubernetes environments. This complete solution delivers an advanced foundation for running stateful business-critical applications in Kubernetes, with full storage management and disaster recovery functionality. For more information about this solution, refer to the white paper https://www.veritas.com/content/dam/www/en_us/documents/white-papers/WP_alta_application_resiliency_kubernetes_V1804.pdf.

Conclusion

Cloud providers now deliver features and services that offer several advantages and reasons to run your applications in the public cloud. However, not all of the functionality needed by business-critical enterprise IT services is available from cloud service providers. Veritas Alta Storage Resiliency is designed to enhance cloud services, and provide additional functionality required by most enterprise IT applications. Veritas enables you to run your enterprise applications in the cloud with several key benefits:

- ✓ **Performance:** Flexible software-defined parallel access storage with intelligent caching designed to maximize performance for enterprise applications in the cloud
- ✓ **Resiliency:** Parallel access storage that can be easily configured to span cloud zones, which helps protect applications against system failures
- ✓ **Mobility:** Easily move data between zones, regions, cloud providers, and your own on-premises environments for maximum flexibility to avoid outages and cloud provider lock-in

Veritas Alta Storage Resiliency empowers businesses to run business-critical applications in the cloud with the same functionality, performance, and resiliency as on-premises environments. This is achieved by providing advanced storage management and resiliency as a software-defined solution that extends cloud-native storage services. With a flexible and scalable architecture designed for business-critical workloads, Veritas Alta Storage Resiliency is an enterprise solution that provides the tools needed to run applications in the cloud with maximum confidence.

1. <https://virtualizationreview.com/articles/2022/05/20/multicloud-report.aspx>

About Veritas

Veritas Technologies is a leader in multi-cloud data management. Over 80,000 customers—including 95 percent of the Fortune 100—rely on Veritas to help ensure the protection, recoverability, and compliance of their data. Veritas has a reputation for reliability at scale, which delivers the resilience its customers need against the disruptions threatened by cyberattacks, like ransomware. No other vendor is able to match the ability of Veritas to execute, with support for 800+ data sources, 100+ operating systems, 1,400+ storage targets, and 60+ clouds through a single, unified approach. Powered by Cloud Scale Technology, Veritas is delivering today on its strategy for Autonomous Data Management that reduces operational overhead while delivering greater value. Learn more at www.veritas.com. Follow us on Twitter at [@veritastechllc](https://twitter.com/veritastechllc).

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