2024-25 DCIG TOP 5

ENTERPRISE HYBRID CLOUD SDS NAS SOLUTIONS

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Enterprise Hybrid Cloud SDS NAS Solutions

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Enterprise Hybrid Cloud SDS NAS Solutions

SOLUTIONS EVALUATED

Acronis Cyber Infrastructure
Buurst SoftNAS
Cloudian HyperFile
Cohesity SmartFiles
Commvault Distributed Storage
CTERA Enterprise File Services Platform
Dell EMC UnityVSA
Hammerspace
Hitachi Vantara HCP
IBM Storage Scale
iXsystems TrueNAS
Nasuni File Data Platform
NetApp Cloud Volumes ONTAP
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Nutanix Unified Storage
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OpenDrives Atlas Core
Panzura CloudFS
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Qumulo Core
Quobyte
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StoneFly SCVM
StorOne S1 Data Platform
Tiger Technology Tiger Bridge
VMware vSAN
WEKA File System
Zadara zStorage

FEATURES EVALUATED

- *Deployment Capabilities*
- *Data Protection and Security Capabilities*
- *Product and Performance Management Features*
- *Technical Support*
- *Licensing and Pricing*

The pace of data growth continues to accelerate. The latest numbers suggest worldwide annual growth rates of 23.71% from more devices and applications generating data, larger file sizes, and the use of media files such as images and video.[1] For enterprises, the storage requirements are growing at an even faster pace of 42.2% annually![2]

The data generated at the edge further adds to the challenge. Industry studies suggest that by 2025, the edge will generate 75% of data outside the data center.[3] In the distributed enterprise, IT organizations must maintain capacity, availability, backup, and disaster recovery plans for hundreds or even thousands of locations, often with different technologies.

Data growth entails expenses for hardware, software, maintenance, and management. It impacts data management strategies for maintaining performance, security, backup, recovery, archiving, and governance. These issues are especially challenging in the context of flat or slowly rising IT budgets.

The Problem of Storage System Proliferation

For many organizations, this rapid data growth has resulted in a proliferation of storage systems, whether on-premises in the corporate data center, at branch office locations, or in the cloud. The result is a plethora of data silos and a lack of visibility into the organization's file estate.

You Cannot Manage What You Cannot See

As a result of these dynamics, organizations are often faced with the reality of not knowing the what and where of their data across the organization. This visibility gap complicates data protection, governance, analysis, security, compliance, and planning, which in turn impacts costs. It increases the likelihood of a successful cyber attack exfiltrating, exposing, or encrypting the organization's data and disabling its critical business processes, which certainly worries every CIO. Further, scattered and unknown file data undermines AI workloads, which require complete data for optimum success. At the end of the day, this lack of visibility into an organization's data undermines IT's mission of providing the technical resources the organization requires to achieve its goals.

Hybrid Cloud SDS NAS Solutions Enables Global Data Visibility

Hybrid cloud SDS NAS solutions, based on enterprise-class software-defined storage, offer a transformative approach to handling the growing accumulation of unstructured data. By decoupling the storage hardware from the management software, a software-defined storage system eliminates storage silos, simplifies storage management, and enhances the visibility of unstructured data.

These solutions unify the management of storage resources across on-premises and cloud platforms, allowing organizations to integrate on-premises and cloud storage under a single management plane. Consequently, organizations achieve a more effective data management strategy that meets the challenges of unstructured data growth and provides the agility to address changing business requirements.

These solutions capitalize on the benefits of SDS, such as:

Cost efficiencies. SDS-based hybrid cloud NAS solutions notably reduce storage management costs. As SDS solutions abstract the storage management layer from the physical storage platform, organizations can optimize storage across on-premises and cloud environments based on actual storage needs and usage patterns.

Enterprise Hybrid Cloud SDS NAS Solutions

For distributed enterprises, hybrid cloud SDS NAS solutions allow an administrator to manage a broad set of file management services across cloud providers and hundreds or thousands of nodes, sites, and users from a single interface.

Flexibility. In contrast to disparate storage systems and devices dispersed across multiple locations, these solutions present cloud and on-premises storage as a single unified storage pool. This means administrators can allocate storage capacity dynamically to users, groups, and applications as needed. These solutions allow organizations to leverage multiple cloud providers as well as on-premises storage. Thus, organizations can optimize the placement of data for cost, compliance, and workload priorities.

Global file management capabilities. Global views, including permissions management, capacity utilization, and analytics, enable new opportunities to ensure optimal performance and cost for managing an organization's unstructured data. For distributed enterprises, hybrid cloud SDS NAS solutions allow an administrator to manage a broad set of file management services across cloud providers and hundreds or thousands of nodes, sites, and users from a single interface. Administrators can apply data governance policies across their file estate. While the dynamics causing file growth still occur, these solutions give enterprises the tools to better understand and manage that growth while enabling organizations to create more value from the data.

Reduces administrative costs. As noted above, hybrid cloud SDS NAS consolidation enables administrators to centrally manage storage resources across the data landscape from a single interface. This simplifies storage administration and reduces the need for multiple tool sets to manage different NAS devices and file servers. The best SDS solutions offer automation tools and APIs that automate routine storage and life cycle management activities like provisioning, tiering, protecting, and migrating data. Automation capabilities reduce manual labor expenses and the risk of human error.

Table 1
Data Security Capabilities

What data security features and capabilities are offered on this SDS product? Check all that apply.

	Response percent	Response total
Air-gapped volumes	60%	3
Anti-virus/anti-malware	40%	2
Audit and identify security risks	100%	5
Array-based AES-256 encryption	20%	1
At-rest AES-256 encryption	100%	5
Certified for SEC and FINRA compliance	20%	1
Client authentication	80%	4
Customer controlled encryption keys	100%	5
Edge detection of ransomware attack	80%	4
FIPS compliant encryption	80%	4
File analytics	60%	3
File auditing	100%	5
Hardware security (e.g., locking bezels)	0%	0
In-flight encryption	100%	5
KMIP	80%	4
Native use of immutable object storage	100%	5
Multi-factor authentication	100%	5
Multi-tenancy	100%	5
Role based access controls	100%	5
Security automation	80%	4
Support for self-encrypting drives	60%	3
WORM file format	80%	4

DCIG TOP 5 winners offer many data security features that help protect data from cybersecurity threats.

Source: DCIG SDS Research

Enhanced data security. Hybrid cloud SDS NAS solutions routinely provide robust security features such as encryption, access controls, multi-factor authentication, multi-tenancy, and immutable storage. These features complement other cyber security strategies organizations take to protect their digital assets from bad actors.

Today's SDS solutions offer advanced storage services such as predictive analytics, object storage interfaces, and AI-driven data management.

Fast file performance. These SDS-based solutions commonly place active data close to users and applications through tiering or caching while placing less frequently accessed data on more cost-effective storage tiers in the cloud. Consequently, these solutions improve application performance and ensure fast file access for end users.

Multi-protocol file support. Hybrid cloud SDS NAS solutions routinely support multiple file storage protocols. This flexibility allows organizations to select the best-fit file protocol for each use case. Many hybrid cloud SDS solutions expand upon file sharing and collaboration features inherent within file storage protocols so that remote teams and users can collaborate on files around the world.

Advanced storage features. Today's SDS solutions offer advanced storage services such as predictive analytics, object storage interfaces, and AI-driven data management. These features further enhance the value of investments in software-defined storage solutions for hybrid cloud use cases.

Cloud Storage Benefits

In addition to the advantages these SDS-based solutions bring to modern file data management, cloud storage integration contributes additional benefits to those presented above, such as:

Scalability. Because these solutions can leverage the data stores of public cloud providers, organizations can scale on demand without requiring capital hardware purchases. If new capacity is needed, an administrator can quickly provide it. Organizations only pay for what they use, scaling up or down their storage as their needs require.

Cyber-resiliency. Cloud storage systems enhance data resiliency against cyber attacks. Organizations can leverage features like immutable storage, replication, snapshots, and automated failover to both mitigate and recover quickly from a cyber attack or other unforeseen events.

Multicloud storage architectures. As an alternative to relying on one cloud provider for all storage requirements, hybrid cloud NAS solutions can often utilize multiple cloud providers for vendor diversity and flexibility. Infrastructure managers can place file data with the cloud provider best suited for business priorities or avail data to specialized services within a cloud ecosystem. Further, organizations may choose cloud providers or their regions to comply with regulatory or data sovereignty requirements.

Offloads storage infrastructure management. By moving some or most unstructured data to centralized cloud storage, organizations can eliminate some of the space and costs required for hosting NAS devices and file servers across their locations. For the data center especially, less hardware translates into less physical space, meaning a smaller footprint and reduced energy and cooling costs compared to legacy solutions. Infrastructure management (space, power, labor), complexity (performance management, networking, administration), and capacity planning (monitoring, acquiring, implementing) shifts out of the enterprise. By offloading some or even most of these activities to the cloud provider, enterprises reduce IT costs for managing on-premises storage hardware.

Global file access. Cloud file storage enables access to file data from anywhere in the world with an internet connection. This especially benefits organizations with distributed office locations and teams across the globe. Administrators can configure permissions for users and groups to ensure data security.

These benefits and more provide organizations with a global file platform that addresses the needs of scalability, governance, compliance, security, analysis, and decision-making in the context of an avalanche of accumulating data. Further, organizations can experience notable time and cost savings with hybrid cloud SDS NAS solutions,

allowing IT staff to shift their attention to other activities that bring value to their organization. Finally, because hybrid cloud SDS NAS solutions incorporate new cloud technologies as they become available, enterprises future-proof their storage infrastructure with these solutions, ensuring the enterprise IT organization is adaptable and capable of meeting changing business needs in the years ahead.

Distinguishing Features of DCIG TOP 5 Enterprise Hybrid Cloud SDS NAS Solutions

DCIG TOP 5 solutions evidence rich support for multi-cloud deployments and storage.

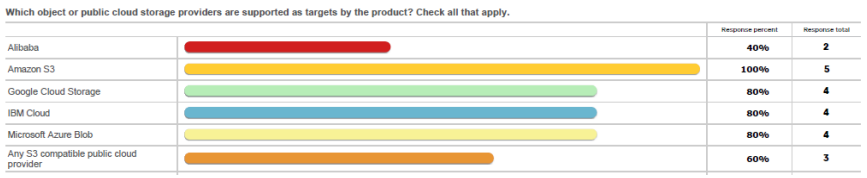
DCIG identified twenty-nine companies offering products meeting DCIG's definition of a hybrid cloud SDS-based NAS solution. Using feature-based analysis and comparisons of defensible data derived from publicly available sources, vendors, and DCIG's own experience, the 2024-25 *DCIG TOP 5 Enterprise Hybrid Cloud SDS NAS Solutions* share these characteristics that distinguish them from the other vendors DCIG evaluated.

Robust technical support. DCIG TOP 5 providers display robust support capabilities compared to the other evaluated solutions. All DCIG TOP 5 vendors provide 24x7x365 availability for trouble resolution, compared to 66% of the other solutions DCIG assessed. Each DCIG TOP 5 provider offers 4-hour or better response times to reported troubles, with most offering one-hour response times or better for mission-critical issues. All the winners provide a wide range of support options, from a knowledge base for online self-support to the opportunity for an assigned account manager.

Multi-cloud support. DCIG TOP 5 solutions evidence rich support for multi-cloud deployments and storage. All five products support multiple cloud providers, both for deployment as a VM and as a storage target. Such broad support offers flexibility in matching cloud provider capabilities with the needs of the business.

Tables 2

Cloud Provider Targets Support



DCIG TOP 5 winners support multiple cloud providers for VM deployments and storage targets.

Source: DCIG SDS Research

Data security features. While dedicated cybersecurity software and infrastructure elements are the first line of defense against viruses and malware, DCIG TOP 5 winners offer many additional security features that help protect data from bad actors. For example, all winners offer both in-flight and at-rest encryption with customer-controlled encryption keys and Role Based Access Controls (RBAC) that limit user access and permissions. Each DCIG TOP winner also offers multi-tenancy for isolating the data storage and services provided to different businesses or business units. All winners offer multi-factor authentication (MFA), which requires two or more forms of authentication before granting access to data or systems, as well as file auditing and analytics tools that help identify security risks.

All DCIG TOP 5 providers support immutable snapshots so organizations can recover a tamper-proof version of their file data in the event of a successful cyber-attack.

SMB and NFS support. All DCIG TOP 5 solutions show strong support for the latest versions of SMB and NFS, which are the protocols used by most enterprise applications to address file-based storage. The updated protocols offer performance improvements, new features, security enhancements, and storage management improvements over previous versions.

S3 support. In addition to strong support of the latest versions of SMB and NFS, each of the DCIG TOP 5 winners supports the S3 protocol. Native S3 support opens possibilities for unified storage solutions that cater to file-based applications as well as cloud-native applications requiring object storage protocols.

Third-party storage integration. The ability to integrate third-party storage arrays brings existing legacy storage into the unified storage management domain. Each of the DCIG TOP 5 solutions supports the integration of third-party storage arrays.

Other Similarities Among the DCIG TOP 5 Enterprise Hybrid Cloud SDS NAS Solutions

In addition to the distinguishing characteristics that the DCIG TOP 5 Enterprise Hybrid Cloud SDS NAS Consolidation Solutions generally share, the DCIG TOP 5 solutions also share the following product features in common:

Global namespace. Each of the DCIG TOP 5 solutions provides a global namespace (or its equivalent). A global namespace presents a unified view of data as a single, unified file system across distributed, heterogeneous storage resources. The resulting visibility enables consistent data management across the organization's global data estate.

REST APIs. Enterprises look for solutions that integrate well with their existing infrastructure management tools and applications. REST APIs facilitate the integration of data stores with external applications. Each of the DCIG TOP 5 solutions provides REST APIs.

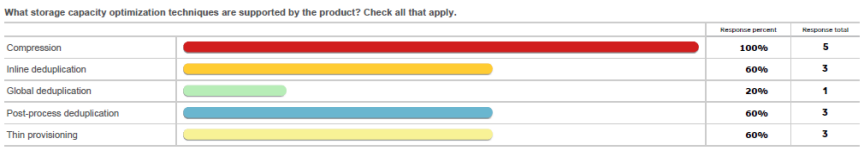
Immutable snapshots. Storage administrators value immutability features because they ensure that once data is written, it cannot be changed. Immutable snapshots are an effective way to safeguard enterprise file data against accidental or malicious alterations, such as those caused by ransomware. All DCIG TOP 5 providers support immutable snapshots so organizations can recover a tamper-proof version of their file data in the event of a successful cyber-attack.

CLI and web-based interfaces. Each of the DCIG TOP 5 solutions features both command-line interfaces and web-based interfaces.

Directory services integration. DCIG TOP 5 solutions show broad support for directory service and authentication features. Directory service permissions enable administrators to control what data is visible to the authenticated user. All DCIG TOP 5 solutions support AD/LDAP integration and Kerberos authentication for data security.

Tables 3

Capacity Optimization Techniques



DCIG TOP 5 winners offer capacity optimization techniques to help organizations efficiently store unstructured data.

Source: DCIG SDS Research

Several TOP 5 solution providers offer turn-key solutions that cover the hardware and software needed for on-premises deployments that complement cloud-based storage.

Capacity optimization techniques. Capacity optimization techniques such as compression and deduplication help organizations save money by reducing the amount of physical storage needed to store their unstructured data. Each of the DCIG TOP 5 solutions uses these capacity optimization techniques that help organizations efficiently store unstructured data across on-premises and cloud platforms.

Concurrent protocol access. Within an enterprise, different teams and applications may have different protocol needs. With concurrent multiprotocol access, data can be shared and accessed across diverse environments. Each of the DCIG TOP 5 winners supports concurrent protocol access to the same data store.

AWS support. While each of the DCIG TOP 5 solutions supports multiple cloud storage providers for deployment and storage, they all share support for Amazon Web Services. Given that many organizations already have at least some storage infrastructure deployed with this leading cloud storage provider, this support for AWS allows IT teams to leverage their on-premese DCIG TOP 5 solutions with AWS services.

Linux deployments. Though DCIG TOP 5 winners vary in the OS and hypervisors they support, they all support deployments within Linux environments.

Differences Between the DCIG TOP 5 Enterprise Hybrid Cloud SDS NAS Solutions

DCIG TOP 5 solutions differ from one another in the following ways:

Auto-tiering. Most organizations possess different types of storage with varying capacities, speeds and costs. Auto-tiering automatically selects storage media based on predefined policies. DCIG TOP 5 solutions vary in providing auto-tiering features.

Pre-integrated appliances. Some organizations prefer pre-integrated turn-key solutions that include the necessary hardware and software. Several TOP 5 solution providers offer turn-key solutions that cover the hardware and software needed for on-premises deployments that complement cloud-based storage.

File system characteristics. The DCIG TOP 5 vendors characterize their file system architecture differently between a distributed, global, or parallel file system. Parallel file systems, in particular, are associated with high-performance computing.

Storage as a Service (STaaS). Some of the DCIG TOP 5 winners offer their solution as a service. Many enterprises value this licensing model as it brings cost predictability, advanced support features, and additional benefits to their hybrid cloud storage environments.

Quality-of-Service. Quality-of-Service (QoS) features ensure organizations can prioritize a minimum level of storage performance for critical applications. Without QoS, lower-priority workloads could dominate resources. Most DCIG TOP 5 solutions include QoS features.

Container storage. Some of the DCIG TOP 5 winners provide a Container Storage Interface (CSI) driver that enables persistent storage for containerized workloads.

Block, file, and object storage. In addition to file and object protocol support, two of the winners also support block storage protocols. The ability to support multiple protocols offers expanded possibilities for hybrid cloud storage consolidation.

Predictive analytics. Predictive analytics within SDS solutions provide enhanced storage management capabilities. Analytics can identify issues before they become problems, improve storage performance, and improve overall storage availability. DCIG TOP 5 winners vary in their predictive analytic features.

Capacity expansion. Customers' methods of expanding storage capacity on-premises with DCIG TOP 5 solutions vary. Most solutions can add scale up storage capacity by adding storage shelves and scale out on-premises by adding additional controllers. The storage architecture models for some of the winners can leverage the near-infinite scalability of cloud storage to expand enterprise storage volumes on the back end while keeping local storage to a minimum.

Licensing options. DCIG TOP 5 solutions vary in how they price and license their products.

DCIG TOP 5 Enterprise Hybrid Cloud SDS NAS Solution Profiles

Each of the DCIG TOP 5 Enterprise Hybrid Cloud SDS NAS Solution Profiles highlights several notable features or capabilities that make the product attractive to organizations.

Nasuni File Data Platform

With Nasuni, administrators can quickly recover a previous file, folder, volume, or system just before an attack occurred, down to a granularity of one minute.

The Nasuni File Data Platform stands out with its unique approach, placing the object store at the heart of its software-defined cloud-native architecture. This innovative hybrid cloud solution empowers enterprises to replace their complex legacy file infrastructure with a single global file system. Unifying the unstructured data enables global visibility into usage, including chargeback reporting and data-informed business planning. Nasuni's intelligent caching boosts productivity by ensuring fast file and object access for all users and locations. Its robust security features provide proactive defense and swift recovery from ransomware attacks and other disasters.

Notable features that helped Nasuni earn a DCIG TOP 5 Hybrid Cloud Solution award include:

Native hybrid cloud architecture. Nasuni integrates with all popular public cloud providers and leading private cloud solutions. This gives organizations the flexibility to use the cloud solution(s) best for their organization. Nasuni's patented UniFS Global File System organizes file data, enables classification and compliance through support for extended metadata, and provides rapid recovery from disasters or human error. The Nasuni Orchestration Center (NOC) serves as the control plane, providing visibility into the entire unstructured data estate through a single global namespace. With the Nasuni Management Console (NMC), administrators can centrally manage all unstructured data services.

Fast file and object access. By deploying the Nasuni caching appliance as a VM, businesses can replace traditional file servers and NAS, gaining a lightweight access point to all their file and object data. Nasuni's intelligent data orchestration and caching technology not only accelerates access for users and applications but also reduces egress fees and the local storage footprint, leading to significant cost savings.

Data protection and security. Nasuni encrypts all data, metadata, and snapshots in transit and at rest with AES-256 encryption. It implements a zero-trust security framework that requires users and applications to be authorized, authenticated, and validated to access data. Nasuni supports 2FA, RBAC, and AD/LDAP integration. A full set of governance, compliance, and security options can be configured by the administrator.

Nasuni protects data from ransomware attacks by taking frequent snapshots of file changes on Nasuni Edge VMs. These snapshots are compressed, encrypted, and chunked before being saved as immutable objects in cloud storage. This continuous versioning process eliminates the need for a separate backup infrastructure. Administrators can quickly recover a previous file, folder, volume, or system just before an attack occurred, down to a granularity of one minute.

Enterprise Hybrid Cloud SDS NAS Solutions

CTERA File Services Platform

With the CTERA Enterprise File Services Platform, organizations can implement a hybrid cloud that unifies local users, branch offices, remote users, and cloud file services into a single operating environment. CTERA works with all major cloud providers to provide flexibility in object storage. Alternatively, enterprises can deploy CTERA within a customer-owned or CTERA-managed private cloud. Administrators can oversee devices, users, deployments, and data stores worldwide through the CTERA Portal, which serves as the central management console for effectively managing enterprise file data.

With CTERA Cloud Storage Routing, organizations can concurrently place file data across multiple cloud providers, cloud regions, data centers, and buckets using policy-based decision-making.

Notable features that helped CTERA earn a DCIG TOP 5 award include:

Concurrent multi-cloud file system. With CTERA Cloud Storage Routing, organizations can concurrently place file data across multiple cloud providers, cloud regions, data centers, and buckets using policy-based decision-making. CTERA Zones allow enterprises to logically segment their global file system into logical units by tags such as geographic area, business unit, or department to control who can see and access data within their global namespace. These features prevent data leakage between groups and ensure compliance with data sovereignty regulations.

Data security. From the endpoint to the cloud, CTERA encrypts all data with AES-256, FIPS 140-2 validated encryption with keys generated and managed by the customer. Additionally, the CTERA platform works from a zero-trust security model. CTERA fully supports features such as WORM, RBAC, AD/LDAP integration, KMIP, and multi-tenancy. Further, infrastructure managers can leverage CTERA's cloud-to-cloud, cross-region, and cross-account replication to protect data from bad actors and unforeseen events.

CTERA's Ransom Protect provides real-time detection and blocking of ransomware attacks on edge filers. Ransom Protect can detect and block an attack within 30 seconds. With unlimited file versioning and CTERA's immutable snapshots, organizations can rapidly recover from an attack to a known good state. In addition, CTERA limits the spread of malware through signature-based anti-virus scanning that checks for known malware threats before transferring file data into the global file system.

CTERA Edge Filers. Multi-location organizations can simplify IT at the edge by replacing legacy file servers and NAS appliances with virtual or physical CTERA Edge Filers. The CTERA Edge Filer becomes an all-in-one solution for branch office storage, file collaboration, and backup. CTERA's intelligent caching of active files provides fast file access and infinite storage capacity with minimal hardware at the edge. Deduplication further reduces the physical cache and improves performance. Streaming technologies allow users to access large files in cloud storage without copying the entire file locally. CTERA Drive enables staff to work productively and collaboratively on any file from any device or location.

Enterprise Hybrid Cloud SDS NAS Solutions

With over 20 years of production deployments, IBM Storage Scale is a proven parallel file system for legacy workloads that also provides a scalable foundation for modern workloads.

IBM Storage Scale

IBM Storage Scale™ sits at the center of IBM storage for data and AI information architecture. It is a proven, enterprise-class software-defined storage solution for high-performance, large-scale workloads on-premises or in the cloud and can incorporate flash, disk, tape, local, and even remote storage under a single global namespace.

Features that helped IBM Storage Scale earn recognition as a DCIG TOP 5 solution include:

Extreme scalability. IBM Storage Scale provides a scale-out high-performance parallel file system (GPFS) that unifies data silos globally using Active File Management (AFM) to place data in the right place at the right time. It supports files and objects though standardized interfaces including POSIX, OpenStack Swift, NFS, SMB/CIFS, and S3 API. Thus, IBM Storage Scale can support a wide range of high-performance workloads whether deployed on-premises or in the cloud, and is widely adopted for technical computing, analytics, and content management workloads.

IBM Cloud Paks. IBM has significant AI market share and supports some of the world's largest and leading-edge AI/ML applications. Enterprises can accelerate AI adoption through IBM's Cloud Pak® portfolio of pre-built applications, tools, and runtimes with IBM Watson. IBM Storage Scale offers one-click integration to the IBM Cloud Pack® for Data and IBM Watson, which supports AI data use cases through a cloud-native data and AI platform. It supports the data lifecycle through data governance, integration, and preparation services for on-premises and cloud data.

IBM Cloud®. In addition to support for multiple public clouds, IBM Storage Scale brings the benefit of deploying on IBM's owned and managed public cloud platform. IBM Cloud contains over 170 products covering data, containers, AI, IoT, and blockchain applications. Within IBM Cloud, IBM Storage Scale runs on bare metal servers bringing hybrid cloud benefits such as data mirroring, tiering, recovery, and consistent storage function between on-premises and the cloud.

Mature innovation platform. IBM Storage Scale is based on technology from the IBM® General Parallel File System. With over 20 years of production deployments, it is a proven parallel file system for legacy workloads that also provides a scalable foundation for modern workloads. For example, IBM Storage Scale now offers Container Native Storage access, native object storage, and NVMe access to object storage data. The IBM Storage Scale Hadoop connector reduces the need to move data for Hadoop workloads or requiring changes to applications. Organizations can also deploy a containerized version of the solution for OpenShift cluster environments.

Enterprise Hybrid Cloud SDS NAS Solutions

NetApp Cloud Volumes ONTAP

NetApp is well-known for its storage appliances and proprietary ONTAP data management software. NetApp Cloud Volumes ONTAP (CVO) extends ONTAP's data management capabilities to hybrid cloud environments by running ONTAP in the cloud as an SDS appliance. IT organizations deploy CVO through NetApp's BlueXP, which serves as the control plane for managing all CVO instances. For distributed enterprises, NetApp Cloud Volumes Edge Cache provides fast access to active files at each location. The NetApp solution delivers a rich set of enterprise data services across a data fabric encompassing on-premises and cloud data stores.

The NetApp solution delivers a rich set of enterprise data services across a data fabric encompassing on-premises and cloud data stores.

Notable features that helped NetApp's Cloud Volumes ONTAP earn a DCIG TOP 5 award include:

Simple multicloud file management. CVO supports multiple cloud platforms, including AWS, Microsoft Azure, and Google Cloud Platform. With point-and-click functionality, administrators can manage cloud storage across multiple cloud accounts. Administrators can easily create a new CVO instance by simply clicking on a new location from the available list of public cloud providers and then choosing a custom or preconfigured CVO system. Again, using point-and-click, administrators can protect new CVO instances by scheduling a snapshot schedule that automatically creates lightweight, immutable snapshots for each volume. Using drag-and-drop, an infrastructure manager can replicate data to a different environment or create automatic backups to object storage.

Multi-cloud cost efficiencies. NetApp CVO offers multiple features that help organizations lower cloud costs by storing data efficiently. Features that minimize the overall cloud storage required include data compression, data compaction, and volume deduplication. Storage tiering brings cost efficiencies by automatically moving inactive data to lower-cost storage tiers. CVO also helps organizations reduce expenses by providing visibility into cloud resource costs. For example, organizations can integrate cloud monitoring applications like AWS Cost Explorer with CVO to track cloud resource consumption. Administrators can also identify and track expenditures by different applications or departments. Monitoring cloud costs as they occur helps enterprises avoid surprise invoices.

Bundled branch office solution. NetApp Cloud Volumes Edge Cache (CVEC) extends ONTAP's data management to distributed and branch office locations. CVEC combines CVO, Cloud Backup, and Global File Cache (GFC) to address the unstructured data management needs of multi-site organizations. The GFC component of the bundle provides a LAN-like experience to workers and applications in remote offices by intelligently caching each location's active files on site. At the same time, while preserving bandwidth, CVEC compresses and transmits changed file blocks to the golden copy within CVO. CVEC includes file backup to the cloud, where the inherent durability of cloud object storage protects against data loss.

Enterprise Hybrid Cloud SDS NAS Solutions

OSNexus QuantaStor

QuantaStor is a unified Software-Defined Storage platform designed to scale up and out to simplify storage management while reducing overall enterprise storage costs. With support for all major file, block, and object protocols, including iSCSI/FC, NFS/SMB, and S3, QuantaStor storage grids may be configured to address the needs of complex workflows that span sites and data centers. Integration with 3rd party systems, including Seagate CORVAULT, can deliver solutions with two layers of data protection and double-layer erasure coding, providing extreme uptime and availability.

OSNEXUS QuantaStor supports more data access protocols than any other DCIG TOP 5 Hybrid Cloud solution.

Notable features that helped OSNEXUS QuantaStor earn a DCIG TOP 5 Hybrid Cloud Solution award include:

Broad protocol support. OSNEXUS QuantaStor supports more data access protocols than any other DCIG TOP 5 Hybrid Cloud solution. In addition to the standard file protocols, QuantaStor provides S3 object storage and supports the latest NVMe-oF and NVMe/TCP block storage protocols. These protocols parallelized storage operations with reduced protocol overhead to deliver more data with less waiting.

Comprehensive data protection. QuantaStor goes beyond most other solutions in its breadth of data protection features. In addition to asynchronous replication, synchronous replication, clones, and immutable snapshots, it offers automated data integrity background scans, application-consistent snapshots, and erasure coding options.

Patented multi-tenancy. QuantaStor has an advanced role-based access control (RBAC) system that has unique patented multi-tenancy capabilities. These capabilities in QuantaStor are centered around Resource Groups. Each Resource Group represents a tenant for resource allocation, providing a logical and efficient way to organize and manage storage resources, apply policies and configurations at a group level, simplify administration tasks, optimize performance, and ensure consistent data protection and access control.

Storage optimization. QuantaStor automatically balances workloads across the storage infrastructure by automatically distributing data and workload evenly across available resources. Further, QuantaStor offers comprehensive monitoring and analytics capabilities to track and analyze storage performance, capacity utilization, and resource usage. These tools help identify bottlenecks, optimize resource allocation, and make informed decisions for further optimization and capacity planning.

Automation features. QuantaStor offers a Python API and pre-built Ansible modules for integration with infrastructure automation frameworks. If a fault occurs, QuantaStor supports automated troubleshooting and remediation steps based on fault data, and integrates with all major IT service management providers via a webhook URL mechanism.

Inclusion and Evaluation Criteria for DCIG TOP 5 Enterprise Hybrid Cloud SDS NAS Solutions

In this report, DCIG specifically focused on SDS-based solutions possessing the following characteristics. DCIG identified thirty-one different solutions meeting these inclusion criteria:

- Commercially available as of January 1st, 2024.
- Sufficient, publicly available information available for DCIG to make an informed decision.
- The solution must support file protocols either natively or via provider-supported gateway.
- The solution must be available as software-defined storage (SDS) software-only product that can be installed on hardware from multiple OEMs, or as a VM, or deployed in the cloud.
- The product may also be available as a pre-integrated software and hardware appliance from the solution provider.

To arrive at the DCIG TOP 5 solutions included in this report, DCIG went through a seven-step process to come to the most objective conclusions possible.

1. DCIG established which features would be evaluated.
2. The features were grouped into five general categories.
3. DCIG identified solutions that met DCIG's definition of an SDS product.
4. A survey was created and completed for each solution. Vendors were given the opportunity to review and complete the survey.
5. DCIG weighted each feature to establish a scoring rubric.
6. DCIG evaluated each solution based on information gathered in its survey.
7. DCIG ranked the solutions using standard scoring techniques.

DCIG evaluated each of these solutions in the following areas:

- ***Deployment capabilities.*** Evaluated the capabilities concerning on-premises deployment options, cloud provider deployment options, cloud provider targets supported, storage protocols supported, virtual environments supported, and self-certifications of equipment, operating systems, and applications.
- ***Data protection and data security capabilities.*** Evaluated solution capabilities supporting features such as availability, encryption, replication, and snapshot features.
- ***Product and performance management features.*** Evaluated options to manage the underlying hardware and optimize it for performance. Examples include dashboard views, predictive analytics, storage optimization, quality of service features, auto-tiering capabilities, and directory service integration.
- ***Technical support.*** Evaluated the availability and technical support options of the solution provider. Examples include self-service documentation, support availability, response time commitments, options to open cases, escalation support, and proactive problem resolution.
- ***Licensing and pricing.*** Evaluated the relative ease of doing business through flexibility and simplicity in contract lengths, pricing elements, and bundled pricing options.

Enterprise Hybrid Cloud SDS NAS Solutions

Vendors of some of the solutions covered in this DCIG TOP 5 report are or have been DCIG clients. In that vein, there are some important facts to keep in mind when considering the information contained in this TOP 5 report and its merit.

- All research was based upon publicly available information, information provided by the vendors, and/or the expertise of those evaluating the information.
- No vendor paid DCIG any fee to research this topic, to include its solutions in DCIG's research, or arrive at predetermined conclusions.
- DCIG did not guarantee any vendor that its solution would receive a DCIG TOP 5 designation.
- No vendor was privy to how DCIG weighted individual features. In every case, the vendor only found out the rankings of its solution after the analysis was complete.
- DCIG conducted no hands-on testing to validate how or if the features worked as described.
- No negative inferences should be drawn against any vendor or solution not covered in this DCIG TOP 5 report.
- It is a misuse of this DCIG TOP 5 report to compare solutions included in this report against solutions not included in it. ■

Sources referenced March 2024

1. https://www.statista.com/statistics/871513/worldwide-data-created/
2. https://www.statista.com/statistics/1186304/total-enterprise-data-volume-location/
3. https://www.gartner.com/smarterwithgartner/what-edge-computing-means-for-infrastructure-and-operations-leaders

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