NetApp Cloud Volumes Edge Cache

Overview

NetApp Cloud Volumes Edge Cache (CVEC) uses an integrated set of NetApp building blocks to cache active data sets running in NetApp's Cloud Volumes ONTAP in the public cloud. Cloud Volumes Edge Cache incorporates NetApp Global File Cache technology to cache active data locally at distributed locations and efficiently transfers data over the WAN leveraging its built-in streaming, compression and delta differencing technologies.

Cloud Volumes Edge Cache is a package of NetApp technologies:

- Cloud Volumes ONTAP
- Global File Cache for edge caching
- Cloud Backup Service for data protection
- **Cloud Manager** for deployment and configuration
- Cloud Insights for infrastructure monitoring

Together, Cloud Volumes ONTAP and Global File Cache make up a cloud-based centralized file management system. They enable CVEC to centralize files into a public cloud while providing immediate access to data locally, even when stored on globally distributed file servers. Using NetApp SnapMirror and Cloud Sync tools, IT teams can consolidate files from all remote file servers into a centralized Cloud Volumes ONTAP instance. Admins can then define the folder structure in the file manager and configure permissions on the files and folders.

Highlights

- Cloud Volumes Edge Cache uses NetApp's Cloud Volumes ONTAP global file system and storage features
- Global File Caching provides edge caching, file sync and file locking
- NetApp Backup, DR, management and monitoring are integrated into CVEC
- Strong focused on Windows file server/NAS consolidation

Usage and Deployment

Cloud Volumes Edge Cache has a strong Windows focus. The inaugural release uses Cloud Volumes ONTAP on Microsoft Azure as the optimized cloud storage platform of choice, and supports only the SMB file protocol. Cloud Volumes Edge Cache integrates with Microsoft Active Directory, and uses ACLS and NTFS permissions for data access control, fully integrated with organizations authentication and authorization frameworks. Cloud Volumes Edge Cache can be purchased through the Microsoft Azure Marketplace. NetApp plans to eventually make Cloud Volumes Edge Cache available through other major hyperscalers, including Google Cloud Platform and Amazon Web Services.

Major use cases for CVEC include Windows file server/NAS consolidation while delivering real-time end user file collaboration on files across geographies. Close to half of CVEC customers are

engineering, construction and design firms who share CAD/BIM and other large design files and image libraries. Other customers include manufacturing, marketing and retail firms.

Cloud Volumes ONTAP

Cloud Volumes ONTAP – a cloud-optimized version of NetApp's flagship ONTAP storage operating system –   provides the global file system for Cloud Volumes Edge Cache. Cloud Volumes ONTAP is an enterprise-grade software appliance that brings ONTAP storage and data management services to public clouds. It also serves as the storage platform to host file-level data, and delivers ONTAP storage efficiencies including compression, compaction, thin provisioning and data tiering to lower-cost object storage.

Global File Cache

CVEC's Edge Caching software (Global File Cache) deploys on a Microsoft Windows Server instance at each distributed location. It embeds services such as Microsoft Active Directory, DNS/DHCP, Distributed File Services (DFS) Namespaces, and System Center Configuration Manager (SCCM) software distribution into a unified IT infrastructure. The software, which has been part of NetApp's portfolio since the 2020 acquisition of Talon Storage, is available to customers using Azure NetApp Files and Cloud Volumes ONTAP. NetApp plans to support other Cloud Volumes ONTAP services such as Amazon FSx and Cloud Volumes Service for Google Cloud.

Besides file sync/caching, the CVEC Edge Caching software provides multi-site orchestration and global file locking for NetApp Cloud Volumes ONTAP. CVEC Edge Caching software creates an intelligent file caching software appliance at each distributed location that runs on Microsoft Windows Server. The software overlays the Microsoft Windows File-Sharing mechanism, integrating with the Microsoft security principles such as Active Directory, ACLs, and NTFS permissions.

CVEC Edge Caching Core and Edge instances create a software fabric that caches active data sets in remote offices globally in public cloud sites. A Core instance installs on a Windows VM in the cloud connected to the back-end storage – Cloud Volumes ONTAP.

Edge instances run in each remote location, connecting a Global File Cache Core, mounted to Cloud Volumes ONTAP central data store to provide users at a remote site access to data center file server resources. Each edge instance is a virtual Windows server that creates a virtual file share representing the namespace of the centralized data set, providing access to the centralized data through file caching. Edge instances handle local encryption, compression, and file delta differencing.

Cloud Backup/DR Services

Cloud Volumes Edge Cache's backup and DR services are supported by NetApp's Cloud Backup and automated by NetApp's Cloud Manager, a SaaS management platform for deploying and configuring Cloud Volumes ONTAP and NetApp's other cloud services.

Cloud Backup creates block-level incremental forever block-level backups, stored as objects. It takes Cloud Volumes ONTAP volume snapshots and uses NetApp SnapMirror to transfer snapshot copies directly to object storage in Azure, AWS, Google Cloud Storage or NetApp

StorageGrid. Cloud Backup encrypts data at rest and in-flight, and stores backups in a customer-owned bucket. Customers can restore full volumes or individual files to any Cloud Volumes ONTAP cluster.

Global File Cache software provides a software-based cache at each location. It does not host or store any authoritative data, but caches data for often-used files for that office. If cache instances are lost, all data is centrally stored and protected. Each Global File Cache instance only contains a cache of data relevant to often-used files for that location.

Customers can use multiple Azure Regions for full DR, setting one region as the primary site and a second region as the DR/Backup site. Customers using multiple Global File Cache Core instances for high scalability can also set up a cold standby for DR. If a core instance fails, it can be replaced by a cold standby instance by changing the IP address of the cold standby or updating the DNS record. This model can also be used to design a multi-fabric deployment with multiple active/active datacenters or to failover to a DR site, either in a separate location or in the cloud.

Cloud Manager

Cloud Manager handles centralized management of NetApp cloud storage services (Cloud Volumes ONTAP, Azure NetApp Files, etc) within hybrid, multi-cloud environments. Cloud Manager is used to deploy and manage the portfolio of NetApp's Cloud Services.

Cloud Insights

NetApp Cloud Insights is a cloud infrastructure monitoring tool used to troubleshoot and optimize public clouds and private data centers. It provides information through dashboards and pre-defined or custom reports.

Enterprise Features

Caching/File Locking

Cloud Volumes Edge Cache uses two types of file caches: On-Demand and Pre-Population.

On-Demand caching opens a file in the cache sitting on the NTFS file system on the Windows Server where it resides. Metadata and data is cached in one object. On-Demand caching does not always cache data where it is used.

Pre-Population caching pre-stages data on Edge appliances so the files are already cached and warm when requested by users. This saves initial download time when files are requested for the first time. Pre-population allows you to stage to cache all files that have been modified over a specified time period, such as the last day or the last week. Pre-Population jobs are scheduled from the Core instance, and scheduled times are local to the Edge appliance so data is cached where it is used.

The cache resides on an NTFS file system and caches active data sets, files, and folders, plus meta data and NTFS permissions. When data on a Global File Cache Edge instance hits 80% of the reserved cache size, Global File Cache will schedule a purge that day to clear the cache.

The cache size adheres to the limitations of NTFS – up to 16TB using the standard NTFS 4KB cluster size and up to 256TB using the maximum 64KB cluster size.

Cloud Volumes Edge Cache will lock files so a file that is open in Cloud Volumes ONTAP cannot be opened in real-time by another user. When a user opens a file, that user's permissions are checked to make sure that user can access the file. An audit of the file access is also recorded for compliance tracking.

When a user opens a file, the Global File Cache Edge communicates with the Global File Cache Core, and the core lock communicates with the Cloud Volumes ONTAP platform. If another user has the file open, there will be a read-write lock on the file and the second user will be notified that the file can be made available as read-only. Locking is centralized so locks are maintained consistently on Cloud Volumes ONTAP, and central Cloud Volumes ONTAP volumes can be directly accessed by applications in parallel with access through the Global File Cache fabric.

Security

Global File Cache deploys SSL encryption between Core and Edge. It uses Microsoft ACLs for NTFS permissions to secure data, applying the access controls and permissions to Cloud Volumes ONTAP shares. Files within a local cache can also be encrypted with technologies such as BitLocker.

Pricing

Pricing for Cloud Volumes Edge Cache is based on provisioned capacity, starting at $0.13 per GB per month with a 30 TB minimum (6 edge nodes included). Edge nodes scale with capacity, with one edge node required for every additional 3 TB of capacity purchased. The subscription includes unlimited cloud backup and Cloud Volumes ONTAP's cross-zone HA features. Cloud Volumes Edge Cache is available only through the Azure Marketplace, although NetApp plans to expand to AWS FSx and Google Cloud Platform.

Evaluator Group Opinion

NetApp is unique among global file system vendors in several ways. First, it is a large established publicly traded storage vendor while its global file system competitors are much smaller private companies, such as **CTERA**, **Hammerspace**, LucidLink, **Nasuni** and **Panzura**. Also, NetApp does more than cloud file storage – it sells on-premises SAN, NAS and unified storage as well as offering its Cloud ONTAP through hyperscalers AWS, Google and NetApp. Its competitors were built specifically to offer global file systems, and almost all started out using public clouds for its storage. NetApp was among the handful of major on-premises NAS vendors that the smaller global file systems set out to replace by using cloud storage.

Before Cloud Volumes Edge Cache, NetApp's Cloud Volumes ONTAP lacked caching capabilities required for collaboration and Global File Cache lacked a file system. CVEC combines those to better compete with companies that require collaboration wherever their workers are located.

Cloud Volumes Edge Cache is part of NetApp's broad portfolio of services and software that use the public cloud for storage. Others include AWS FSx for ONTAP, Azure NetApp Files, and Cloud Volumes Service for Google Cloud.

NetApp's close reliance on Windows for Cloud Volume Edge Cache limits is use cases compared to competitors. Expanding to AWS and Google would broaden the value of CVEC. We expect NetApp to fulfill its expansion roadmap, as it has already made ONTAP available across the three major public clouds.

More detailed information is available at http://evaluatorgroup.com

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