NEC HYDRAstor

HYDRAstor is a family of systems used for long-term storage applications such as backup and archiving. The HS8-50S is capable of scaling to 165 nodes and 27.7PB of raw capacity. Inline compression and deduplication are included to increase the stated effective capacity to 353.2PB. The HS6-5000A is targeted at archiving and while it scales the same as the HS8, its overall performance is tailored for archiving. NEC does not state an effective capacity for the HS6 is the repository for the single original files. NEC also offers a Virtual Appliance version of HYDRAstor that customers can install on existing hardware infrastructure. It is targeted for the needs of remote offices, small to medium businesses, and virtualized platforms.

Access can be through a variety of remote file system interfaces. Object APIs (Amazon S3 and OpenStack Swift) are supported with the HS6 model. Remote replication is optional via IP to another HYDRAstor system with WAN acceleration and encryption of data in flight. Only deduped and compressed data are replicated.

Two types of nodes are supported in the HS8 and HS6 configurations, Hybrid Nodes and Storage Nodes. Both contain 12 HDDs. A Hybrid Node adds capacity, performance and additional network connections for host access. A Storage Node adds capacity only. Forward Error Correction using erasure coding is used for data protection with the capability to protect from up to six drive or node failures.

HYDRAstor supports an ecosystem of backup, archiving and enterprise data management solutions and partners.

Highlights

- Grid architecture for long-term data storage
- Multiple models including virtual appliance
- Scales up and out – add performance and capacity or just capacity
- Inline deduplication and compression
- Access via NFS, CIFS, NEC custom Express I/O
- Optional replication, WORM, and encryption at rest

Overview

Currently in its fifth generation, HYDRAstor's most unique attribute is perhaps its ability to intermix multiple generations of technology (currently up to three) in the same grid. This makes it feasible to use it as a long-term storage system without having to do data migration. The evolutionary generations provide the ability for increases in performance, capacity, and feature/function. Nodes may be added or deleted non-disruptively.

The other significant unique feature is called Distributed Resilient Data (DRD). This erasure coded technique allows the user to "dial in" the level of resiliency required to protect data. DRD can protect

against as many as six concurrent drive failures, or even complete node failures, without data loss. The default setting for protection is three. While the HS8 and HS6 models are clearly targeted at the enterprise, the HYDRAstor Virtual Appliance model provides long-term storage capability for small to medium-sized businesses. There is a common code base across all HYDRAstor models.

Inline compression and global deduplication are standard features, as is automatic dynamic provisioning and load balancing. Optional features are available for replication, WORM, source-side deduplication, and encryption at rest.

Evaluator Group Comments: The concept of a long-term archive lasting decades, supporting ongoing technology refresh, is a customer requirement. HYDRAstor meets this requirement by demonstrating support for mixed nodes and ongoing upgrades since its introduction, along with the massive scalability to allay concerns from customers with nearly any size of data preservation requirement.

Figure 1: HYDRAstor HS8-5000

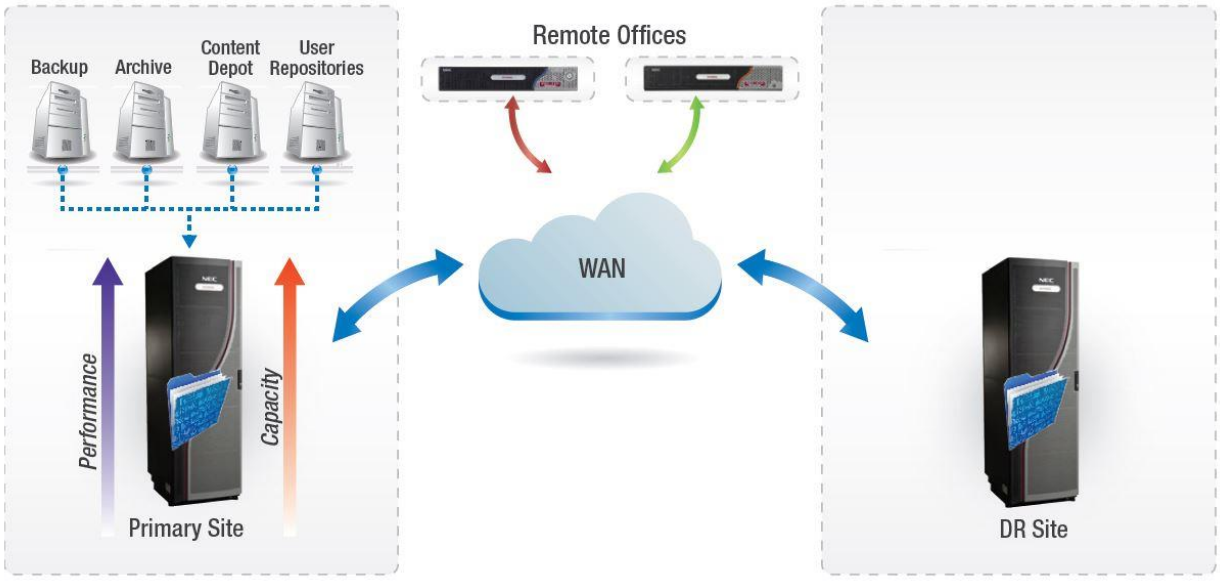

Figure 2: HYDRAstor Replication

Features

The following product features are summarized from the Data Protection Systems comparison matrices.

	NEC HYDRAstor	NEC HYDRAstor
Model	**HS8-50S**	**HS6-5000A**
Host Interface protocols		
NAS: File: CIFS / NFS	Yes	Yes
SAN: Block: FC	Yes	No
SAN: Block: iSCSI	No	No
SAN: Block: FCoE	No	No
OST	Yes	Yes
Simultaneous OST/NAS protocols	Yes	Yes
REST	Yes	AWS S3, OpenStack Swift
Storage Appliances		
Nodes (Ctlr) / common repository	1-165	1-165
Raw capacity range	18TB - 27.7PB	72TB - 11.88PB
Usable capacity range (TB)	240TB - 353.2PB	240TB - 353.2PB
HA Failover	Yes	Yes
Disk Types	SATA	SATA
RAID levels / Error Correction	DRD (error correction configurable to 6 devices)	DRD (error correction configurable to 6 devices)

	NEC HYDRAstor	NEC HYDRAstor
Model	**HS8-50S**	**HS6-5000A**
Internal disk connectivity	6Gbps SATA	6Gbps SATA
Host Interfaces / node		
FC	4 FC ports	0
Ethernet	Up to 6 @ 1-10 GbE	Up to 6 @ 1-10 GbE
Dedupe Details		
External or Integrated Dedupe	Integrated	Integrated
When Dedupe	Inline	Inline
Global Dedupe	Yes	Yes
Dedupe Algorithm	SHA-1 hash	SHA-1 hash
Byte compare (resolve hash dupe)	No	No
Fixed or Variable Chunk	Variable	Variable
Replication		
Licensing (by source or target)	Both	Both
Control Granularity	Share	Share
Restart from Checkpoints	No	No
Replication Port	IP	IP
Many to 1	16	16
Multi Hop / Cascade	No	No
Throttling / Scheduling	No	No
Encryption		
Replication (inflight encryption)	Yes	Yes
At Rest (on media)	Yes	Yes
Key Management	Yes	Yes
Crypto Shred	Yes	Yes
Performance (TB / hr)	HS8-5083R-11880	HS6-5083A-11880
Max ingest no dedupe all nodes	597.6	178.2
NAS max ingest / node with dedupe	72	Not specified
OST max ingest / node with dedupe	72	Not specified
Max ingest with dedupe all nodes	5,900	Not specified
Dedupe Only Rate (post process)	n/a	n/a
Max Dedupe in 24 hours (TB)	124,800	4,277
Max Egress (deduped restore)	Not specified	Not specified
Management		
Install Wizards	Yes	Yes
Task Based Wizards	Yes	Yes
Manage Multiple Systems	Yes	Partial
Remote Lights Out Mgmt.	No	No

	NEC HYDRAstor	NEC HYDRAstor
Model	**HS8-50S**	**HS6-5000A**
Type of GUI	Web based	Web based
CLI	Yes	Yes
Logging	Yes	Yes
Usage Reports	Yes	Yes
Trend Reports	Yes	Yes

Table 1: NEC HYDRAstor Model Comparison

Specifications	
Usable capacity	890GB to 91TB
Effective capacity	17.8TB to 302TB
Max ingest no dedup (2 vCPU – 4 vCPU)	0.8 TB/hr - 1.6 TB/hr
Max ingest depdup (2 vCPU – 4 vCPU)	5 TB/hr – 10 TB/hr
Supported protocols	NFS, CIFS, Universal Express I/O, OST
Supported Hypervisors	VMware ESXi 5.5, 6.0, 6.5U1; Windows Server 2012 R2 2016 Hyper-V
Host Hardware Requirements	
CPU	2 to 4 cores for HS VA, 1 or more cores for host server
Memory	20GiB (4GiB for hypervisor, 16GiB for single VA)
Disk capacity (system)	296GB for ESXi, 326GB for Hyper-V
Disk capacity (data)	200GB – 16TB for ESXi, 200GiB – 17TiB for Hyper-V

Table 2: NEC HYDRAstor Virtual Appliance

Model	Hybrid Nodes	Storage Nodes	Raw Capacity	Effective Capacity	Raw Ingest TB/hr.	Deduped Ingest TB/hr.
HS3-510-8	0	1	8TB	104TB	5	32.4
HS3-510-16	0	1	16TB	208TB	5	32.4
HS3-510-24	0	1	24TB	312TB	5	32.4
HS6-5001A-72	1	0	72TB	960TB	1.1	Not specified
HS6-5001A-144	1	1	144TB	1.92TB	2.2	Not specified
HS6-5001A-144	2	0	144TB	1.92TB	2.2	Not specified
HS6-5001A-288	2	2	288TB	3.84PB	4.4	Not specified
HS6-5008A-1080	8	7	1.08PB	14.4PB	16.2	Not specified
HS6-50083A-11880	83	82	11.88PB	158.4PB	178.2	Not specified
HS8-50S-72	1	0	72TB	960TB	7.2	61
HS8-50S-144	1	1	144TB	1.92TB	7.2	72
HS8-50S-144	2	0	144TB	1.92TB	14.4	72
HS8-50S-288	2	2	288TB	3.84PB	14.4	144
HS8-50S-1080	8	7	1.08PB	14.4PB	57.6	540
HS8-50S-11880	83	82	11.88PB	158.4PB	597.6	5,900

Table 3: NEC HYDRAstor Capacity/Performance Comparison (Capacity based on 72TB nodes)

Product Architecture

The larger HS8 and HS6 systems are scaled out using Hybrid Nodes that provide connectivity, performance and capacity, or scaled up using Storage Nodes that provide additional capacity. This allows scaling of performance and capacity together, or capacity alone if that is all that is required. These nodes also ship with full capacity using 12 x 6TB 3.5" SATA drives. The high capacity nodes of HS8-50S are being shipped with full capacity using 12 x 14TB 3.5" NLSAS drives. The nodes are connected via a grid architecture that creates a matrix with no single point of failure in either the nodes or in the grid.

Evaluator Group Comments: The ability to scale capacity and performance up to 27.7PB of raw capacity, and over 353PB of de-duped capacity is significant. Further, the performance of nearly 6PB/hr. of deduped ingest for the HS8 is also significant. Few if any other vendor can challenge NEC for either capacity or aggregate performance.

HYDRAstor is optimized for sequential write access, providing the best performance when writing simultaneous large data streams. Sequential read throughput is a secondary consideration, since recovery typically does not have the same volume of data as backup operations.

Product Design

Included systen and software features:

- Distributed Resilient Data (DRD)
  - Advanced erasure coding
  - Flexible resiliency levels per file system
- DataRedux
  - Inline global deduplication and compression
  - Application awareness
- DynamicStor
  - Dynamic thin auto-provisioning
  - Load balancing of data and processing
  - Non-disruptive addition/removal of nodes
  - Multi-generation grid
- Scale out grid storage
  - Scale compute and capacity independently
  - Non-disruptive hardware upgrades
  - Multiple generation hardware support
- High availability
  - Front-end automatic failover
  - Back-end node-level fault tolerance
  - Dual switch interconnect
  - No single point of failure
- Data Management Services
  - File system clones/snapshots
  - “Instant” file copy
  - Dynamic data shredding
  - File system quotas
- Connectivity
  - 1GigE or 10GigE
  - CIFS, NFS, NEC custom Express I/O
  - Amazon S3 and OpenStack Swift with HS6 models
  - Multi-tenant shared mode
- System Management & Monitoring
  - Web-based GUI administrative console
  - Scriptable CLI via SSH and RSH
  - Email alerts and notifications
  - SNMP
  - Automatic system reports

Optional software features:

- HYDRAlock
  - Write-Once Read-Many (WORM)
  - Support for compliance or enterprise WORM
  - Dynamic data shredding
- RepliGrid
  - WAN-optimized remote replication
  - In-flight data encryption
- Advanced Data Services (including the OpenStorage Suite for Veritas environments)
  - Dynamic I/O - Adaptive Load Balancing
  - Express I/O - Lightweight Data Transport
  - Deduped Transfer - Source Side Deduplication
  - Optimized Synthetics - Storage-Synthesized Full Backup
  - Optimized Copy - WAN-Optimized Copy Services
  - A.I.R. - WAN-Optimized Auto Image Replication
- Encryption at rest
  - Fast inline data encryption
  - AES 128 or 256 bits
  - Secure encryption key management

Host Access

Host access is provided via Ethernet interfaces on the HS8 and HS6 Hybrid Nodes ~~or the single node HS3~~ using NFS, CIFS, or NEC custom Express I/O. The HS6 hybrid nodes also include support for object APIs from AWS S3 and OpenStack Swift. The HS8 and HS6 Hybrid Nodes provide access to data on any Storage or Hybrid node, regardless of location in the grid.

Storage Capacity

Storage is provided on HS8 and HS6 models by the storage logical function implemented on a Hybrid Node, or a separate Storage Node. This function provides a distributed, clustered filesystem for data. These nodes are responsible for “chunking” the data, and generating the hash value for the data deduplication process.

Reliability and Availability

The NEC HYDRAstor derives its reliability, availability and serviceability (RAS) features from its grid architecture, coupled with the HYDRAstor software elements. The replaceable, multi-node, "shared nothing" approach of HYDRAstor is able to tolerate multiple hardware failures without loss of either availability or data.

There is no single point of failure in either the nodes or in the grid. The Hybrid Nodes provide automatic front-end failover. DRD, described below, provides data resiliency beyond the capabilities of currently defined RAID levels, including failure of entire nodes.

Evaluator Group Comments: The design of the HYDRAstor hardware and software components represent a well thought out, scalable approach to long-term data storage. The original design of front-end host accessible nodes, which are separate from the back-end storage - capacity nodes, provides a flexible foundation for a scale-out grid architecture.

Logically, these two separate functions still exist, although both logical elements are now contained physically within Hybrid Nodes. The distributed functionality of deduplication, coupled with a single global pool are key design elements, as are the distributed grid filesystem and data services built on top of these features. Further, the use of DRD provides the necessary resiliency without imposing significant capacity or performance overhead as the system scales out.

Software Features

DataRedux (Included)

HYDRAstor implements variable-sized block, inline, hash-based data deduplication known as DataRedux. Application-aware data deduplication occurs globally, across all nodes within a grid.

The data deduplication implementation is split between the Hybrid and Storage nodes, or entirely within Hybrid nodes. The Hybrid nodes chunk the data, and then perform the SHA-1 hash function, along with an additional checksum for each block. The SHA-1 hash and checksum are then sent to all Storage nodes within the grid. The Storage nodes check the hash value against the list of hash values stored on the Storage node. If a hash and checksum are unique, the block is stored. If not, it is reported back to the Hybrid node as a duplicate.

For deduplication, it is optimal to break, or "chunk" data into consistent groups. Ideally, these chunks are aligned to the underlying application or source of the data. NEC refers to the process of breaking data into application aware chunks as "Content Defined Chunking".

Evaluator Group Comments: NEC's DataRedux design provides high scalability. Rather than using one or two nodes to process all data, HYDRAstor distributes the task among all nodes in a grid. With this design, NEC has accomplished what some competing dedupe target devices offerings do without placing the burden on external media servers. By scaling out the deduplication generation to all of the nodes in the HYDRAstor grid, NEC is able to accomplish scale out data deduplication without separate purchases and configuration of backup media servers. Moreover, NEC's approach is simple to manage at scale.

DynamicStor (Included)

The DynamicStor feature is NEC's implementation of thin provisioning, referred to as auto-provisioning. This feature allows the capacity allocation of any one filesystem to appear much larger than the actual amount of data stored. Capacity is automatically consumed from the pooled block storage provided by storage nodes.

DynamicStor also includes load balancing, the non-disruptive addition or removal of nodes, and the ability to support multiple generations of nodes in the same grid.

Distributed Resilient Data (Included)

Distributed Resilient Data (DRD) is NEC's proprietary software-based, data protection approach. It uses multiple distributed parity elements to provide data resiliency. DRD utilizes erasure encoding rather than traditional RAID for data protection. As a result, DRD enables levels of data protection beyond RAID-6. The default protection is level 3, which establishes three parity chunks, and allows for the failure of three elements of data. The resiliency level can be increased to as many as six and can be set by application with the system able to intermix the different levels. The erasure coding algorithm breaks each block into fragments, as shown in Figure 3.

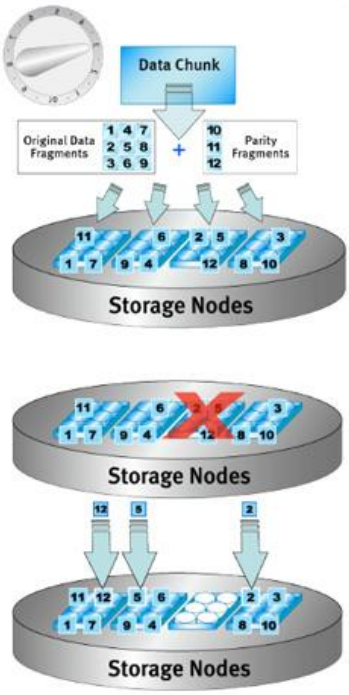

Figure 3: DRD Implementation (Source: NEC)

Nodes contain 12 disk drives. In all cases, data chunks are stored on all 12 devices, regardless of the resiliency setting. With a setting of 3, data is broken into 9 elements, with 3 additional pieces of parity data added. Each of these 12 chunks is then stored on a different device. Using these settings, the overhead is similar to RAID 5, with a 25% overhead, while delivering 3X better resiliency than RAID 5, and 1.5X better resiliency than RAID 6. Using the highest setting of 6 results in a 50% overhead similar to RAID 1, although with 5X better resiliency.

DRD distributes the 12 fragments (nine original fragments + three parity fragments) across as many nodes as possible with each fragment residing on a separate disk. If the system has less than 12 nodes, multiple fragments will be stored on the same node. In this case, HYDRAstor will still distribute these fragments on different disks within the node. In the minimum recommended configuration of four nodes, three fragments would be written to different disks on each node to maximize resiliency.

With the default resiliency setting of three, a chunk of data can be re-created using any nine out of the total of 12 fragments. That means the system could simultaneously lose as many as three fragments from the group without jeopardizing data integrity. In a HYDRAstor configuration of four nodes, this would protect all data in the event of one node failure (12 data disks) or the failure of any three disk drives across multiple nodes.

In larger HYDRAstor systems with 12 or more nodes, each node stores no more than one of the 12 fragments of a chunk. Thus, the default resiliency can protect data from three or more entire node failures (36 data disks). Administrators can optionally choose a higher level of resiliency if data stored is deemed

critical. Based on the resiliency setting, HYDRAstor will automatically calculate the appropriate number of original data fragments and create the necessary number of parity fragments. The fragments will always be distributed to achieve maximum data resiliency.

Evaluator Group Comments: The use of Forward Error Correction (using Erasure Coding) is a significant design element. It helps provide greater reliability, without significant overhead at large scale. The HYDRAstor's grid design supporting up to 165 nodes would not be practical using traditional RAID schemes. NEC's implementation is much more flexible than RAID, allowing administratively established fault tolerance beyond that available with RAID, and with less overhead.

Data Management Services (Included)

This feature provides the ability to create file system clones and snapshots, as well as the capability to make "instant" file copies.

A dynamic data shredding capability is included, as is the ability to extablish file system quotas.

RepliGrid (Optional)

Provides WAN-optimized asynchronous replication between multiple, independent grids. The steps for replication are as follows:

- Tracks changes since previous sync point
- Checks to see if data chunks exist at remote site
- Sends only unique data chunks to remote site
- Data compression occurs prior to sending data

Some of the features for RepliGrid include:

- Many to one replication
- Scheduled resynchronization
- In-flight data encryption
- Scheduled data replication
- Maintains data attributes, including WORM policy for compliance

Working in conjunction with DataRedux, only unique, compressed, deduplicated data chunks are sent across the network.

HYDRAlock (Optional)

HYDRAlock provies both enterpise and compliance modes of WORM administration. Read-only file attributes persist after replication to a remoted site. The duration for read-only access can be specified on a per-file basis. After read-only durations has elapsed, files and their attributes, including deletion, can be administered normally.

Encryption at Rest (Optional)

HYDRAstor encrypts data chunks with Advanced Encryption Standard (AES) 256-bit, implemented with FIPS 140-2 validated OpenSSL libraries. HYDRAstor encrypts data prior to writing to disk. Encrypting only unique compressed chunks, HYDRAstor minimizes encryption overhead and maximizes throughput.

HYDRAstor Encryption at Rest provides secure and reliable encryption key management. The encryption keys are automatically generated by the HYDRAstor system based on passphrases provided by the user. The encryption keys are stored in the Storage Nodes and they are also encrypted by another key stored in the Hybrid Nodes. HYDRAstor decrypts the encryption keys in the Storage Nodes during system startup and references the decrypted keys out of system memory, ensuring the decrypted keys are not persisteent to disk.

Advanced Data Services (Optional, including ADS for OpenStorage Suite)

ADS is a family of advanced capabilities to enhance the performance and efficiency of HYDRAstor in integration with backup and archiving applications. This includes five enhancements of the NEC interface to Symantec's OST described below

- Dynamic I/O – Adaptive load balancing
- Express I/O – Lightweight data transport
- Deduped Transfer – Source side deduplication
- Optimized Synthetics & Accelerator – Storage-synthesized full backup
- Optimized Copy and OST AIR – WAN-optimized replication services for DR

Dynamic I/O

Dynamic I/O enables automatic distribution of backup jobs across front-end nodes to adapt to changing workloads. It's design to maximize both throughput and capacity.

Evaluator Group Comments: While having an OST interface is not unique for a disk backup product, the capability to load balance across multiple nodes and ports is unique. The OST interface itself provides a very efficient mechanism for backup from Veritas applications. When coupled with load-balancing across multiple accelerator nodes, the NEC HYDRAstor should provide very high performance along with high reliability. This unique feature merits serious consideration by customers looking for a high performance multi-node backup or archive appliance.

Express I/O

Express I/O is a lightweight data transfer protocol that delivers more efficient data transfer than standard protocols such as NFS and CIFS. Express I/O reduces the overhead of data access and maximizes backup performance. It is designed to work with any backup application.

Deduped Transfer

HYDRAstor's Deduped Transfer delivers higher performance than standard Express I/O by reducing network bandwidth consumption between backup server and HYDRAstor. Deduped Transfer leverages backup server resources for data deduplication pre-processing and sends only unique chunks of data from backup server to HYDRAstor, resulting in significantly higher throughput for backup workloads. Deduped Transfer can let backup servers at small remote sites directly backup to HYDRAstor at data center, and reduce both network and storage cost.

Optimized Synthetics & Accelerator

HYDRAstor's Optimized Synthetics extend the synthetic full backup functionality of backup applications, minimizing the backup window by offloading synthetic full backup processing to HYDRAstor. Controlled by the backup server, Optimized Synthetics synthesizes a new full backup using the last full backup and subsequent incremental backups. HYDRAstor's Optimized Synthetics work with Veritas NetBackup's synthetic backup and Accelerator feature via OpenStorage API.

Supporting Accelerator simplifies the process even further by automating the synthesis of the next full backup as soon as the new incremental backup is received. Optimized Synthetics enable the user to eliminate weekly full backup from the job schedule and maintain an up-to-date full backup image with only daily incremental backups, while improving the efficiency of the backup process by reducing backup server workload and network traffic.

Optimized Copy and OST AIR

For Veritas NetBackup, Optimized Copy automates the copy process and updates the NetBackup catalog, while minimizing required bandwith and simplifying administration workflows. HYDRAstor also supports NetBackup Auto Image Replication (AIR) via OpenStorage API, which automates site-to-site disaster recovery. Using AIR, the NetBackup server at DR site automatically imports the images replicated by HYDRAstor WAN-Optimized Replication and updates its catalog, enabling quick recovery at DR site.

Data Protection Software

NEC HYDRAstor provides point in time copies using pointers, also known as snapshots, provide protection against user errors and accidental deletion or changes, as well as asynchronous remote copy (RepliGrid) to provide disaster recovery capability

Local Point In Time Copy

NEC provides both read-only and read-write snapshot capability. Snapshots are implemented using a "redirect on write" technique similar to that used by NetApp. This method copies the pointers to data blocks when a snapshot is taken. Subsequent updates write data in a different location, allowing the original pointers to remain consistent for a specific point in time. However, unlike the NetApp Data ONTAP WAFL filesystem, NEC HYDRAstor attempts to maintain files in close proximity to each other, in order to maximize streaming read / write performance.

	Remote Replication	Local PIT Copy	
	RepliGrid	**R/W**	**R/O**
Copy Type	Remote Copy	PIT Copy	PIT Copy
Replication Type	Asynchronous		
Architecture	Full Copy	Bit Map	Bit Map
Max # Copies	No Spec	255	255
Re-sync	Yes	No	No
Write Performance Impact	Minimal	None	None
Potential Data Exposure	Back to last sync point	Exposure back to time when snap was taken	Exposure back to time when snap was taken
Availability for Restore	Available after completion of initial replication	Available for restore, or replace volume	Available as source of restore only
DR, Fail-over Capability	Yes After suspending replication	No Not for DR or fail-over, depends on source data	No Not for DR or fail-over, depends on source data
Default Action	Mirror. Copy is a true mirror until it is split	Copy file pointers when command issued (background)	Copy file pointers when command issued (background)
Additional Capacity	100%	Changes only	Changes only
Access to Copy	R/W after split	R/W immediate	R/O
Performance Impact after copy	None	Minimal	Minimal
Performance Impact during copy	Requires cache for buffer space	Minimal	Minimal

Table 4: NEC HYDRAstor Data Protection Options

Evaluator Group Comments

The software feature set of HYDRAstor has continued to be enhanced since it was initially released in 2007. NEC has chosen to use a bundled approach to marketing, including most features for the same price. This typically simplifies configuration and administration and can greatly simplify the approval process for future add-on capabilities.

The HYDRAstor Virtual Appliance scales down the system and its pricing to better meet the requirements of small and mid-sized businesses and is available as a free trail for customers to evaluate.

Strengths:

The HYDRAstor product is designed to accommodate large capacity environments using a scale out architecture, also known as a grid architecture. With support for up to 165 nodes, this degree of scale goes far beyond what many competing systems and architectures are able to support. With current systems supporting 353PB of effective capacity and 596TB/hour of backup speed, scale, capacity and performance should not be a concern for any anticipated use case.

The data protection strength of NEC's DRD, coupled with data deduplication and the recently added Dynamic I/O capability to load balance OST backup jobs across multiple nodes, all provide evidence of a robust, scalable, highly capable disk to disk appliance.

Another strength is the ease of use and configuration. NEC has continued to refine their management interface with the HYDRAstor product, which is an important consideration in the data protection and archiving appliance market. By intelligently linking multiple components into a single grid, management duties are also reduced with the ability to manage one logical system.

The larger HS8 systems ability to scale up both performance and capacity independently provides a capability for users to grow their disk based backup system as needed. Many competing systems have much smaller capacity limitations, forcing customers to purchase multiple systems in order to meet their performance and capacity needs. The scalable design of HYDRAstor can eliminate the need for separate systems in all but the very largest accounts requiring multiple Petabytes of data protection capacity.

Evaluator Group has examined some of NEC's HYDRAstor performance. The results indicate the grid is able to scale write performance linearly for the first 12 nodes. When nodes are initially added, there is some overhead in an attempt to rebalance data across all nodes. However, after data is rebalanced, performance of the system shows nearly linear improvement as additional hybrid nodes are added to the grid.

Potential Concerns:

The concern for HYDRAstor is primarily around the adoption and number of channels selling and supporting the product. To address this concern, NEC continues to expand HYDRAstor distribution channels (e.g., selling HYDRAstor-based managed services). The price is also an issue brought up by some potential customers when evaluating this product, rather than the lack of a particular feature. NEC is leveraging the virtual appliance option to offer a lower-priced option and extend HYDRAstor into smaller-scale environments.

When used as an archiving platform, the HYDRAstor line is capable but does not offer quite the same feature set as the most successful archiving products. Competing archive products provide more application integration for compliance, including data encryption, data access logging and legal hold along with other features that the archiving and compliance market are seeking.

HYDRAstor's scale out architecture and WORM lock provide the core features needed for an archive platform. However, without additional ISV software the platform itself is insufficient to meet stringent regulatory compliance requirements.

Evaluator Group is not aware of any technical issues or problems with the HYDRAstor product line. Evaluator Group believes that the HYDRAstor line should be able to compete with disk based backup appliances on its technical merits. The concern lies with the ability of NEC to compete with established rivals in the highly competitive, backup disk-target segment.

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