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HYDRAstor

Scale-out Global Deduplication Storage

HYDRAstor: High Performance Capacity-optimized Storage for Long-Term Data

At a Glance

- Application-aware inline global deduplication
- Massive linear scalability of performance and capacity
- High availability - no single point of failure
- Advanced erasure-coded data resiliency
- Investment protection with online upgrade/expansion
- WAN-optimized replication for DR

Overview

HYDRAstor is NEC's massively scalable distributed grid storage platform, built to modernize storage infrastructure to support long-term data retention. HYDRAstor has been architected to maximize capacity optimization and modular scalability, without the complexity and inherent limitations of legacy storage solutions such as expensive inefficient primary storage, limited scale-up NAS, virtual or physical tape, or specialized single-purpose backup or archive appliances. Pioneered by NEC, a Global 500 company and worldwide technology leader, HYDRAstor provides user configurable, integrated data management services to streamline storage management.

Solution

HYDRAstor delivers high performance, cost effective, and highly reliable long-term data retention for enterprise and SME environments. HYDRAstor reduces storage capacity consumption by up to 95% or more with inline global deduplication, enabling high performance and low storage costs. Leveraging HYDRAstor's grid architecture, enterprise customers can customize the appropriate configuration to match performance and capacity requirements with high availability and no single point of failure. HYDRAstor also provides advanced erasure-coded data resiliency that can tolerate up to 6 concurrent disks or node failures, delivering greater data resiliency with less overhead than traditional RAID. HYDRAstor maximizes investment protection with online upgrade/expansion, as well as in-place technology refresh with intermix of multi-generation nodes within the same grid system.

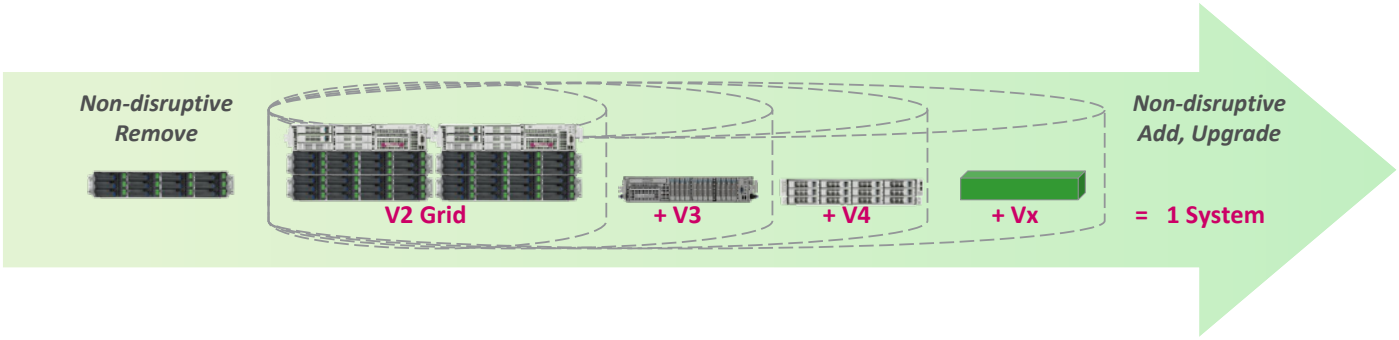
Scalable Grid Architecture

HYDRAstor's unique grid architecture delivers unrestricted, independent linear scalability of both performance and capacity. HYDRAstor's two-tier design eliminates disruptive technology refresh and legacy forklift upgrades by replacing error-prone manual data migration with an automated process which recognizes new nodes and optimally distributes data and processing. HYDRAstor scales by using two node types: Hybrid Node (HN) for expanding both performance and capacity, and Storage Node (SN) for expanding just capacity. HYDRAstor systems can scale from single-node systems for SME or remote offices to large grid systems with up to 165 nodes per system for large enterprises. Combining multiple HNs and SNs within the same grid system, all enterprise customers can customize the appropriate configuration as needed.

Dynamic Auto-Provisioning

HYDRAstor's DynamicStor™ technology virtualizes all available storage resources into a common shared pool and dynamically allocates storage capacity as needed. DynamicStor eliminates the onerous tasks of provisioning, automatically allocating storage capacity on-the-fly and balancing incoming data across storage resources spanning all nodes within the grid. DynamicStor ensures maximum capacity utilization efficiency through dynamic capacity allocation and adaptive resource sharing. HYDRAstor supports a default filesystem size of 256PB per filesystem, dynamically allocating actual storage capacity as needed without any reconfiguration or user intervention. HYDRAstor also supports filesystem quotas, preventing or warning the user from exceeding pre-configured capacity thresholds.

Online Upgrade/Expansion with Multi-generation Nodes



Online Multi-generation Expansion

With DynamicStor, HYDRAstor maximizes investment protection by enabling non-disruptive expansion of performance and capacity independently with no data migration and no downtime. HYDRAstor can be further expanded and refreshed with no data migration by incorporating intermix of newer generation hardware into the same grid system, enabling in-place technology refresh and eliminating forklift upgrades. DynamicStor ensures enterprises can customize the system configuration based on their current needs, as well as expand the system to meet future needs.

Application-aware Inline Global Deduplication

DataRedux™ technology eliminates redundant data across and within incoming data streams, reducing storage consumption by 95% or more. HYDRAstor processes incoming data inline and ensures that all data across the grid is fully deduplicated, delivering maximum efficiency and cost reduction. HYDRAstor further enhances space reduction efficiency with application-aware deduplication. Application-aware deduplication can increase space reduction by >130% compared to alternatives by leveraging application format awareness to optimize deduplication of user data without impact from the corresponding application metadata.

Advanced Erasure-coded Data Resiliency

HYDRAstor protects data across the entire system with Distributed Resilient Data™ (DRD) erasure-coded resiliency, delivering greater protection and faster rebuild than traditional RAID with less capacity or processing overhead. DRD can tolerate up to 6 concurrent disk or node failures while maintaining normal I/O, and offers flexible protection level configuration on a per filesystem granularity. HYDRAstor automatically rebuilds only lost data using available free capacity on remaining disks, enabling faster data rebuild than traditional RAID and automatically restoring the configured resiliency level.

High Availability and No Single Point of Failure

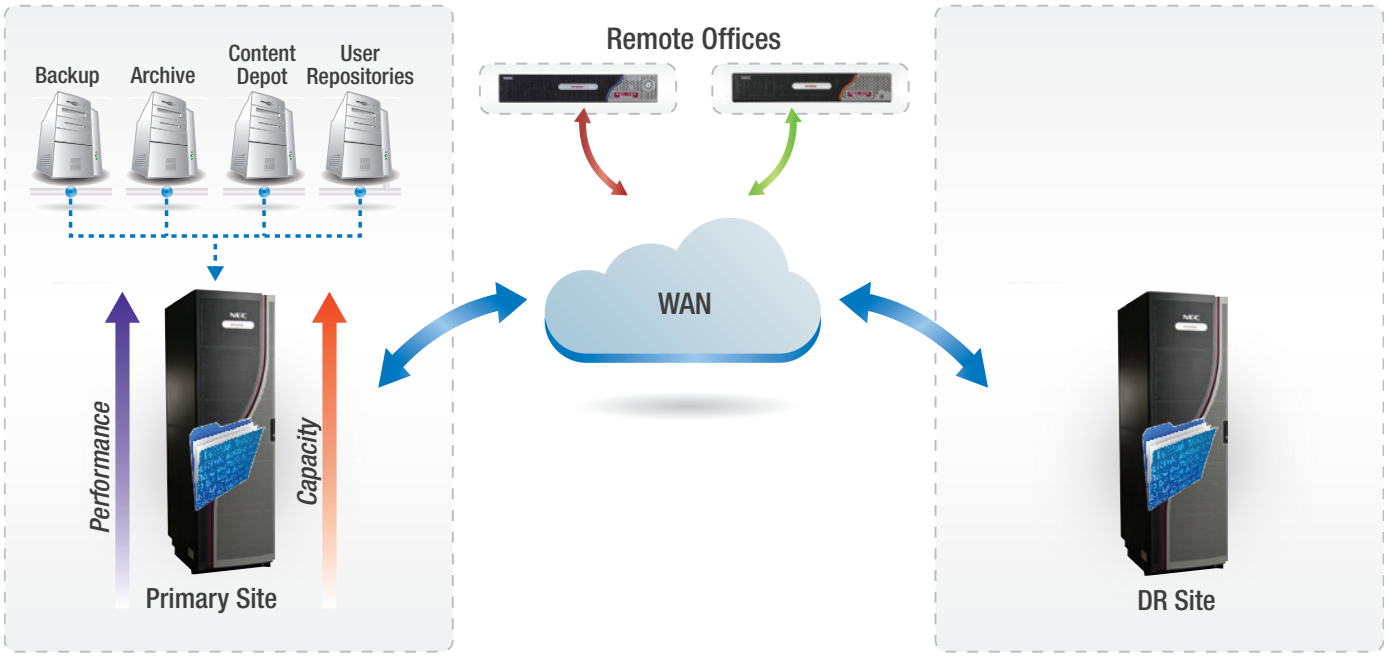
HYDRAstor's grid architecture delivers high availability with no single point of failure, including front-end failover, back-end node level resiliency, and dual switch interconnect. If an HN fails, HYDRAstor automatically moves filesystems and IP addresses from the failed HN to its failover partner HN, delivering front-end failover across HNs. On the back-end, HYDRAstor leverages flexible erasure-coded node level resiliency that can be adjusted on a per file system basis, delivering back-end fault tolerance across the entire grid. All nodes (both HNs and SNs) are connected to one another via redundant dual switch interconnect, ensuring sustained connectivity and no disruption in data transfer.

WAN-optimized Replication for DR

HYDRAstor RepliGrid™ offers WAN-optimized replication for disaster recovery and business continuity. Transmitting only unique compressed data chunks and newer reference metadata to the remote HYDRAstor system, HYDRAstor can significantly reduce the network bandwidth requirements and share information with another HYDRAstor system via asynchronous replication. RepliGrid delivers a comprehensive DR solution between multiple data centers or data center and remote offices. With in-flight encryption, the data transfer between the master and remote HYDRAstor systems can be protected from unauthorized access.

Advanced Data Management Services

HYDRAstor Encryption at Rest can protect data against unauthorized access to lost or stolen disks, by encrypting data prior to being written to disk. In addition, HYDRAstor delivers cloning capability to generate a deduplicated copy of any filesystem within seconds, as well as HYDRAlock™ Write-Once Read-Many (WORM) capability to ensure record immutability for regulatory and legal mandates. Filesystems with different resiliency levels or different protection attributes can be intermixed on the same system, including the ability to dynamically shred all deleted data to support intermix of classified and unclassified data within the same system.



Standard Features

DataRedux™	• Inline global deduplication • Application awareness • Inline compression
DynamicStor™	• Dynamic auto-provisioning • Load balancing of data and processing • Non-disruptive addition/removel of nodes • Multi-generation grid with up to 165 nodes
Distributed Resilient Data™	• Advanced erasure-coded data resiliency • Flexible resiliency levels per file system
High Availability	• Front-end automatic failover • Back-end node-level fault tolerance • Dual switch interconnect • No single point of failure
Data Management Services	• File sytem clones/snapshots • Instant file copy • Dynamic data shredding • File system quotas
Connectivity	• 1GB or 10GB Ethernet • CIFS, NFS, and OST • Multi-tenant shared mode
System Management & Monitoring	• Web-based GUI administrative console • Scriptable CLI via SSH and RSH • E-mail alerts and notifications • SNMP • Automatic system reports

Optional Features

RepliGrid™	• WAN-optimized replication • In-flight data encryption
HYDRAlock™	• Write-Once Read-Many (WORM) • Support for compliance or enterprise WORM
OpenStorage Suite	• 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

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