Western Digital.

Solution Brief

A High-Performance Scale-out Cloud Storage Solution Built on Western Digital Ultrastar® Data60 and Powered by NetApp® StorageGRID®

Highlights

- The Ultrastar Data60 is a key element of next-generation disaggregated storage and software-defined storage (SDS) systems, delivering high density and the flexibility to balance performance with cost. Western Digital HelioSeal® drives ensure cool running, quiet operation, and high reliability. A high-performance data tier can be set up for demanding applications by using SSDs in the drive slots, enabling the ability to serve both fast and big data from a single platform.

- NetApp StorageGRID is a software-defined, object-based storage solution that supports Amazon Simple Storage Service (S3) API. StorageGRID provides secure, durable storage for unstructured data at scale with integrated metadata-driven lifecycle management policies and optimizes where your data lives throughout its life.

Benefits of StorageGRID deployment on Ultrastar Data60

- Massive scalability.
- Flexible deployment.
- Resilience and high availability.
- Low TCO.
- 100% native Amazon S3 API support.
- Automated easy data management.
- Cloud platform services.
- Advanced security and encryption capabilities.
- Reinforced data integrity with compliance-grade WORM.
- Flexible data protection through various replication and erasure coding schemes.
- Bucket-level granularity for all storage policies.
- Centralized and automatable installation and expansions.
- Automated monitoring & tenant management through an API.
- Reduced deployment risk, streamlined implementation, and the ability to migrate quickly with minimal disruption.
- Service-level objective and performance monitoring.

Executive Summary

The key to managing explosive data growth is to stop treating all data the same. Hot data that's actively used needs fast storage and backups. Cold data that's rarely used doesn't. Its estimated over 80% of the data in enterprises may be unstructured and hasn't been touched in over a year. The exponential growth of unstructured data has created new challenges for enterprises and service providers alike. At the same time, they are also seeking increased infrastructure agility and cost savings while providing improved security, compliance, and flexibility for managing file storage, access, and sharing.

To address these issues, Western Digital with NetApp have created an enterprise level object storage scale solution with Ultrastar Data60 and StorageGRID.

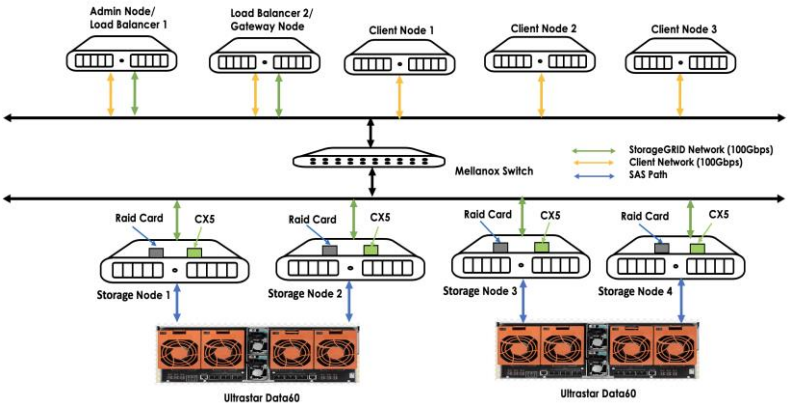
This enterprise solution provides a browser-based view of an organization's unstructured data, on-premises filers, and object storage solution for both on-premises and public cloud services.

This single pane of data index helps users securely store, access, and share files from any computer or device, all within a role-based access control framework that does not sacrifice end-user productivity – and it integrates with your existing auth system(s).

This joint solution provides new levels of economic efficiencies, improved performance, and service levels, as well as comprehensive, policy-based control over all file data, independent of location.

The Ultrastar Data60 provides the flexibility to specify the HDD combinations to balance capacity, performance, and cost. With Ultrastar Data60 and NetApp StorageGRID, you get petabyte-scale, cloud compatible storage right in your data center. You store data locally or with policy-based migration to any cloud service provider. NetApp StorageGRID hybrid cloud solution provides nearly limitless capacity with on-premises control and a single management view into all your storage. Providing the perfect technology is only part of the solution for service providers to deliver the best offerings at the right price. It can as well be configured as a simple, low-cost, low-performance archive target based on the need to address your data center challenges.

StorageGRID Deployment Details on Ultrastar Data60



Ultrastar Data60 Overview

The Ultrastar Data60 is a key element of next-generation disaggregated storage and software-defined storage (SDS) systems, delivering high density and the flexibility to balance performance with cost. The Ultrastar Data60 provides up to 1.32PB of raw storage using our 22TB HDDs in a compact and efficient form factor[1]

Building on 50+ Years of Storage Design Experience

Developing storage devices and platforms side-by-side, we address these challenges through Silicon to Systems Design, a set of technologies developed based on a holistic view of devices, platform, and their interactions. The first two of these innovative technologies are IsoVibe™ and ArcticFlow™. IsoVibe reduces vibration-induced performance degradation, while ArcticFlow overcomes the cooling issues by introducing cool air into the middle of the platform. Both these technologies contribute to long-term reliability, enabling our five-year limited warranty on the entire platform.

IsoVibe Vibration Isolation Technology

Precise cuts in the baseboard provide a suspension for the drives in the chassis, isolating them from transmitted vibration. The result is that consistent performance is maintained, even when all the drives are working hard.

ArcticFlow Thermal Zone Cooling Technology

By dividing its enclosure into multiple zones, created an innovative air-ducting design that moves cool air directly into the center of the enclosure. The setup more effectively cools the controller modules that collect data from all the drives. This results in lower fan speeds, reduced vibration, lower power consumption, quieter operation, and ultimately higher reliability.

Western Digital Resource Manager

A GUI-based tool that enables real-time monitoring and management of the platform and provides a consolidated dashboard displaying the most critical information. Other views allow platform configuration, health monitoring and maintenance.

Designed for the Enterprise and the Cloud

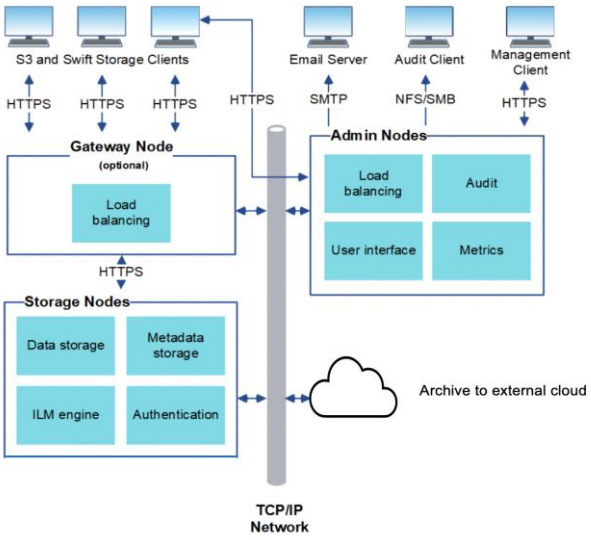
The UltrastarData60 addresses the demanding storage needs of large enterprise customers, storage OEMs, cloud service providers and resellers/integrators that require dense, shared HDD storage.

[1]One terabyte(TB) is equal to one trillion bytes and one petabyte (PB) is equal to one quadrillion bytes. Actual user capacity may be less due to operating environment.

StorageGRID Overview

NetApp StorageGRID is a software-defined object storage suite that supports a wide range of use cases across public, private, and hybrid multi-cloud environments. StorageGRID offers native support for the Amazon S3 API and delivers industry-leading innovations such as automated lifecycle management to store, secure, protect, and preserve unstructured data cost effectively over long periods.

StorageGRID is composed of globally distributed, redundant, heterogenous nodes that collectively support file and object protocols, allowing integration with both existing and next-generation client applications.



Grid nodes and services

The basic building block of a StorageGRID system is the grid node. Nodes contain services, which are software modules that provide a set of capabilities to a grid node. The values and statuses for all the functions of the StorageGRID system are reported through attributes.

The StorageGRID system uses three types of grid nodes. Specifically, the Admin and Storage nodes are mandatory, whereas the Gateway nodes are optional.

Admin Nodes

Admin nodes provide management services such as system configuration, monitoring, and logging. Each grid must have one primary Admin node and might have additional non-primary Admin nodes for redundancy. Admin nodes can also be used to load balance S3 client traffic.

Storage Nodes

Storage nodes manage and store object data and metadata. Each StorageGRID system must have at least three Storage nodes. If you have multiple sites, each site within your StorageGRID system must also have three Storage nodes.

Gateway Nodes

Gateway nodes provide a load-balancing interface that client applications can use to connect to StorageGRID. A load balancer seamlessly directs clients to an optimal Storage node, so that the failure of nodes or even an entire site is transparent. You can use a combination of Gateway nodes and Admin nodes for load balancing, or you can implement a third-party HTTP load balancer.

An Industry Leader in JBOD Storage

Storage solutions don't have to be complicated, but you wouldn't know it looking at other solutions on the market. Many high-capacity storage enclosures include features and performance that enterprises rarely need for backup and archiving, or to configure object storage solution with muti-tiering, with a price tag to match. Others offer simple JBOD storage but keep costs down by skimping on components, manufacturing, and warranties.

Western Digital Ultrastar storage platforms provide a simple, affordable solution for your data repositories. They incorporate Western Digital innovations, like patented IsoVibe™ vibration isolation technology to ensure consistent performance, and ArcticFlow™ thermal zone cooling, which reduces power consumption, improves reliability, and lowers TCO

Added Resiliency and High Availability with NetApp StorageGRID

Integration with NetApp StorageGRID makes it easy for organizations to start using the object storage environment for storing, backing up, and archiving data with easier management and high security, including moving data to tape, site recovery, and cloud-based monitoring.

With simplified management through GRID Manager, Administrators can easily integrate on-premises workloads with services and policies such as Erasure Coding and Replication.

It's all about software defined storage. Unleash the full power of StorageGRID with object QoS, dedicated load balancer, and lifecycle management capabilities. StorageGRID lets you take advantage of industry leading Amazon S3 APIs, object versioning, object locking, multipart upload, S3 Select, Amazon Identity and Access Management - style access policies, cross-origin resource sharing, and object-tags. With Active Directory and LDAP identity federation for Amazon S3, StorageGRID bridges the gap between enterprise IT and cloud semantics.

StorageGRID optimizes the durability and availability of your data across multiple geographies. Whether your data is on premises or in a public cloud, it enables hybrid cloud workflows to fit your business demands with access to Amazon Simple Notification Service (SNS), Google Cloud, Microsoft Azure Blob, Amazon Glacier, Elasticsearch®, and similar services.

Performance Results

We have used s3tester to run the performance benchmark on the StorageGRID system. The s3tester needs to be configured on all the clients before proceeding with the performance test. The performance test is run using s3tester, simultaneously running tests from three clients. We have used different object sizes (1M, 2M, 4M, 8M, 10M, 32M, 64M, 128M and 265M etc.), different threads, and different policies to measure the performance of the complete deployment.

StorageGRID Performance Results		
Storage Policy	**Read BW**	**Write BW**
Replication (Two-copy policy)	6.75 GBps	3.44 GBps
EC (2+1)	6.71 GBps	2.66 GBps

Conclusion

NetApp StorageGRID with Western Digital's Ultrastar Data60 storage platform, with its object storage solution, addresses the need of IT/HPC with a well-designed solution that is easy to manage and deploy. The solution includes the added benefit of Western Digital innovations, like patented IsoVibe vibration isolation technology to ensure consistent performance, and ArcticFlow thermal zone cooling, which reduces power consumption, improves reliability, and lowers TCO. NetApp StorageGRID on Western Digital's Ultrastar Data60 systems shows excellent benchmark results for object storage data streaming with both erasure coding as well as Replication policy configuration. This highlights the superiority of the solution over other competitors offerings.

By leveraging the solutions offered by Western Digital's Ultrastar Data60 and NetApp StorageGRID, enterprises and service providers can

- Minimize the cost of the installation
- Implement high-performance HA object storage solution
- Analyse petabytes of data in hours, not weeks
- Access data natively in the cloud
- Enable object tiering
- Cut cold data costs
- Migrate without headache
- Reduce Your Data center Footprint
- Lower Total Cost of Ownership

With this solution, organizations can quickly deploy a proven, object storage infrastructure solution, helping customers move to a more flexible, highly available, and variable cost model.

For full setup description and step by step implementation, please contact your Western Digital sales team and request the White Paper titled "*An Intelligent Cloud Enabled Data Storage Solution Powered By Western Digitals' Ultrastar Data60 and NetApp StorageGRID*".

IsoVibe

IsoVibe™ Vibration Isolation Technology

Precise cuts in the baseboard provide a suspension for the drives in the chassis, isolating them from transmitted vibration. The result is that consistent performance is maintained, even when all the drivers are working hard.

ArcticFlow

ArcticFlow™ Thermal Zone Cooling Technology

By Introducing cool air into the center of the chassis, drives operate at lower and more consistent temperatures than conventional systems. This results in lower fan speeds, reduced vibration, lower power consumption, quieter operation and ultimately higher reliability.

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