Scalable Cost-effective NAS Storage Solutions Powered by AUK Computing's AUK SILO NAS Controllers & Western Digital's Ultrastar® Data60 & Data102 Storage Platforms
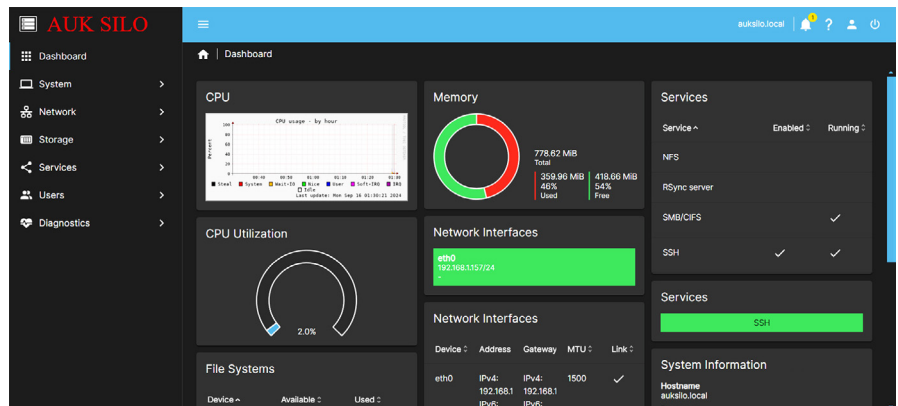
AUK Computing®

Highlights

- **File Sharing**: Support for protocols like SMB/CIFS (Windows file sharing), NFS (Unix/Linux file sharing), FTP, and more.

- **User & Group Management**: You can create user accounts and groups to control access to shared resources.

- **Disk Management**: Supports various file systems like EXT4, XFS, BTRFS ZFS, etc. RAID arrays can also be created for data redundancy and protection.

- **Backup Solutions**: Integration with Rsync, USB backup, and support for snapshot tools like BTRFS snapshots, ZFS snapshots.

- **Add-ons** : AUK SILO allows extend its functionalities, such as Docker support, Plex Media Server, and more.

- **Monitoring**: Built-in monitoring for system performance and network statistics using S.M.A.R.T. monitoring

- **Controllers**: Single & dual controller-based NAS solutions

Solution

AUK Computing's AUK SILO is a storage controller-based network-attached storage (NAS) solution designed on Debian Linux®. It is designed for small, medium, and large office use, offering a simple and efficient way to manage your data storage needs. It provides services such as SSH, FTP, SMB/CIFS, NFS, and more, and includes a web-based administration interface to easily manage the NAS setup.

Solution Highlights and Benefits

AUK Computing's AUK SILO and Western Digital's Ultrastar Data 60 and 102 Storage Platforms joint storage solutions offer several benefits to end customers, particularly in terms of cost-efficiency, flexibility, and ease of use. Here's how this combination can help end customers.

Cost-Effective Storage Solution

Affordable Hardware: Affordable Storage Platform configurations allow users to combine multiple hard drives of different sizes and types without the need for expensive RAID controllers or matching disk capacities. This makes it possible to create large storage pools using a mix of existing drives.

Flexible Storage Expansion

If the storage needs increase over time, more drives can be added to the Just a Bunch Of Disks (JBOD) pool, providing an easy way to scale without needing to replace existing hardware. Unlike RAID, where all disks are treated as if they have the same capacity, matching the smallest disk, the JBOD fully utilizes the storage of each individual disk. This allow for no size limitations, making it more efficient in using available space.

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Simple Setup and Management

AUK SILO is a user-friendly interface that comes with a web-based interface that makes it simple to manage storage platforms, create shared folders, assign user permissions, and set up network protocols (SMB/CIFS, NFS, FTP, and so on). Customers can easily add or remove disks from the storage array with minimal configuration, simplifying the expansion and management process compared to more complex RAID setups. AUK SILO paired with Western Digital Storage Platforms is a plug and play storage solution that makes it easy to get a network storage system up and running without the need for technical expertise or enterprise-level hardware.

Advanced Features Through AUK SILO

AUK SILO allows users to access and share their data over the network using common protocols like SMB/CIFS (Windows), NFS (Linux), and FTP, making it easy to set up a file server for home or small business environments. AUK SILO supports user-based access control, which allows customers to manage user access and permissions to data, providing a secure multi-user environment. Customers can use AUK SILO's built-in tools, such as Rsync, to set up automated backup solution to other NAS systems, cloud storage, or external drives. This ensures data can be duplicated and stored safely elsewhere, even if a JBOD itself lacks redundancy. AUK SILO supports various plugins, allowing customers to extend functionality. For example, they can integrate Plex for media streaming, Docker for running lightweight applications, and even use encryption plugins to secure sensitive data.

Use Cases for End Customers

Customers can use a Western Digital Storage Platform with AUK SILO to create a large, flexible media and file server. They can store Voice, Media, Software repositories, student thesis files to devices across their network, taking full advantage of mixed and larger disk capacities. By setting up file sharing and remote access, customers can create their own personal cloud storage system, giving them the ability to access their data from anywhere, without relying on third-party services. Western Digital Storage Platforms are useful in providing high dense storage in a compact and efficient form factor to create a large storage backup repository. AUK SILO's Rsync and scheduled backups make this easy to automate. Customers who need to store large amounts of data (such as photographers, video producers, or researchers) but do not require real-time access to the files can use Western Digital Storage Platforms connected to AUK SILO NAS controllers for data archival purposes, benefiting from the lower cost per TB compared to other storage solutions.

Control

AUK SILO provides built-in data management and monitoring tools that allow users to keep track of system performance, disk health, and network usage, giving them greater control over their data and system resources.

Considerations

AUK SILO's backup options, including Rsync, USB backups, and cloud sync, can help customers mitigate this risk by backing up important data to other storage systems.

Single Controller NAS

Single-controller NAS refers to a NAS system where all storage management and control are handled by a single controller CPU. This is the typical and more affordable setup for most businesses.

Key Features

- **Simple Design**: Easier setup and configuration, usually managed via a web-based interface like AUK Computing, AUK SILO's interface

- **Data Redundancy**: Supports RAID configurations, providing protection against disk failures.

- **Basic Fault Tolerance**: While RAID protects against disk failures, the controller itself is a single point of failure.

- **Cost-Effective**: Lower upfront and operational costs compared to dual-controller systems.

- **Expansion Support**: Limited to external drive expansion options or via USB ports.

Use Cases for Single Controller NAS

- **Home Media Server**: With AUK Computing (AUK SILO), you can easily store and stream media files (movies, music, etc.) to different devices (TVs, computers, mobile devices) across your home network

- **Personal Backup System**: Store backups of important files from multiple devices (computers, laptops, smartphones) in one central location

- **Small Office File Server**: For small businesses or home offices, a single-controller AUK SILO NAS can serve as a central file repository for documents and other business data.

- **Lightweight Virtualization**: AUK SILO supports Docker, so you can run lightweight containers for applications like automation, small and medium web servers, etc.

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Dual Controller NAS

Dual-controller NAS systems feature two controllers working in an active-active or active-passive mode. These systems are more commonly found in enterprise-level environments where high availability and fault tolerance are critical. The Dual controller configuration contains an Active-Active mode and an Active-Passive operating modes.

Modes

The Active-Active mode utilizes both controllers to work simultaneously, distributing the workload for higher performance. The Active-Passive mode uses one active controller while the other remains in standby mode, ready to take over in case the active controller fails.

Key Features

- **High Availability (HA)**: Dual controllers offer failover capabilities. If one controller fails, the other immediately takes over, ensuring continuous operation

- **Load Balancing (Active-Active Configuration)**: In active-active setups, both controllers share the workload, improving system performance and efficiency

- **Fault Tolerance**: Not only does RAID protect against drive failures, but the system as a whole is protected against controller and PSU failures

- **Data Integrity & Protection**: Advanced error correction, snapshot technologies, and real-time replication across controllers for enterprise-grade data protection

- **Advanced Networking**: Dual-controller systems often support link aggregation, bonding multiple Ethernet ports for higher throughput and redundancy

- **Serviceability**: Hot-swappable drives, PSUs, and controllers allow for maintenance without downtime

- **Redundant Architecture**: Fully redundant components (controllers, PSUs, network ports, etc.) to avoid any single point of failure

Use Cases for Dual-Controller NAS

- **Enterprise Data Storage:** For large businesses or organizations that require 24/7 uptime and can't afford any downtime, dual-controller NAS setups are ideal

- **Mission-Critical Applications:** Suitable for industries like finance, healthcare, or media production, where data availability and redundancy are crucial

- **Virtualization Environments**: For hosting virtual machines (VMs) or running critical services that require consistent access to storage with minimal downtime

- **High-Performance File Sharing:** Businesses with many employees accessing the NAS simultaneously can benefit from the increased throughput and failover protection

- **Backup and Disaster Recovery**: Dual-controller NAS setups can serve as the core of a disaster recovery plan, ensuring that data is always available, even if one controller fails.

Technical Specifications

Feature	Single Controller NAS	Dual Controller NAS
Processor	Single CPU (Arm®, Celeron®, Intel Atom®, etc.)	Dual CPUs (Intel® Xeon®, AMD EPYC™)
RAM	8-32 GB, expandable to 16 GB	32 GB-128 GB or more
Storage Bays	8-36 bays, typically 2-4 for home use	24-102 bays or more
Network Interfaces	1-2 Gigabit Ethernet ports, optional 10 GbE	4+ Gigabit Ethernet ports, multiple 10/25/40 GbE ports
RAID Support	RAID 0, 1, 5, 6, 10	RAID 0, 1, 5, 6, 10 + enhanced/proprietary RAID like ZFS
Power Supply	Single/ Dual PSU	Dual redundant PSUs
High Availability	None	Yes, active-active or active-passive
Cache Support	Limited or none, consumer-level SSD caching	SSD caching, tiered storage, NVMe™ for high performance
Failover Support	No, Single point of failure	Yes, Controller failover
Cost	Lower cost (home, small business)	Higher cost (enterprise, mission-critical applications)
Use Cases	Home/SMB/Medium, media servers, basic backup, file sharing	Enterprise storage, cloud, virtualization, disaster recovery

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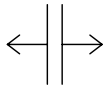
Ultrastar Data60 and Data102 Platform Features

Ultrastar Data60

- Up to 60 Ultrastar HDDs (SAS or SATA)
- Up to 1.56 PB[1] of raw CMR HDD storage
- 4U form factor

Ultrastar Data102

- Up to 102 Ultrastar HDDs (SAS or SATA)
- Up to 2.65 PB[1] of raw CMR HDD storage
- 4U form factor

IsoVibe™ Patented 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.

Innovative 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.

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.

Daisy-chaining for High Capacity

Up to 4 units may be daisy-chained for a total raw capacity of 6.24 PB (Data60) or 10.6 PB (Data102).

Flexible

- Choose dual-port SAS for high availability or single-port SATA for low cost.
- Up to 12 x 12Gb/s SAS[2] host connections.

Designed for Serviceability

- Enterprise-grade redundant and hot swappable PSUs, IO Modules, and fans.
- Rack-mounted top cover for quick and easy service.

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Western Digital Resource Manager Data Center Edition

Resource Manager Data Center Edition is a comprehensive, in-band and out of-band monitoring and management application designed for Western Digital storage platforms. It operates on a central management server, discovering health and utilization data for all compatible devices on a network, and presenting device information and management capabilities to a browser in a convenient dashboard format.
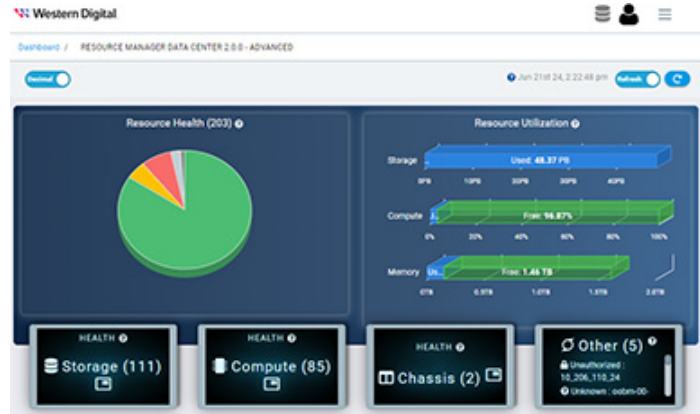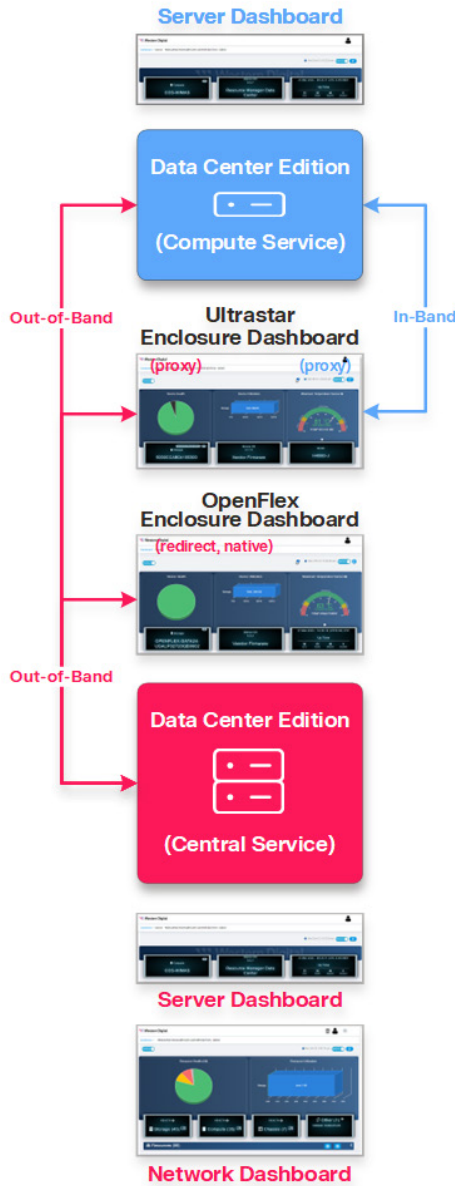
Features

- Data Analytics and Reporting
- Network Operation Center (NOC) View
- Multi-Node Management
- File Based Zoning
- Telemetry
- Centralized Remote Management
- Persistent Storage of Discovered Resources
- Inventory Management
- Policy Engine
- Group Management
- Notification Services
- Authentication Services
- Ansible Modules for Bulk Operations and Orchestration
- Ansible Playbook Templates for End-to-End Orchestration

Conclusion

AUK Computing's AUK SILO and Western Digital's Ultrastar Data 60 and 102 Storage Platform solutions provide a flexible, scalable, and cost-effective storage solutions. AUK SILO single controller NAS solution is ideal for home users, hobbyists, and small businesses. Dual-controller NAS solution is more suited for larger businesses and enterprise environments where high availability, performance, and fault tolerance are required.

Both options offer great functionality, but your choice should be guided by your specific needs, budget, and the criticality of your data.

≋ Western Digital.