

INDEPENDENT, INTUITIVE, POWERFUL: DATA STORAGE MANAGEMENT WITH ZFS AND LINUX

Executive Summary

- > **Hardware-agnosticism:** Flexible deployment on any hardware.
- > **User-Friendly GUI:** Intuitive management and easy operation.
- > **ZFS Technology:** Integrated snapshots, deduplication, and data compression.
- > **Open-E JovianDSS On- & Off-Site Protection:** Protection through local and external backups.
- > **Geo-Redundancy:** Data redundancy across multiple locations for high availability.
- > **Scalability:** Adaptable to growing data requirements.



Requirements and Objectives

The **Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall e. V. (DWA)** is deeply committed to developing secure and sustainable water management solutions. **As a politically and economically independent organization, it specializes in water management, wastewater, waste, and soil protection.** In Europe, the DWA is the largest association in this field, holding a unique position due to its expertise in regulation, education, and public information. **Its approximately 14,000 members represent professionals and executives from municipalities, universities, engineering firms, authorities, and businesses.** With its headquarters in Hennef and seven regional branches, the DWA is well-connected nationally and regionally.

Through its work, the DWA sets standards, promotes innovation, and supports professionals and organizations in actively advancing environmental and resource conservation. At the same time, the **DWA drives digital transformation by aligning its activities with modern technologies.** This increases demands for data storage capacity, scalability, and data security to effectively manage its diverse tasks.

The DWA faced the challenge of finding a new data storage system that met their requirements. The key challenges were:

- **Cost Efficiency:** An affordable system that meets budget requirements.
- **Hardware-agnosticism:** The ability to operate the system flexibly with any hardware.
- **Ease of Use:** A user-friendly GUI for efficient management.
- **Powerful Technology:** Integration of technology for reliability and high performance.
- **Versatility:** Support for key applications such as websites, e-learning platforms, and webshops.
- **Data Security:** Protection against the consequences of ransomware attacks and reliable data backups.
- **Scalability:** Adaptability to growing demands driven by digital transformation.

With these requirements, the DWA was looking for a solution that ensures flexibility, security, and future-proofing.

Solution

Three Open-E JovianDSS Single Node systems were acquired and configured as follows:

Main System – Located in the annex building of the DWA site:

- › **Function:** Central data storage system for virtualization with Microsoft Hyper-V and file servers.
- › **Role:** Stores primary data and serves as the core of the IT infrastructure.

Backup System – Located in the main building of the DWA site:

- › **Function:** A backup target for both the main system and the cloud system.
- › **Role:** Secures and replicates data from both systems to ensure maximum failover protection.
- › **Special Feature:** Using the Open-E JovianDSS On- & Off-Site Data Protection feature, a secure and efficient data protection system is implemented that supports both local and off-site backups.

Cloud System – Located in an external data center:

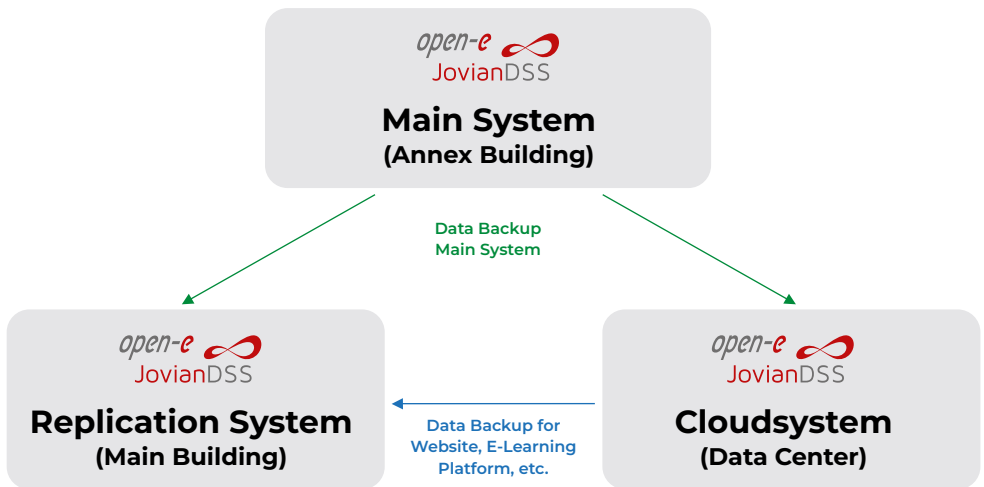
- › **Function:** Open-E JovianDSS operates as a data storage system installed on an external cloud service. It serves as a backup copy of the main system and as a platform for hosting websites, webshops, and e-learning platforms.
- › **Role:** The cloud system complements the local infrastructure, ensures Business Continuity, and provides additional security. It also acts as a backup system, protecting critical data and providing a redundant copy outside the main location.

Interaction of the Three Systems with Geo-Redundancy:

Main System: Serves as the production node, storing and managing central data at the main site.

Backup System: Functions as a local backup system located in the main building and housed in a separate building section with a different fire compartment, providing additional security against local risks and hardware failures.

Cloud System: Operates as an additional off-site backup system housed in a remote data center. This system also utilizes the Open-E JovianDSS On- & Off-Site Data Protection feature, offering geo-redundant data backup. It minimizes the risk of data loss from major regional events, such as natural disasters, and ensures the continuous availability of critical applications like websites, webshops, and e-learning platforms.



This three-tiered approach leverages the comprehensive capabilities of the Open-E JovianDSS On- & Off-Site Data Protection features, combining local and geo-redundant backup strategies.

It provides the DWA with optimal data security, failover protection, and availability for its diverse tasks.



Additional Security Through Monitoring with Checkmk:

The security of the systems is further enhanced by the full integration of the open-source monitoring platform Checkmk into Open-E JovianDSS. Checkmk monitors the entire infrastructure and ensures that potential issues are detected early. Open-E provided valuable support during the implementation and integration of the monitoring solution, enabling seamless monitoring of all three systems.

Customer Feedback:

We chose Open-E JovianDSS because we were impressed by its user-friendly interface, powerful ZFS technology, and hardware independence. This combination provides the flexibility and reliability we need for our complex storage requirements.

Mr. Furnya, System Administrator, DWA

Hardware Details

Main System (Annex Building) - EUROstor Open-E JovianDSS ZFS Single System

Chassis	4 HE, 36 Hot-Swap Bays	SSD-Pool: 14.2 TiB (for 5 HyperV Server) HDD-Pool: 26.2 TiB (SMB Storage for Backup and File services)
CPU	2x Intel Xeon Gold 5222 (4-Core, 3.8GHz)	
RAM	192 GB DDR4 ECC RAM	
Data Drives	12x 1.92 TB SAS SSDs (RAID-Z1) 16x 4 TB HDDs (Mirror vdevs)	
Cache Devices	ZIL (400 GB SSD), L2ARC (800 GB SSD)	

Backup-System (Main Building) - EUROstor Open-E JovianDSS ZFS Single System

Chassis	-4 HE, 36 Hot-Swap Bays	HDD-Pool: 59 TiB
CPU	1x Intel Xeon E5-1620 (4-Core, 3.5GHz)	
RAM	128 GB DDR4 ECC RAM	
Data Drives	16x 6 TB SAS NL HDDs (RAID-Z2)	
Cache Devices	ZIL (400 GB SSD), L2ARC (800 GB SSD)	

Cloudsystem (ext. Data Center) - EUROstor Open-E JovianDSS ZFS Single System

Chassis	4 HE, 36 Hot-Swap Bays	SSD-Pool: 6.3 TiB + 28.8 TiB (after expansion) HDD-Pool: 117.9 TiB
CPU	1x Intel Xeon Gold 5222 (4-Core, 3.8GHz)	
RAM	192 GB DDR4 ECC RAM	
Data Drives	8x 7.68 TB TLC SSDs (Kioxia, erweitert) 24x 8 TB SAS NL HDDs (RAID-Z2)	
Cache Devices	ZIL (280 GB NVMe) L2ARC (800 GB SSD)	

Data Storage Licenses and Support

Main System (Annex Building)

1 x Open-E JovianDSS Product License 0TB
1 x 64 TB Open-E JovianDSS Storage Extension
1 Jahr Standard Support

Backup system (Main Building)

1 x Open-E JovianDSS Product License 0TB
1 x 128TB Open-E JovianDSS Storage Extension
1 Jahr Standard Support

Cloud system (ext. Data Center)

1 x Open-E JovianDSS Product License 0TB
1 x 256TB Open-E JovianDSS Storage Extension
5 Jahre Premium Support



About Open-E

Open-E, founded in 1998, is a leading developer of IP-based storage management software. Its flagship product, Open-E JovianDSS, is a robust storage application known for its excellent compatibility with industry standards, as well as its ease of use and management. Additionally, it is one of the most stable solutions on the market, offering an optimal price-performance ratio. Thanks to its reputation, experience, and reliability, Open-E is a trusted technology partner for leading IT companies. Open-E has over 40,000 installations worldwide and has received numerous industry awards. For more information about Open-E, its products, and partners, visit: www.open-e.com

About DWA

The German Association for Water, Wastewater, and Waste (DWA), founded in 1948, is a technical and scientific organization that plays a leading role in developing sustainable solutions for water and waste management. Through the DWA rulebook, training, and publications, it sets standards and promotes innovations that advance environmental and resource conservation.

For more information, visit: www.dwa.de

About EUROstor

EUROstor has been a manufacturer of storage systems since 2004. Initially focused on RAID systems, the majority of its product portfolio now consists of server-based systems that function as flexible storage servers, tailored to meet customers' specific needs. Solutions range from small file servers and CCTV storage (video surveillance) to highly available storage clusters, scale-out clusters, and cloud solutions. Based in Filderstadt near Stuttgart, Germany, EUROstor serves professional end-users across Europe, including SMEs, universities, research institutes, and data centers.

For more information, visit: www.eurostor.com

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