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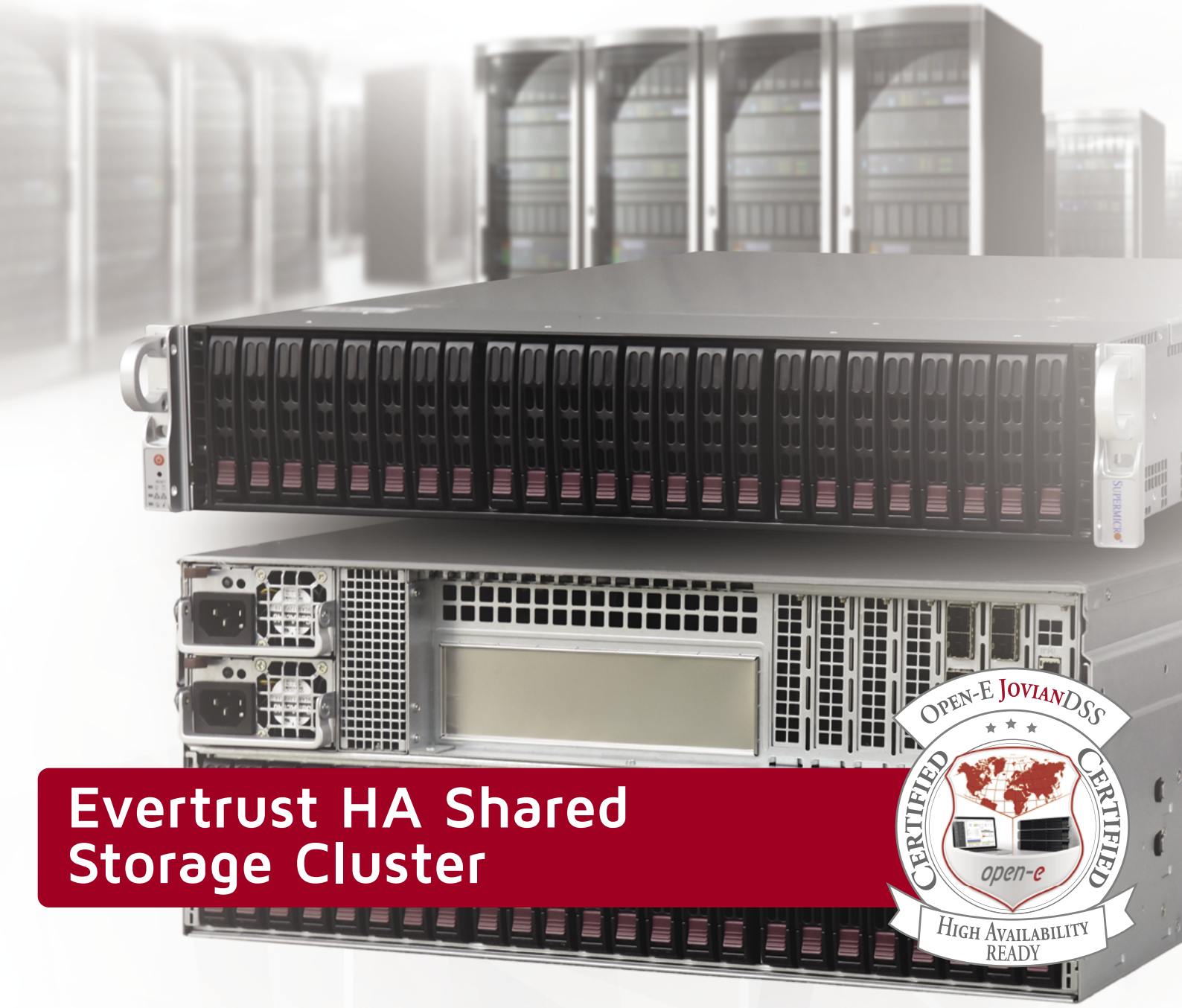

Evertrust HA Shared Storage Cluster

At Merlin-EDV, we take a holistic approach to plan new or revised infrastructure and consider the budget, as well as a system design that meets requirements.

Our customers benefit from the experience we have gained over more than 25 years of working with all kinds of projects. We value partners who can provide not only state-of-the-art technology and stringent quality assurance procedures but also a responsive and competent service model.

Consequently, when we decided to develop a new, extremely resilient Evertrust HA Shared Storage Cluster network storage system our long-time partner Open-E was the obvious choice.

With lightning-fast Intel Optane caching and multi-redundant high-availability features, Evertrust HA Shared Storage Cluster combines unparalleled speed and reliability in an affordable package complemented by a range of optional maintenance plans.

- Enhanced storage performance
- Guaranteed data protection
- High Availability
- Data integrity check
- Improved caching functionality
- Effective use of resources
- HA Shared Storage Cluster
- Optane Write Log

Flexible and reliable storage solution

Guaranteed data protection

Data is your most important resource. This is why the Open-E JovianDSS-based Evertrust HA Shared Storage Cluster includes several mechanisms for data protection. Automatic and scheduled multi-layer data integrity checks ensure data consistency, while unlimited snapshots and clones make it easy to implement a disaster protection strategy and to instantly roll back to a previous point-in-time. At the same time, **a scheduled self-healing mechanism fixes malfunctions and automatically restores full data redundancy in the system**. Even when a drive fails, the software-based spare function offers one drive to several RAID arrays, saving you money on extra hardware without compromising data safety.

Enhanced storage performance

Nowadays, enterprise storage has to provide big capacity while also being fast, affordable, and include reliable support. This is exactly what Evertrust HA Shared Storage Cluster has to offer. On top of that, powerful tuning tools allow the system to optimize on I/O heavy databases or high throughput video editing equally well and predefined profiles save annoying testing time.

Improved caching functionality

SSD/NVMe NAND based flash cache works very fast at the beginning, then slows down. In general, the life-time of those disks is limited and high-endurance drives are expensive. **Intel® Optane™ Technology greatly enhances the storage speeds by caching the computer's most commonly utilized hard drive processes**. The basis for Intel® Optane™ Technology is 3D Xpoint™, a new transistor-less memory technology where the memory cell lies in a three-dimensional mesh, as opposed to traditional memories with 2D layout to maximize memory density. Thanks to this solution, we have increased performance on write operations. Also, unlike regular SSDs, Intel® Optane™ drives retain their performance with the course of time.

Effective use of resources

To use Intel® Optane™ disks (which are single channel disks) for write log, a metro cluster is usually required. A shared storage cluster, which is more cost effective, requires dual channel disks, and as a consequence, the Intel® Optane™ disks couldn't be implemented. To solve this problem, the server was set up as a HA Shared Storage Cluster, with the Open-E JovianDSS customized feature. In a HA Shared Storage Cluster, **the write operation is executed on a server locally and mirrored on a remote node via fast network connection and not through JBOD**. Thanks to this solution, single channel Intel® Optane™ drive is sufficient because data is being stored directly through the server.

Thanks to the improved caching, that is managed by the RAM and Intel® Optane™ disks, now it is also possible to use the whole JBOD for customer data.

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High Availability solution functionality test results

Functionality test name	Functionality test results [passed/failed]
Manual Failover	Passed
Automatic Failover triggering after network failure	Passed
Automatic Failover triggering after shutdown test	Passed
Automatic Failover triggering after reboot test	Passed
Automatic Failover triggering after power-off	Passed
Automatic Failover triggering after I/O test	Passed

Active-active failover resource switching time test results

Total number of targets	Switching time [seconds]	Performance test results [passed/failed]
2	22	Passed
10	23	Passed
20	24	Passed

HA Shared Storage Cluster in action

High Availability

The Evertrust HA Shared Storage Cluster is a perfect option if you are looking to deploy a High Availability cluster setup with NFS or iSCSI for storing business-critical data. **With the Open-E JovianDSS High Availability Cluster Feature Pack the Evertrust HA Shared Storage Cluster ensures reliability and redundancy through failover in case of a failure**. By using the cluster management software, all features related to the cluster setup can be quickly accessed and maintained - everything is in one place and guarantees ease of use for the storage administrator. Moreover, Open-E JovianDSS includes an independent Virtual IP (VIP) address feature. With this, VIPs can be used by multiple servers and flexibly switched at all times. When a hardware failure is detected, VIPs are automatically moved from the primary to the secondary node without the client servers noticing a timeout.

Data integrity check

The Evertrust HA Shared Storage Cluster storage system effectively detects data corruption, as even minor integrity violations could cause loss of data. Evertrust HA Shared Storage Cluster ensures reliability by check-summing individual blocks of data and once faulty blocks have been detected, they are automatically rewritten. **If the same error is found several times, the data blocks are moved to different parts of the drives**. Each read/write is checked automatically plus you can schedule to perform checks on not accessed blocks. All actions are done in atomic writes to ensure consistency of your data and to reduce data loss, even during power cuts.

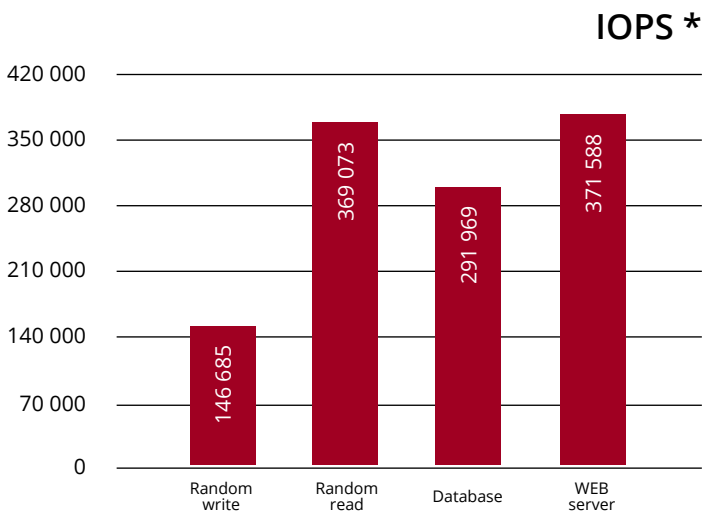
HA Shared Storage Cluster functionality

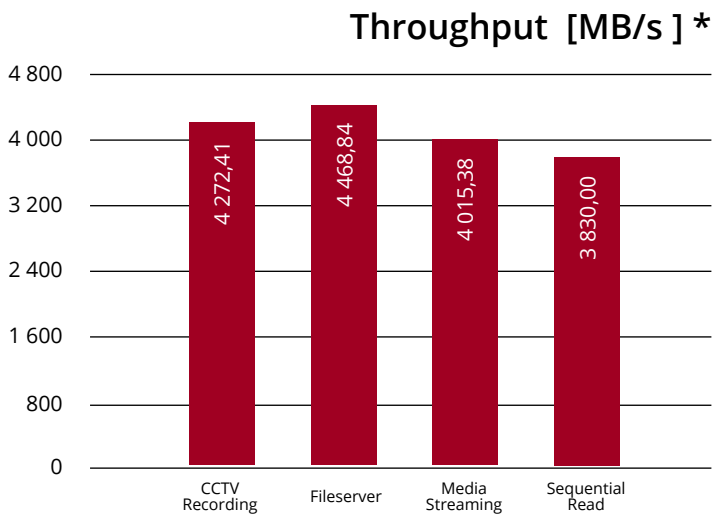
Thanks to Open-E JovianDSS, while using a shared storage cluster it is possible to use Intel® Optane™ drives as cache that are only single channel. Previously it was available only at non-shared storage cluster solutions. **At first the data is being saved locally on the server, mirrored on a remote node and not via JBOD**, and thanks to it, the caching functionality is enhanced.

Optane Write Log

When it comes to write operations, the caching is supported with ultra-fast and ultra-stable Intel® Optane™ SSDs. Using Intel® Optane™ SSD based on 3D XPoint technology allows gaining very high and stable IOPS. Also, **extremely low and stable latency was achieved throughout the whole operation resulting in an excellent level of Quality of Service (QoS)**.

Due to the fact that there are two write log groups which in total contain 4 Intel® Optane™ drives per pool (8 drives in total in servers), the performance is even higher - in a matter of fact, it has been multiplied. Thanks to HA Shared Storage Cluster technology, disks are replicated between servers, and a synergy effect between Open-E JovianDSS and Intel® Optane™ drives is achieved. You are able to create 2 write log groups which behave like RAID0, the data that write log stores has to be mirrored, thanks to it there is multiplied data write speed.





* To achieve best performance, tests were performed with ZFS volume sync set to disabled.

Hardware details

For each of the 2 servers

	Default configuration	Options
Motherboard	Supermicro H11SSL-NC	-
CPU	1x AMD EPYC 7232P 8-Core Processor	-
RAM	8x 32GB Samsung M393A4K40DB3-CWE	-
Storage controller	1x Broadcom SAS 9400-8i8e	-
Storage device	provided by JBOD	-
Write log device	4x 100GB Intel® Optane™ SSD DC P4801	-
Network controller	2x Intel® Ethernet Controller I210-AT 3x Intel® Ethernet Converged Network Adapter X520-DA2	-
Form factor	2U	-
Boot medium	2x 240GB SAMSUNG PM883	-

	JBOD Configuration	Options
Model name	1x Supermicro CSE-417BE2C-R1K23JBOD	-
Storage device	44x 1.2TB SEAGATE ST1200MM0009	-
Storage raw capacity	52.8TB	-

About Merlin-EDV

Our work focuses mainly on highly qualified network, communications and data security services, including the supply and maintenance of the required hard- and software. We also offer worldwide procurement services for rare IT components as well as quality assurance procedures for these components.

We also offer consulting and planning services for networks, communication infrastructure, firewalls, virtualized environments and also server and storage solutions. Our consulting services include deployment strategy design for new hard- and software systems, the development of security strategies and preparatory studies for platforms migration.

Additionally, we specialize in Voice-over-IP solutions and also offer installation and maintenance support for conventional telephone systems.
We repair faulty IT equipment of all kinds and also assist you with software issues.

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About Open-E

Open-E, founded in 1998, is a well-established developer of IP-based storage management software. Its flagship product Open-E JovianDSS is a robust, award-winning storage application which offers excellent compatibility with industry standards, and is the easiest to use and manage. Additionally, it is of the most stable solutions on the market and undisputed price performance leader.

Thanks to its reputation, experience and business reliability, Open-E has become the technology partner of choice for industry-leading IT companies. Open-E accounts for over 37,000 installations world-wide and has received numerous industry awards and recognition, also with its product Open-E DSS V7.

For further information about Open-E, its products and partners, visit http://www.open-e.com/

About the Open-E JovianDSS Server Certification

Open-E JovianDSS delivers software-defined storage which results in a wide variety of different hardware requirements such as performance, range, capacity, capability, and connectivity. To ensure compatibility and robust storage environments, all selected partners offer storage systems which are tested, benchmarked, and certified by Open-E. This way, customers are able to use solutions that require exceptional security and redundancy, without compromising performance.