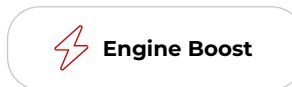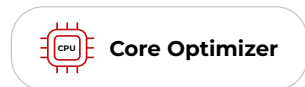# egino NVMe Metro Cluster

Introducing the **Defend IT egino product line build** exclusive **by primeLine Solutions**, the forefront of cutting-edge data storage solutions. Within the dynamic landscape of modern IT infrastructure, where speed, reliability, and versatility are paramount, the **egino NVMe Metro Cluster** stands out as a pinnacle of innovation.

The **Defend IT egino NVMe Metro Cluster** with a AMD EPYC 9004 single-processsor supports up to 24 DIMM, 24 NVMe, five PCIe® 5.0 slots, two M.2, OCP 3.0, two dual-slot GPUs, and ASUS ASMB11-iKVM offering within the Defend IT portfolio, this 2U rack solution ensures the enterprise-level of both power and performance. Advanced technology enables additional workload throughput by maximizing processor frequency and boost power, ideal for time-sensitive applications such as financial services or data center operations.

**Core Optimizer**

**Engine Boost**

**Workload Presets**

Testified by Janusz Bak, CTO of Open-E, as: "*One of* the ***fastest tested systems*** *in* the *Lab of Open-E so far*" the Defend IT's **egino NVMe Metro Cluster** is optimized for data centers and private clouds, setting a new standard for excellence in data storage technology.

This Open-E JovianDSS certified cluster system guarantees not only data protection but also delivers enhanced data storage performance with the **KIOXIA CD8-R, a data center NVMe™ SSD** optimized to support a broad range of most demanding applications. What is more, the system leverages the **PCIe 5.0, DDR5 RAM**, and the fastest **AMD 4th Generation processor**, **AMD EPYC™ 9174F**, that provides exceptional performance and energy efficiency for business-critical applications.

Boasting numerous configuration options, the Egino NVMe Metro Cluster is tailored to meet the diverse needs of today's enterprises, whether it's providing data storage for:

**Media & Entertainment**

**Data Centers**

**Virtualization**

**Private Cloud**

**Virtual Desktop Infrastructure**

With the **egino NVMe Metro Cluster**, you can build:

→ Compute-intensive applications
→ High-performance and high-capacity storage
→ High-throughput storage
→ and more!

open-e JovianDSS

# Defend IT's egino NVMe High Availability Metro Cluster

## High Availability

For businesses seeking robust and dependable storage solutions for their critical data, the **egino NVMe Metro Cluster** presents an optimal option. This system facilitates a High Availability Metro cluster setup, supporting NFS or iSCSI protocols to ensure uninterrupted data accessibility and safeguarding in the event of node failure. Leveraging the Open-E JovianDSS Advanced Metro High Availability Cluster Feature Pack, cluster configuration and performance management become effortless through dedicated system management software. Upon detecting a node failure, the automatic transfer of VIPs from primary to secondary nodes occurs seamlessly, without any disruption or timeout for client servers.

## Data integrity check

Ensuring the integrity of your data, the **egino NVMe Metro Cluster** data storage system employs advanced checksumming algorithms. Each data block undergoes verification via checksums to promptly identify any potential corruption or errors. Upon detection of a flawed block, an automatic repair and rewrite process ensues. Persistent errors trigger the relocation of the block to an alternate section of the NVMe drive. Every read/write operation, along with periodic checks on less accessed blocks (scrubbing), undergoes meticulous data integrity verification. All data operations are executed atomically, guaranteeing either successful completion or no alteration whatsoever. This robust approach mitigates the risk of data inconsistency and loss, even in the face of power failures.

## Efficient Data Compression and Deduplication

The **egino NVMe Metro Cluster** integrates advanced data compression techniques to minimize storage capacity utilization, thereby enhancing performance and optimizing data storage space efficiency. It offers resource-friendly compression protocols such as lz4, which exhibits low system resource utilization at medium compression rates, as well as protocols like gzip-9 for achieving exceptionally high compression rates suitable for archiving or backup purposes. Additionally, the in-line deduplication feature within the **egino NVMe Metro Cluster** effectively eliminates redundant data, significantly reducing data storage capacity requirements. By identifying and removing duplicate blocks, this feature can achieve deduplication ratios of 3:1 or more, translating to substantial savings in physical disk space. Particularly beneficial for environments with highly repetitive data, such as VDI, server virtualization, or backup systems, it enables the attainment of significantly higher deduplication ratios.

## Efficient Data Storage Allocation

The **egino NVMe Metro Cluster** streamlines your data storage efficiency through thin provisioning. This functionality enables dynamic allocation of data storage space, ensuring resources are utilized only as required. By avoiding fixed resource provisioning, you can prevent unnecessary expenditure and optimize storage capacity. Thin provisioning eliminates the need for preemptive estimation of storage needs, mitigating the risk of space depletion and having to rebuild your system. Embracing thin provisioning empowers you to craft adaptable, scalable storage volumes that seamlessly evolve alongside your expanding data requirements.

Maximize your business's data storage performance and reliability with **egino's NVMe Metro Cluster**. Contact us today to learn more and enhance your data storage capabilities!
**Explore the solution now!**

## 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 | **Passed** |
| Automatic Failover triggering after reboot | **Passed** |
| Automatic Failover triggering after power-off | **Passed** |
| Automatic Failover triggered after I/O failure | **Passed** |

## Active-active failover resource switching time test results

| Total number of targets | Switching time [seconds] | Performance test results [passed/failed] |
|---|---|---|
| 2 | 26 | **Passed** |
| 10 | 28 | **Passed** |
| 20 | 30 | **Passed** |

# Mastering NVMe Performance for the Modern Data Center Environments

## Unlimited Snapshots and Clones

The **egino NVMe Metro Cluster** data storage system offers seamless creation and management of an unlimited number of snapshots and clones. These features are essential for robust Disaster Recovery plans, enabling swift data restoration in cases of accidental deletion, corruption, or malware/ransomware attacks. You can schedule snapshots according to your specific needs and monitor storage capacity closely, receiving alerts when space is running low. With egino Open-E JovianDSS NVMe Metro Cluster and Open-E JovianDSS, you enjoy unlimited snapshots and clones without compromising data storage performance or efficiency.
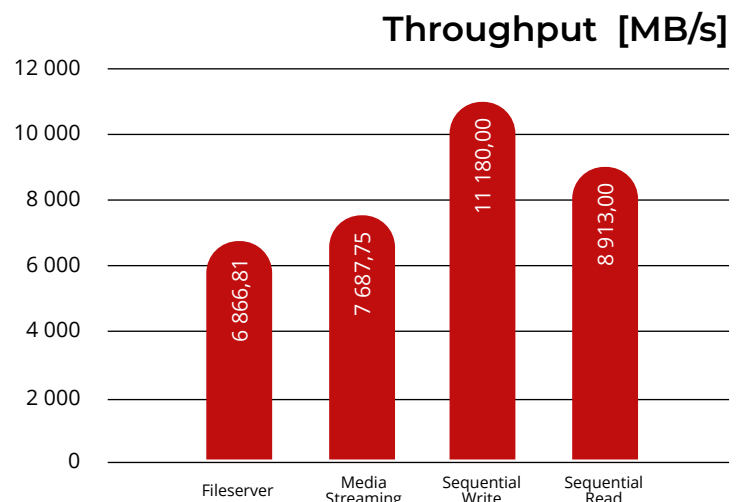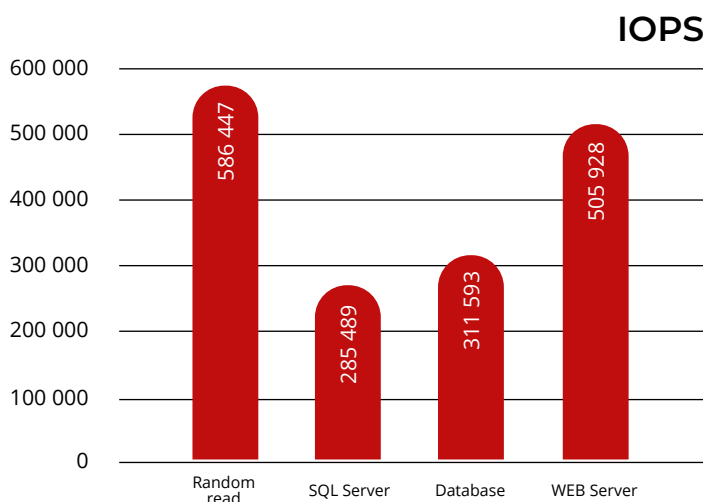
## Tailored for Modern Data Centers

Crafted with precision for the data center environments, the **egino NVMe Metro Cluster** storage system is primed to effortlessly handle compute-intensive tasks associated with big data, extensive virtualization, and high-density server configurations. Offering seamless management of data storage infrastructure, this system ensures uninterrupted operations even during updates or refreshes. Opting for the egino NVMe Metro Cluster data storage system unlocks the benefits of flexible AMD CPU power, the robust capabilities of KIOXIA CD8-R NVMe™ SSDs tailored for data center usage, and the wealth of expertise from Defend IT in constructing and refining servers tailored specifically for data center environments.

## Optimal resource utilization

The **egino NVMe Metro Cluster** storage system helps you make the most of your data storage resources with the advanced features of Open-E JovianDSS and powerful AMD EPYC™ 9174F, the 4th Generation CPU. These features are especially useful for virtual environments, where data storage efficiency and flexibility are crucial. With deduplication and compression, you can reduce your storage footprint and increase your effective capacity. With thin provisioning, you can allocate storage space on demand and expand your physical storage capacity without downtime. With these features, you can also extend your disk retention periods and save costs.

## Enhanced NVMe Data Storage Performance

The **egino NVMe Metro Cluster**, powered by Open-E JovianDSS, stands as an innovative data storage solution meticulously designed to elevate efficiency and performance. Leveraging the KIOXIA CD8-R NVMe™ SSDs, this system delivers unparalleled speed and reliability. Further enhancing its adaptability, robust tuning tools enable you to optimize the system for diverse workloads, whether it's I/O-intensive databases or virtualization environments. With the convenience of predefined profiles tailored to specific needs, users save time and mitigate operational complexities.

### IOPS

| Category | IOPS |
|---|---|
| Random read | 586 447 |
| SQL Server | 285 489 |
| Database | 311 593 |
| WEB Server | 505 928 |

### Throughput [MB/s]

| Category | Throughput [MB/s] |
|---|---|
| Fileserver | 6 866,81 |
| Media Streaming | 7 687,75 |
| Sequential Write | 11 180,00 |
| Sequential Read | 8 913,00 |

# Hardware details

**For each of** the **2 servers**

| | Default configuration | Options |
|---|---|---|
| Motherboard | ASUS K14PA-U024 | - |
| CPU | AMD EPYC \| 4.1GHz \| 16-Core \| Genoa | AMD EPYC \| 3.1 GHz \| 64-Core \| Genoa |
| Chassis | primeLine \| 2U red. Power \| 20x NVMe | - |
| RAM | 768GB \| 24x32GB DDR5 4800 ECC Reg | 3TB \| 24x128GB DDR5 4800 ECC Reg |
| Storage raw capacity | 153.6TB | up to 307.2TB |
| Storage device | 20x NVMe Enterprise \| 2,5" \| Kioxia CD8-R (Base) \| 3.84TB / 7.68TB / 15.36TB | up to 20x NVMe Kioxia CD8-R (Base) 15.36TB |
| Network interface | 1x Dual Port Intel I350-AM2 GbE LAN Controller<br>1x 25Gbit Quad-Port Broadcom NetXtreme N425G<br>1x 100Gbit Dual-Port Broadcom NetXtreme P2100G | up to 4x 25Gbit Quad-Port Broadcom NetXtreme N425G<br>up to 2x 100Gbit Dual-Port Broadcom NetXtreme P2100G |
| Form factor | 2U | - |

## About Defend IT

Defend IT is the trusted partner for comprehensive IT security solutions in Germany. With years of experience, they specialize in integrating hardware and software components to develop tailored security solutions for businesses. Offering 24/7 support and emergency services, their team goes beyond conventional consulting to provide holistic, proactive strategies. From highly available data storage servers to virtual security measures, Defend IT ensures robust protection against evolving cyber threats. Their expertise in IT security, data protection, and infrastructure optimization makes them the go-to choice for safeguarding digital assets and empowering businesses to thrive in today's interconnected landscape.

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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 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.