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AIC HA401-LB2

The HA401-LB2 is a 4U 24-Bay Cluster-in-a-box solution offering high-availability in an active-active configuration and supports 12Gbs SAS. It is Open-E JovianDSS High Availability Ready, and comes with two AIC Server Boards (one per node) that are each supporting dual Intel® Xeon® processors in the E5-2600 v3 and v4 product family. Overall cluster performance is significantly increased as both nodes process I/Os and provide simultaneous and balanced access to the logical devices. The HA401-LB with Open-E JovianDSS eliminates single point of failures and is optimized for mission-critical, enterprise-level storage applications.

Key features of the system:

- High-availability storage server optimized for mission-critical, enterprise-level storage applications
- Fully redundant, fault-tolerant system supporting hot swappable compute nodes and storage drives

- Two compute nodes, Active-Active configuration, each supporting two Intel® Xeon® Processors E5-2600 v3 and v4 product family
- 10 GbE, PCIe NTB or SAS link between nodes for communication and failover
- Built-in LSI SAS3x48R SAS/SATA expander per node
- Intel® Trusted Platform Module (TPM) header to support Intel® Trusted Execution Technology (TXT)
- 6 PCIe 3.0 slots

Capacity of the HA401-LB2 can be increased with AIC's J4024-02, a 4U 24-Bay SAS 12G JBOD with optional interposer compatible trays, housing single/dual expander (field upgradable) modules, four fans and redundant power supply. With its short-depth design the JBOD provides full redundancy and high availability for critical, performance driven storage demand.

> Guaranteed data protection
> Enhanced storage performance
> Flexible scalability
> Simplified management
> Data integrity check
> Tiered RAM and SSD Cache
> Unlimited number of snapshots and clones
> Data compression and in-line deduplication

Guaranteed data protection

Data is your most important resource. This is why the Open-E JovianDSS-based HA401-LB2 includes several mechanisms for data protection. Automatic and scheduled multi-layer data integrity checks ensure data consistency, while unlimited snapshots and clones make it is 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 disk fails, the software-based spare function offers one disk to several RAID arrays, saving you money on extra hardware without compromising data safety.

Flexible scalability

The HA401-LB2 will let you experience unlimited flexibility and minimize unappreciated downtime. Open-E JovianDSS uses a 128-bit file system that includes unlimited snapshots for easy backup, unlimited clones for easy duplication, unlimited capacity with volume sizes up to one Zetabyte, as well as unlimited amount of disks which can be increased on the fly without effort by using thin provisioning. There are no limitations and you may easily control the total cost of ownership and expand your storage infrastructure as data grows.

HA401-LB2

Enhanced storage performance

Nowadays, enterprise storage has to provide big capacity while also being fast, affordable and include reliable support. This is exactly what HA401-LB2 has to offer. Open-E JovianDSS-based HA401-LB2 is an innovative hybrid storage system fusing the capacity of HDDs with the performance of SSDs in a single solution that offers high performance while lowering cost. Additionally, by leveraging capacity optimization technologies and advanced tiered SSD and RAM caching, HA401-LB2 provides an overall efficiency boost and increased cache performance. 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.

Simplified management

Managing Open-E JovianDSS and its extensive features is easy and intuitive compared to many competing solutions on the market. The WebGUI provides a quick overview and management of all storage resources and features. After extensive analyses of storage usage and user interaction the clicks per step in each functionality have been reduced to a minimum, i.e. in creating iSCSI targets or when expanding the size of your storage. This way, you are able to quickly and easily manage HA401-LB2 with Open-E JovianDSS, barely involving actions of a storage administrator.

J4024-02

Data integrity check

The HA401-LB2 storage system effectively detects data corruption, as even minor integrity violations could cause loss of data. HA401-LB2 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 HDD. 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.

Tiered RAM and SSD Cache

The Open-E JovianDSS-based HA401-LB2 works as a tiered storage environment - dramatically speeding up access to frequently accessed files. It uses a caching algorithm to cache "often used" and "recently used" data separately, and provides the best performance for your storage by tiering hot data between RAM and SDD Cache. In HA401-LB2 data is always saved on HDDs and only Hot Data is stored in RAM and SSD to ensure data safety and increase performance.
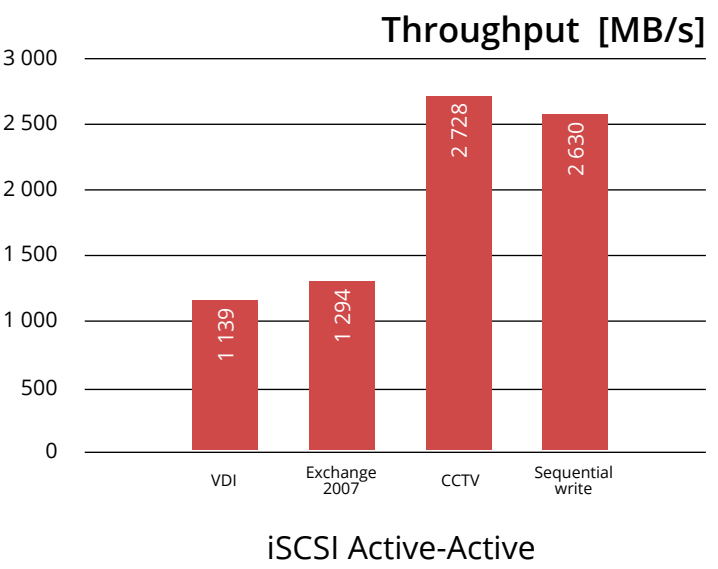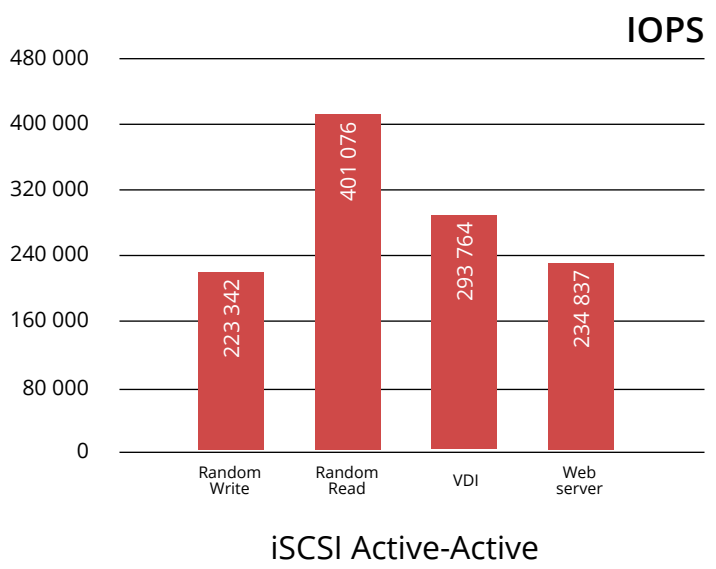

The tests with the HA401-LB2 were done in Active-Passive mode with one customer client. With an additional server you can gain 40% higher results due to more processors with more cores and threads. The tests were conducted with fio benchmarker. The system includes ATTO 40GbE cards. It did not contain SSDs for Read and Write cache, but performance of the server may increase with high performance SSDs. The JBOD used in this setup was an AIC J4024-02.

Unlimited number of snapshots and clones

Every Open-E JovianDSS-based HA401-LB2 allows an unlimited number of snapshots and clones – greatly simplifying back-ups, replications and data recreation in case of accidental deletes or viruses. Snapshots are read-only points-in-time and allow for easy roll-back. They are a must-have option for effective disaster recovery scenarios and in HA401-LB2 you may schedule snapshots for months, weeks, hours or even minutes. Whereas, a clone is a writable copy of a snapshot and allows to easily duplicate virtual machines and scale out for virtual networks instantly and without duplicating data.

Data compression and in-line deduplication

HA401-LB2 offers data compression tor minimizing storage capacity usage and ultimately boosting performance and taking less space on your storage. Find resource-friendly compression protocols (lz4) with low system resource utilization at medium compression rates, but also protocols that are able to achieve very high rates for archiving or backup (as gzip-9). The in-line deduplication feature in HA401-LB2 removes redundant data and minimizes storage capacity usage. The software checks each block for redundancy in the system and if it finds a match the new block isn't written; instead, a shortcut leading to the original block is created. Such a system can reach a deduplication ratio of 3:1 or more, which means that if you place 3TB of data it will only use 1TB of physical disc space. This feature is especially interesting for highly repetitive data, i.e. in VDI, server virtualization or backup, where much higher deduplication ratios can be reached.

IOPS

480 000	
400 000	401 076 (Random Read)
320 000	
293 764 (VDI)	
240 000	
223 342 (Random Write)	234 837 (Web server)
160 000	
80 000	
0	Random Write / Random Read / VDI / Web server

iSCSI Active-Active

Throughput [MB/s]

3 000	
2 728 (CCTV)	2 630 (Sequential write)
2 500	
2 000	
1 500	
1 139 (VDI)	1 294 (Exchange 2007)
1 000	
500	
0	VDI / Exchange 2007 / CCTV / Sequential write

iSCSI Active-Active

HA401-LB2 with J4024-02 JBOD

Hardware information

	Default configuration	Options
CPU	Intel® Xeon® Processor E5-2650 v4 3.60GHz	-
RAM	128GB DDR4 2133 MHz	-
RAW capacity	154TB	-
Hard drive interface	12Gb HBA SAS	-
Network interface	Intel® Ethernet Connection I217-LM Intel® Ethernet Controller I210-AT Intel® 82599ES 10 Gigabit Ethernet Controller ATTO FastFrame NQ42 QSFP+ Optical Interface	-
Form factor	4U	-
Weight	47KG	-
Power	1200W 1+1 redundant power supply 80+	-
Fan	4 x 60x56mm hot swap fans	-

AIC

AIC is a leading provider of both OEM/ODM and COTS (commercial off-the-shelf) and server and storage solutions. With expert in-house design, manufacturing and validation capabilities, AIC's products are highly flexible and configurable to any form factor, standard or custom. AIC leads the industry since 1996 with experience in mechanical, electronic, system-level engineering as well as a dedication to innovation and customer satisfaction. Headquartered in Taiwan, AIC has offices and operations throughout the United States, Asia and Europe.

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About Open-E

Open-E is a well-established developer of IP-based storage management software. Open-E JovianDSS and Open-E DSS V7 are robust, award-winning enterprise storage applications which offer excellent compatibility with industry standards, and are the easiest to use and manage. Additionally, they are some of the most stable solutions on the market and undisputed price/performance leaders. Open-E accounts for over 27,000 installations world-wide and has received numerous industry awards and recognition. Thanks to our reputation, experience and business reliability, Open-E has become the technology partner of choice for industry-leading IT companies.

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.