

## ARGO Scalable Storage Systems

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### Basic information

- Provide a high level of data security and availability due to high-speed recovery of storage without performance degradation
- Up to 3 copies of data blocks constantly exist, each of which is protected by redundant encoding.
- Distributed architecture: there are no bottlenecks in the system typical for legacy systems
- High concurrency with automatic load and data balancing between many controllers and drives
- Active-active circuit with three or more controllers simultaneously
- Managed performance - up to 8 million IOPS depending on configuration
- Processing of blocks, files, and object data with a single unified system, built-in interfaces for working with archive data and S3 cloud storage

The volume of data processed by corporate information systems (CIS) is growing exponentially each year. All divisions, departments, branches try to provide themselves with the computing infrastructure capacities necessary for core business.

As a result of individual lobbying, many data storage systems of different generations and from different manufacturers appear in the organization. From the point of view of IT infrastructure, this means that the same functions and data are repeatedly duplicated, processed by fragmented systems, expensive and difficult to maintain, too massive, and inefficient.

RAID technology specifications were created decades ago. Traditional RAID (as well as subsequent modifications) is no longer an effective data protection mechanism, since it takes many hours and days to restore traditional RAID arrays. The algorithms for protecting and monitoring the integrity of data used in ARGO allow you to restore a data array in the shortest time. The catastrophic data loss that occurs during multiple disk failures in RAID when using ARGO solutions is basically impossible.

### Modern ARGO storage systems

ARGO systems are based on software-defined data warehouse (SDS) technology. Controllers and storage nodes are industry standard servers with proven configurations, without major manufacturer restrictions on component compatibility. The distributed storage factory is organized using Mellanox technology. ARGO systems include their own version of a UNIX-based operating system, not having platform limitations, application service suites and a file system that provides reliable long-term data storage.



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Using ARGO technologies makes separate massive repositories of raw data (data silos) unnecessary, provides the highest level of performance, and simplifies the management of big data through a single administrative interface. Having consolidated the disconnected requirements for data storage systems, the output yields at least a two-fold reduction in the cost of acquisition and operation, with an increase in performance and processing of dozens of petabytes on a single storage system.

A unique feature of ARGO storage systems is distributed ARGO RAID, using erasure coding algorithms with double or triple data block protection. After a confirmed record of a data block, this block is almost impossible to lose or ruin, its integrity is checked and guaranteed by a double or triple checksum, respectively. The technologies that we developed and implemented in ARGO RAID perform restoration of the integrity of the ARGO array in the shortest time, even in the event of multiple disk failures at the same time. ARGO RAID distributes data blocks across all available spindles or flash drives and controllers, providing high parallelism, lightning fast response time, and high performance. The solution allows serving equally traditional loads of relational DBMS (OLTP) and modern tasks associated with the processing of tens and hundreds of petabytes of unstructured data.

### **Scalability**

- Due to the capabilities inherent in the architecture of the software developed by us, the boundaries of system scaling are currently determined solely by the needs of the client.
- Argo storage can meet the data storage needs of a company of any size, from a small startup to an international corporation with hundreds of thousands of employees.
- Argo storage provides the ability to increase the number of hard drives or flash drives, the amount of cache memory, hardware upgrades and functionality expansion using special software. All these operations occur without significant reconfiguration and loss of functionality, which saves time/resources and is flexible in designing IT infrastructure.
- Argo storage - scaling without stopping the solution! Everything is in real time and without loss of system performance or functionality.

### **Performance**

- Writing information to or reading from a disk is a complex algorithm or sequence of actions that result in imposing restrictions on the speed of a solution. The architecture of ARGO storage allows you to remove many restrictions when performing disk operations, which in turn allows you to get a significant performance gain. ARGO uses the Mellanox Ethernet Storage Fabric solution to maximize scalability and network interconnect performance (10 to 100 Gb / s).

### **Flexibility**

- It doesn't matter what data to store for ARGO storage. The system has adaptation mechanisms for storing completely different content.



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### **Scalability**

- ARGO architectural solutions allow you to horizontally scale the solution to tens of thousands of nodes or more (controllers and storage nodes), allowing you to organize a flexible, unified and reliable data storage infrastructure.

### **Custom Tuning Resources**

- By virtue of flexible management of the storage system, the ARGO solution allows you to create file resources with an individual set of parameters that most closely match the task. This means that most parameters can be changed at any time without the need to stop the storage.

### **Data security**

- After a confirmed record of a data block, this block is almost impossible to lose or ruin, its integrity is checked and guaranteed by a triple checksum. Independence from hardware failures is ensured by recording the block on three different disks and integrity control at all levels - during storage, processing and data transfer.

### **Data integrity**

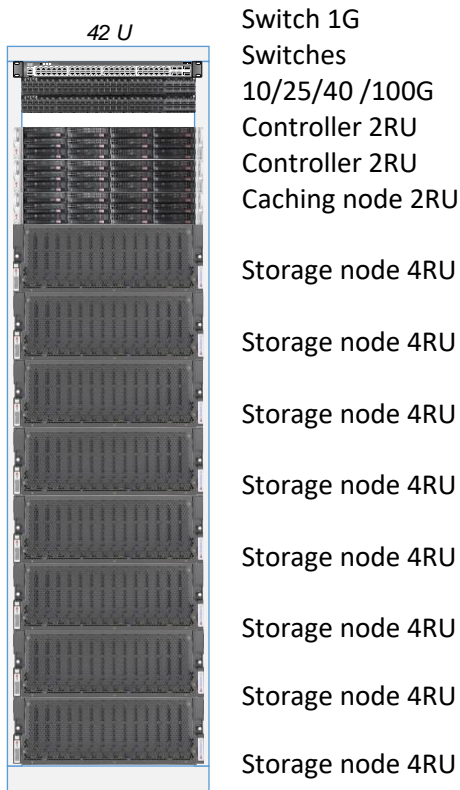
- The software used in Argo storage systems guarantees the integrity of recorded data. If damaged data blocks are detected, they are automatically restored, which does not affect the speed of storage.

### **Hardware**

- The entire intellectual configuration of ARGO systems is software-defined (“software-defined everything”).
- Data storage systems are delivered as a hardware-software complex based on tested hardware platforms or based on hardware platforms, which are the corporate standard for the customer. There are delivery versions in the form of software, in case of a platform agreement.

**ARGO Scalable Solution Segment:**

- 2 controllers
- 8 storage nodes
- Up to 5.1 Pb usable capacity
- Data safety even in case of failure of 2/3 storage nodes in a segment
- Connection speed - from 10 Gb/s



**ARGO specialized solution:**



**Performance:**

- up to 1 M IOPS (4k, random)

**Net capacity:**

- 920Tb on JBOD (SSD / HDD)

**Specialized Solution:**

- Hardware and software complex ARGO + Nvidia DGX (1/2)