ACTSVISION AVSTOR mSCALE Software Defined Storage (SDS) Overview

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Introduction

ACTSVISION AVSTOR mSCALE Software-Defined Storage (SDS) is enterprise-grade unified storage platform with scale-out architecture (Ceph based), addressing the limitations of traditional architectures by offering agility, scalability, and cost-effectiveness. With its optimized self-developed storage I/O engine enhances performance and efficiency, providing a comprehensive solution for diverse storage needs.

Key Benefits

Agility

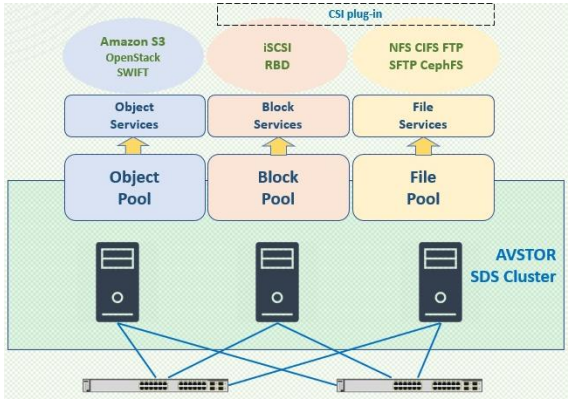
AVSTOR mSCALE SDS simplifies storage management through automation and a unified platform that supports a wide range of storage needs and protocols, including block (iSCSI/RBD), file (NFS/CIFS/FTP/SFTP/CephFS), and object storage (S3/SWIFT). This flexibility enables quick adaptation to changing business requirements. CephFS is file-distributed system (DFS) built on top of AVSTOR mSCALE SDS (Ceph based)'s distributed object store.

Scalability

AVSTOR mSCALE SDS allows organizations to scale their storage infrastructure as needed without service impact. It supports a cluster size from 3 to 1,024 nodes, high availability (HA) and the ability to scale-out capacity and performance seamlessly. (ex. raw capacity= 10PiB with 4U server x 15)

Cost-Effectiveness

Utilizing an open X86 platform with no vendor lock-in, AVSTOR mSCALE SDS reduces costs by supporting commodity hardware. This approach minimizes initial investment and ongoing operational costs.

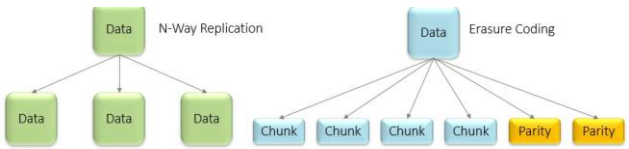


Connectivity: 10/25/100/200 GbE

Unique Advantages of AVSTOR mSCALE SDS

- **All-in-One Platform**
  Supports nearly all major storage protocols simultaneously(iSCSI/RBD,NFS/CIFS/FTP/SFTP/CephFS, S3/SWIFT), and includes a CSI plugin for container integration, delivering a comprehensive solution for diverse storage requirements.
- **Optimized I/O Engine**
  The self-developed storage I/O engine enhances performance and efficiency, ensuring smooth data operations across the storage cluster.
- **Data Protection with Tunable**
  Offers configurable data protection levels (ex. RF2, RF3) among 2 data protection methods: Replication/ Erasure Coding, and supports Rack-aware replication.
- **Data Passage Technology**
  Between File(CIFS/NFS) and S3.
- **Rich Features of S3**
  Including S3 tiering, S3 versioning, S3 audit log.
- **Remote Replication**
  Replicate/restore between AVSTOR SDS storage systems across sites for various storage types(Block: iSCSI, File: NFS/CIFS, Object: S3/Swift). Additionally, S3 bucket and NAS folder can be replicated to public cloud services such as AWS S3.
- **Decentralized Web UI Management**
  The Web UI management provides an intuitive interface for monitoring and managing the storage environment without additional software installation, offering detailed insights into capacity, performance, and health status.

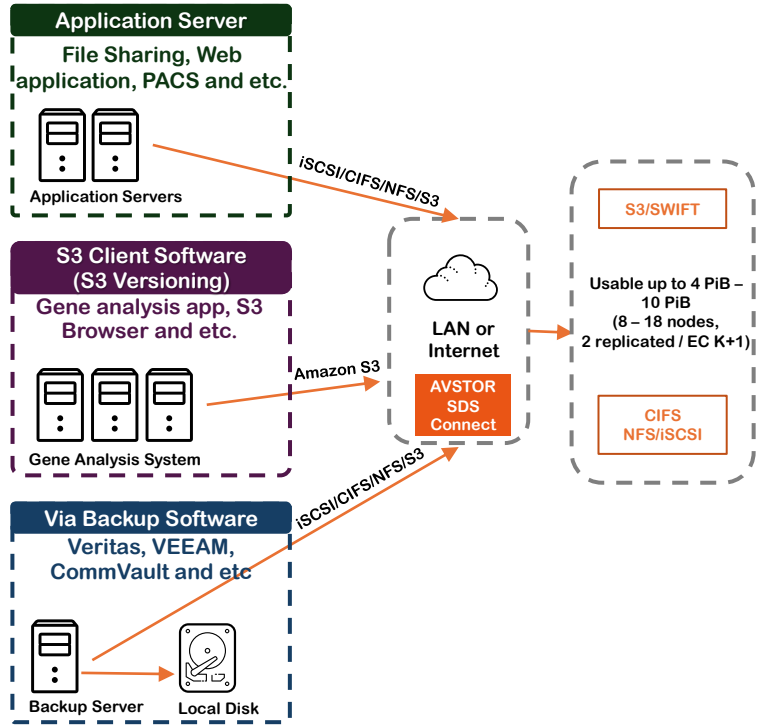
Data Protection with Tunable (ex. RF2, RF3) Replication/ Erasure Coding



Usable capacity	Form Factor	Data protection	# of node	# of fault tolerance node	Usable capacity = % of raw capacity
200 TiB	2U	2 replicated and RAID5	3	1	50%
360 TiB	2U	3 replicated and RAID5	5	2	33%
500 TiB	4U	2 replicated and RAID5	3	1	50%
5 PiB	4U	EC (6+2) and RAID5	10	2	75%
8 PiB	4U	EC (7+1) and RAID6	16	1	87.5%

Conclusion

ACTSVISION AVSTOR mSCALE SDS is enterprise-grade unified storage solution for organizations seeking to modernize their storage infrastructure. With its agile, scalable, and cost-effective approach, it addresses the challenges of traditional storage architectures, providing a robust platform for managing today's data-driven enterprises.



Major Target Customers

Usable capacity: > 100 TiB, 500TiB, 1PiB, 5PiB or above

Healthcare
PACS, EMR, HIS, Hot / Cold data tiering(S3), Backup / Archiving

Telco
File sharing, Server virtualization(ex. VMware), Remote Replication

Genome Center
AI/ML, Data passage between NFS and S3, Hot / Cold data tiering (S3)

Rich Media / Multimedia
Media broadcasting, Surveillance, Backup/Archiving

Cloud Service Provider
File sharing, Server virtualization, Backup as Service (ex. Veeam, Commvault, Veritas)

Alternative as other storage brands

NetApp StorageGRID, IBM Redhat Ceph storage, Dell ECS, Dell PowerScale, HPE Ezmeral Data Fabric, and etc.

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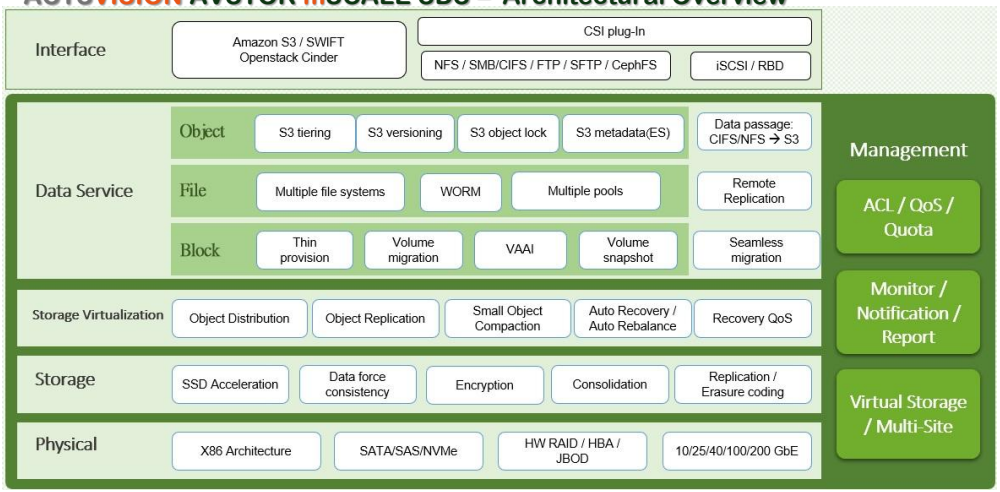
■ Product Features of AVSTOR mSCALE SDS

- **All-in-One Platform**
  ACTSVISION AVSTOR mSCALE Software-Defined Storage (SDS) is enterprise-grade unified storage platform with scale-out architecture (Ceph based) that supports a wide range of storage needs and protocols, including block (iSCSI, RBD), file (NFS, SMB/CIFS, FTP/SFTP, CephFS), and object storage (S3/SWIFT). And it includes a CSI plugin for container integration. CephFS is file-distributed system (DFS) built on top of AVSTOR mSCALE SDS (Ceph based)'s distributed object store.
- **Optimized I/O Engine**
  The self-developed storage I/O engine enhances performance and efficiency, ensuring smooth data operations across the storage cluster.
- **Cluster size**
  Supports 3 to 1,024 nodes with high availability (HA) and scalable capacity and performance. Allows online node expansion and upgrades with no service disruption.
  With a fully symmetric architecture, there's no need for extra management node, eliminating single point of failure. All nodes can provide consistent management through a unified control console managing the entire cluster.
- **Data Passage Technology**
  Support exporting S3 bucket to CIFS/NFS folder. The back-end support of CIFS/NFS allows for using an S3 bucket as storage, facilitating data interoperability between CIFS/NFS and S3. It also supports S3 versioning for data protection. Note: (Usage restriction) Data passage between CIFS/NFS and S3 only supports applications with sequential read and write behaviors, such as PACS system.
- **Data Protection with Tunable**
  Supports Tunable Resiliency Factor – Enables dynamic configuration of different fault tolerance levels for various applications within the same cluster. It supports multiple data protection methods, including replication (e.g., 2x or higher) and erasure coding. When a single server fails, the system automatically redirects service requests to other servers with replica data, ensuring continued service operation. It also supports rack-aware replication, allowing replica data to be distributed across physical or even logical racks/buildings.
- **Storage media**
  Supports NVMe SSD, SAS/SATA SSD, and SAS/SATA HDD. Customers can freely select the capacity of HDD and SSD according to storage capacity and performance requirements, and adjust the proportion of SSD and HDD.
- **Application Data Security**
  Supports comprehensive application data protection features including S3 object versioning, S3 object lock, volume snapshots, Write Once Read Many (WORM), SMB/CIFS recycle bin, Amazon S3 Server-Side Encryption (SSE-S3), and FIPS 140-2 compliant encryption. And it also supports the Internet Content Adaptation Protocol (ICAP) to enable communication with external servers hosting 3rd-party anti virus software to scan inbound data.
- **S3 tiering**
  The S3 tiering mechanism automatically separates hot and cold data by moving cold data to lower-cost Tier 2 storage, enhancing cost efficiency. This process is transparent to frontend applications and requires zero code changes.
- **Performance tiering**
  Supports grouping different disk types into performance-based storage pools within the same cluster, such as SSD, mixed (SSD+SATA), and SATA pools. SSDs across all nodes can be grouped as a "Shared Storage" pool.
- **Connectivity**
  Supports 10/25/40/100/200 GbE. And support the bonding mode of the network interface : Round-robin policy, Active-backup policy, XOR policy, Broadcast, IEEE 802.3ad Dynamic link aggregation (LACP), Adaptive transmit load balancing and Adaptive load balancing.
- **AD/LDAP ID mapping**
  It is able to integrate AD and LDAP at the same time.
- **Small Object Compaction**
  Optimizes storage and performance for billions of small objects (files), reducing fragmentation and space waste.
- **Remote replication**
  Support remote replication (asynchronous / synchronous) between AVSTOR mSCALE SDS systems across sites for various storage types(Block: iSCSI/Cinder RBD, File: NFS, SMB/CIFS, Object: S3/Swift). Additionally, S3 bucket and NAS folder can be replicated to public cloud services such as AWS S3.
- **ACL/QoS/Quota management**
  Supports setting Quota and ACL policies for NAS folders, S3 buckets, S3 accounts, and storage pools. Also allows configuring QoS for file access and controlling the speed of data recovery and rebalance.
- **Decentralized Web UI management and storage management API (RESTful API) support**
  Provide decentralized Web UI management with no additional software installation required, and support RESTful APIs for storage management. The UI supports management of storage pools, nodes, provisioning, volume snapshots, quotas, virtual IPs, firmware updates, monitoring, alerts, and user accounts (add, modify, delete, permissions). It includes a real-time analytics dashboard showing cluster health, usage, IOPS, throughput, access control, alerts, and server details (CPU, memory, storage, NIC, IP, etc.). Monitoring covers system and node status, usage, hardware metrics, capacity and performance trend prediction, and sends alerts via email.

ACTSVISION AVSTOR mSCALE SDS – Architectural Overview



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