



QSAN Storage Manager

QSM 4

Enterprise Data Management for Unified Storage

Key Benefits

One Platform

- QSM is an all-in-one storage solution that supports multiple protocols
- Enable cross QSAN platform replication, ensuring secure and easy backup storage

Reliable

- QSM's tailor-made storage pool technology effectively meets the diverse storage requirements for data integrity, scalability, high performance and availability
- With variety of built-in backup applications to help your data integrity and continues to evolve security level to protect data from software to physical

Simple

- QSM frees you from the complicated process of deploying your storage
- Power it on and enjoy the convenience and ability to focus on your business without having to pay attention to storage setup with just a few clicks

Overview

QSM (QSAN Storage Manager) is an innovative storage operating system designed for unified storage products. Based on QFS (QSAN File System), QSM brings new levels of simplicity, flexibility, and security with proven storage efficiencies, high performance, and leading cloud integration.

Complete All Business in One

QSM delivers unified storage features including support for a range of multi protocols, thin provisioning, SSD cache, auto-tiering, compression, inline deduplication, and more. With the help of an intuitive dashboard, managers can monitor storage status in real time.

- Multi protocol support
- Storage efficiency features
- Storage acceleration features

Keep Business Always-On

The unwarned service interruption can cost a huge hidden cost for your company, QSM is a high availability and resiliency software to help the company minimize its system downtime and alleviates issues, ensuring business-critical applications stay online forever.

- Smart failover
- No downtime for software upgrading
- Long-established RAID technology

Complete and Efficiency Data Backup

QSM effectively addresses the modern businesses' data threats by providing comprehensive and effective backup solutions that assist you design a complete and efficient backup solution to minimize the risk of data loss. In addition, new QSM can support cross-platform replication to integrate QSAN block and unified storages.

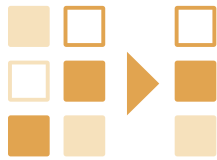
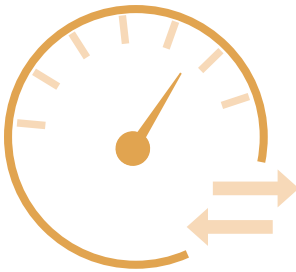
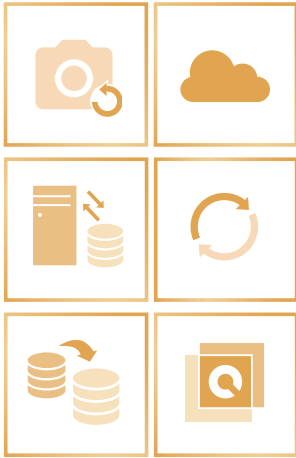
- Versatile backup plan
- Cloud backup
- Cross QSAN platform replication

Agile and Always Simple

With QSM, you can save your time building storage environments by utilizing automatic functions which enable the deployment of multiple volumes in just one step.

- Easy deployment in 5 minutes
- Auto load balance
- Grouping batch operation

The QSAN logo, consisting of the word "QSAN" in a bold, white, sans-serif font, centered within a solid orange rectangular background.



Software Feature

QFS Based Operating System

QSM implements rich enterprise data services founded upon QSAN core engines. These are the technologies that care about your data and drive the high performance QSAN is so proud of.

- **QFS (QSAN File System)** - Provides a stable enterprise-level file protocol to ensure data integrity.
- **Cross-platform Replication** - Brand new QSM breaks boundaries by enabling unification and interoperability of XEVO and QSM platforms for replication, establishing the foundation and enhancing performance for all QSAN platforms.

Comprehensive Business Backup Function

QSM covers local and remote snapshots scheduled, giving you the flexibility and confidence to work worry-free. Also provides synchronous multi-site data replication to make sure business continuity.

- **Snapshot** - Snapshots record the status of shared folders and volumes as changes happen on write, and rollback transfers the changes to the previous state.
- **Remote Replication** - It has unlimited bandwidth, traffic shaping, and multiple connections per replication task powerful capabilities. It's the most efficient way to perform remote data backup.
- **Cloud Backup* and S3** - Provides cloud services backup ensures that you can backup your data to multiple cloud services such as Amazon S3, iCloud S3, and S3 compliant services.

Enlarge Storage Capacity

QSM provides deduplication, compression, and thin provisioning functions to save storage space and achieve effective cost control.

- **Inline Deduplication** - Block-level function that checks the block similarity of data and auto removes the redundant data object to reduce the usage of storage capacity.
- **Compression** - Reducing data for your storage, helping ITs to reduce the amount of storage you need to purchase and maintain.
- **Auto Tiering (for block level)** - Demanding workloads of your business applications could be dramatically reduced and the performance increased.
- **Thin Provisioning** - lets various services and applications use the same storage space without limiting how much of the quota can be used by each.

Facing Modern Security Threats Proactively

QSM secures your current data by delivers an actionable, proactive protection strategy to minimize potential risks.

- **WORM (Write Once Read Many)*** - WORM can protect your data from encryption-based ransomware that installs covertly on a victim's system and encrypt their files, making them inaccessible.
- **SED (Self-Encrypting Drive)** - With the technology, even if the physical drive is stolen or misplaced, the data on it remains protected against data breach by generating the AK (Authentication Key) to prevent unauthorized access.

* The feature will be available in Q1, 2024.



Virtualization Ready

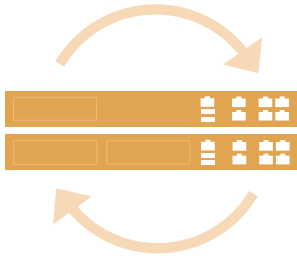
QSM is verified with VMware® Ready™ and Microsoft® Hyper-V™ certified. No matter which virtualization environment you've adopted, the QSM is a practical and efficient storage system for you to deploy in any virtualization platform. QSM can be used for primary storage repositories and as a backup to existing primary storage. As a backup storage device, the QSM supports a comprehensive list of 3rd-party virtual machine backup software to ensure that your VMs and data are never at risk of loss.



High Availability with No Single Point-of-Failure**

QSM's automatic failover / failback mechanism and cache mirroring through NTB (Non-Transparent Bridge) bus to achieve active-active HA functionality allows the system to withstand multiple component failures and achieve 99.9999% availability.

- **Dual-Active (Active / Active)** - The dual-active design provides the highest-level availability and supports non-disruptive firmware upgrades. It also allows double the host bandwidth and cache-hit ratio by utilizing both controllers, meaning there are no idle resources within the system.
- **Automatic Failover / Failback** - When one controller fails, the other controller can seamlessly take over all the tasks of the failed controller.
- **Online firmware update** - Always keep the latest version of firmware with zero system downtime.
- **Cache-to-Flash Memory Protection** - In the event of power loss, it will lose the cache data stored in volatile memory. The cache-to-flash memory protection function will safely transfer the memory cache data to a non-volatile flash device for permanent preservation.



Simple Business Continuity with Active Cluster

Clustered controller design allows for the complete failure of a controller or any controller component without impacting operations. Both controllers concurrently provide storage services in real-time. If one controller fails, the other controller can transparently seamlessly take over all storage services.

RESTful API

QSM provides the standard RESTful API. The system can be deployed into the IT management system using RESTful API and let IT managers continuously use the existing management tool, even the first-time user can finish the management job confidently, which considerably reduce the learning cost for organizations.

Everything is Non-disruptive**

Downtime will cost a huge hidden cost when your unified storage hosts hundreds of applications. That is why keeping storage activities is a critical part of the business. For instance:

- **Non-disruptive Hardware Upgrades and Replacement** - All of the critical components include controller, fan module, or PSU are hotly pluggable for failover without downtime.
- **Non-disruptive Software Upgrades** - With smart failover, both controllers can take over all service when the other controller fails or doing an upgrade.



** Only available for dual controller storage models

Software Specification

Operating System	64-bit embedded Linux
Service	CIFS / NFS / FTP ⁶ / AFP ⁶ / iSCSI / FCP ⁶
User Management	Local and domain user and group management / Application privilege / User quota / User home folder Windows AD and LDAP support / Trust domain
Folder Management	Windows ACL / Hide shared folder on Windows network WORM ⁶ (Write Once Read Many) protection / Folder quota / File retention
Backup Server	Time machine ⁴ / External storage device backup Public cloud backup: Alibaba Cloud OSS, HiCloud S3, Amazon S3, and S3 compatible Public cloud synchronization ⁶ : Google Drive, Microsoft OneDrive, Dropbox
Storage Management	RAID level 0, 1, 0+1, 3, 5, 6, 10, 30, 50, 60, and N-way mirror / RAID EE level 5EE, 6EE, 50EE, and 60EE Flexible storage pool ownership / Global hot spares / Online disk roaming Write-through and write-back cache policy / Background I/O priority setting / Instant RAID volume availability Fast RAID rebuild / Online storage pool expansion / Online volume extension / Online volume migration ¹ Auto volume rebuilding / Instant volume restoration / Online RAID level migration Video editing mode for enhanced performance / Disk drive health check and S.M.A.R.T. attributes Storage pool parity check and media scan for disk scrubbing / SSD wear lifetime indicator Disk drive firmware batch update / QSLife ⁶ to monitor and analyze the activity of disk drives Multiple volume creation / Volume QoS (Quality of Service)
iSCSI Host Connectivity	CHAP & mutual CHAP authentication / iSCSI-3 PR (Persistent Reservation for I/O fencing) iSNS / VLAN (Virtual LAN) / Jumbo frame (9,000 bytes) support
Fibre Channel Host Connectivity ⁶	FCP-2 & FCP-3 support / Auto detect link speed and topology Topology supports point-to-point ² and loop
High Availability ⁵	Dual-Active (Active/Active) controllers / Cache mirroring through NTB bus / ALUA support Multipath I/O and load balancing support (MPIO, MC/S, Trunking, and LACP) Firmware update with zero system downtime / Cache-to-Flash memory protection
Security	Secured Web (HTTPS), SSH (Secure Shell) / iSCSI Force Field to protect from mutant network attack iSCSI CHAP & mutual CHAP authentication / ISE & SED drive support
Storage Efficiency	Thin Provisioning with space reclamation SSD Cache / Auto Tiering
Networking	DHCP / Static IP / NTP / Trunking / LACP / VLAN / Jumbo frame (up to 9,000 bytes)
Advanced Data Protection	Snapshot, block-level, differential backup Writeable snapshot support Manual or schedule tasks Snapshot recycle bin Remote Replication Auto remote replication without doing configurations 1 Step Local-to-Remote Asynchronous, block-level, differential backup based on snapshot technology Synchronous ³ , block-level, always synchronize based on the recorded fracture log Traffic shaping for dynamic bandwidth controller Manual or schedule tasks Volume clone for local replication Auto local clone without doing configurations Instant volume restoration Support USB UPS and network UPS with SNMP management
Virtualization Certification	Server Virtualization & Clustering Latest VMware vSphere certification / VMware VAAI for iSCSI & FC Microsoft Windows Server Hyper-V certification / Microsoft ODX
Easy Management	USB LCM ³ / Serial console support / Online firmware update Intuitive Web management UI, secured web (HTTPS), SSH (Secured Shell), LED indicators S.E.S. support / S.M.A.R.T. support Grouping batch operation for host and protection groups QReport ⁶ generates performance, capacity analytics, SSD cache and auto tiering statistics Advanced QReport ⁶ collects all disk drive health and analysis information and sends periodic emails XFinder utility support to easy find storage system / RESTful API ⁶ support QAuth for authorizations of user's responsibility
Log	Event log with filter / Download event log with filter
Notification	Email / SNMP / syslog / RESTful API ⁶
Green & Energy Efficiency	Wake-on-LAN and Wake-on-SAS to turn on or wake up the system only when necessary / Auto disk spin-down
Multi-Browser Support	Google Chrome / Microsoft Edge / Apple Safari / Mozilla Firefox
Host Operating System Support	Windows Server SLES / RHEL / CentOS Solaris / FreeBSD Mac OS X
Utility	XFinder / XInsight

Software Specification

Notes

1. The feature is based on RAID level migration of disk groups on the fly in thick provisioning pools.
 2. 16 / 32 Gb Fibre Channel only supports Point-to-Point topology.
 3. The feature is optional and is not included in the default package.
 4. The feature is supported only in selected models.
 5. The features are supported in dual controller models.
 6. The feature will be available in Q1, 2024.
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Specification Sheets

Pool	
Maximum number of disk groups in a pool	32
Maximum number of diskdrives in a pool	256
Maximum number of pools per system	128
Maximum number of dedicated spares in a pool	8
Thin Provisioning	
Maximum capacity of a thin provisioning pool	8 PB
Volume	
Maximum number of block volumes in a pool	96
Maximum number of block volumes per system	8,192
Maximum block volume capacity of a thin provisioning pool	1 PB
Maximum number of file volumes in a pool	96
Maximum number of file volumes per system	8,192
Maximum file volume capacity of a thin provisioning pool	1 PB
File System	
Maximum number of files per system	2 ^ 64
Maximum size per file	8 EB
Maximum number of shares per system	8,192
Maximum share size of a thin provisioning pool	1 PB
Host	
Maximum number of iSCSI hosts	1,024
Maximum number of fibre channel hosts	512
Maximum number of file hosts	4,096
Snapshot	
Maximum number of snapshots per volume	256
Maximum number of snapshots per system	2,097,152 (8,192 * 256)
Local Clone	
Maximum number of local clone pairs per source volume	1
Maximum number of running local clone tasks per system	4
Remote Replication	
Maximum number of remote replication tasks per system	64
Maximum number of running remote replication tasks per system	12
Rsync	
Maximum number of Rsync tasks per system	32
Maximum number of running Rsync tasks per system	4
Maximum Rsync target	32
Accounts	
Maximum user quantity per system	2,048
Maximum group quantity per system	1,024