



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 in block, file, and object services
- Storage efficiency and 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 and no downtime for software upgrading
- Long-established RAID technology

Complete and Efficiency Data Backup

QSM provides a comprehensive and effective backup solution to address the data threats faced by modern enterprises, helping you design complete and efficient backup plans to minimize the risk of data loss. Furthermore, the new version of QSM supports cross-platform replication and can integrate QSAN block storage and unified storage.

- Versatile backup plan with 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
- Grouping batch operation



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.
- **QSeal** - Providing air gap backup mechanism, ensuring network layer security and ensure data availability to effectively defend the threats and unauthorized access from the internet.
- **Cloud Backup and S3** - Provides cloud services backup ensures that you can back up 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.



Facing Modern Security Threats Proactively

QSM protects your current data by providing actionable, proactive protection strategies, thereby minimizing 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.

* This function is only available in all-SSD pool.



Virtualization Ready

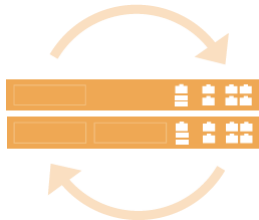
QSM is verified with VMware® Ready™ and Microsoft® Hyper-V™ certified. No matter which virtualization environment you've adopted, the QSM is a practical and efficient storage system for you to deploy in any virtualization platform. QSM can be used for primary storage repositories and as a backup to existing 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.
- **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 provide storage services simultaneously and 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 reduces 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 the critical components including controller, fan module, or PSU are hotly pluggable for failover without downtime.
- **Non-disruptive Software Upgrades** - With the help of intelligent failover, when one controller fails or is upgraded, both controllers can take over all services.

** The feature is only available for dual controller storage models.

Software Specification

Operating System	64-bit embedded Linux
Service	CIFS / NFS / FTP / SFTP / WebDAV / iSCSI / FCP / NVMe-oF / Object Storage
User Management	Local and domain user and group management / User quota / User home folder Windows AD and LDAP support
Folder Management	Windows ACL / UNIX ACL / Hide shared folder on Windows network WORM (Write Once Read Many) protection / Folder quota / File retention
Backup Server	XMirror / External storage device backup / Microsoft 365 email backup Public cloud backup: Alibaba Cloud OSS, HiCloud S3, Amazon S3, and S3 compatible Cloud drive backup: Google Drive, Microsoft OneDrive, Dropbox
Storage Management	RAID level 0, 1, 0+1, 5, 6, 10, 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 Disk drive health check and S.M.A.R.T. attributes / SSD wear lifetime indicator Disk drive firmware batch update / QSLife to monitor and analyze the activity of disk drives Multiple volume creation / Volume QoS (Quality of Service) Storage pool parity check and media scan for disk scrubbing QScale ³ (scale-out) / JBOF expansion / JBOF mode
iSCSI Host Connectivity	CHAP & mutual CHAP authentication / iSCSI-3 PR (Persistent Reservation for I/O fencing) / NVMe-oF iSNS / VLAN (Virtual LAN) / Jumbo frame (9,000 bytes) support
Fibre Channel Host Connectivity	FCP-2 & FCP-3 support / Auto detect link speed and topology / NVMe-oF 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	HTTPS (secure web) / SSH (secure shell) / SSL import / iSCSI Force Field to protect from mutant network attack iSCSI CHAP & mutual CHAP authentication / ISE & SED drive support / Antivirus Email 2FA (two factor authentication) / QSeal (AirGap backup)
Storage Efficiency	Thin Provisioning with space reclamation / QCompact (deduplication and compression) ^{3,4} SSD cache / Auto tiering / RDMA / Performance mode
Networking	DHCP / Static IP / IPv6 / NTP / Trunking / LACP / VLAN / Jumbo frame (up to 9,000 bytes)
Advanced Data Protection	Snapshot, block and file, differential backup Writeable snapshot support Manual or schedule tasks Snapshot recycle bin Remote replication Asynchronous, block-level, differential backup based on snapshot technology Synchronous ⁵ , 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 Local to remote configuration Instant volume restoration QMetro ³ (synchronous data replication between two storages) Cross-system replication (replicate data between block storage and unified storage) Support USB UPS and network UPS with SNMP management
Virtualization & Containerization	Server virtualization & clustering Latest VMware vSphere certification / VMware VAAI for iSCSI & FC / VMware vVols 2.0 / VASA support Microsoft Windows Server Hyper-V certification / Microsoft ODX Support CSI (Container Storage Interface) CSI volume (NFS / iSCSI / FCP)
Easy Management	USB LCM ³ / Serial console support / Online firmware update Intuitive web management UI, LED indicators S.E.S. support / S.M.A.R.T. support Grouping batch operation for host and protection groups QReport generates performance, capacity analytics, SSD cache and auto tiering statistics Advanced QReport collects all disk drive health and analysis information and sends periodic emails XFinder utility support to easy find storage system / RESTful API support QAuth for authorizations of user's responsibility
Log	Event log with filter / Download event log with filter or between a certain time period
Notification	Email / SNMP / syslog / RESTful API
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
Notes	1. The feature is based on RAID level migration of disk groups on the fly in thick provisioning pools. 2. 16 / 32 / 64 Gb Fibre Channel only supports Point-to-Point topology. 3. The feature is optional and is not included in the default package. 4. This feature is only available in all-SSD pool. 5. The features are supported in dual controller models.

Software Specification

Pool	
Maximum number of disk groups in a pool	32
Maximum number of disk drives in a pool	256
Maximum number of pools per system	128
Maximum disk capacity support	Largest disk capacity on the market
Maximum capacity of a thin provisioning or an auto tiering pool	1 PB
Maximum capacity of total thin provisioning or auto tiering pools	8 PB
Volume	
Maximum number of volumes in a pool	1,024
Maximum number of volumes per system	8,192
Maximum block / file volume capacity of a thin provisioning pool	1 PB
File System	
Maximum file number per system	2 ^ 64
Maximum number of shares per system	8,192
Maximum share capacity of a thin provisioning pool	1 PB
Host	
Maximum number of iSCSI hosts (dual controller / single controller)	2,048 / 1,024
Maximum number of Fibre Channel hosts (dual controller / single controller)	512 / 256
Maximum number of file hosts (dual controller / single controller)	4,096 / 2,048
Maximum number of LUNs per system	8,192
Snapshot	
Maximum number of snapshots per volume	256
Maximum number of snapshots per system	2,097,152 (8,192 * 256)
Accounts	
Maximum number of users per system	2,048
Maximum number of groups per system	1,024
Maximum number of domain users	200,000