FalconStor® Software

Virtual Tape Library (VTL) *with Global Deduplication*

Scalable VTL with integrated clustered data deduplication technology

The FalconStor® Virtual Tape Library (VTL) and FalconStor® Single Instance Repository (SIR) solution is the industry's market-leading, fully integrated virtual tape library (VTL) and data deduplication solution, unmatched in performance and scalability. This cost-effective and fully integrated solution independently scales FalconStor VTL nodes and deduplication nodes, offering flexibility and growth to meet present and future business data protection needs.

Highlights

Performance

> High-throughput backup via 2/4/8Gb FC and 1/10Gb/s iSCSI, up to 5 TB/hr per node
> Sustained deduplication rates of over 500 MB/s per node, linearly scaling to 2 GB/s
> Read-ahead technology ensures fast restore directly from deduplication repository

Scalability

> Clusters scale from 44TB to 268TB usable deduplication storage
> FalconStor VTL scales up to 8 nodes in HA pairs, seen as a single logical unit
> Global deduplication supports N+1 cluster, supporting up to 4 active nodes, eliminating repository silos

Management

> Direct physical tape support, multi-tape export, and tape consolidation
> Centralized management console for ease of use

Integration

> Supports all major enterprise backup software, including open systems (Microsoft Windows, UNIX, Linux, NetWare, Mac), mainframe, and IBM iSeries
> Emulates over 50 tape libraries and 30 tape drive formats

Efficiency

> Integrated deduplication and compression reduces storage requirements by as much as 95%
> Supports one-to-one and many-to-one bi-directional replication for DR, lowering costs by slashing network traffic by 99%

Security

> Enhanced data security including support for tape shredding, tape encryption, and replication with network data encryption

Designed as an enterprise-class solution, FalconStor VTL with clustered deduplication is a fully integrated high-performance, high-availability VTL and deduplication solution that eliminates the proliferation of deduplication silos while offering ease of deployment and management. Built on scalable FalconStor VTL and FalconStor SIR nodes, clusters start with 44TB of usable RAID 6 repository and expand to 268TB of usable repository by seamlessly adding storage as needed.

FalconStor enables a high availability (HA) architecture that can scale up to eight FalconStor VTL nodes, with up to four active FalconStor SIR global deduplication nodes and multiple petabytes of protected data, managed as a single system. Unlike most single function grid architectures, the FalconStor VTL with deduplication offers a true enterprise architecture that provides the ability to scale FalconStor VTL nodes independently of deduplication nodes while adding high-performance storage in a shared storage pool as needed. Users can add FalconStor VTL nodes to meet demanding backup windows and separately add global deduplication nodes for faster performance, increased capacity optimization, and longer data retention.

Availability and scalability

FalconStor VTL nodes are arranged in HA pairs, aggregating performance linearly as more nodes are added, while offering protection in the event of a node failure. Starting at 1500 MB/sec (5.4 TB/hr) for a single FalconStor VTL node, the solution can seamlessly scale to a remarkable 12GB per second or 43 TB/hr in backup performance, enabling even the largest data center to meet or exceed backup windows and achieve service level agreements (SLAs) with ease. Deduplication can be performed concurrently with the backup or after the backup completes, optimizing storage efficiency without affecting the backup window. Supporting the latest high-speed protocols, including 8Gb Fibre Channel (FC) and 10Gb Ethernet, FalconStor VTL with global deduplication can sustain deduplication rates of over 500 MB/sec per node, linearly scaling in performance as FalconStor SIR nodes are added.

With the ability to sustain high data throughput rates, FalconStor VTL with global deduplication allows backup environments to operate more efficiently while reducing total backup time. Equally important is the ability to scale simultaneous backup jobs across multiple FalconStor VTL nodes to achieve maximum performance. Up to 128 virtual tape libraries, 1024 virtual tape drives, and 65536 virtual tapes can be created per FalconStor VTL node, allowing backup jobs to be distributed across multiple tape targets, rather than having to share a limited number of physical tape drives. Since backup jobs won't have to queue up while waiting for a free tape drive, the total backup time across all jobs is significantly reduced.

Performance

From a performance standpoint, solutions that only offer a single deduplication server/appliance are not adequate for large organizations that need to back up hundreds of terabytes of data every day, or those who need to back up more than once a day. In such cases, deduplication can become a bottleneck. Some organizations may consider using two or more appliances to do the job, but because every appliance maintains its own data repository, it cannot identify the duplicated data that was already backed up through another appliance. This approach compromises the deduplication efficiency and increases maintenance workloads.

The FalconStor VTL solution with global deduplication optimizes manageability and scalability by supporting up to four active FalconStor SIR nodes in a global cluster transparently accessible by all FalconStor VTL nodes. By adding cluster nodes in a linear fashion, this architecture allows organizations to scale capacity and performance, each node supporting up to 67TB of usable repository, or a total of 268TB of shared virtualized storage, equivalent to 5.1 PB using a 20:1 deduplication ratio. While global deduplication nodes increase the usable storage repository, they also linearly increase aggregate global deduplication performance to over 2000 MB/s (2 GB/s).

This solution also provides built-in N+1 failover, which means that if one unit fails, the standby node (+1) automatically takes over its workload to ensure continuity. Because global deduplication occurs across all active deduplication nodes, backups are not tied to a single node. Regardless of which node deduplicated the original backup data, all subsequent backups will be compared against all data in the shared repository. This improves deduplication efficiency and storage optimization.

Storage scalability is equally as powerful, since deduplication nodes share a HA virtualized storage pool, scalable up to 268TB of usable repository. If more repository storage is required, storage trays may be non-disruptively added at any time.

Best-of-breed tape management

Many data centers require both disk and tape for tiered backup and archive/compliance needs, driving the need for VTL solutions that integrate virtual and physical tape operations. FalconStor VTL with clustered deduplication seamlessly bridges disk and tape through best-of-breed tape management capabilities. Operations are streamlined with direct tape library support, eliminating the requirement for media server management, while media creation is optimized to reduce media consumption through features that include:

- **Tape caching.** Transparently and directly moves data from virtual to physical tape, either concurrently or based on user-defined policies.
- **Tape consolidation.** Writes multiple virtual tapes to a single physical tape of the same or greater capacity, maximizing physical media utilization.
- **Multi-tape export.** Creates multiple copies of physical tapes to meet offsite disaster recovery (DR) needs, SLAs, and/or regulatory requirements.
- **Secure tape export.** Prevents unauthorized access to data on physical tapes; writes to tape in an encrypted format based on the Advanced Encryption Standard.
- **Tape shredding.** Enables users to "destroy" a virtual tape image so that it cannot be accessed, even when using disk forensics.

Additional features

FalconStor VTL with clustered deduplication includes built-in WAN-optimized replication, which ensures that only globally unique blocks of data are transmitted, reducing bandwidth requirements by as much as 99% and enabling physical tape creation and consolidation at a central site. Multi-site replication eliminates tape management costs and the risks of lost or stolen tapes during transport, while encryption ensures security during transmission. Tight integration with Symantec OpenStorage (OST) offers high-performance backup, a single point of management, transparent data replication, and direct copy-to-tape capabilities while maintaining catalog consistency.

Extensive certification testing has validated FalconStor VTL operationally with all major backup software packages across multiple operating systems, including Microsoft Windows, UNIX, Linux, NetWare, and Apple Mac. Various backup methods are also supported, such as NDMP and Symantec OST, as well as enterprise-ready features such as support for StorageTek ACSLS, IBM 3494 tape libraries, HP Non-Stop (Tandem), IBM iSeries (AS/400), and FICON or ESCON for mainframe connectivity. Additionally, backups across open systems platforms, mainframes, and IBM iSeries can be consolidated into a single globally deduplicated repository.

Manageability is critical for any enterprise-class solution, and the FalconStor VTL with global deduplication solution includes central management of all operations, including backups, restores, configuration, deduplication, and remote replication within the central data center as well as for remote locations. Enhanced features include extensive command line functionality, SNMP support, historical and real-time reporting and monitoring, email alerts, and group-based policy management.

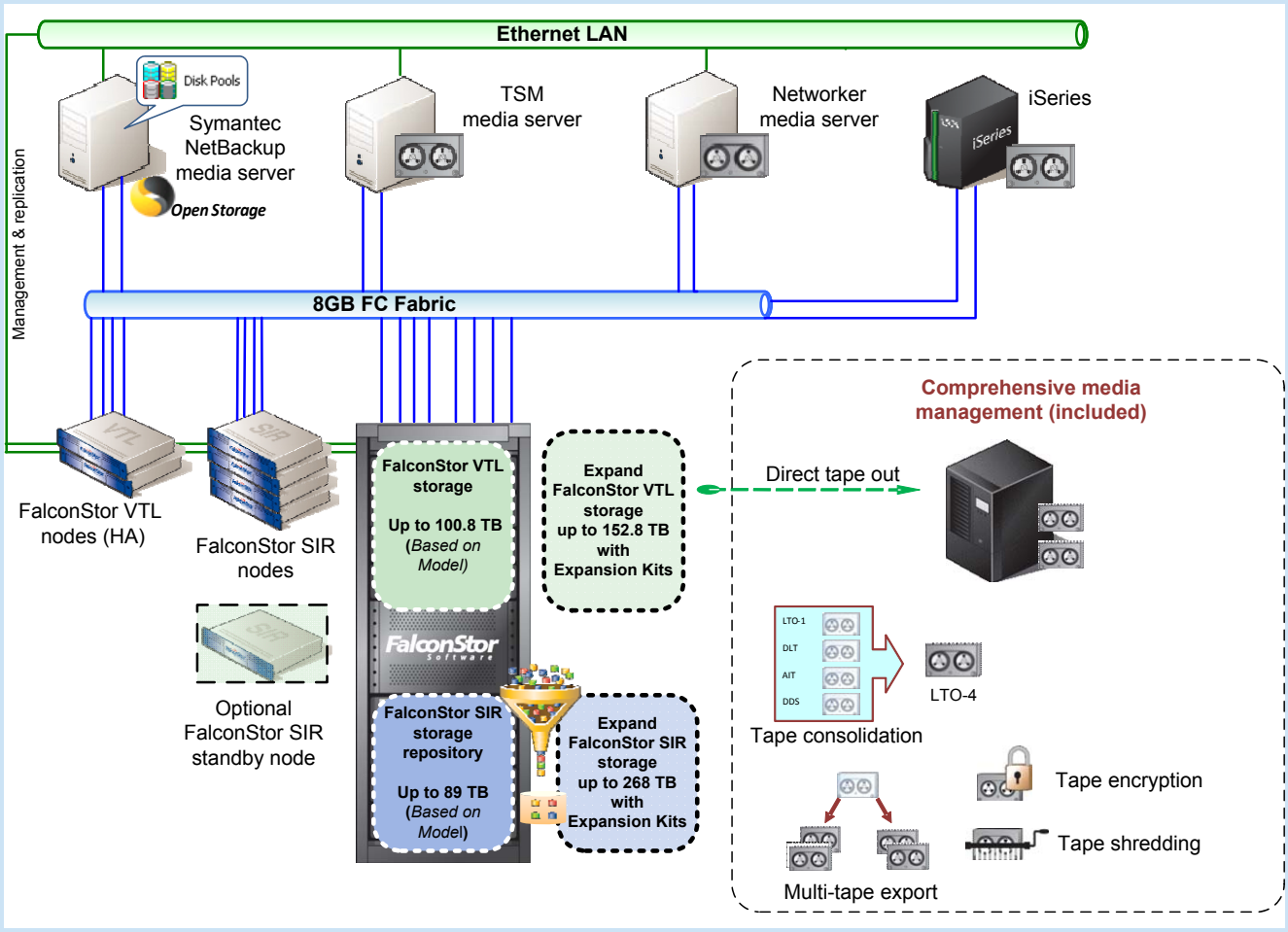
Multiple configuration options

Small. A small FalconStor VTL with clustered deduplication configuration includes a single FalconStor VTL node with aggregate backup speeds of 1500 MB/s (5.4 TB/hr), allowing users to solve the single biggest issue in backup: meeting the backup window. An optional node may be added for HA and to increase aggregate performance to over 3000 MB/s (10.8 TB/hr). This includes a single FalconStor SIR global deduplication node, with the option to add a standby node for automatic failover. Shared high-performance storage includes active-active controllers and 44TB to 67TB of RAID 6 usable repository storage. Storage can scale easily and non-disruptively by adding more shelves.

Medium. A medium FalconStor VTL with clustered deduplication configuration adds a second FalconStor VTL node for HA, automatic failover, and increased aggregate backup speeds of 3000 MB/s (10.8 TB/hr), eliminating single points of failure and improving backup performance to meet tight backup windows. This includes two FalconStor SIR global deduplication nodes, with an option to add a standby node for automatic failover. Shared high-performance storage includes active-active controllers and 44TB to 134TB of RAID 6 usable repository storage. Storage can scale easily and non-disruptively by adding more shelves.

Large. A large FalconStor VTL with clustered deduplication configuration includes two FalconStor VTL nodes for HA, automatic failover, and increased aggregate backup speeds of 3000 MB/s (10.8 TB/hr), eliminating single points of failure and improving backup performance to meet tight backup windows. The large cluster includes four FalconStor SIR global deduplication nodes, with an option to add a standby node for automatic failover. Shared high-performance storage includes active-active controllers and 89TB to 268TB of RAID 6 usable repository storage. Storage can scale easily and non-disruptively by adding more shelves.

Example of a large FalconStor VTL configuration with clustered deduplication.



Specifications

	VTL Server (per unit)	SIR Server (per unit)	Storage Controller (per unit)
Physical Characteristics			
Controller	Dual, quad core X5520 Xeon CPU, 2.26Ghz, 8M cache		Dual: active/active, failover/failback
Hardware compression	1600 Mb/s	N/A	N/A
Hot-plug hard drives	2	2	Based on configuration
Disk type	SATA	SATA	SATA
Power supply	Redundant hot-plug auto-switching (870W)		4 x dual hot swap & redundant (500W)
Dimensions (HxWxL)	3.4 x 17.44 x 26.8" (8.64 x 44.31 x 68.07 cm)		5.2 x 17.6 x 22.1" (13.1 x 44.65 x 56.1 cm)
Weight	57.54 pounds (21.1 kg)		84.9 pounds (38.5 kg)
Host Connections			
iSCSI support: 1 Gb/s	4 ports	4 ports	N/A
iSCSI support: 10 Gb/s	Optional		N/A
FC support	Included		N/A
8Gb FC ports	4 ports	4 ports	N/A
4Gb FC ports	N/A	N/A	N/A
Symantec OST (FC)	Included		N/A
Host expansion port interface cards: 4 x 1GbE ports; 2 x 8Gb/s FC ports; 1x10GbE port	1 expansion slot	2 expansion slots	N/A
Capabilities			
VTLs/drives/cartridges	128/1024/65536		N/A
Deduplication	Included		N/A
NDMP	Included		N/A
Hosted backup	Included		N/A
Replication/encryption	Included		N/A
Tape caching	Included		N/A
Secure tape	Included		N/A
Tape duplication	Included		N/A
Tape consolidation	Included		N/A
ACSLS shared library	Optional		N/A
IBM iSeries support	Optional		N/A
IBM 3494 library support	Optional		N/A
HP NonStop support	Optional		N/A
Environmental Requirements			
Voltage	90-264 VAC, autoranging, 47-63 Hz		100-240 VAC, autoranging, 50-60 Hz
BTU/hr per unit	2969 (high output), 1945 (energy-smart)		4 x 1040
Temperature	32° to 95°F (0° to 35°C)		41° to 104°F (5° to 40°C)
Relative humidity	20% to 80% non-condensing		Maximum 95%
Altitude	-50 to 10000 feet (-16 to 3048 meters)		Up to 12000 feet (3657 meters)

Base configuration

	Base small cluster	Base medium cluster	Base large cluster
Useable storage repository	44TB	44TB	89TB
Maximum usable storage repository (with expansion kits)	67TB	134TB	268TB
# of FalconStor VTL nodes	1	2	2
# of FalconStor SIR nodes	1	2	4
# of storage controllers	4	4	8
# of shelves (FalconStor VTL storage)	4	4	8
# of SATA drives per shelf	16	16	16
Total # of FalconStor VTL SATA drives	64	64	128
Total usable FalconStor VTL capacity	50.4 TB	50.4 TB	100.8 TB
# of shelves (FalconStor SIR storage)	4	4	8
# of SATA drives per shelf	16	16	16
Total # of FalconStor SIR SATA drives	64	64	128
Total usable FalconStor SIR capacity	44.8 TB	44.8 TB	89.6 TB

Cluster upgrade options

SKU	Reason	Small cluster	Medium cluster	Large cluster
FS-VTL820SVR-A	Add FalconStor VTL node	Yes	As needed	As needed
FS-SIR820STB-A	Add FalconStor SIR standby node	Yes	Yes	Yes
FS-VTLCCE13-A	FalconStor VTL cache storage (13TB) 3U	1	4	4
Total FalconStor VTL storage with all expansion kits		63.4 TB	98.4 TB	152.8 TB
FS-VTLCRCE20-A	FalconStor SIR Storage Expansion Kit (22TB) 6U	1	3	6
FS-VTLSRSE20-A	FalconStor SIR Storage Expansion Kit w/ storage controller (22TB) 6U	0	1	2
Total FalconStor SIR storage with all expansion kits		67TB	134TB	268TB

Note: "MB" is defined as 1024 x 1024 bytes, "GB" is defined as 1000MB, and "TB" is defined as 1000GB.

For more information, visit www.falconstor.com/VTL or contact your local FalconStor representative.

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