



The Freedom of High-Performance Backup and Restore with Falconstor Virtual Tape Library (VTL) with Deduplication

Take a Strategic Approach to Reducing Storage Costs and Processing Overhead by Optimizing Backup.

ABSTRACT

This white paper explores the different use cases enabled by FalconStor Virtual Tape Library (VTL) with Deduplication.

THE CHALLENGES OF LEGACY BACKUP

Growing data volumes, the proliferation of server virtualization, and the increased dependence on data availability are all presenting new challenges for legacy backup and recovery solutions. These demands are compounded by shrinking IT budgets and the increased complexity caused by the expansion of remote offices and large heterogeneous data center environments, often with hundreds of servers running various operating systems and applications, generating petabytes of data.

With this explosive data growth – the amount of data is doubling every year – IT organizations are experiencing the challenges of legacy backup:

- Inability to search for data across multiple backups and locations
- Inability to meet recovery time objectives (RTO)
- Difficulty in meeting backup windows
- Disruption of production backup for tape creation
- Increased spending on storage systems
- Longer retention policies that require more storage and tape media and affect SLAs
- Difficulty meeting regulatory compliance requirements
- Unreliable data recovery from tape media

In some cases, traditional tape backup has been replaced by disk-to-disk (D2D) backup to accelerate backup/recovery processes and improve operational efficiencies. However, explosive data growth can drive up storage costs, as each time a full backup is performed, a great deal of redundant data is stored. This also applies to duplicate data within a backup job, across servers, and across backup jobs (full and incremental), leading to multiple copies taking up valuable disk capacity.

THERE'S A BETTER WAY

To overcome the obstacles of legacy backup, a holistic approach to backup and recovery is needed. A solution that integrates non-disruptively with tape- and network-based file infrastructures and provides longer data retention and improved restore times while increasing data reliability is required. A centrally managed, multi-node, highly available global deduplication architecture is also needed to be able to scale to accommodate the data protection needs of remote offices and large data centers alike.

And finally, heterogeneous support for major operating systems such as Microsoft Windows, Unix, and Linux, as well as certification with backup software applications is required to be able to protect existing investments and prevent rip-and-replace scenarios.

FalconStor® Virtual Tape Library with Deduplication meets these stringent requirements. FalconStor VTL is a disk-based solution and emulates physical tape drives and libraries. VTL is a vital tool in your data mastery arsenal and gives you instant hero status by optimizing tape backup and restore so you can save your department money, improve performance, and enable rapid remote disaster recovery.

FalconStor VTL unifies NAS and VTL technology to enhance legacy backup with a more flexible data protection architecture that reduces physical storage needs and costs. Designed with flexibility in mind, FalconStor VTL can be installed at the edge of an organization as a preconfigured storage appliance, in VMware infrastructures as a preconfigured virtual appliance, as well as at the data center or DR site by using high availability (HA). WAN-optimized replication enables cost-effective DR, also setting the stage for cost-effective cloud initiatives.

Benefits include capacity reduction, longer data retention, improved restore times, and increased data reliability through the elimination of tape shipments. Complex passwords and customizable account lockout policies add additional layers of security without compromising performance.

Whether you're refining an existing backup system or implementing a new one, FalconStor VTL with Deduplication can make the process faster and smoother, eliminating backup windows and improving storage efficiency by up to 95%.

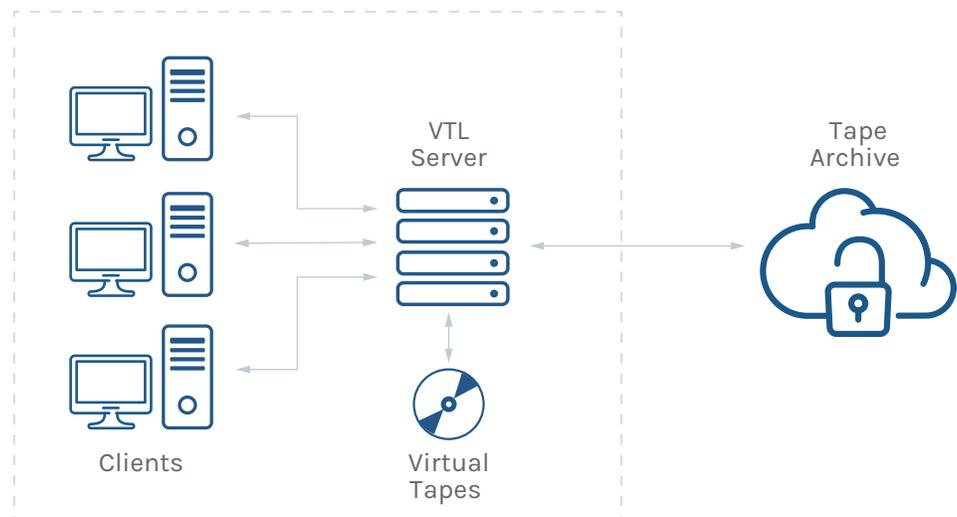
MEET THE BACKUP WINDOW AND SCALE TO MEET DATA GROWTH NEEDS

Designed as an enterprise-class solution, FalconStor VTL with Deduplication can achieve single node aggregate backup speeds of 40TB/hour allowing users to solve the single biggest issue in backup: meeting the backup window.

FalconStor VTL with Deduplication is the only solution that can independently scale HA backup nodes from cluster deduplication nodes to handle large data sets and extremely demanding backup windows. It is also one of the only solutions that can deduplicate data seamlessly across nodes without a predefined node/controller designation. For greater repository capacity, deduplication processing can be physically separated from virtual tape backup processing by running each process on a separate server. The Single Instance Repository (SIR) deduplication engine offers 4-node clustering with an N+1 failover architecture. Multiple nodes can run as a single logical repository. If one node fails, the standby node (+1) automatically takes over its workload to ensure continuity.

EXPORT TAPES TO THE CLOUD AND STOP PHYSICALLY MOVING TAPES OFFSITE FOR STORAGE.

With FalconStor VTL with Deduplication, you can achieve low-cost tape archive by exporting tapes to the cloud, eliminating the need to physically move tapes offsite for storage. This reduces costs and, in remote and branch offices, eliminates the need for non-IT employees to intervene. Data is encrypted for protection and managed by the local VTL software.



EXPERIENCE FAST, FLEXIBLE DEDUPLICATION

Deduplication eliminates redundant data and retains only unique instances on disk, reducing capacity requirements by as much as 95% (based on an average 20:1 deduplication

ratio) and allowing you to keep weeks' or months' worth of data on disk for fast, dependable restore. Users can assign specific policies to individual deduplication, replication, and tape output jobs.

FalconStor VTL provides the flexibility to select the deduplication policy that best aligns performance to business requirements: Inline minimizes storage requirements and replicates sooner. Postprocess helps meet tight backup windows. Turbo makes the best use of CPU resources, especially in clustered environments. No deduplication works best for data that does not deduplicate effectively or will be archived to tape. Combined with high-speed protocols such as 8Gb Fibre Channel (FC) and 16GbE, this solution can sustain deduplication rates of 40TB/hour per node, linearly scaling in performance to a sustained deduplication rate of over 40TB/hr in two-node HA cluster.

***How It Works:** The FalconStor SIR deduplication engine examines the data stream, checking for blocks of data that are identical and removing redundant copies. Data indexing ensures that all of the data can be recovered. When a file read request is initiated for data restore, the deduplication system can detect the links and read the blocks.*

DEPLOY IN A NON-DISRUPTIVE MANNER

FalconStor VTL with Deduplication offers simplified, non-disruptive integration with backup environments. With the choice of NAS and VTL interfaces, it seamlessly integrates with major backup software, database utilities, archiving applications, virtual machine data, and manual file copy methods. There is little or no need to change D2D backup applications or file and data archiving processes. By offering an extensive, certified set of tape libraries and drives, including IP, FC SAN, and Symantec OpenStorage Technology (OST) protocols for SAN and IP, this solution provides higher backup throughput and faster backup to disk. Backup methods and policies do not have to change in order for performance and reliability to improve drastically.

***How It Works:** FalconStor VTL with Deduplication emulates over 60 popular tape libraries and 30 tape drive formats, ensuring easy and transparent integration into existing environments without the need to reconfigure backup jobs. Format awareness for over 32 backup formats maximize detection of duplicate data, guaranteeing that the same data is aligned the same way each time and improving deduplication efficiency by as much as 40% over generic, fixed, block deduplication methods. Simultaneous support for NDMP, SMG/NFS, Veritas OST, and IBM environments provides non-disruptive support for all backup applications in an enterprise.*

SEAMLESSLY BRIDGE DISK AND TAPE

Many data centers require both disk and tape for tiered backup and archive/compliance needs. FalconStor VTL with Deduplication seamlessly bridges physical and virtual tape operations through best-of-breed tape management. By integrating seamlessly with the tape environment, this solution streamlines operations, preventing isolated silos of backup and unnecessary overhead.

***How It Works:** A physical tape library can be FC zoned to the solution device so that data can be imported from tape to disk or exported from disk to tape. For DR, deduplicated tapes that have been replicated can be exported, making data directly accessible from the tape. Backup software can use its own tape copy function to create physical copies from a virtual tape library. A built-in auto-archive feature can automatically export modified data to tape.*

AUTOMATE TAPE CACHING

Automated tape caching enhances the functionality of FalconStor VTL with Deduplication

by acting as a cache to the physical tape library, providing transparent access to data regardless of location. With automated tape caching, tapes always appear to be inside virtual libraries and are always visible to the backup application. The backup application always has direct access to data.

***How It Works:** A tape caching policy contains data migration triggers that determine which events will activate an action and when it will occur. Tape caching policies are very flexible and can be defined to automatically trigger migration to physical tapes immediately or at a specific time. Data is written to physical tape transparently in the background, without impacting production servers.*

CONSOLIDATE TAPE

Because backup jobs rarely match the exact size of the target tape, space often gets wasted. Tape consolidation writes multiple virtual tapes to a single physical tape, maximizing utilization of physical media. This significantly reduces the number of cartridges used, shipped, and stored, lowering overall costs. In fact, the cost savings that can result from tape consolidation alone is often enough to enable a return on investment (ROI) in VTL with Deduplication.

***How It Works:** Tape consolidation allows the conversion of virtual media with a smaller capacity to physical media with a higher capacity (i.e. DLT to LTO). This allows newer, larger capacity physical tape formats to be deployed into the backup infrastructure. There is no need to reconfigure backup jobs, which can continue to run to virtual tapes based on the original assigned tape format.*

EXPORT MULTI-TAPES

Organizations often need to create multiple copies of tapes to meet service level agreements (SLAs) and regulatory requirements. VTL with Deduplication provides multi-tape export, which creates multiple copies of physical tapes. This increases IT productivity, eliminating the need for manual tape duplication or scripting.

***How It Works:** FalconStor VTL with Deduplication can create up to five physical copies of virtual tapes as part of automated tape caching or an auto-archive policy; or it can occur during manual export of a single tape. When data is exported, separate jobs are created for each physical tape copy, and each job is assigned a unique job ID so that it can be tracked, monitored, and recovered.*

HAVE PEACE OF MIND WITH BUILT-IN SECURITY

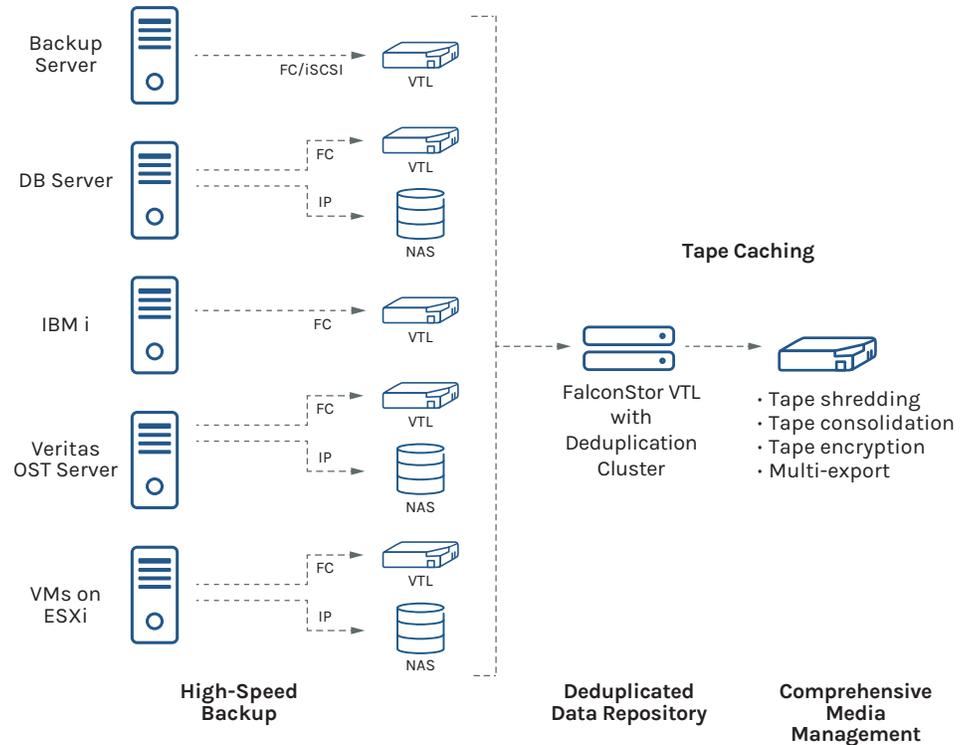
To ensure data integrity, FalconStor VTL with Deduplication provides a full set of features to secure data on backup media, during replication, and at rest. Encryption in-flight protects data during replication while supporting Federal Information Processing Standards (FIPS) 140-2 compliance. Support for complex passwords, user account lockout and password expiration limits system access to only designated users. A secure tape export feature provides comprehensive data integrity for storage and migration. In addition, integrated tape shredding destroys all of the data on virtual tape during deletion, for optimal security.

How It Works:

- **Secure Tape Export.** This solution enables the creation of encryption keys using the Advanced Encryption Standard (AES) 256-bit key algorithm. When data is exported to physical tape, an encryption key must be selected. When that physical tape is imported, the same key must be used to decrypt the data and enable it to be read. Each key consists of a secret phrase and is password-protected. A single key may be applied to all virtual tapes when exported to physical tape, or a unique key may be created for each physical tape.
- **Tape Shredding.** Tape shredding performs a three-pass wipe of the selected virtual tapes using an algorithm specified by the U.S. Department of Defense (Standard 5220.22-M), helping IT managers meet security and regulatory compliance requirements.

- **Encryption at Rest.** By creating encryption keys using the Advanced Encryption Standard (AES) 256-bit key algorithm. All data written to virtual tape and stored in the deduplication repository will be stored in an encrypted state. Encrypted data can be replicated to both encrypted and non-encrypted virtual tape libraries.

INTEGRATE HIGH-SPEED BACKUP AND TAPE ACROSS HETEROGENEOUS ENVIRONMENTS



WAN-OPTIMIZED REPLICATION

FalconStor VTL with Deduplication supports one-to-one, one-to-many, and many-to-one replication of deduplicated data, enabling consolidation at a centralized site. With stand-alone storage appliances deployed at each site, deduplicated virtual tapes in remote locations can be globally replicated via the WAN to the data center, where data is aggregated into a clustered repository of globally unique data. Data from remote sites can be exported to physical tape at the central site as needed, eliminating tape entirely at remote sites.

How It Works: WAN-optimized replication includes global deduplication, which scans data prior to transmission to determine if it already exists in the central site. Only unique missing data blocks are sent over the wire, reducing bandwidth requirements by as much as 95%, along with associated costs. Compression and bandwidth throttling further optimize WAN utilization. Data can be encrypted in-flight and validated at the DR site to provide data assurance. Additionally, FalconStor VTL supports FC replication, a unique feature that enables large data centers to support dark fibre links to their DR sites, drastically improving replication and restore performance.

SUPPORT VERITAS OST

FalconStor VTL with Deduplication includes the industry's first FC SAN target for the Veritas OST protocol, accelerating backup from Symantec NetBackup Media Servers and enabling

Deployment Options



Software Only

Choose the hardware configuration appropriate for the level of continuity required.



Virtual Appliance

Deploy in small environments or branch offices in virtual or physical settings.



Storage Appliance

Provide continuity and remove the risk of downtime with an all-in-one appliance.



Gateway

Put existing storage to better use in larger organizations with gateway deployments that provide consistent capabilities across multiple types of storage.

transparent operations including single pane-of-glass management, high performance, and catalog consistency during NetBackup duplication (replication), A.I.R. (auto image replication), Accelerator backup, Optimized Synthetic Backup, and tape operations. Additionally, this solution can operate in a mixed mode, combining Veritas OST logical storage units and virtual tape data from other backup applications. Optimized APIs and the ability to support up to 250,000 images enable the most efficient storage utilization.

How It Works: An OpenStorage option interfaces with Veritas NetBackup, enabling the NetBackup server to perform high-speed backup and recovery to intelligent disk devices over FC. As the FalconStor solution uses disk to emulate physical tape, this option provides an additional disk view through NetBackup. FalconStor VTL with Deduplication supports Veritas Optimized Duplication, which provides integrated replication to local or remote DR sites. The solution also allows CIFS/NFS and Veritas OST LSU shares to operate simultaneously so multiple users and applications can share the deduplication target residing in a common repository.

MANAGE AND CREATE AND DELIVER REPORTS

For simplified, comprehensive management, FalconStor VTL with Deduplication offers a host of administration features, including extensive command line functionality, historical and real-time reporting, email alerts, and group-based policy management, all via a centralized management console. Additionally, it provides SNMP support for integration with existing enterprise management solutions, such as HP OpenView, CA Unicenter, IBM environments and BMC Patrol.

How It Works: Easy-to-use wizards allow you to configure and manage users and administrators, add/configure clients, set server properties, monitor activity, create deduplication policies, monitor deduplication, replicate data, and manage the import/export of tapes. Users can also monitor the status of total storage capacity, used storage capacity, and available storage capacity and run and/or view reports. Predefined enterprise-level reports help manage and monitor FalconStor clusters, disk space usage, physical resource allocation, comprehensive status information, and storage and performance trending for optimal capacity planning.

DEPLOYMENT OPTIONS

Designed with your organization's size and unique needs in mind, FalconStor VTL with Deduplication is available in several form factors:

- **Software Only:** Provides the flexibility to choose the hardware and configuration appropriate for the level of protection and recovery required.
- **Virtual Appliance:** For VMWare infrastructures scaling from 1TB - 10TB
- **Storage Appliance for ROBO and Midmarket:** For remote/branch office (ROBO) and mid-market environments, scaling from 12TB - 192TB.
- **Cluster Deduplication Gateway for Midmarket and Enterprise:** HA cluster deduplication gateways that integrate with certified existing SAN storage, scaling to 2PB of usable storage for midmarket organizations, enterprises, and large enterprise

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