Migrating to Dell Compellent Storage Using FalconStor Data Migration Solutions

A Dell Technical White Paper

Abstract
This technical report details the benefits that the data migration solution from FalconStor provides for Dell Compellent storage systems. It also includes best practices and some use cases.
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Introduction
One of the biggest challenges that storage professionals face is the need to move data to new disk arrays as older models become outdated, inefficient, or reach the end of their lease cycles. Many organizations will postpone data migrations due to the associated downtime and service costs. These delays can create additional delays and costs, such as extended lease terms and increased operational expenses. The more complex and heterogeneous an environment is, the more problematic this becomes.

FalconStor, a market leader in disk-based data protection, has partnered with Dell to provide a high-performance, reliable, and flexible solution for data migration. The FalconStor® Network Storage Server (NSS) solution provides storage virtualization and data migration technology in a Dell appliance, allowing Dell Professional Services to easily migrate data from any FalconStor-certified third-party array to new Dell Compellent storage systems. This includes any-to-any data movement between multiple protocols and storage systems.

By enabling customers to migrate non-disruptively from legacy storage platforms to new high-efficiency Dell storage platforms, FalconStor NSS allows them to uncover inaccessible storage, eliminate isolated islands of underutilized capacities, and increase the overall utilization rate of storage resources.

Dell & FalconStor partnership
FalconStor leads the way in developing innovative, scalable, and open network storage solutions designed to optimize the storage, protection, efficiency, and availability of enterprise data and applications. The company’s mission is to transform traditional backup and disaster recovery (DR) into next-generation service-oriented data protection. Built upon an award-winning platform, FalconStor solutions deliver disk-based backup, continuous data protection, WAN-optimized replication, and disaster recovery (DR) automation. FalconStor-powered data protection solutions change the economic equation for companies that need to manage their IT bottom lines - despite exponential data growth and ever-expanding retention periods.

FalconStor is part of Dell’s Technology Partner program, which is a multi-tier program that includes ISVs, IHVs, and Solution Providers. Likewise, Dell is a FalconStor Strategic Partner. Working together, Dell and FalconStor have built an innovative and competitive business solution using Dell server and storage platforms. Under the program, Dell and FalconStor have tested the FalconStor NSS technology to validate the integration and interoperability with Dell’s offerings.

Joint solution overview
FalconStor NSS can be deployed in mixed operating system and protocol environments, supporting platforms such as HP-UX, AIX, and Solaris, in addition to supporting mainstream operating systems such as Microsoft Windows, Linux, and VMware. This allows Dell customers to confidently migrate their data in complex, multi-vendor environments.

There are three key types of migrations that can be facilitated using FalconStor NSS technology on Dell servers:

- **In-band (Online):** FalconStor NSS is installed on Dell servers in high availability (HA) configurations and zoned between hosts and arrays while the data is migrated.

- **Offline:** While the hosts are shut down, the source array and target array LUNs are mirrored by provisioning them to the FalconStor NSS migration server.
• **Direct Connect Servers:** When servers are directly connected to arrays, FalconStor NSS can connect directly to the existing array and to the new Dell Compellent storage. This allows an administrator to mirror the disk or replicate the data to a remote site.

**Dell storage platforms**

Dell offers a comprehensive portfolio of storage platforms to help organizations reap the benefits of consolidation. Dell’s award-winning primary storage portfolio consists of the virtualized iSCSI EqualLogic™ PS Series SAN and the multi-protocol Dell Compellent™ Storage Center NAS and SAN family. Dell also offers file-based Microsoft Windows NAS and Unified Storage platforms, as well as direct-attached storage (DAS). The breadth of storage architectures and platforms, and expertise, allows Dell to help customers design and implement storage solutions uniquely designed for their needs.

This paper is focused on Dell’s Compellent Storage Center. Compellent is a reliable, self-optimized storage array designed to power the enterprise. Built-in intelligence boosts performance of business-critical applications while maximizing efficiency to help lower total cost of ownership (TCO). Intuitive software unifies block and file management and delivers real-time intelligence on data usage. Non-disruptive hardware scalability and perpetual software licensing make this array one of the best investments of any enterprise-class array on the market.

**FalconStor data migration**

*Migrate and move data without downtime*

The FalconStor NSS solution is a SAN-based storage virtualization platform that enables simple point-and-click data migration through the use of synchronous data mirroring between disk arrays. As storage resources get closer to their lease terms, FalconStor NSS enables customers to swap storage frames by mirroring data to the new arrays and decommission the old arrays without application downtime. An open architecture supports a broad range of hardware, software, and protocols, enabling migration in heterogeneous environments and including Fibre Channel (FC) to iSCSI, and iSCSI to FC. Using FalconStor NSS in a migration to Dell Compellent storage allows customers to:

- Take advantage of latest storage technology while protecting current investments
- Move data and applications quickly with minimal risk
- Upgrade storage arrays and consolidate storage
- Implement or leverage a tiered storage environment
- Leverage virtualization technology through extensive VMware integration and support

**Key features**

*Synchronous Mirroring* - Synchronous mirroring is a necessary component of migrating data from one vendor’s disk array to another, allowing a virtual or Service Enabled Disk (SED) to be mirrored to another set of physical storage media. Synchronous Mirroring offers the ability to define a synchronous mirror for any FalconStor-managed disk (virtualized or service-enabled). In the event that the primary disk is unable to read/write data when requested by a SAN Client, FalconStor NSS seamlessly swaps data functions to the mirrored copy disk.
Synchronous mirroring provides high availability by minimizing the downtime that can occur if a physical disk fails. The mirror can be defined with disks that may vary in terms of vendor, type, or interface (SCSI, FC, iSCSI). When the primary disk is damaged or inaccessible, the system will swap the mirror disk as the primary so access to the data is continuous. The same feature can also be used as a real-time data migration feature.

Unique Uncertainty Map (U-Map) technology is employed to track changes when the mirror connectivity is disrupted. By design this minimizes the resynchronization time and performance impact for continuous protection. Dell has validated this functionality by mirroring between existing EMC CX4 storage and Dell Compellent storage.

**HA/Failover** - High availability is required when performing online data migration. Configuring FalconStor NSS in HA pairs protects the environment from a variety of issues, including connectivity failures, storage device failures, and path failures. Failover and failback of a HA pair is a critical part of the FalconStor QA engineering and certification process.

**Service Enabled Disks (SED)** - SED is a unique, patented technology that allows physical LUNs with existing data to be controlled by FalconStor NSS and the disks presented back to the original client host. The disks remain in their original format and the client host is able to access the original data as if the disks are still connected directly. New data is written to the disks exactly as if the disks were directly connected to the host via the SAN.

If the disks ever need to be removed from FalconStor NSS and directly reconnected to the client host, the data format is preserved and data becomes immediately accessible.

With the SED capability, third-party disks with data can be migrated using mirroring. Although the disks are never used as virtual disks, the SED technique allows the disks to be emulated as virtual disks to perform real-time data migration, with minimum interruption to operations.

**Advanced Virtual Storage Services** - Disks that are connected through FalconStor NSS with the SED feature are enabled with advanced virtual storage services such as application-aware snapshots, WAN-optimized replication with compression and encryption, and automated disaster recovery. These services are enabled transparently without altering the disks, which allows the disks to easily be mirrored to the new Dell storage platform.

**How migration works**

To enable migration, the FalconStor NSS solution is installed on a Dell appliance, which is then inserted into the SAN fabric. Using the SED feature, FalconStor NSS can connect to existing storage LUNs without the need to modify the native data format. Any new storage array that is connected to the SAN is also zoned to the FalconStor NSS migration device.

With the new storage in place, data LUNs are mirrored to the new array. It does not matter if the new array uses different drive sizes or different RAID configurations. FalconStor NSS provides block-level, synchronous mirroring between the two storage frames. There is no need to shut down applications. Granular controls over quality of service (QoS), input/output (I/O) throughput, and other factors ensure that primary application processing is uninterrupted.

When the data mirroring is complete, the legacy storage platform can be taken offline and operations can continue from the new Dell storage platform.
Best practices

In order to enable the best possible data migration project, FalconStor recommends that customers implement the following best practices:

- Determine the type of migration and the necessary required maintenance windows
- Pre-test migration in a lab setting in an existing environment
- Coordinate dates and activities with all affected groups
- Request appropriate outage windows
- Document pre-migration environment
- Confirm the required state of configuration post-migration
- Develop process and risk assessment documents

The following summary outlines a typical data migration process:

1. Configure the FalconStor NSS migration device so that it has access to existing storage by re-zoning the SAN. There is no need to re-cable the environment.

2. To ensure failover/failback during online migration, FalconStor NSS should be configured in HA pairs.

3. Insert the FalconStor NSS migration device into the data path. Verify that the host-to-storage access is successfully restored.
4. Configure the FalconStor NSS/HA pair to access the new Dell Compellent storage device.

5. Initiate the data migration process to transfer data from the source device to the new destination. Migration can be performed one LUN at a time; FalconStor recommends running up to five LUNs concurrently to maximize throughput at disk array speed. Monitor the progress carefully and wait for completion.

6. Repeat the steps above for all LUNs to be migrated.

7. Activate the new Dell Compellent storage as the production storage.

8. Remove the FalconStor NSS/HA pair and configure the host to directly access the Dell Compellent storage device. Verify that the host-to-storage access is maintained.

**Use cases**

Many organizations have realized the value of migrating to Dell storage using FalconStor NSS. For example, a financial institution in the Southeast U.S. needed to perform long-term migration to Dell Compellent Series 40 arrays. FalconStor NSS allowed the flexibility to decommission the old technology and move applications to Dell storage in increments as needed. The company initially migrated 30TB of data and continues to leverage the solution to migrate additional data and expand the infrastructure.

Another company performed a cost/benefit analysis of owning technology versus paying for services, and determined that it required long-term migration to Dell Compellent storage for improved internal control. Facilitated by FalconStor NSS, this customer has migrated 100TB of data. As the company’s storage needs grow and legacy arrays reach end-of-life, FalconStor NSS allows the customer to upgrade to the new Dell Compellent storage without costly downtime.

**Conclusion**

The integration of FalconStor NSS and Dell storage solutions solves the most pressing issues related to data migration and storage infrastructure refreshes. The joint solution allows a customer to seamlessly migrate data from an older storage infrastructure to Dell storage, reducing costs, improving performance, and getting the most value from existing and new investments in IT.

A complete list of FalconStor NSS-supported storage devices from which a customer can migrate can be found on the FalconStor Certification Matrix, located at [http://www.falconstor.com/support-and-services/support-and-services-overview/certification-matrix](http://www.falconstor.com/support-and-services/support-and-services-overview/certification-matrix)

For more information about this offering, please contact dellmigration@falconstor.com