

Best Practices for Data Migration Using FalconStor NSS

Technical White Paper

FalconStor®

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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biggest challenges that storage professionals face is the need to move data to new disk arrays as older models become outdated, inefficient, or reach the end of their lease cycles.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, provides 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 single solution allowing organizations to easily migrate data to new storage systems, including any-to-any data movement between multiple protocols and systems.

By enabling customers to migrate non-disruptively from legacy storage platforms to newer, high-efficiency 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.



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

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 project 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.

High Availability (HA)/Failover. In order to ensure business continuity, high availability (HA) 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 FalconStor's 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 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 a new storage platform.



How Migration Works

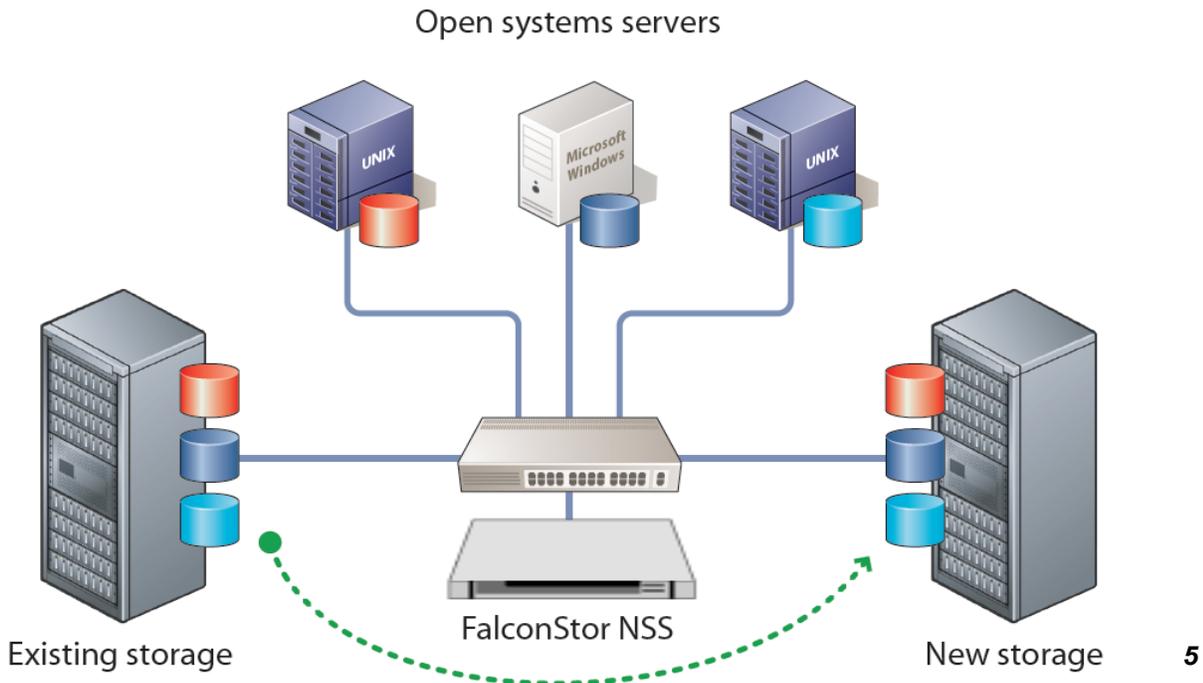
There are three key types of migrations that can be facilitated using FalconStor NSS technology:

- **In-band (Online):** FalconStor NSS is installed 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 storage. This allows an administrator to mirror the disk or replicate the data to a remote site.

In a migration project, FalconStor NSS is inserted into the SAN fabric of an IT infrastructure. The SED feature enables FalconStor NSS to 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, even if the new array uses different drive sizes or different RAID configurations.

With the new storage in place, data LUNs are mirrored to the new array. FalconStor NSS provides block-level, synchronous mirroring between the two storage frames without requiring users to shut down applications. Granular controls over quality of service (QoS), input/output (I/O) throughput, and other factors ensure that primary application processing remains uninterrupted.

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





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



Conclusion

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. Our 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 Data Migration solutions change the economic equation for companies that need to manage their IT bottom lines – despite exponential data growth and ever-expanding retention periods.

The open architecture of FalconStor NSS enables integration with existing and new storage and servers, solving the most pressing issues related to data migration and storage infrastructure refreshes. The solution allows customers to seamlessly perform storage upgrades, 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 can be found on the FalconStor Certification Matrix located at www.falconstor.com/matrix.