**NAS Storage Migration Techniques**

These options only cover NetApp NAS migration options at the storage level. Other methods exist for other storage vendors, as well as for the various platform groups which won't be covered here.

The Storage team requires a minimum of 3-5 business days notice to complete all necessary pre-checks and initial data transfer for any storage migration. This window may need to be larger depending on the amount of data being moved, the network connectivity between source/target filers,

This 3-5 days notice is purely for the storage technical work and does not include any coordination efforts such as contacting BUs for an outage window, creating CR(s), getting approvals, etc. that would typically be handled by a project manager.

In general, if the prerequisites for NetApp DataMotion can be met then it is the preferred migration method due to the relatively simple setup, cutover, and rollback functionality (if problems exist after a migration) it provides.

**Quick Overview of Migration Options**

* Netapp DataMotion (offline or online)
  + Moves an entire vfiler and all of its resources from one physical filer pair to another physical filer pair.
  + Minimal preparation and post-migration work.
  + Easy rollback to source filer if problems appear after migration cutover.
  + A strict set of criteria for both source and target filers to be met.
* CLI Vfiler Migrate (offline only)
  + Moves an entire vfiler and all of its resources from one physical filer pair to another physical filer pair.
  + Greater preparation and post-migration work.
  + Less-strict setup criteria for source and target filers to be met.
* SnapMirror (offline only)
  + Copies data in a volume or qtree from a source vfiler to a new target vfiler
  + Large amount of setup and preparation work
  + Server side changes needed - new vfiler setup dictates NFS mount changes for UNIX hosts, new DNS records for CIFS shares, etc.

More in-depth information is available for each migration method on the following pages.

**NetApp DataMotion Overview**

NetApp DataMotion is a technology that will move an entire vfiler as a whole to a new physical filer. Migration is controlled by and run by a single managing DFM.

While there is both an offline \*and\* online version of a DataMotion cutover, it's worth noting we ONLY use offline DataMotion cutovers unless the Design & Engineering team approves an online cutover.

Offline DataMotion cutovers behave in a predictable and reliable way during each cutover instance. Additionally, offline cutovers don’t have the potential performance impact to either source or target filers that online cutovers exhibit.

Base Technical Requirements:

* Source and target filers must both be managed by the same DFM.
* No inter-cluster DataMotion (must be moving to a new filer-pair).
* Target filer must be an equal or “bigger” model than source filer (IE you can move from a FAS6080 to a FAS6210, but not from a FAS6080 to a FAS3140).
* Source and target filers ONTAP versions must be 8.1 or higher.
* Source and target filers must be licensed for multistore, snapmirror, and snapmirror\_sync.
* Source and target filers must be able to resolve each other's DNS names.
* Source and target filers must have identical ipspaces for migrating vfiler (vfiler must be migrating within the same datacenter.)
* Source and target aggregates for all volumes being migrated must be same type (IE both 32bit or 64bit).
* All volumes being migrated must be 10GB or higher.
* CPU utilization of source and target filers must be lower than 90%, how much lower depends on the current workload of both filers as well as the workload to the vfiler (online cutovers only).

Pros:

* Vfiler IP address and DNS records remain the same after migration.
* Entire vfiler is moved to a new physical filer pair and maintains all existing NFS export configurations, CIFS configurations, quota configurations, snapvault configuration, etc. after cutover.
* Migration preparation and cutover work is simple compared to other migration methods.
* Can avoid taking an outage for NFS and iSCSI volumes during cutover window (online migration only), depending on performance metrics.
* The setup and cutover processes are centrally managed by the DFM, meaning the cutover process can easily be completed by other staff members in a different timezone.

Cons:

* Strict set of requirements surround using DataMotion, little flexibility.
* Performance of both source/target filers will impact cutover length and success (online cutovers only).
* Migration success depends on the managing DFM to be working properly both during setup and during cutover time.

**CLI Vfiler Migrate Overview**

CLI vfiler migrate is also used to migrate an entire vfiler from one physical filer to another. It is based upon using the standard NetApp Snapmirror technology.

This method is an offline-only migration and an outage window is required in every instance.

Technical Requirements:

* New volumes with exact same names and sizes from source vfiler must be manually created on the target filer.
* Certain ONTAP versions must be met to use cli vfiler migrate (technically using SnapMirror), see NetApp support site for details - (<https://library.netapp.com/ecmdocs/ECMP1368826/html/GUID-ED9C09EF-3F61-41FE-B8F1-36356C5FEC5F.html>)

Pros:

* Vfiler IP address and DNS records remain the same after migration.
* Entire vfiler is moved to a new physical filer pair and maintains all existing NFS export configurations, CIFS configurations, quota configurations, snapvault configuration, etc. after cutover.

Cons:

* Additional work needed for setup as each volume to be migrated in the vfiler needs to be manually recreated on the target filer. Necessary preparation work can be found on NetApp support site - (<https://library.netapp.com/ecmdocs/ECMP1155585/html/GUID-A788DBD7-74C6-4FB5-BDBC-719D3328A1D5.html>)
* Outage window absolutely required for all hosts connecting to vfiler being migrated.
* Setup and cutover involve executing commands directly on the root filer CLI console. This can be problematic if multiple users are attempting to administer the filer at the same time.
* CLI vfiler migrate is restricted by filer ONTAP versioning, see NetApp support site for details. (<https://library.netapp.com/ecmdocs/ECMP1368826/html/GUID-ED9C09EF-3F61-41FE-B8F1-36356C5FEC5F.html>)

**Volume/Qtree SnapMirror Overview**

Volume and qtree snapmirrors are the fallback migration opens when an entire vfiler can't be moved, if a single volume/qtree needs to be migrated, or if there are other limitations in place such as incompatible ONTAP versions preventing other vfiler migration methods.

Technical Requirements:

* New vfiler must be manually created on target filer.
* New volumes with exact same names and sizes from source vfiler must be manually created on the target filer.
* Certain ONTAP versions must be met to use Volume Snapmirror, see NetApp support site for details. (<https://library.netapp.com/ecmdocs/ECMP1368826/html/GUID-ED9C09EF-3F61-41FE-B8F1-36356C5FEC5F.html>)

Pros:

* More flexibility on where volumes are being moved to. Often used when the target filer has reached its vfiler limit and volumes need to be condensed/stacked into a single vfiler.
* Allows for previously stacked volumes to be "unstacked" or split to different vfilers if desired.
* Volume snapmirrors transfer volume snapshots to the target filer.
* Qtree snapmirrors bypass the ONTAP versioning problems that volume snapmirrors face.
* Most familiar NetApp technology to Storage team members, little questions/confusion should be present using this method.

Cons:

* Volume Snapmirror is restricted by filer ONTAP versioning, see NetApp support site for details. (<https://library.netapp.com/ecmdocs/ECMP1368826/html/GUID-ED9C09EF-3F61-41FE-B8F1-36356C5FEC5F.html>)
* Amount of work during setup and cutover scales upward with the number of volumes or qtrees being migrated.
* Qtree snapmirrors do not transfer snapshots to the target filer.
* Outage window absolutely required for all hosts connecting to vfiler/volumes/qtrees being migrated.