SVM data mobility

ONTAP 9

NetApp
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Learn about ONTAP SVM data mobility

Beginning with ONTAP 9.10.1, cluster administrators can non-disruptively relocate an SVM from a source cluster to a destination cluster to manage capacity and load balancing, or to enable equipment upgrades or data center consolidations.

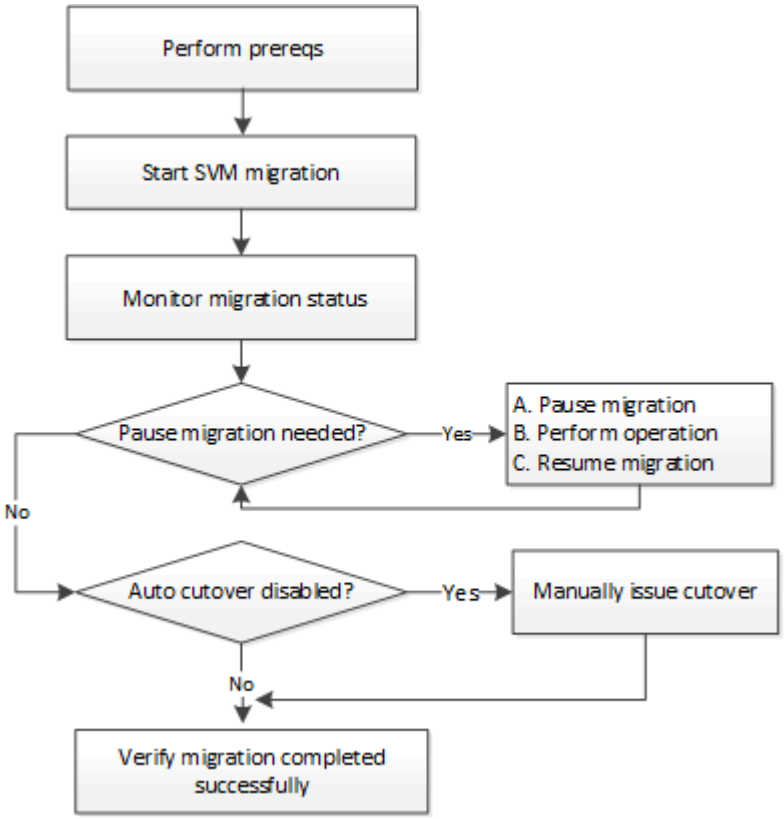
Non-disruptive SVM relocation is supported on AFF systems in ONTAP 9.10.1 and 9.11.1. Beginning with ONTAP 9.12.1, this capability is supported on both FAS and AFF systems and on hybrid aggregates.

The SVM's name and UUID remain unchanged after migration, as well as the data LIF name, IP address, and object names, such as the volume name. The UUID of the objects in the SVM will be different.

Beginning with ONTAP 9.18.1, SVM migration is supported from ASA storage systems to ASA r2 storage systems. If you have an ASA r2 storage system (ASA A1K, ASA A90, ASA A70, ASA A50, ASA A30, ASA A20, or ASA C30) and you would like to migrate an SVM to your ASA r2 system from an ASA system, follow these steps.

SVM migration workflow

The diagram depicts the typical workflow for an SVM migration. You start an SVM migration from the destination cluster. You can monitor the migration from either the source or the destination. You can perform a manual cutover or an automatic cutover. An automatic cutover is performed by default.



SVM migration system support

Controller family	ONTAP versions supported
ASA	ONTAP 9.18.1 and later Follow these steps for SVM migration from ASA to ASA r2 systems.
AFF C-series	ONTAP 9.12.1 patch 4 and later
FAS	ONTAP 9.12.1 and later
AFF A-series	ONTAP 9.10.1 and later

When migrating from an AFF cluster to a FAS cluster with hybrid aggregates, auto volume placement attempts to perform a like-to-like aggregate match. For example, if the source cluster has 60 volumes, the volume placement tries to find an AFF aggregate on the destination to place the volumes. When there is not sufficient space on the AFF aggregates, the volumes are placed on aggregates with non-flash disks.

Scalability support by ONTAP version

ONTAP version	HA pairs in source and destination
ONTAP 9.14.1 and later	12
ONTAP 9.13.1	6
ONTAP 9.11.1	3
ONTAP 9.10.1	1

Network infrastructure performance requirements for TCP round trip time (RTT) between the source and the destination cluster

Depending on the ONTAP version installed on the cluster, the network connecting the source and destination clusters must have a maximum round trip time as indicated:

ONTAP version	Maximum RTT
ONTAP 9.12.1 and later	10 ms
ONTAP 9.11.1 and earlier	2 ms

Maximum supported volumes per SVM

The maximum number of volumes that you can migrate per SVM in a mixed or hybrid cluster is based on the cluster member that supports the lower number of volumes.

Source	Destination	ONTAP 9.14.1 and later	ONTAP 9.13.1	ONTAP 9.12.1	ONTAP 9.11.1 and earlier
AFF	AFF	400	200	100	100

FAS	FAS	80	80	80	N/A
FAS	AFF	80	80	80	N/A
AFF	FAS	80	80	80	N/A

Prerequisites

Before initiating an SVM migration, you must meet the following prerequisites:

- You are a cluster administrator.
- The source and destination clusters are peered to each other.
- The source and destination clusters have the SnapMirror synchronous license installed. This license is included with ONTAP One.
- All nodes in the source cluster are running ONTAP 9.10.1 or later. For specific ONTAP array controller support, see Hardware Universe.
- All nodes in the source cluster are running the same ONTAP version.
- All nodes in the destination cluster are running the same ONTAP version.
- The destination cluster ONTAP version is at the same or no more than two major newer versions as the source cluster.
- The source and destination clusters support the same IP subnet for data LIF access.
- Both the source and destination clusters must have at least one interface that has access to all the migrating SVM's networks, otherwise the migration precheck will fail.
- The source SVM contains fewer than the maximum number of supported data volumes for the release.
- Sufficient space for volume placement is available on the destination.
- The Onboard Key Manager or external key management is configured at the cluster level on the destination if the source SVM has encrypted volumes.
  - In this case, key managers configured at the SVM level on the source do not migrate to the destination. The destination uses the cluster-level key manager.
- If the source has encrypted volumes and is configured for NetApp Aggregate Encryption (NAE), the destination must also be configured for NAE.
- If you are migrating an SVM between a non-MetroCluster configuration and a MetroCluster configuration, or between two MetroCluster configurations, verify that your configuration meets the following requirements:

  Migrating an SVM between the local and partner cluster in a MetroCluster configuration is not supported.

  - The source and destination MetroCluster clusters are in a "normal" state. This means that they cannot be in switchover mode or in the "waiting-for-switchback" state.
  - The source and destination MetroCluster clusters aren't in the process of an FC-to-IP transition or a hardware refresh.
  - The source and destination cluster must both be running ONTAP 9.16.1 or later.
  - If the source is a MetroCluster cluster, the SVM subtype is "sync-source" (not "sync-destination").

If the destination is a MetroCluster cluster, the SVM created on the destination is always "sync-source". If the destination is a non-MetroCluster cluster, the SVM subtype is always "default".

Best practice

When performing an SVM migration, it is a best practice to leave 30% CPU headroom on both the source cluster and the destination cluster to enable the CPU workload to execute.

SVM operations

Check for operations that can conflict with an SVM migration:

- No failover operations are in progress
- WAFLIRON cannot be running
- Fingerprint is not in progress
- Vol move, rehost, clone, create, convert, or analytics are not running
- No SVM migration is running on the destination cluster. Only one SVM migration is allowed at any given time.

Supported and unsupported features

The table indicates the ONTAP features supported by SVM data mobility and the ONTAP releases in which support is available.

For information about ONTAP version interoperability between a source and destination in an SVM migration, see Compatible ONTAP versions for SnapMirror relationships.

Feature	Release first supported	Comments
Audit logs (NFS and SMB)	ONTAP 9.13.1	For on-premises SVM migration with audit enabled, you should disable audit on the source SVM and then perform the migration. Before SVM migration: • Audit log must be enabled on the destination cluster. • The audit log destination path from the source SVM must be created on the destination cluster.
Autonomous Ransomware Protection	ONTAP 9.12.1	
Cloud instances	Not supported	Migrating SVMs to or from on-prem instances to the cloud is not supported.

Cloud Volumes ONTAP	Not supported	
External key manager	ONTAP 9.11.1	
FabricPool	Not supported	
Fanout relationship (the migrating source has a SnapMirror source volume with more than one destination)	ONTAP 9.11.1	
FC SAN	Not supported	
Flash Pool	ONTAP 9.12.1	
FlexCache volumes	Not supported	
FlexGroup volumes	Not supported	
IPsec policies	Not supported	
IPv6 LIFs	Not supported	
iSCSI SAN	Not supported	
Job schedule replication	ONTAP 9.11.1	In ONTAP 9.10.1, job schedules are not replicated during migration and must be manually created on the destination. Beginning with ONTAP 9.11.1, job schedules used by the source are replicated automatically during migration.
Load-sharing mirrors	Not supported	

MetroCluster SVMs	ONTAP 9.16.1	Beginning with ONTAP 9.16.1, the following MetroCluster SVM migrations are supported: • Migrating an SVM between a non-MetroCluster configuration and a MetroCluster IP configuration • Migrating an SVM between two MetroCluster IP configurations • Migrating an SVM between a MetroCluster FC configuration and a MetroCluster IP configuration Note: The source and destination cluster must both be running ONTAP 9.16.1 or later to support SVM migration. The following MetroCluster SVM migrations are not supported for all ONTAP versions: • Migrating an SVM between two MetroCluster FC configurations • Migrating an SVM between a non-MetroCluster configuration and a MetroCluster FC configuration • Migrating an SVM between the local and partner cluster in the same MetroCluster configuration. See the prerequisites to migrate an SVM in a MetroCluster configuration.
NetApp Aggregate Encryption (NAE)	ONTAP 9.11.1	NAE volumes must be placed on NAE supporting destination. If no NAE destination is available, the migration operation fails.
NDMP configurations	Not supported	
NetApp Volume Encryption (NVE)	ONTAP 9.10.1	NVE volumes are migrated as NVE volumes on the destination.
NFS v3, NFS v4.1, and NFS v4.2	ONTAP 9.10.1	
NFS v4.0	ONTAP 9.12.1	
NFSv4.1 with pNFS	ONTAP 9.14.1	
NVMe over Fabric	Not supported	
Onboard key manager (OKM) with Common Criteria mode enabled on source cluster	Not supported	
ONTAP Select	Not supported	Migrating SVMs to or from ONTAP Select instances is not supported.

Qtrees	ONTAP 9.14.1	
Quotas	ONTAP 9.14.1	
S3	Not supported	
SMB protocol	ONTAP 9.12.1 However, SMB1 protocol is not supported.	SMB migrations are disruptive and require a client refresh after the migration.
SnapMirror cloud relationships	ONTAP 9.12.1	Beginning with ONTAP 9.12.1, when you migrate an on-premises SVM with SnapMirror cloud relationships, the destination cluster must have the SnapMirror cloud license installed, and it must have enough capacity available to support moving the capacity in the volumes that are being mirrored to the cloud.
SnapMirror asynchronous destination	ONTAP 9.12.1	
SnapMirror asynchronous source	ONTAP 9.11.1	• Transfers can continue as normal on FlexVol SnapMirror relationships during most of the migration. • Any ongoing transfers are canceled during cutover and new transfers fail during cutover. They cannot be restarted until the migration completes. • Scheduled transfers that were canceled or missed during the migration are not automatically started after the migration completes. When a SnapMirror source is migrated, ONTAP does not prevent deletion of the volume after migration until the SnapMirror update takes place. This happens because SnapMirror-related information for migrated SnapMirror source volumes is available only after migration is complete, and after the first update takes place.
SMTape settings	Not supported	
SnapLock	Not supported	

SnapMirror active sync	Not supported	
SnapMirror SVM peer relationships	ONTAP 9.12.1	
SnapMirror SVM disaster recovery	Not supported	
SnapMirror synchronous	Not supported	
Snapshots	ONTAP 9.10.1	
Tamperproof snapshot locking	ONTAP 9.14.1	Tamperproof snapshot locking is not equivalent to SnapLock. SnapLock Enterprise and SnapLock Compliance remain unsupported.
Virtual IP LIFs/BGP	Not supported	
Virtual Storage Console 7.0 and later	Not supported	
Volume clones	Not supported	
Vscan	Not supported	Migration of Vscan-enabled SVMs is not supported.
vStorage	Not supported	Migration is not allowed when vStorage is enabled. To perform a migration, disable the vStorage option, and then reenable it after migration is completed.

Supported operations during migration

The following table indicates volume operations supported within the migrating SVM based on migration state:

Volume operation	**SVM migration state**		
	In progress	**Paused**	**Cutover**
Create	Not allowed	Allowed	Not supported
Delete	Not allowed	Allowed	Not supported
File System Analytics disable	Allowed	Allowed	Not supported
File System Analytics enable	Not allowed	Allowed	Not supported
Modify	Allowed	Allowed	Not supported
Offline/Online	Not allowed	Allowed	Not supported
Move/rehost	Not allowed	Allowed	Not supported
Qtree create/modify	Not allowed	Allowed	Not supported
Quota create/modify	Not allowed	Allowed	Not supported
Rename	Not allowed	Allowed	Not supported

Resize	Allowed	Allowed	Not supported
Restrict	Not allowed	Allowed	Not supported
Snapshot attributes modify	Allowed	Allowed	Not supported
Snapshot autodelete modify	Allowed	Allowed	Not supported
Snapshot create	Allowed	Allowed	Not supported
Snapshot delete	Allowed	Allowed	Not supported
Restore file from snapshot	Allowed	Allowed	Not supported

Post-migration information

- After migration, local snapshot policies have the extension -MIG that might break some automation. You should search for this extension and rename the policies and needed.
- Migrated vault destination SnapMirror volumes must perform a resync to reactivate protection. The vault resync is necessary because the migration creates a new baseline between the migration SVMs that is more recent than the vault's previous baseline. Performing a resync reactivates the vault, which will also deletes any data newer than the current vault baseline, specifically the snapshot that was generated during the migration.

Migrate an ONTAP SVM

After an SVM migration has completed, clients are cut over to the destination cluster automatically and the unnecessary SVM is removed from the source cluster. Automatic cutover and automatic source cleanup are enabled by default. If necessary, you can disable client auto-cutover to suspend the migration before cutover occurs and you can also disable automatic source SVM cleanup.

About this task

This procedure applies to FAS, AFF, and ASA systems. If you have an ASA r2 system (ASA A1K, ASA A90, ASA A70, ASA A50, ASA A30, ASA A20, or ASA C30), follow these steps to migrate an SVM. ASA r2 systems provide a simplified ONTAP experience specific to SAN-only customers.

- You can use the `-auto-cutover false` option to suspend the migration when automatic client cutover normally occurs and then manually perform the cutover later.

  Manually cutover clients after SVM migration

- You can use the advance privilege `-auto-source-cleanup false` option to disable the removal of the source SVM after cutover and then trigger source cleanup manually later, after cutover.

  Manually remove source SVM after cutover

Migrate an ONTAP SVM with automatic cutover enabled

By default, clients are cut over to the destination cluster automatically when the migration is complete, and the unnecessary SVM is removed from the source cluster.

Steps

1. From the destination cluster, run the migration prechecks:

```
vserver migrate start -vserver <SVM_name> -source-cluster <cluster_name>
-check-only true`
```

2. From the destination cluster, start the SVM migration:

```
vserver migrate start -vserver <SVM_name> -source-cluster <cluster_name>
```

3. Check the migration status:

```
vserver migrate show
```

   The status displays migrate-complete when the SVM migration is finished.

Migrate an ONTAP SVM with automatic client cutover disabled

You can use the -auto-cutover false option to suspend the migration when automatic client cutover normally occurs and then manually perform the cutover later. See Manually cutover clients after SVM migration.

Steps

1. From the destination cluster, run the migration prechecks:

```
vserver migrate start -vserver <SVM_name> -source-cluster <cluster_name>
-check-only true`
```

2. From the destination cluster, start the SVM migration:

```
vserver migrate start -vserver <SVM_name> -source-cluster <cluster_name>
-auto-cutover false`
```

3. Check the migration status:

```
vserver migrate show
```

The status displays ready-for-cutover when SVM migration completes the asynchronous data transfers, and it is ready for cutover operation.

Migrate an ONTAP SVM with source cleanup disabled

You can use the advance privilege -auto-source-cleanup false option to disable the removal of the source SVM after cutover and then trigger source cleanup manually later, after cutover. See Manually remove source SVM.

Steps

1. From the destination cluster, run the migration prechecks:

```
vserver migrate start -vserver <SVM_name> -source-cluster <cluster_name>
-check-only true`
```

2. From the destination cluster, start the SVM migration:

```
vserver migrate start -vserver <SVM_name> -source-cluster <cluster_name>
-auto-source-cleanup false`
```

3. Check the migration status:

```
vserver migrate show
```

   The status displays ready-for-source-cleanup when SVM migration cutover is complete, and it is ready to remove the SVM on the source cluster.

Monitor ONTAP volume migration

In addition to monitoring the overall SVM migration with the `vserver migrate show` command, you can monitor the migration status of the volumes the SVM contains.

Steps

1. On the destination cluster, check the volume migration status:

```
vserver migrate show-volume
```

Pause and resume an ONTAP SVM migration

You might want to pause an SVM migration before the migration cutover begins. You can pause an SVM migration using the `vserver migrate pause` command.

Pause migration

You can pause an SVM migration before client cutover starts by using the `vserver migrate pause` command.

Some configuration changes are restricted when a migration operation is in progress; however, beginning with ONTAP 9.12.1, you can pause a migration to fix some restricted configurations and for some failed states so that you can fix configuration issues that might have caused the failure. Some of the failed states that you can fix when you pause SVM migration include the following:

- `setup-configuration-failed`
- `migrate-failed`

Steps

1. From the destination cluster, pause the migration:

```
vserver migrate pause -vserver <vserver name>
```

Resume migrations

When you're ready to resume a paused SVM migration or when an SVM migration has failed, you can use the `vserver migrate resume` command.

Steps

1. From the destination cluster, resume the SVM migration:

```
vserver migrate resume
```

2. Verify that the SVM migration has resumed, and monitor the progress:

```
vserver migrate show
```

Cancel an ONTAP SVM migration

If you need to cancel an SVM migration before it completes, you can use the `vserver migrate abort` command. You can cancel an SVM migration only when the operation is in the paused or failed state. You cannot cancel an SVM migration when the status is "cutover-started" or after cutover is complete. You cannot use the `abort` option when an SVM migration is in progress.

Steps

1. On the destination cluster, check the migration status:

```
vserver migrate show -vserver <SVM_name>
```

2. Cancel the migration:

```
vserver migrate abort -vserver <SVM_name>
```

3. Check the progress of the cancel operation:

```
vserver migrate show
```

The migration status shows migrate-aborting while the cancel operation is in progress. When the cancel operation completes, the migration status shows nothing.

Manually cut over clients after migration of an ONTAP SVM

By default, client cutover to the destination cluster is performed automatically after the SVM migration reaches "ready-for-cutover" state. If you choose to disable automatic client cutover, you need to perform the client cutover manually.

Steps

1. Manually execute client cutover:

```
vserver migrate cutover -vserver <SVM_name>
```

2. Check the status of the cutover operation:

```
vserver migrate show
```

Manually remove source ONTAP SVM after client cutover

If you performed the SVM migration with source cleanup disabled, you can remove the source SVM manually after client cutover is complete.

Steps

1. Verify the status is ready for source cleanup:

```
vserver migrate show
```

2. Clean up the source:

```
vserver migrate source-cleanup -vserver <SVM_name>
```

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