



Isilon OneFS

Version 8.0.1

Built-In Migration Tools Guide

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CHAPTER 1

Introduction to this guide

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About this guide

This guide describes how to migrate data from NetApp filers, EMC Celerra, and EMC VNX systems to EMC Isilon clusters through `isi_vol_copy` and `isi_vol_copy_vnx` which are migration tools built within OneFS for data migration.

Your suggestions help us to improve the accuracy, organization, and overall quality of the documentation. Send your feedback to <https://www.research.net/s/isi-docfeedback>. If you cannot provide feedback through the URL, send an email message to docfeedback@isilon.com.

Isilon scale-out NAS overview

The EMC Isilon scale-out NAS storage platform combines modular hardware with unified software to harness unstructured data. Powered by the OneFS operating system, an EMC Isilon cluster delivers a scalable pool of storage with a global namespace.

The platform's unified software provides centralized web-based and command-line administration to manage the following features:

- A cluster that runs a distributed file system
- Scale-out nodes that add capacity and performance
- Storage options that manage files and tiering
- Flexible data protection and high availability
- Software modules that control costs and optimize resources

Where to go for support

If you have any questions about EMC Isilon products, contact EMC Isilon Technical Support.

Online Support	<ul style="list-style-type: none"> • Live Chat • Create a Service Request
Telephone Support	<ul style="list-style-type: none"> • United States: 1-800-SVC-4EMC (1-800-782-4362) • Canada: 1-800-543-4782 • Worldwide: 1-508-497-7901 • Local phone numbers for a specific country are available at EMC Customer Support Centers
Support registration or access	For questions specific to EMC Online Support registration or access, email support@emc.com .
Isilon Info Hubs	For the list of Isilon info hubs, see the Isilon Info Hubs page on the EMC Isilon Community Network. Isilon info hubs organize Isilon documentation, videos, blogs, and user-contributed content into topic areas, making it easy to find content about subjects that interest you.

Support for IsilonSD Edge

If you are running a free version of IsilonSD Edge, support is available through the [EMC Isilon Community Network](#). If you purchased one or more IsilonSD Edge licenses, support is available through EMC Isilon Technical Support, provided you have a valid support contract for the product.

CHAPTER 2

OneFS built-in migration tools

This section contains the following topics:

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- [Advantages and limitations of OneFS built-in migration tools](#) 10
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OneFS built-in migration tools overview

The OneFS built-in migration tools transfer data over the network through Network Data Management Protocol (NDMP). The tools leverage snapshot technology on source devices so that a point-in-time image of the file system is transferred to the target EMC Isilon cluster. Snapshot technology enables clients on the source device to continue to access directories that are being migrated.

The OneFS built-in migration tools provide the following features:

- Migrate data onto EMC Isilon clusters through the following tools:
 - `isi_vol_copy` tool for NetApp storage system data migrations.
 - `isi_vol_copy_vnx` tool for Celerra and VNX storage system data migrations.

Note

Celerra and VNX systems have the same underlying code base and therefore follow similar data migration protocols.

- Migrate files and directories, including NFS permissions for NFS versions 3 and 4, Windows ACLs, Windows properties, and alternate data streams (ADS). However, the OneFS built-in migration tools do not migrate system configuration settings, such as SMB shares, local user accounts, or quotas.
- Migrate all of the data contained in a specified volume or directory. You cannot exclude any directories or files within a volume or directory from being migrated.

Advantages and limitations of OneFS built-in migration tools

For most smaller data migrations from NetApp, Celerra, or VNX platforms, we recommend that you migrate data with the OneFS built-in migration tools: `isi_vol_copy` and `isi_vol_copy_vnx`.

The OneFS built-in migration tools can often be more efficient than host-based tools, such as EMC Copy and Robocopy. This is because the performance of host-based tools depends on the network connectivity of the host, whereas the OneFS built-in migration tools depend only on the network connection between the source device and the target EMC Isilon cluster. However, you should consider migrating data with a host-based tool if one or more of the following conditions apply to your migration:

- The source device and the EMC Isilon cluster are on separate networks.
- Security restrictions prevent the source device and the EMC Isilon cluster from communicating.
- The source volume on the NetApp storage system contains more than ten million inodes.

OneFS built-in migration tools are available only for specific versions of OneFS, NetApp Data ONTAP, Celerra, and the VNX operating systems. If you are migrating data from operating systems that the OneFS built-in migration tools do not support, you might need to migrate data with other tools. For more information, see *NetApp system requirements* and *VNX system requirements*.

Related documents

We recommend that you consult the following documentation before migrating your data:

- *EMC Isilon Multiprotocol Data Access with a Unified Security Model and Identities, Access Tokens, and the Isilon OneFS User Mapping Service* for information about Isilon identity management.
- *OneFS Web Administration Guide* and *OneFS CLI Administration Guide* for information about Isilon administration.
- *VNX Open Systems Configuration Guide* for information about VNX identity management.
- NetApp website for information about NetApp identity management and administration.
- *SMB File Migration to EMC Isilon* for information about SMB file migration.
- *NFS File Migration to an EMC Isilon Cluster* for information about NFS file migration.

CHAPTER 3

Data migration planning

This section contains the following topics:

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- [Scheduling NetApp migrations](#) 18

Migration workflow

We recommend that you follow the migration workflow to make sure that your data is migrated successfully.

Each migration must pass through the following stages:

Preparation

In the preparation stage, you can determine which data will be migrated from the source device and where the data will be migrated to on the EMC Isilon cluster. During this stage, you can also configure settings of the source device and the target EMC isilon cluster to maximize the performance and reliability of the data migration.

Testing

In the testing stage, you can select a smaller, representative data set to migrate to the EMC Isilon cluster, and record performance statistics. This stage enables you to verify whether your network settings support data transfer between the source device and the EMC Isilon cluster. You can also estimate how much time the migration will take.

Initial data transfer

In the initial data transfer stage, all of your data is migrated from a directory on the source device to the EMC Isilon cluster. This process is also known as a full migration. A full migration process can take a very long time to complete, depending on the amount of data that you are transferring. A migration ID is generated during this stage that can be accessed subsequently to view the status of a running, completed, or failed migration. A migration run ID corresponding to the migration ID is also generated during this stage.

Incremental data transfers

In the incremental data transfer stage, all the additions that occurred since the previous data transfer stage are migrated. This process helps to ensure that minimal amount of data is required to be transferred at the time of switching over completely to the EMC Isilon cluster, also known as the cutover stage.

Final data transfer and cutover

In the final data transfer and cutover stage, clients are prevented from accessing data on the source device, changes to the data are migrated one more time, and clients are redirected to access their data on the EMC Isilon cluster.

Tracing the workflow of a migration

You can trace the end-to-end workflow of a NetApp or Celerra/VNX migration session through a migration ID that ties the workflow from the source filer to the EMC Isilon cluster.

A migration ID is a unique value for a given pair of source and destination migration directories. A new number is generated each time you run a new full migration from the source to the destination directory. A migration ID allows you to view the status of a running, completed, or failed migration. In the following example that lists a completed migration process, the number 12 represents the migration ID:

```
Migration_ID  Mode  Ckpt  Ctx  State Options  Files  Last_File
Server: Source Destination
```

```
12          Full    277      14    completed    284  ./index_46
10.68.5.87:/vol/vol1/testdir/tkr/empty /ifs/tkr/sparse2
```

Migration run ID

A migration run ID is an identifier corresponding to a migration ID that begins with the number 1 and increases monotonically with every restarted migration. The run ID is appended as a file name suffix for all the files that are created during a specific migration process.

NetApp system requirements

Your environment must meet the following system requirements before you can migrate data from a NetApp storage system to an EMC Isilon cluster with the `isi_vol_copy` tool:

- The NetApp storage system and the EMC Isilon cluster must be connected by either a WAN or a LAN. We recommend that you perform migrations through a LAN.
- The NetApp storage system must be running Data ONTAP 7.x or Data ONTAP 8.x 7-Mode operating systems.

Note

NetApp clustered data ONTAP (CDOT) operating system is not supported.

- NDMP must be enabled on the NetApp storage system. You are not required to enable the NDMP daemon on the EMC Isilon cluster.
- The EMC Isilon cluster must be accessible through the root account.
- If there are firewalls between the NetApp system and the EMC Isilon cluster, the NDMP port that is configured on the NetApp system must be opened on the firewall.
- An NDMP user account and password must be configured and enabled on the NetApp storage system.

Celerra and VNX system requirements

Your environment must meet the following system requirements before you can migrate data from a Celerra or VNX system to an EMC Isilon cluster with the `isi_vol_copy_vnx` tool:

- The VNX or Celerra system and the EMC Isilon cluster must be connected either by a WAN or a LAN. We recommend that you perform migrations through a LAN.
- The VNX or Celerra system must be running either VNX operating environment 7.x or 8.0 or Celerra DART 5.6.0 or later.
- On the EMC Isilon cluster, at least one access zone must be configured to access the same authentication providers as the Celerra or VNX system.
- The EMC Isilon cluster must be accessible through the root account.
- If there are firewalls between the Celerra or VNX system and the EMC Isilon cluster, the NDMP port that is configured on the Celerra or VNX system must be opened on the firewall. The default port on a Celerra or VNX system is 10000.
- An NDMP user must be configured on the Celerra or VNX data mover.

Estimating time requirements for migration

We recommend that you estimate the amount of time that will be required for you to complete a data migration.

The total amount of data being migrated is not the only factor that determines time requirements. The size and number of files being transferred can also affect the amount of time taken for a data migration. Smaller files incur a larger overhead, and so migrating smaller files takes more time than migrating larger files.

EMC Isilon migration testing over the NDMP protocol produced the following time-estimation results for a full NetApp migration:

File size	Data set size (in MB)	Average time
1 KB	385	13 min
64 KB	6537	6 min
1 MB	15218	6 min
128 MB	128438	28 min
1 GB	102788	19 min
50 GB	51488	12 min

The results from the preceding table were obtained under the following conditions:

- Data was migrated from a NetApp filer to an EMC Isilon cluster through the `isi_vol_copy` tool.
- The EMC Isilon cluster was running OneFS 8.0.0.
- The NetApp filer was running Data ONTAP release 7.3.7.
- It was a standalone migration.
- Data was migrated through a single NDMP stream.
- Data was migrated over a low-latency (less than 100 microseconds) Gigabit Ethernet (GigE) network.
- All the network bandwidth was allocated to the migration.

Data migration considerations

As you prepare to migrate data to an EMC Isilon cluster, keep in mind the following considerations:

- Local users and groups are not migrated to the EMC Isilon cluster, so if a local user or group owns a file, the file might not have an owner on the target EMC Isilon cluster.
- Backups have to be disabled on the VNX system for the migrations to run correctly.
- When you perform a data migration from a source VNX storage system, the `isi_vol_copy_vnx` tool cannot restore hard links when the link count on the source system is greater than 32767. This is due to a limitation on the source system.
- When you migrate data that includes sparse files from a source VNX storage system to an EMC Isilon cluster, the migrated data or the sparse files do not retain their property of having holes. They are migrated as regular files retaining the data intact.

- Migrations of NetApp data sets do not support deduplication. Data is migrated as if it is not deduplicated. However, after the data is transferred to the EMC Isilon cluster, you can deduplicate data through the SmartDedupe software module.
- In case of Celerra or VNX datasets, migration fails if there are any deduplicated files. You must remove deduplication on the files before transferring them to the EMC Isilon cluster. After migration, you can deduplicate the data again on the EMC Isilon cluster.
- NetApp data sets support the Backup Restartable Extension (BRE) for the 7-mode volume. The BRE feature enables you to restart failed backup or recovery operations at known good points or tape boundaries that were identified prior to the failure. However, Celerra and VNX systems do not support the BRE feature.
- Migrations of NetApp or VNX data sets to the EMC Isilon cluster over IPv6 link-local addresses are not supported.
- If the path of a symbolic link changes during migration, the symbolic link breaks, and you must rebuild the symbolic link.
- Check the export paths, share paths, and hostnames after a migration to make sure that they are valid and work properly. Make changes to them, if necessary.
- If a firewall exists between your EMC Isilon cluster and either the NetApp storage system or the Celerra or VNX systems, the firewall might block incoming data packets. To help ensure that data migrations are successful, we recommend that you configure your firewall to perform a stateful inspection of incoming data packets, rather than disabling your firewall. For information about configuring a stateful inspection, see your firewall documentation.
- Perform migrations from a Celerra or VNX system at the volume level to make sure that data is backed up properly.
- Multiprotocol migrations from Celerra or VNX systems might not permit the same data access methods or the same user access. For more information on multiprotocol migrations, see the VNX documentation.
- VNX datasets with multiprotocol access policies are not supported for the same file. For more information on the protocols supported to access these files, see the VNX documentation.
- The names of all directories and files must contain only UTF-8 characters.
- The OneFS built-in migration tools do not migrate attributes that are specific to NetApp Data ONTAP, VNX, or Celerra DART operating environments.
- If you have performed a migration to an existing destination folder, you cannot perform new migrations targeted to any folder that resides within this folder until all the data is successfully migrated to the target folder and the older or completed migrations have been cleaned up.
- After data has been successfully transferred to a destination folder on an EMC Isilon cluster, you can enable new migrations to folders residing within the destination folder only after clearing the details associated with the completed migration.

Upgrade considerations

- If you have migrated data using the previous versions of OneFS and have then upgraded to the current version of OneFS, incremental migrations are supported in the current OneFS version as long as the migrations were completed successfully with the previous OneFS versions. You do not need to perform a full migration in such cases.
- Rolling upgrade from a previous OneFS version to the current version is not supported.

NFS data migration considerations

The following considerations are applicable only if you are migrating NFS data to an EMC Isilon cluster:

- If you are migrating data from multiple source devices, and the source devices are not configured with a common source of authentication, you might introduce duplicate User IDs (UIDs) on the EMC Isilon cluster. If two users share a UID, and files owned by the users are migrated to the cluster, both users will have the same access to each other's files when the files are migrated to the cluster. To work around this issue, you can change the UID for one of the users. However, if you do this, you must also remember to change the permissions of all files that the user has access to, to reflect the changes.
- A named attribute that is created for data in a VNX system over NFS version 4 is not migrated to an EMC Isilon cluster.
- EMC Isilon clusters do not support extended proprietary file attributes.
- EMC Isilon clusters do not support compressed or encrypted file attributes.
- The `isi_vol_copy_vnx` tool does not migrate file change times.

Scheduling NetApp migrations

If you expect a NetApp migration process to be time-consuming or network-intensive, you can schedule the migration in such a way that the migration process is stopped when the network usage is high and resumed during off-peak hours without any loss of data. You can also schedule your migrations when there is a planned downtime of the network or when you plan to run multiple migration processes at a time.

You can schedule migrations through the following methods:

- Pausing and restarting migrations
- Specifying a sleep schedule for the migration

Pausing and restarting a migration

You can pause or kill an active NetApp migration running on an EMC Isilon cluster and restart it at a later time in case there is a planned downtime of the servers or network. The pause action stops the backup process on the NetApp storage system.

You can pause a NetApp migration only after one checkpoint of the migration has been recorded. You can then restart the migration at a later time from the point where you paused it by reconnecting to the NetApp storage system. For pausing and restarting a migration, you must specify the migration ID that is described in the *Tracing the workflow of a migration* section. Upon a successful restart, a new migration run ID corresponding to the migration ID is generated.

You can restart the migration process on the same node where you originally started the process or you can restart the process from another node in a cluster, thus promoting load balancing.

Pause and restart NetApp migrations

You can pause a NetApp migration process and restart it at a later time.

Before you begin

Make sure that the migration process has crossed at least one checkpoint before pausing it.

Procedure

1. View all the migration processes that are currently running through the following command:

```
isi_vol_copy - list -state=Running
```

The output appears as shown in the following example:

```
Migration_ID  Mode  Ckpt   Ctx  State Options  Files
Last_File  Server: Source Destination
1           Full   41     10   running  206  ./84
10.68.5.87:/vol/VOL_SMALL_DATASET/
NFS/bvt/sparse1 /ifs/auto/data/bvt/sparse1_345676589/

12          Full   277    14   running  284  ./index_46
10.68.5.87:/vol/vol1/testdir/tkr/empty /ifs/tkr/sparse2
```

2. Pause or kill the migration process by running the following command:

```
isi_vol_copy -pause <migration-id>
```

For example, pause the migration process with the migration ID **12** by running the following command:

```
isi_vol_copy -pause 12
```

Sleep schedule overview

Unlike pausing a migration wherein there is a dependency on the checkpoint of the migration process, you can specify a sleep schedule to put a migration to sleep at any time during the migration process.

Use one of the following methods to specify a sleep schedule:

- Update the cluster-wide sleep schedule configuration file `sleep_schedule.config` at `/ifs/.ifsvar/modules/isi_vol_copy/` with the required sleep duration.
- Run the `isi_vol_copy` command with the `-sleep` option per migration to override the settings in the cluster-wide configuration file, if the file exists.

Note

- The actual sleep time might begin slightly later than the original schedule and might extend slightly over the requested end time because of the delayed start of the schedule.
 - The migration process checks for a sleep duration after transferring 1 GB of data each time thus causing a delayed start of the sleep schedule in some cases.
-

Sleep schedule configuration file

Keep the following points in mind when updating a sleep schedule configuration file.

- For a migration ID-specific sleep request, the following conditions apply:
 - You can create the sleep schedule configuration file as a plain text file and save it anywhere on an EMC Isilon node.
 - When you specify a configuration file for scheduling the sleep duration, the file is copied into a folder corresponding to the migration ID as `/ifs/.ifsvar/modules/isi_vol_copy/<migration-id>/sleep_schedule.config`.
- You can override the settings in the sleep schedule configuration file for any individual migration by running the `isi_vol_copy` command with the `-sleep` option.
- You must specify a sleep duration time range as a part of the schedule.
- Each time range entry must consist of start and end dates along with the time stamps. However, the migration process is put to sleep only if the current day or time meets the specified time range mentioned in the sleep schedule file. The day and time entries in a sample configuration file are shown:

```
Monday 08:00 17:00
Tuesday 08:00 17:00
Wednesday 08:00 17:00
Thursday 08:00 17:00
Friday 08:00 17:00
```

- You can specify a maximum of 64 time entries within the configuration file.
 - You must avoid specifying overlapping time entries. For example, if you specify time entries as shown in the following sample sleep schedule file, the sleep duration is followed incorrectly for all the time ranges except for the earliest time range. That is, the sleep schedule will work correctly only for the time range set between 12:13 and 12:16.
- ```
Wednesday 12:13 12:16
Wednesday 12:15 12:18
Wednesday 12:17 12:20
Wednesday 12:19 12:22
Wednesday 12:21 12:24
```
- For specifying time ranges that span more than a day, create separate time entries for each day. For example, split Monday 20:00 hours through Tuesday 02:00 hours into two separate entries; the first entry must end at Monday 23:59 and the second entry must start at Tuesday 00:00.

## Specify a sleep schedule using a configuration file

You can put a migration process to sleep through a cluster-wide sleep schedule configuration file.

### Procedure

1. Update the sleep schedule configuration file `sleep_schedule.config` with the required sleep duration schedule.
2. Save the file at `/ifs/.ifsvar/modules/isi_vol_copy/`.

### Results

If a migration process is already in progress, the sleep schedule file is read immediately and the migration process is put to sleep based on the sleep schedule. If a migration

process is not in progress but is in a *restartable* state, the sleep schedule file is read and the migration process is put to sleep based on the sleep schedule when the migration process is restarted.

## Specify a sleep schedule per migration

You can specify a sleep schedule per migration that overrides the settings in the cluster-wide sleep schedule configuration file.

Any migration process that is in progress or is in a restartable state can be made to follow a sleep schedule through these steps.

### Procedure

1. Update the sleep schedule file and save it to a location on your system.
2. View all of the migration processes by running the following command:

```
isi_vol_copy - list
```

The output appears as shown in the following example:

```
Migration_ID Mode Ckpt Ctx State Options Files
Last_File Server: Source Destination
1 Full 41 10 running 206 ./84
10.68.5.87:
/vol/VOL_SMALL_DATASET/ NFS/bvt/sparse1 /ifs/auto/data/bvt/
sparse1_345676589/
9 Incr 2 13 completed 393 ./file1
10.68.5.87:
/vol/voll/testdir/tkr/index_wl/ /ifs/ntap/index_wl/
12 Full 277 14 running 284 ./index_46
10.68.5.87:
/vol/voll/testdir/tkr/empty /ifs/tkr/sparse2
```

3. Specify a sleep schedule for a migration process by running the following command:

```
isi_vol_copy -sleep <path_to_sleep_schedule_file> <migration-id>
```

Where *migration-id* is the ID of the migration process that is either running already or is in a restartable state.

For example, based on the output displayed in the previous step, run the following command to specify a sleep schedule through the sleep schedule configuration file `weekday_schedule.txt` for the migration ID 12:

```
isi_vol_copy -sleep /ifs/.ifsvr/modules/isi_vol_copy/
weekday_schedule.txt 12
```



# CHAPTER 4

## Data migration preparation

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## Network preparation

Before you migrate data to an EMC Isilon cluster, follow these recommendations to prepare the network.

- Optimize the network infrastructure and connectivity between the source device and the target EMC Isilon cluster.
- Maximize network bandwidth between the source device and the Isilon cluster by connecting the two systems over 10 Gb/s Ethernet switches and by setting MTU at 1500 bytes.
- Perform migrations over isolated networks so that migrations do not compete with clients for network bandwidth.
- Limit traffic on the network for maximum throughput.
- Connect to the management port of a node by following the recommendations in [article 16744](#) on EMC Online Support.
- Make sure that you have provisioned alternate connectivity before enabling IPv6 support. For example, keep an IPv4 network pool intact before modifying your network configuration and disconnecting access to the EMC Isilon cluster.

## Cluster preparation

Before you migrate data to an EMC Isilon cluster, follow these recommendations to prepare the cluster.

- Create a directory that will serve as the target for all the migration processes. Migrating data to a dedicated directory will minimize the impact of the migration on the rest of the cluster. After the migration is complete, you can move data to appropriate locations throughout the file system.
- Allocate space for all the metadata that gets generated during the migration process. You can choose to save minimal metadata to manage storage space overheads for every migration. For more information on saving metadata, see the *Saving data associated with a migration process* section.
- Create equivalent exports and shares on the EMC Isilon cluster, and set up SmartPools policies to govern these exports. Do not migrate data directly to the exported directories.
- If local users exist on the source device, create equivalent accounts on the EMC Isilon cluster.
- If necessary, modify replication policy schedules to make sure that the data is not replicated with the SyncIQ software module at the same time as when the data is migrated to the EMC Isilon cluster.
- Disable all SmartQuotas quotas. Do not enable quotas until the migration is completed.
- If you want to schedule a sleep schedule for a NetApp migration process, update the cluster-wide sleep schedule configuration file `sleep_schedule.config` at `/ifs/.ifsvar/modules/isi_vol_copy/`, with the required sleep duration. For more information, see the *Sleep schedule configuration file* section.

## Prepare the NetApp storage system

If you plan to migrate data from a NetApp storage system to an EMC Isilon cluster, you must prepare the NetApp storage system before you begin migrating data.

### Procedure

1. Make sure that the NetApp storage system is configured to transfer data through NDMP v4.

- a. Verify the NDMP version by running the following command:

```
ndmp version
```

- b. (Optional) Set the NDMP version to v4 by running the following command.

```
ndmpd version 4
```

2. Enable the challenge authentication method by running the following command:

```
options ndmpd.authtype challenge
```



# CHAPTER 5

## Data migration testing

This section contains the following topics:

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## Test data migration from a NetApp storage system

We recommend that you test data migration from a NetApp storage system before you begin your migration.

### Procedure

1. Identify directories on the NetApp storage system that contain small, representative samples of the data that will be migrated.
2. Create a directory on the EMC Isilon cluster that will contain the data that is migrated during the test.
3. Initiate the full migration for each test directory on the source NetApp storage system by running the `isi_vol_copy` command.

The following command migrates data to `/ifs/data/netapp_migration/test`:

```
isi_vol_copy netapp.ip.address:/vol/volume_name/media \
/ifs/data/netapp_migration/test -sa user-name: -full
```

The system displays output similar to the following example:

```
The transfer is complete.
Elapsed time: 5 hours, 1 minutes, 22 seconds.
```

4. Record the amount of time taken to transfer the data for each directory.
5. Verify that data and permissions were transferred to the cluster correctly.
6. Continue migrating data, recording the amount of time between incremental migrations and the amount of time taken to complete the incremental migrations.

The following command incrementally migrates data to `/ifs/data/netapp_migration/test`:

```
isi_vol_copy netapp.ip.address:/vol/volume_name/media \
/ifs/data/netapp_migration/test -sa user-name: -incr
```

7. Record the amount of data transferred to the test directories.

The following command displays the amount of data contained in `/ifs/data/netapp_migration/test`:

```
du -hs /ifs/data/netapp_migration/test
```

8. Record the number of files transferred to the test directories.

The following command displays the number of files contained in `/ifs/data/netapp_migration/test`:

```
ls -lR /ifs/data/netapp_migration/test | egrep -c '^-'
```

9. (Optional) Compile the results of your test in a table and evaluate potential migration time requirements.
10. If you analyze the data migration process to be time consuming or network-intensive, schedule the migration to run during off-peak hours either through the `pause` or `sleep` options or by configuring the sleep schedule configuration file. For more information, see the *Scheduling NetApp migrations* section.

11. Save metadata and clean up dumpstream data after the migration has been cutover.

## Test data migration from a VNX or Celerra system

We recommend that you test data migration from a VNX or Celerra system before you begin your migration.

### Procedure

1. Identify directories on the VNX or Celerra that contain small, representative samples of the data that will be migrated.
2. Create a directory on the EMC Isilon cluster that will contain the data migrated during the test.
3. Initiate the full migration for each test directory on the source VNX or Celerra storage system by running the `isi_vol_copy_vnx` command.

The following command migrates data to `/ifs/data/vnx_migration/test`:

```
isi_vol_copy_vnx vnx.ip.address:/directory/media \
/ifs/data/vnx_migration/test -sa user-name: -full
```

The system displays output similar to the following example:

```
The transfer is complete.
Elapsed time: 5 hours, 1 minutes, 22 seconds.
```

4. Record the amount of time taken to transfer the data for each directory.
5. Verify that data and permissions were transferred to the cluster correctly.
6. Continue migrating data, recording the amount of time between incremental migrations and the amount of time taken to complete the incremental migrations.

The following command incrementally migrates data to `/ifs/data/vnx_migration/test`:

```
isi_vol_copy_vnx vnx.ip.address:/directory/media \
/ifs/data/vnx_migration/test -sa user-name: -incr
```

7. Record the amount of data transferred to the test directories.

The following command displays the amount of data contained in `/ifs/data/vnx_migration/test`:

```
du -hs /ifs/data/vnx_migration/test
```

8. Record the number of files transferred to the test directories.

The following command displays the amount of data contained in `/ifs/data/vnx_migration/test`:

```
ls -lR /ifs/data/vnx_migration/test | egrep -c '^-'
```

9. (Optional) Compile the results of your test in a table and evaluate potential migration time requirements.
10. Save metadata and clean up dumpstream data after the migration has been cutover.



# CHAPTER 6

## Performing a data migration

This section contains the following topics:

- [Migrate data from a NetApp storage system](#)..... 32
- [Migrate data from a VNX or Celerra storage system](#)..... 32
- [Monitoring the progress of NetApp migrations](#)..... 33
- [Cutover to an EMC Isilon cluster](#)..... 35

## Migrate data from a NetApp storage system

You can migrate data from a NetApp storage system to an EMC Isilon cluster through the `isi_vol_copy` tool.

We recommend that you break large data sets into smaller divisions and repeat this procedure until all of the data is migrated.

### Procedure

1. Initiate the full migration by running the `isi_vol_copy` command.

The following command migrates data from a NetApp storage system to `/ifs/data/netapp_migration/`:

```
isi_vol_copy netapp.ip.address:/vol/volume_name/media \
/ifs/data/netapp_migration/ -sa user-name: -full
```

The system displays output similar to the following:

```
The transfer is complete.
Elapsed time: 5 hours, 1 minutes, 22 seconds.
```

2. Verify that data and permissions were transferred to the EMC Isilon cluster correctly.
3. Continue performing scheduled, incremental data transfers until you are ready to transfer clients to the EMC Isilon cluster.

The following command incrementally migrates data from a NetApp storage system to `/ifs/data/netapp_migration/`:

```
isi_vol_copy netapp.ip.address:/vol/volume_name/media \
/ifs/data/netapp_migration/ -sa user-name: -incr
```

---

### Note

We recommend that you do not move or rename directories on the source NetApp storage system during the migration life cycle. In case you do so, a subsequent incremental migration to the same target EMC Isilon cluster might fail due to the changed directory on the source NetApp system.

---

## Migrate data from a VNX or Celerra storage system

You can migrate data from a Celerra or VNX storage system to an EMC Isilon cluster through the `isi_vol_copy_vnx` tool.

We recommend that you break large data sets into smaller divisions and repeat this procedure until all of the data is migrated. Alternatively, we recommend that only full volume-level migrations be performed.

### Procedure

1. Initiate the full migration by running the `isi_vol_copy_vnx` command.

The following command migrates data from a Celerra or VNX system to `/ifs/data/vnx_migration/test`:

```
isi_vol_copy_vnx vnx.ip.address:/directory/media \
/ifs/data/vnx_migration/test -sa user-name: -full
```

If the full migration is successful, output indicating the completion of data transfer and the time taken for the transfer appears at the end of the message log, as shown in the following example:

```
The transfer is complete.
Elapsed time: 5 hours, 1 minutes, 22 seconds.
```

If the full migration is unsuccessful, an error message appears at the end of the message log, as shown in the following example:

```
Error sending text authentication: Error: Connection has not been
authorized
```

2. Verify that data and permissions were transferred to the cluster correctly.
3. After one full migration session is completed successfully, continue performing scheduled, incremental data transfers until you are ready to transfer clients to the EMC Isilon cluster.

The following command incrementally migrates data from a Celerra or VNX storage system to `/ifs/data/vnx_migration/test`:

```
isi_vol_copy_vnx vnx.ip.address:/directory/media \
/ifs/data/vnx_migration/test -sa user-name: -incr
```

---

#### Note

We recommend that you do not move or rename directories on the source VNX storage system during the migration life cycle. In case you do so, a subsequent incremental migration to the same target EMC Isilon cluster might fail due to the changed directory on the source VNX system.

---

4. Verify that the data and permissions were transferred to the cluster correctly during the incremental data transfer sessions.

## Monitoring the progress of NetApp migrations

You can monitor and log the progress of migration of NetApp data sets that support BRE at regular intervals to estimate the time required to complete the migration. This data is very helpful for migrations that are long and might take days or weeks to finish.

A NetApp migration process can be monitored and logged under the following conditions:

- If the migration process is in a Running state
- If the migration process is paused or killed and then restarted
- If a sleep schedule is specified for the migration process

## Monitor the progress of a NetApp migration

You can monitor the progress of a NetApp migration by tracking the status of data that is transferred to an EMC Isilon cluster during the migration process on a regular basis.

### Procedure

1. View the migration processes that are currently running through the following command:

```
isi_vol_copy -list
```

The output appears on the command console as shown in the following example:

```
Migration_ID Mode Ckpt Ctx State Options Files Last_File
Server:Source Destination
 1 Incr 0 1 Completed
10.30.77.233:/vol/VOL_SMALL_DATASETS/NFS/small/ /ifs/a1/1/ 0
 2 Full 0 1 Completed
10.30.77.233:/vol/VOL_SMALL_DATASETS/NFS/small/ /ifs/a1/4/ 0
 3 Full 0 1 Completed
10.30.77.233:/vol/VOL_SMALL_DATASETS/NFS/small/ /ifs/a1/5/ 0
 4 Full 2 1 Completed 160 ./
40.txt 10.30.77.233:/vol/VOL_SMALL_DATASETS/NFS/small/ /ifs/a1/6/
 5 Full 0 1 Completed 0
10.30.77.233:/vol/VOL_SMALL_DATASETS/NFS/small/ /ifs/a1/7/
 9 Full 0 1 Running 0
10.30.77.233:/vol/VOL_SMALL_DATASETS/NFS/small/ /ifs/a1/12/
 11 Full 0 1 Completed 0
10.30.77.233:/vol/VOL_SMALL_DATASETS/NFS/small/ /ifs/a1/11/
 12 Full 0 1 Completed 0
10.30.77.233:/vol/VOL_SMALL_DATASETS/NFS/small/ /ifs/a1/14/
 15 Full 0 2 Failed 0
10.30.77.233:/vol/VOL_SMALL_DATASETS/NFS/small/ /ifs/a1/19/
```

2. For a specific migration ID that shows the state as *Running*, view the status of progress of migration by running the following command:

```
isi_vol_copy -status <migration-id>
```

For example, to view the status of progress of migration with migration ID 9, run the following command:

```
isi_vol_copy -status 9
```

The status of progress appears on the console as shown in the following example:

```
isi_vol_copy progress summary

The content below is fyi only. The status below shows the
status of migration at the time checkpoint was taken.

Migration state: Running
Migration start time: Wed May 20 07:09:27 2015
Checkpoint dump time: Wed May 20 08:06:32 2015
Total inodes restored: 448 of 1000
Total file data restored: 1.312 GB of 2.935 GB (Estimated)

Time elapsed since first run: 57 minutes 5 seconds
Idle time since first run: 54 minutes 29 seconds
Transfer speed (End to End): 207.355911 KB/sec
```

```
Current speed: 33559.800781 KB/sec
ETA: 50 seconds
```

**Where:**

| Output                       | Description                                                                                                                                       |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Migration state              | Specifies the current state of the migration process.                                                                                             |
| Migration start time         | Specifies the first time a migration process was started. This time remains unchanged even if the migration is completed or killed.               |
| Checkpoint dump time         | Specifies the time at which the latest checkpoint was taken.                                                                                      |
| Total inodes restored        | Specifies the number of inodes that have been restored successfully. This includes only files and not directories.                                |
| Total file data restored     | Specifies the amount of logical data that is restored. Logical data refers to data that amounts to the summation of your file data.               |
| Time elapsed since first run | Specifies the total time that has elapsed since the first run.                                                                                    |
| Idle time since first run    | Specifies the total idle time that has elapsed since the first run.                                                                               |
| Transfer speed (End to End)  | Specifies the end-to-end transfer speed. It is computed as the total data transferred at a given point of time divided by the total time elapsed. |
| Current speed                | Specifies the current speed computed as the average of the last five seconds.                                                                     |
| ETA                          | Specifies the estimated time to complete the migration based on the current transfer speed.                                                       |

- After the migration process is completed, all the details related to the migration such as the start and end times and average speed of transfer, appear on the console. The details are also stored in a log file at `/var/isi_vol_copy.log`.

## Cutover to an EMC Isilon cluster

After the data has been successfully migrated to an EMC Isilon cluster, you can perform a cutover to allow clients to access their data on the cluster.

**Procedure**

- Restrict access to the source device or set the data on the source device to read-only.
- Initiate the final incremental data transfer by running either the `isi_vol_copy` or `isi_vol_copy_vnx` command with the `-incr` option.

The following command incrementally migrates data from a NetApp storage system to `/ifs/data/netapp_migration/`:

```
isi_vol_copy netapp.ip.address:/vol/volume_name/media \
/ifs/data/netapp_migration/ -sa user-name: -incr
```

- (Required) Transfer files to their final locations on the EMC Isilon cluster.
- Validate that the data is ready to be accessed by clients.

5. Update the client connections and name resolution protocols.
6. Redirect clients to the EMC Isilon cluster.

# CHAPTER 7

## Managing Migration Data and Failed Migrations

This section contains the following topics:

- [Managing data migrations and the associated data](#).....38

## Managing data migrations and the associated data

During a NetApp or VNX data migration process, temporary files, temporary databases, log files, checkpoint files, symbol tables, and saved dumpstreams of data get generated and are stored in the `<persistent_store>` folder.

When a migration process fails, you can access some of this data to identify the root cause for the problems. You can clean up the dumpstream data to preserve space on the EMC Isilon cluster. Additionally, you can view migration history and gather historical information about all of the migrations performed.

### Storing migration data

You can store all of the persisting metadata across migration run IDs in a folder that is associated with the migration ID.

A sample folder structure for storing the files generated during a NetApp migration is shown:

```
/ifs/.ifsvar/modules/isi_vol_copy/
|- isi_vol_copy.db
|- <migration-id>
 |- persistent_store
 |- .dump.1.addr
 |- .dump.1.bits
 |- .dump.1.clri
 |- .dump.1.inode
 |- .dump.1.tape
 |- chkpt
 |- isi_vol_copy.log
 |- restoresymtable
 |- restoresymtable.hdr
 |- rst-acldb
 |- rst-dir
 |- rst-dirhash
 |- rst-fbm-uimap
 |- rst-mode
 |- rst-ntfsnames
 |- rst-rmlist
 |- rst-sinodb
```

A `<migration-id>` folder is created and a `persistent_store` folder within the `<migration-id>` folder stores all of the persisting metadata. All the data generated for older migration sessions is stored at `/ifs/.ifsvar/modules/isi_vol_copy/<migration-id>/persistent_store/.snapshot/isi_vol_copy.<migration-id>.<run-ID>.snap`.

After a full migration, when you perform the first incremental data transfer corresponding to a migration ID, a snapshot of the `persistent_store` folder of the full migration is created with the name `isi_vol_copy.<migration-id>.0.snap`. Similarly, when you perform the second incremental data transfer, a snapshot of the previous incremental migration is stored with the name `isi_vol_copy.<migration-id>.1.snap`. A snapshot is created for every future incremental migration corresponding to this migration ID.

**Note**

If you want to perform an incremental data transfer to the same destination folder, remove or rename the existing snapshot through the `isi_snap delete` command before you proceed.

## Migration logs

If a migration fails, you can view the migration log files to identify the causes for the failure. The log files are stored at `/ifs/.ifsvar/modules/isi_vol_copy/<migration-id>/persistent_store/` per migration ID for a NetApp migration. Similarly for a VNX migration, the log files are stored at `/ifs/.ifsvar/modules/isi_vol_copy/<migration-id>/persistent_store/`.

The log files for a NetApp migration are `isi_vol_copy.log` and `isi_restore.log`. The log files for a VNX migration are `isi_vol_copy.log` and `isi_emctar.log`.

## Set the migration log level

If problems arise during migration, you might want to increase the migration log level for a migration command to help you troubleshoot. Increasing the migration log level increases the amount of data stored in the migration logs.

If you choose to increase the log level for a migration command, always set the log level back to the default setting after you have completed your troubleshooting. Increased log levels can negatively impact migration performance and should not be used unless you are investigating a problem.

**Procedure**

1. Set the migration log level by running the `isi_ilog` command with the `--level` and `--syslog_threshold` options.

The following command sets the log level for `isi_vol_copy` to debug:

```
isi_ilog -a isi_vol_copy --level debug --syslog_threshold debug
```

2. After you have completed your investigation, reset the log settings by running the `isi_ilog` command with the `--default` option.

The following command resets the log settings for `isi_vol_copy_vnx`:

```
isi_ilog -a isi_vol_copy_vnx --default
```

## Restart a NetApp data migration

If a data migration process from a 7-mode NetApp storage system fails, you can restart the migration from the point at which the migration failed based on certain conditions.

### Restart a NetApp migration after taking a checkpoint

You can restart a migration session from the point at which the migration failed, if a checkpoint was taken before the failure. A checkpoint is a point in the NDMP backup data stream when the data has been successfully written to a tape, and that data can be located and accessed by subsequent NDMP recovery operations.

**Procedure**

1. Restart the migration by running the `isi_vol_copy` command with the same parameters that you specified to begin the migration. For example, if you started a

migration process through the following command and the process failed, you must run the same command again to restart the migration:

```
isi_vol_copy netapp.ip.address:/vol/volume_name/media \
/ifs/data/netapp_migration/ -sa user-name: -full
```

The system displays output similar to the following:

```
The transfer is complete.
Elapsed time: 1 hours, 2 minutes, 35 seconds.
```

## Restart a NetApp migration without a checkpoint

You can run a full migration for a failed migration if a checkpoint was not taken before the failure, even if the migration that failed was an incremental migration.

### Procedure

1. Delete the directory on the EMC Isilon cluster where the data was being migrated to. For example, run the following command to delete the `/ifs/data/netapp_migration` directory on the EMC Isilon cluster:

```
rm -Rf /ifs/data/netapp_migration
```

2. Recreate the migration directory on the cluster. For example, run the following command to create the `/ifs/data/netapp_migration` directory:

```
mkdir /ifs/data/netapp_migration
```

3. Restart the migration process by running the `isi_vol_copy` command with the `-full` option.

For example, the following command restarts the migration process and migrates data to the `/ifs/data/netapp_migration/` directory:

```
isi_vol_copy netapp.ip.address:/vol/volume_name/media \
/ifs/data/netapp_migration/ -sa user-name: -full
```

---

### Note

If you run try to run the `isi_vol_copy` command with the `-incr` option for the first time, a warning message appears and a full migration is automatically run.

---

## Restart a Celerra or VNX data migration

If a data migration from a Celerra or VNX storage system fails, you must restart the process by running a full migration.

### Procedure

1. Delete the directory on the EMC Isilon cluster that data was being migrated to.

The following command deletes `/ifs/data/vnx_migration`:

```
rm -Rf /ifs/data/vnx_migration
```

## 2. Recreate the migration directory on the cluster.

The following command creates `/ifs/data/vnx_migration`:

```
mkdir /ifs/data/vnx_migration
```

## 3. Restart the migration by running the `isi_vol_copy_vnx` command with the `-full` option.

The following command restarts the migration of `/ifs/data/vnx_migration/`:

```
isi_vol_copy_vnx vnx.ip.address:/directory/media \
/ifs/data/vnx_migration/ -sa user-name: -full
```

## Collecting and viewing migration history

Migration history is collected and stored for both Netapp and VNX migrations in a `migration_history` file within the EMC Isilon cluster. You can view the history of a migration by querying this file and listing the details.

You cannot clean up the contents of the `migration_history` file either manually or automatically.

At the start of a migration, the following details are appended to the `migration_history` file:

- The source and destination IP addresses and path names
- A migration ID
- A migration run ID corresponding to the migration ID
- Start time for the migration process
- Details on whether a full or incremental migration was run
- Additional details such as the Node ID, PID, start time, and the last checkpoint time corresponding to the migration process

### View migration history

You can view the history of a NetApp or VNX migration process by listing the details recorded in the `migration_history` file.

#### Procedure

### 1. View the history of a NetApp migration process by running the following command:

```
isi_vol_copy - list [migration-id] | [[-detail] [state=<state>]
[destination=<pathname>]]
```

The following table describes the options associated with the `list` command:

| Option                    | Description                                                                                                                                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>migration-id</code> | Lists historical information about all the migrations performed (full, incremental, and restarted migrations) against a given migration ID on an EMC Isilon cluster. |
| <code>detail</code>       | Similar to the <code>-list</code> command but lists additional details such as Node ID, PID, start time, and the last checkpoint time.                               |
| <code>destination</code>  | Accepts the destination pathname.                                                                                                                                    |

| Option | Description                                                                                                                                                          |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| state  | Accepts the state of a migration process which can be one of <i>'Running'</i> , <i>'Restartable'</i> , <i>'Completed'</i> , <i>'Failed'</i> , or <i>'Sleeping'</i> . |

You can run the above commands for a VNX migration process as well.

## Saving data associated with a migration process

You can save metadata and other sensitive data that is generated during a NetApp or VNX migration process.

Data sets with large numbers of small-sized files generate significant metadata. Therefore, you must plan your storage overheads carefully to save such data.

### Save data associated with a migration process

You can choose to save all of the dumpstream data or save only the metadata generated during a NetApp or VNX migration process.

#### Procedure

1. Run the following command to save data generated during a NetApp migration process:

```
isi_vol_copy [-metasave | fullsave | nosave]
```

Where:

| Option   | Description                                           |
|----------|-------------------------------------------------------|
| metasave | Saves only metadata. This is the default setting.     |
| fullsave | Saves all the dumpstream data including the metadata. |
| nosave   | Does not save any data.                               |

## Cleaning up migration data

You can clean up the persisting metadata at the end of a migration process to preserve space on the EMC Isilon cluster and thus control the total amount of space consumed.

You can initiate the cleanup process either manually or by specifying parameters to automatically clean up the data.

### Cleaning up data manually

You can clean up dumpstream data manually through the `isi_vol_copy` or the `isi_vol_copy_vnx` commands using the `-cleanup` option.

The `-cleanup` option retains the dumpstream data for the latest migration process that was run and deletes all the files stored at `/ifs/.ifsvvar/modules/isi_vol_copy/<migration-id>/` for the previous migration processes. In the case of migration processes initiated from a NetApp storage system, the restartable migrations are deleted only for the completed migrations.

For example, to manually clean up all the temporary files generated during a NetApp migration process, run the following command:

```
isi_vol_copy -cleanup <migration-id> [-everything] [-noprompt]
```

Where

| Parameter    | Description                                                                                                                                                                                                                                                                                                                                                  |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| migration-id | Specifies the migration ID for cleaning up temporary files generated during a migration process.                                                                                                                                                                                                                                                             |
| everything   | Specifies that all the data including the data generated with the latest run level must be cleaned up after a successful cutover from a NetApp filer to an EMC Isilon cluster.<br><br><b>Note</b><br>You must use this parameter only after a successful cutover because you cannot run further incremental migrations after you have passed this parameter. |
| noprompt     | Suppresses the message prompts.                                                                                                                                                                                                                                                                                                                              |

#### Note

- You cannot start a new migration process until the cleanup operation is completed.
- The `-cleanup` option removes the migration ID after all of the data pertaining to the migration is cleaned up. If the deletion of any data associated with the migration ID is unsuccessful, the migration ID is left as is. You must fix the errors reported and run the cleanup process again.

## Cleanup parameters

You can control the total amount of space consumed on your EMC Isilon cluster as a result of storing persistent data by setting the following cleanup parameters.

| Parameter                    | Description                                                                                                                                                        |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CLEANUP_INACTIVE_DAYS_FAILED | Cleans up everything including the current migration data if the count exceeds the total number of inactive days for a failed migration.                           |
| CLEANUP_INACTIVE_DAYS        | Cleans up everything excluding the current migration data if the count exceeds the total number of inactive days for a successful migration.                       |
| WORKER_COUNT                 | Specifies a count of all the cleanup parameters.                                                                                                                   |
| TOTAL_SPACE_GB               | Specifies the total amount of space in GB used by the <code>persistent_store</code> folder.                                                                        |
| TOTAL_PERCENT                | Specifies the percentage of <code>/ifs</code> space that might be used by the <code>persistent_store</code> folder.                                                |
| PER_MIGR_PERCENT             | Specifies the percentage of space that can be used by a given <code>persistent_store</code> folder as against the total space used by the target migration folder. |

| Parameter         | Description                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------------------------------|
| PER_MIGR_SPACE_GB | Specifies the total amount of space in GB that can be used by a given <code>persistent_store</code> folder. |

Keep in mind the following points as you set the cleanup parameters:

- You can set all of the parameters to zero to remove any limits on the space consumed by the `persistent_store` folder.
- You can use only one of `TOTAL_SPACE_GB` or `TOTAL_PERCENT` parameter values at a time.
- You can use only one of `PER_MIGR_SPACE_GB` or `PER_MIGR_PERCENT` parameter values at a time .
- You can set both system-wide and per-migration limits on a cluster.
- The default value for the `PER_MIGR_PERCENT` parameter that specifies the per-migration limit is 35%.
- The default value for the `TOTAL_PERCENT` parameter that specifies the system-wide limit is 25%.

## Set cleanup parameters

You can set cleanup parameters for a NetApp or VNX migration process in order to control the data that gets stored in the `<persistent_store>` folder.

### Procedure

1. Set cleanup parameters for a NetApp migration process by running the following command:

```
isi_vol_copy -set_config name=value
```

Where:

- `name` is the cleanup parameter name. For more information on the cleanup parameters, see the *Cleanup parameters* section.
- `value` is the value of the cleanup parameter that you want to specify.

You can set cleanup parameters for a VNX migration by running the following command:

```
isi_vol_copy_vnx -set_config name=value
```

You can set a value to the `PER_MIGR_SPACE_GB` parameter using the previous command as shown in the following example:

```
isi_vol_copy -set_config PER_MIGR_SPACE_GB=140
```

## View cleanup parameters

For a NetApp or VNX migration process, you can view the settings for the cleanup parameters.

### Procedure

1. View the cleanup parameters for a NetApp migration by running the following command:

```
isi_vol_copy -get_config
```

The previous command lists the values set for all of the cleanup parameters that are described in the *Cleanup parameters* section.

You can run the command for a VNX migration as follows:

```
isi_vol_copy_vnx -get_config
```

The output of the command appears as shown in the following example:

| Name                         | Value |
|------------------------------|-------|
| CLEANUP_INACTIVE_DAYS_FAILED | 30    |
| CLEANUP_INACTIVE_DAYS        | 90    |
| PER_MIGR_SPACE_GB            | 0     |
| WORKER_COUNT                 | 16    |
| PER_MIGR_PERCENT             | 25    |

## Clean up persistent data automatically

You can automatically clean up persistent data that is stored on an EMC Isilon cluster during NetApp and VNX data migrations.

### Before you begin

Verify that you have set all the cleanup parameters as necessary.

### Procedure

1. Clean up the `persistent_store` folder automatically for all the active NetApp migrations by running the following command:

```
isi_vol_copy -autocleanup
```

Run the following command to clean up the `persistent_store` folder automatically for all the active VNX migrations:

```
isi_vol_copy_vnx -autocleanup
```

## Upgrading data migrated from previous releases

After successfully migrating data from a NetApp or VNX storage device to an EMC Isilon cluster running versions of OneFS earlier than 8.0.1, you can upgrade migration directories on the cluster to OneFS 8.0.1. However, keep in mind that you cannot upgrade directories with failed data migrations. The upgrade process converts all of the metadata associated with that migrated data to the format supported by OneFS 8.0.1.

In case of a NetApp Backup Restartable Extension (BRE) migration, if the migration process is either paused or is in a restartable state, you cannot upgrade the corresponding directories to OneFS 8.0.1. You must complete the migration before upgrading the data.

---

**Note**

The upgrade procedures described in the following sections do not apply to data migrations that are performed using OneFS 8.0.0.

---

## Upgrade existing migration folders

You must upgrade all the data migrations that you performed to an EMC Isilon cluster running earlier versions of OneFS to OneFS 8.0.1 before performing additional incremental migrations.

**Procedure**

1. Upgrade a migrated directory on an EMC Isilon cluster running OneFS 8.0.1 through one of the following commands:

```
isi_vol_copy -upgrade <src_filer>:<src_dir> <dest_dir>
isi_vol_copy_vnx -upgrade <src_filer>:<src_dir> <dest_dir>
```

Where:

| Option      | Description                                                          |
|-------------|----------------------------------------------------------------------|
| <src_filer> | IP address or domain name of the NetApp or VNX storage device        |
| <src_dir>   | Absolute path of the directory on the NetApp or VNX storage device   |
| <dest_dir>  | Absolute path of the destination directory on the EMC Isilon cluster |

If the upgrade is successful, a migration ID is generated.

2. Verify the status of the upgrade by running one of the following commands depending on your storage device:

```
isi_vol_copy - list <mig-id>
isi_vol_copy_vnx - list <mig-id>
```

The migration mode is displayed as full irrespective of whether you performed a full or Incremental migration before the upgrade.

3. To run an incremental migration, repeat step 1 for each of the migrated directories.

## Limitations of upgrading migrated directories to OneFS 8.0.1

The following limitations apply when you upgrade migrated directories on an EMC Isilon cluster that is running OneFS 8.0.1.

- After an upgrade, all the incremental migration run IDs begin with 1 even though you might have migrated data several times onto the EMC Isilon cluster running the previous versions of OneFS.
- Log files generated for migrations performed on EMC Isilon clusters running the previous version of OneFS will be lost during a rolling upgrade to OneFS 8.0.1.
- A paused NetApp BRE migration cannot be upgraded to OneFS 8.0.1.

- For a pre-OneFS 8.0.1 VNX migration, the `isi_vol_copy_vnx` tool cannot accurately determine whether the previous migration was successful. You must refer to the VNX migration logs or any other records to make sure that the migration was successful before upgrading it.

## Data migration considerations for a non-disruptive upgrade

Make note of the following migration considerations before performing a non-disruptive upgrade to OneFS 8.0.1 and later releases.

- Complete any migrations that are in active, sleeping, or restartable states and then start the upgrade. A non-disruptive upgrade operation fails when an active migration is in either of these states.
- If the non-disruptive upgrade takes precedence, kill any active, paused (restartable), or sleeping migration processes and restart them after the upgrade.

---

### Note

If the migration process changes to a failed state, restart the migration process and perform a full data migration.

---

- When performing a non-disruptive upgrade, you cannot run a full or an incremental migration.

See the *OneFS Upgrade Process and Planning Guide* for most information on the non-disruptive upgrade process.



# CHAPTER 8

## Migration commands

This section includes the following topics:

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- [isi\\_vol\\_copy\\_vnx](#)..... 52

## isi\_vol\_copy

Migrates data from a NetApp storage device.

### Syntax

```
isi_vol_copy {<src_filer>:<src_dir> <dest_dir>
 [-sa <migration-id> -sa user: | user:password]
 [-sport <ndmp_src_port>]
 [-dport <ndmp_data_port>]
 [-full | -incr]
 [-dhost <dest_ip_addr>]
 [-maxino <integer>]
 [-no_acl]
 [-fullsave]
 [-nosave]
 [-worm]}
 [-dport <ndmp_data_port>]
 [-upgrade <src_filer>:<src_dir> <dest_dir>]
```

### Options

*<src\_filer>*

Specifies the IP address or domain name of the NetApp storage device.

*<src\_dir>*

Specifies the absolute path of the directory on the NetApp storage device to migrate.

*<dest\_dir>*

Specifies the absolute path of the directory on the cluster to migrate data to.

*-sa <migration-id> -sa user: | user:password]*

Specifies the username and password of a user for a specific migration ID on the NetApp storage device. If the *<username>* specified is not the name of the root account, specify *<password>* as the NDMP password of the user. To view the NDMP password of a user, run the `ndmpd password` command on the NetApp storage device.

We recommend that you do not specify a password through this option. Instead, specify only a username. If you specify a password as a part of the command, the password will be visible to all the other users who are logged in to the cluster. If you do not specify a password, and one is required, you will be prompted for the password. If you enter a password at the prompt, the password will not be visible to the other users on the cluster.

*-sport <ndmp\_src\_port>*

Specifies the NDMP port that OneFS will connect to on the NetApp storage device. The default value is 0, which causes OneFS to connect to the default NDMP port configured on the NetApp storage device.

*-dport <ndmp\_data\_port>*

Specifies the NDMP port on the EMC Isilon cluster that OneFS will coordinate the data migration through. The default value is `ANY`, which causes OneFS to connect through any available port. You can also specify a fixed NDMP port on the EMC Isilon cluster when a firewall is configured between an EMC Isilon cluster and a NetApp storage device.

*-full*

Migrates all data from the source to the target directory.

*-incr*

Migrates only data that has been modified since the last migration was run.

**Note**

If you try to run the `isi_vol_copy` command with the `-incr` option without running a full migration, a warning message appears and a full migration is automatically run.

`-dhost <dest_ip_addr>`

Specifies the name or IP address of the interface on the EMC Isilon cluster that OneFS will coordinate the data migration through. This can be useful if the cluster has multiple network interfaces and the majority of the data must be transferred through a link other than the outgoing NDMP control interface.

`-maxino <integer>`

Specifies the maximum number of files that can be created on the NetApp volume. This option can be useful if the NDMP stream incorrectly reports the maximum number of files, which can cause the migration to fail. Manually specifying the correct maximum number of files prevents this issue.

`-no_acl`

Specifies that no Access Control List (ACL) must be assigned to a file.

`-fullsave`

Saves the entire dumpstream data including metadata and user data.

`-nosave`

Saves the dumpstream data that includes metadata but excludes user data.

`-worm`

Specifies that the WORM state of the files on the NetApp storage device must be applied to the files after migrating to an EMC Isilon cluster.

To access this option, the destination directory on the EMC Isilon cluster must belong to the SmartLock domain and must be a SmartLock Enterprise directory. The access time of the file determines the retention period. You can apply the `-worm` option even when the migration process is paused and restarted.

When migrating WORM files, keep in mind the following points:

- If a file in a WORM state is newly committed without any changes, or if the retention period of an already committed WORM file is extended and then an incremental migration process is run, the file is not included in that migration process.
- After performing a full migration of a WORM file, if you delete the WORM file through the privilege delete feature and recreate a new WORM file with the same name, the incremental migration of that newly created file might fail.
- NetApp provides support to append a file which is already in a WORM state. However, `isi_vol_copy` does not support the migration of such files to an EMC Isilon cluster.

`-upgrade <src_filer>:<src_dir> <dest_dir>`

Specifies the destination directory to upgrade.

**Syntax of additional `isi_vol_copy` commands**

When you run an `isi_vol_copy` command that starts a migration session, you can monitor the progress and control the migration process by running the following commands:

```
isi_vol_copy
 -list [migration-id] | [[-detail] [-state=<state>] [-
destination=<pathname>]]
 -cleanup <migration-id> [-everything] [-noprompt]
 -pause <migration-id>
 -status <migration-id>
```

```
-sleep </path_to_sleep_schedule.config> <migration-id>
-get_config
-set_config <name>=<value>
```

### Options

- list [*migration-id*] [*-detail*][*-state*=<state>] [*-destination*=<pathname>]]
 

Displays details about the migration sessions that are currently running. The details include the migration ID of each of the sessions, the state of migration, for example, Completed, Running, or Restartable, and the destination folder on the EMC Isilon cluster that will hold the migrated files. This option enables you to view the BRE contexts for NetApp migrations.
- cleanup <*migration-id*> [*-everything*] [*-noprompt*]
 

Deletes the dumpstream files for all the migrations except for the latest run. Specifying the *-everything* option deletes information about all the non-restartable migration sessions both on the source and destination filers.
- pause <*migration-id*>
 

Pauses a migration session based on a specific migration ID.
- status <*migration-id*>
 

Displays the current migration status for a specific session based on the migration ID by retrieving information from the NetApp storage device.
- sleep </path\_to\_sleep\_schedule.config> <*migration-id*>
 

Specifies a sleep schedule for a migration session that is either running or in a restartable state based on the migration ID by pointing to a sleep schedule configuration file.
- set\_config <*name*>=<value>
 

Sets the parameter name and value for the auto-cleanup process.
- get\_config
 

Lists all the parameter names and values set for the auto-cleanup process.

## isi\_vol\_copy\_vnx

Migrates data from a Celerra or VNX storage device.

### Syntax

```
isi_vol_copy_vnx
<src_filer>:<src_dir> <dest_dir>
[-sa user | user:<password>]]
[-sport <ndmp_src_port>]
[-dport <ndmp_data_port>]
{-full | -incr [-level_based]}
[-dhost <dest_ip_addr>]
[-no_acl
[-upgrade <src_filer>:<src_dir> <dest_dir>]
```

### Options

- <*src\_filer*>
 

Specifies the IP address or domain name of the VNX.
- <*src\_dir*>
 

Specifies the absolute path of the directory on the Celerra or VNX storage device that is being migrated to the cluster.
- <*dest\_dir*>
 

Specifies the absolute path of the directory that data is being migrated to.
- sa *user*| *user*:<*password*>]
 

Specifies the username and password of a user on the Celerra or VNX storage device.

We recommend that you do not specify a password through this option. Instead specify only a username. If you specify a password as part of the command, the password will be visible to all other users logged in to the cluster. If you do not specify a password and one is required, you will be prompted for the password. If you enter a password at the prompt, the password will not be visible to other users on the cluster.

`-sport <ndmp_src_port>`

Specifies the NDMP port that OneFS will connect to on the Celerra or VNX storage device. The default value is 0, which causes OneFS to connect to the default NDMP port configured on Celerra or VNX.

`-dport <ndmp_data_port>`

Specifies the NDMP port on the EMC Isilon cluster that OneFS will coordinate the data migration through. The default value is `ANY`, which causes OneFS to connect through any available port.

`-full`

Migrates all data from the source to the target directory.

`-incr`

Migrates only data that has been modified since the last migration was run.

`-level_based`

Specifies to use the migration methods that are applicable for releases prior to OneFS version 8.0.0 for data from previous releases that is yet to be cutover.

`-dhost <dest_ip_addr>`

Specifies the name or IP address of the interface on the EMC Isilon cluster that OneFS will coordinate the data migration through. This can be useful if the cluster has multiple network interfaces and the majority of the data must be transferred through a link other than the outgoing NDMP control interface.

`-no_acl`

Specifies that no Access Control List (ACL) must be assigned to a file.

`-upgrade <src_filer>:<src_dir> <dest_dir>`

Specifies the destination directory to upgrade.

### Syntax of additional `isi_vol_copy_vnx` commands

When you run an `isi_vol_copy_vnx` command that starts a migration session, you can monitor the progress and control the migration process by running the following commands:

```
isi_vol_copy_vnx
 -list [migration-id] [[-detail] [-state=<state>] [-destination=<pathname>]]
 -cleanup <migration-id> [-everything] [-noprompt]
 -get_config
 -set_config <name>=<value>
```

### Options

`-list [migration-id] [[-detail] [-state=<state>] [-destination=<pathname>]]`

Displays details about the migration sessions that are currently running. The details include the migration ID of each of the sessions, the state of migration, for example, `Completed` or `Running`, and the destination folder on the EMC Isilon cluster that will hold the migrated files.

`-cleanup <migration-id> [-everything] [-noprompt]`

Deletes information about specific non-restartable migration sessions based on the migration ID both on the EMC Isilon cluster and the Celerra or VNX storage device. Specifying the `-everything` option deletes information about all the non-restartable migration sessions both on the source and destination filers.

`-set_config <name>=<value>`

Sets the parameter name and value for the auto-cleanup process.

## Migration commands

`-get_config`

Lists all the parameter names and values set for the auto-cleanup process.