



# FLI 7-Mode to ONTAP transition workflow

## ONTAP

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# FLI 7-Mode to ONTAP transition workflow

This section provides an example of the FLI 7-Mode to ONTAP transition workflow. The transition workflow can be run as either an online or offline workflow.

The FLI transition is recommended when either the source LUN is hosted on a 32-bit aggregate and/or the LUN is misaligned. The FLI 7-Mode to ONTAP transition is able to combine transitioning the LUN from 7-Mode to ONTAP, along with correcting LUN alignment and transitioning the LUN from a 32-bit to 64-bit aggregate. Other methods of transitioning the LUN, including 7-Mode Transition Tool (7MTT), can require remediating the LUN alignment and/or converting a 32-bit to 64-bit aggregate prior to transitioning to ONTAP.

The FLI 7-Mode to ONTAP transition workflow can be either an online or offline workflow. These workflows are functionally identical to the two corresponding FLI offline and online migration workflows, with the exception that the source array is a NetApp 7-Mode storage array. Both workflows share the same rules and procedures as their migration equivalents. This includes the FLI online workflow host operating support list.

The example provided should give a thorough walkthrough of the FLI 7-Mode to ONTAP process. The FLI 7-mode to ONTAP transition flow includes the following tasks:

1. Preparing source and destination arrays
2. Performing a disruptive cutover
3. Importing the data
4. Verifying migration results
5. FLI transition post-migration tasks

## 7-Mode to ONTAP FLI supported configurations

It is important to verify that the host OS, HBA, switch, and ONTAP array to which you are ultimately transitioning are supported.

If you are using the FLI 7-Mode to ONTAP transition workflow, you don't need to verify your source (7-Mode controller) in the FlexArray IMT. It won't be listed but is supported expressly for this transition workflow. You do still need to verify all hosts are in a supported configuration.

There are no FLI-specific platform requirements. There are also no minimum versions of 7-Mode Data ONTAP, although the version would have to support Fibre Channel protocol (FCP).

The maximum size LUN that FLI can import is 6 TB. This is a limitation based on the current maximum size drives currently supported by ONTAP. If you attempt to mount a larger foreign LUN, the LUN will be marked as broken, and you will not be able to write a label to it.

## Rebooting hosts

You have the option to reboot hosts prior to starting this workflow in order to verify that the host is in a known good state.

This would also be a good time to take a Snapshot copy in order to facilitate a revert if needed later. To verify that the server configuration is persistent and pristine across reboots, complete the following steps:

### Steps

1. Shut down all your open applications.
2. Review the logs for errors.
3. Verify that the host sees all of its paths.
4. Reboot the host.

## Verify host LUN path and multipath configuration

Prior to any migrations, verify that multipathing is correctly configured and working properly.

All available paths to LUNs should be active. See the SAN host multipath verification topics for examples of how to verify multipathing on Windows, Linux, and ESXi hosts.

## Prepare hosts for the transition

The execution phase includes the preparation of migration hosts.

In many instances it may be possible to have performed the remediation prior to this step. If not, then this is where you would perform any host remediation such as installing host attach kits or DSMs. From the analysis phase, you will have a gap list of items that need to be performed on each host in order for that host to be in a supported configuration using NetApp ONTAP. Depending on the type of migration being performed, either the host would be remediated and then rebooted (FLI 7-Mode to ONTAP online) or hosts would be rebooted, remediated, and then shut down (FLI 7-Mode to ONTAP offline).

## Preparing source and destination arrays for migration

To prepare for the FLI 7-mode to ONTAP migration, verify the host and source LUN paths and other details.

### Steps

1. In ONTAP, change to advanced privilege level.

```
cluster::> set adv
```

```
Warning: These advanced commands are potentially dangerous; use them  
only when directed to do so by NetApp personnel.  
Do you want to continue? {y|n}: y
```

```
cluster::*>
```

2. Verify that the source array can be seen on the destination controller.

```

cluster::*> storage array show
Prefix                               Name      Vendor      Model Options
-----
NET-1                                NETAPP_LUN_1  NETAPP      LUN

cluster::*> storage array config show -array-name NETAPP_LUN_1
LUN  LUN
Node      Group Count      Array Name      Array Target
Port Initiator
-----
ontaptme-fc-cluster-01
          1      2              NETAPP_LUN_1
500a0981880b813d      0d

500a0981980b813d      0d
ontaptme-fc-cluster-02
          1      2              NETAPP_LUN_1
500a0981880b813d      0d

500a0981980b813d      0d
4 entries were displayed.

Warning: Configuration errors were detected.  Use 'storage errors show'
for detailed information.

```

3. View details on any storage errors listed. Some errors might require action before proceeding. However, the errors shown in the following example, “This device is an ONTAP® LUN.” can be safely ignored.



The error message “This device is an ONTAP(R) LUN.” is caused because FLI relies on FlexArray technology which doesn’t support virtualizing ONTAP or ONTAP targets. FLI is able to import the LUNs, however, FlexArray doesn’t support virtualizing them.

```
cluster::*> storage errors show
Disk: NET-1.1
UID:
60A98000:44306931:452B4738:5767366B:00000000:00000000:00000000:00000000:
00000000:00000000
-----
NET-1.1 (60a9800044306931452b47385767366b): This device is an ONTAP(R)
LUN.

Disk: NET-1.2
UID:
60A98000:44306931:452B4738:5767366D:00000000:00000000:00000000:00000000:
00000000:00000000
-----
NET-1.2 (60a9800044306931452b47385767366d): This device is an ONTAP(R)
LUN.

2 entries were displayed.
```

#### 4. Display source LUN details.

```
cluster::*> storage array config show -array-name NETAPP_LUN_1 -instance

    Controller Name: ontaptme-fc-cluster-01
      LUN Group: 1
    Array Target Ports: 500a0981880b813d
      Initiator: 0d
      Array Name: NETAPP_LUN_1
    Target Side Switch Port: stme-5010-4:2-6
    Initiator Side Switch Port: stme-5010-4:2-3
    Number of array LUNs: 2

    Controller Name: ontaptme-fc-cluster-01
      LUN Group: 1
    Array Target Ports: 500a0981980b813d
      Initiator: 0d
      Array Name: NETAPP_LUN_1
    Target Side Switch Port: stme-5010-4:2-5
    Initiator Side Switch Port: stme-5010-4:2-3
    Number of array LUNs: 2

~~~~~ Output truncated ~~~~~
4 entries were displayed.

Warning: Configuration errors were detected. Use 'storage errors show'
for detailed information.
```

5. Verify the source array is discovered through all the initiator ports.

```

cluster::*> storage array config show -array-name NETAPP_LUN_1
          LUN  LUN
Node      Group Count          Array Name      Array Target
Port Initiator
-----
ontaptme-fc-cluster-01
          1    2              NETAPP_LUN_1
500a0981880b813d      0d

500a0981980b813d      0d
ontaptme-fc-cluster-02
          1    2              NETAPP_LUN_1
500a0981880b813d      0d

500a0981980b813d      0d
4 entries were displayed.

Warning: Configuration errors were detected. Use 'storage errors show'
for detailed information.

```

6. List the LUNs mapped from the 7-Mode storage. Verify the disk properties and paths.

```

cluster::*> storage disk show -array-name NETAPP_LUN_1 -instance
          Disk: NET-1.1
          Container Type: unassigned
          Owner/Home: - / -
          DR Home: -
          Stack ID/Shelf/Bay: - / - / -
          LUN: 0
          Array: NETAPP_LUN_1
          Vendor: NETAPP
          Model: LUN
          Serial Number: D0i1E+G8Wg6k
          UID:
60A98000:44306931:452B4738:5767366B:00000000:00000000:00000000:00000000:
00000000:00000000
          BPS: 512
          Physical Size: -
          Position: present
          Checksum Compatibility: block
          Aggregate: -
          Plex: -
          Paths:
          LUN  Initiator Side      Target Side

```



```

Link
Controller          Initiator          ID  Switch Port          Switch Port
Acc Use  Target Port          TPGN  Speed          I/O KB/s
IOPS
-----
ontaptme-fc-cluster-02
          0d          0  stme-5010-4:2-4          stme-5010-
4:2-6          ANO RDY  500a0981880b813d          1  4 Gb/S
0          0
ontaptme-fc-cluster-02
          0d          0  stme-5010-4:2-4          stme-5010-
4:2-5          AO  INU  500a0981980b813d          0  4 Gb/S
0          0
ontaptme-fc-cluster-01
          0d          0  stme-5010-4:2-3          stme-5010-
4:2-6          ANO RDY  500a0981880b813d          1  4 Gb/S
0          0
ontaptme-fc-cluster-01
          0d          0  stme-5010-4:2-3          stme-5010-
4:2-5          AO  INU  500a0981980b813d          0  4 Gb/S
0          0

Errors:
NET-1.1 (60a9800044306931452b47385767366b): This device is a ONTAP(R)
LUN.
~~~~~ Output truncated ~~~~~
2 entries were displayed.

```

7. Verify the source LUN is marked as foreign.

```

cluster::*> storage disk show -array-name NETAPP_LUN_1
          Usable          Disk          Container          Container
Disk          Size Shelf Bay Type          Type          Name
Owner
-----
NET-1.1          -          -          - LUN          unassigned          -          -
NET-1.2          -          -          - LUN          foreign          -          -
2 entries were displayed.

```

8. Serial numbers are used in FLI LUN import commands. List all foreign LUNs and their serial numbers.

```
cluster::*> storage disk show -container-type foreign -fields serial-
number
disk      serial-number
-----  -----
NET-1.2  D0i1E+G8Wg6m
```

9. Create the target LUN. The LUN create command detects the size and alignment based on partition offset and creates the LUN accordingly with the foreign-disk argument

```
cluster::*> vol create -vserver fli_72C -volume flivol -aggregate aggr1
-size 10G
[Job 12523] Job succeeded: Successful
```

10. Verify volume.

```
cluster::*> vol show -vserver fli_72C
Vserver  Volume      Aggregate  State  Type  Size
Available Used%
-----  -----  -----  -----  ----  -----
-----  -----
fli_72C  flivol      aggr1      online  RW    10GB
9.50GB  5%
fli_72C  rootvol     aggr1      online  RW    1GB
972.6MB 5%
2 entries were displayed.
```

11. Create the target LUN.

```
cluster::*> lun create -vserver fli_72C -path /vol/flivol/72Clun1
-ostype windows_2008 -foreign-disk D0i1E+G8Wg6m

Created a LUN of size 3g (3224309760)
```

12. Verify new LUN.

```

cluster::*> lun show -vserver fli_72C
Vserver   Path                               State   Mapped   Type
Size
-----
fli_72C   /vol/flivol/72Clun1               online  unmapped windows_2008
3.00GB

```

13. Create an igroup of protocol FCP with host initiators.

```

cluster::*> lun igroup create -vserver fli_72C -igroup 72C_g1 -protocol
fc -ostype windows -initiator 10:00:00:00:c9:e6:e2:79

cluster::*> lun igroup show -vserver fli_72C -igroup 72C_g1
      Vserver Name: fli_72C
      Igroup Name: 72C_g1
      Protocol: fcp
      OS Type: windows
Portset Binding Igroup: -
      Igroup UUID: 7bc184b1-dcac-11e4-9a88-00a0981cc318
      ALUA: true
      Initiators: 10:00:00:00:c9:e6:e2:79 (logged in)

```

14. Map the test LUN to the test igroup.

```

cluster::*> lun map -vserver fli_72C -path /vol/flivol/72Clun1 -igroup
72C_g1

cluster::*> lun mapping show -vserver fli_72C
Vserver   Path                               Igroup   LUN ID
Protocol
-----
fli_72C   /vol/flivol/72Clun1               72C_g1   0
fc

```

15. Offline the test LUN.

```

cluster::*> lun offline -vserver fli_72C -path /vol/flivol/72Clun1

Warning: This command will take LUN "/vol/flivol/72Clun1" in Vserver
"fli_72C" offline.
Do you want to continue? {y|n}: y

cluster::*> lun show -vserver fli_72C
Vserver   Path                               State   Mapped   Type
Size
-----
-----
fli_72C   /vol/flivol/72Clun1               offline mapped   windows_2008
3.00GB

```

#### 16. Create import relationship between new LUN and foreign LUN.

```

cluster::*> lun import create -vserver fli_72C -path /vol/flivol/72Clun1
-foreign-disk D0i1E+G8Wg6m

cluster::*> lun import show -vserver fli_72C -path /vol/flivol/72Clun1
vserver foreign-disk   path                               operation admin operational
percent
                                in progress state state
complete
-----
-----
fli_72C D0i1E+G8Wg6m   /vol/flivol/72Clun1 import       stopped
0                                                stopped

```

## Performing a disruptive cutover of FLI 7-Mode to ONTAP

This example gives you the general steps for performing a disruptive cutover for the FLI transition process.

For a host remediation walkthrough of Windows, Linux, and ESXi hosts, see related topics in this guide as well as the host operating system and host-attach kit documentation.

### Steps

1. On the 7-Mode system, display the igroup to which the source LUN is mapped.

```
stme-7ma> igroup show
  FLI_on_fcp (FCP) (ostype: windows):
    10:00:00:00:c9:e6:e2:79 (logged in on: 0c, vtic)
    50:0a:09:81:00:96:43:70 (logged in on: 0c, vtic)
    50:0a:09:81:00:96:3c:f0 (logged in on: 0c, vtic)
```



The disruption begins immediately after the unmap command is executed. Generally, the disruption window can be measured in minutes. It is literally the length of time it takes to move the host to the new NetApp target and scan for LUNs.

2. If the LUNs being imported are for ESXi hosts, review and follow the instructions in the *ESXi CAW/ATS remediation* topic.
3. Use the unmap command to move the LUN from its hosts. (The disruption window begins here.)

```
stme-7ma> igroup remove -f FLI_on_fcp 10:00:00:00:c9:e6:e2:79
```

4. Verify that the host initiators are no longer present.

```
stme-7ma> igroup show
  FLI_on_fcp (FCP) (ostype: windows):
    50:0a:09:81:00:96:43:70 (logged in on: 0c, vtic)
    50:0a:09:81:00:96:3c:f0 (logged in on: 0c, vtic)
```

5. On the ONTAP cluster, bring the destination LUN online and verify that it's mapped.

```
cluster::*> lun online -vserver fli_72C -path /vol/flivol/72Clun1

cluster::*> lun show -path /vol/flivol/72Clun1
Vserver      Path                               State   Mapped   Type
Size
-----
-----
fli_72C      /vol/flivol/72Clun1               online  mapped   windows_2008
3.00GB
```

6. Rescan disks on the host; find the LUN on the ONTAP target.



The disruption window ends here.

The LUNs are online and mapped, and hosts are now mounting the new ONTAP hosted LUN. Reads are passed through the ONTAP array to the source LUN, and writes are written to both the new ONTAP hosted LUN and also the original source LUN. Both source and destination LUNs will remain in sync until the

migration is complete and the LUN relationship has been broken.

## Importing the data from FLI 7-Mode to ONTAP

These steps describe how to import the data from a 7-Mode source LUN to an ONTAP destination LUN using FLI.

### Steps

1. Start the migration import.

```
cluster::*> lun import start -vserver fli_72C -path /vol/flivol/72Clun1
```

2. Display FLI status.

```
cluster::*> lun import show -vserver fli_72C -path /vol/flivol/72Clun1
vserver foreign-disk path operation admin operational
percent
                                in progress state state
complete
-----
-----
fli_72C D0i1E+G8Wg6m /vol/flivol/72Clun1 import started
                                                completed
100
```

If you want to make sure the source LUN remains consistent after the migration completes, you will need to:

- After the import show indicates it is completed, shut down the host.
- Delete the LUN relationship: `lun import delete -vserver fli_72C -path /vol/flivol/72Clun1.`



Remember that after the LUN relationship is broken, the LUNs will quickly lose sync because changes are made to the new LUN only. Therefore, while it may be beneficial to maintain a consistent state in the event you want to restore the original state, the new LUN will likely have changes not reflected in the source LUN.



After the import is stopped, you can destroy the import relationship unless you intend to verify the import.

## Verifying FLI 7-Mode to ONTAP migration results

You have the option to verify that LUNs have been properly migrated from FLI 7-Mode to ONTAP.

Start the verify job to compare source and destination LUNs. Monitor the verify progress. The LUNs being verified need to be offline for the duration of the verification session. The verification session can potentially be lengthy because it is a block-for-block comparison between source and destination LUNs. It should take approximately the same amount of time as the migration. Verification is not required, but we encourage you to verify a subset of the LUNs imported/migrated to feel comfortable about the import process.



The LUN import verify must be explicitly stopped before bringing the LUN back online. Otherwise, the LUN online fails. This behavior will be changed in an upcoming release of ONTAP.

## Steps

1. Offline the LUNs to be verified.

```
cluster::*> lun offline -vserver fli_72C -path /vol/flivol/72Clun1
Warning: This command will take LUN "/vol/flivol/72Clun1" in Vserver
"fli_72C" offline.
Do you want to continue? {y|n}: y
```

2. Start LUN verify.

```
lun import verify start -vserver fli_72C -path /vol/flivol/72Clun1
```

3. Display LUN verify status.

```
ontaptme-fc-cluster::*> lun import show -vserver fli_72C -path
/vol/flivol/72Clun1
vserver foreign-disk path operation admin operational
percent
in progress state state
complete
-----
-----
fli_72C D0i1E+G8Wg6m /vol/flivol/72Clun1 verify started
9
```



The LUN import verify must be explicitly stopped before bringing the LUN back online. Otherwise, the LUN online fails. See the following CLI output.

4. Stop LUN verification. This step needs to be performed manually even if the status shows that verify is complete.

```
lun import verify stop -vserver fli_72C -path /vol/flivol/72Clun1
```

5. Online the LUN upon completion of verification.

```
lun online -vserver fli_72C -path /vol/flivol/72Clun1
```

## FLI transition workflow post-migration tasks

The post-migration tasks for the FLI 7-mode to ONTAP workflow are similar to the other FLI workflows.

- When ready, you can delete the LUN import relationship.

The LUN import relationship can be safely removed because the host is now accessing the new NetApp array for all I/O to the new ONTAP LUN, and the source 7-Mode LUN is no longer in use.

- All server remediations are performed during post-migration.

The third-party software is removed, NetApp software is installed and configured, and then the host is brought up accessing the LUNs on NetApp.

- Review logs for errors, check pathing, and perform any application testing to verify that your migration completed cleanly and successfully.



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