Configure ONTAP FLI

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NetApp
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Learn about ONTAP FLI configuration

This section describes the configuration and validation framework for Foreign LUN Import (FLI) using both Fibre Channel (FC) and iSCSI backend connectivity. It focuses on ensuring reliable, redundant access from ONTAP to the foreign storage array during LUN discovery and import, while maintaining clear separation from host access paths. The content walks through recommended SAN design principles (dual-fabric FC, initiator/target port usage, and zoning best practices), adapter configuration requirements on ONTAP, and operational checks to confirm that the foreign LUNs are visible and healthy before import is initiated.

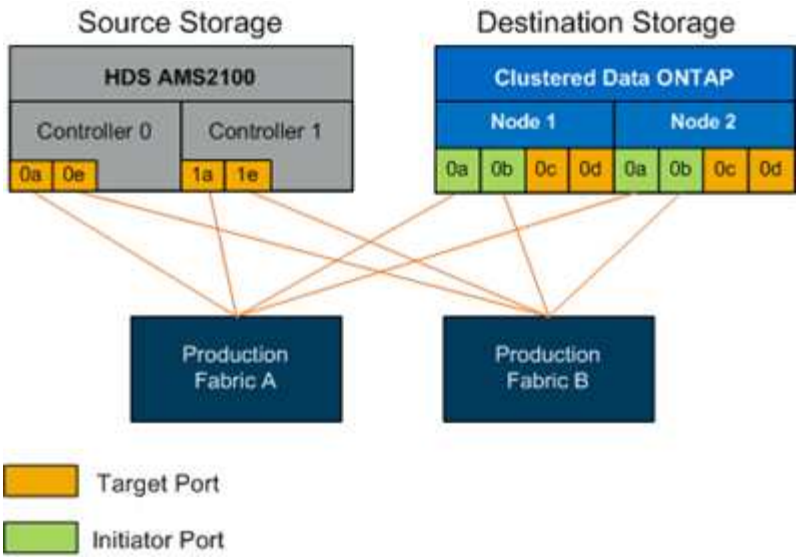
In addition, it details the iSCSI backend FLI model, which uses ONTAP software iSCSI initiator bound to intercluster LIFs (IC LIFs), emphasizing explicit session creation (no discovery sessions), full-mesh connectivity for resiliency, and strict validation of network reachability and session health. Across both FC and iSCSI scenarios, the goal is to establish a deterministic, supportable backend transport that satisfies FLI prerequisites, enables consistent foreign LUN discovery across all paths, and provides the necessary instrumentation (statistics and visibility) to troubleshoot issues during discovery and import execution.

ONTAP Foreign LUN Import (FLI) connectivity and wiring

Foreign LUN Import over FC relies on a dual fabric SAN design so the destination ONTAP controllers can reliably access the foreign array LUNs during discovery and import. For a supported deployment, each storage controller in use must have a primary active path in both fabrics, which effectively means the source array target ports and the ONTAP initiator ports for the nodes performing the import must be in a common zone in Fabric A and Fabric B. You do not need to include every node in the ONTAP cluster—only the nodes that will actually import and migrate LUNs. While indirect paths can work, best practice is to use active, optimized paths between the source and destination.

ONTAP FLI recommended FC wiring and zoning practices

- Use dual fabrics (A and B) for redundancy.
- Ensure primary, active paths from each controller in use are present in both fabrics.
- Use at least two ONTAP initiator ports and two source array target ports where possible to avoid single points of failure.
- Do not zone ONTAP initiator ports with the host. ONTAP initiator ports are used only to connect to source array target ports for import and discovery.
- Zone only the ONTAP nodes participating in imports, you don’t need to zone the entire cluster.



Configure FC adapters for initiator mode for ONTAP Foreign LUN Import (FLI) migration

ONTAP FLI over FC requires an FC adapter in initiator mode on the ONTAP side. If free initiator ports don't exist, you might need to convert an FC target adapter port to initiator mode. And if the FC adapter has active FC LIFs, then the active FC LIFs must be moved to different adapter ports within the same fabric.

Steps

1. View the available FC adapters:

```
fcp adapter show -status-oper online
```

Example output

```
  (network fcp adapter show)
                      Connection  Port    Admin    Operational
Node         Adapter  Established Address Status   Status
Topology
------------ -------- ----------- ------- -------- ---------------
--------
ssan-a50-06a 3a       true        640a00  up       online
fabric
ssan-a50-06b 3b       true        640a00  up       online
fabric
ssan-a50-07a 3a       true        640e00  up       online
fabric
ssan-a50-07b 3b       true        640d00  up       online
fabric
```

2. Take the target FC adapter port offline:

```
fcp adapter modify -node <node_name> -adapter <adapter>> -status-admin
down;
```

Example output

```
fcp adapter modify -node ssan-a50-06a -adapter 3a -status-admin down;
```

3. Verify that the status of the adapter is down:

```
fcp adapter show -node <node_name> -adapter <adapter>> -fields status-
admin
```

Example output

```
ssan-a50-06-07::*> fcp adapter show -node ssan-a50-06a -adapter 3a
-fields status-admin

node         adapter status-admin
------------ ------- ------------
ssan-a50-06a 3a      down
```

4. Convert the FC adapter port from target mode to initiator mode:

```
system node hardware unified-connect modify -node <node_name> -adapter
<adapter> -type initiator
```

Example

```
ssan-a50-06-07::*> system node hardware unified-connect modify -node
ssan-a50-06a -adapter 3a -type initiator

Any changes will take effect after rebooting the system. Use the "system
node reboot" command to reboot.
```

5. Bring the adapter back online:

```
fcp adapter modify -node <node_name> -adapter <adapter> -status-admin
up;
```

Example

```
ssan-a50-06-07::*> fcp adapter modify -node ssan-a50-06a -adapter 3a
-status-admin up;
```

6. Verify that the adapter is back online and in initiator mode:

```
system node hardware unified-connect show
```

Example

```
ssan-a50-06-07::*> system node hardware unified-connect show
                       Current  Current    Pending  Pending    Admin
Node          Adapter  Mode     Type       Mode     Type       Status
------------  -------  -------  ---------  -------  ---------
-----------
ssan-a50-06a  3a       fc       target     -        initiator  offline
<< pending node reboot
ssan-a50-06b  3b       fc       target     -        -          online
ssan-a50-07a  3c       fc       target     -        -          online
ssan-a50-07a  3d       fc       initiator  -        -          online
<<< already converted
ssan-a50-06-07::*>
```

ONTAP Foreign LUN Import recommended FC wiring and zoning practices

Foreign LUN Import (FLI) requires the source LUNs to be accessible by ONTAP, which is achieved by zoning source target ports to ONTAP initiator ports. The existing source-to-host zones are typically not modified during migration and can be removed or deactivated post migration.

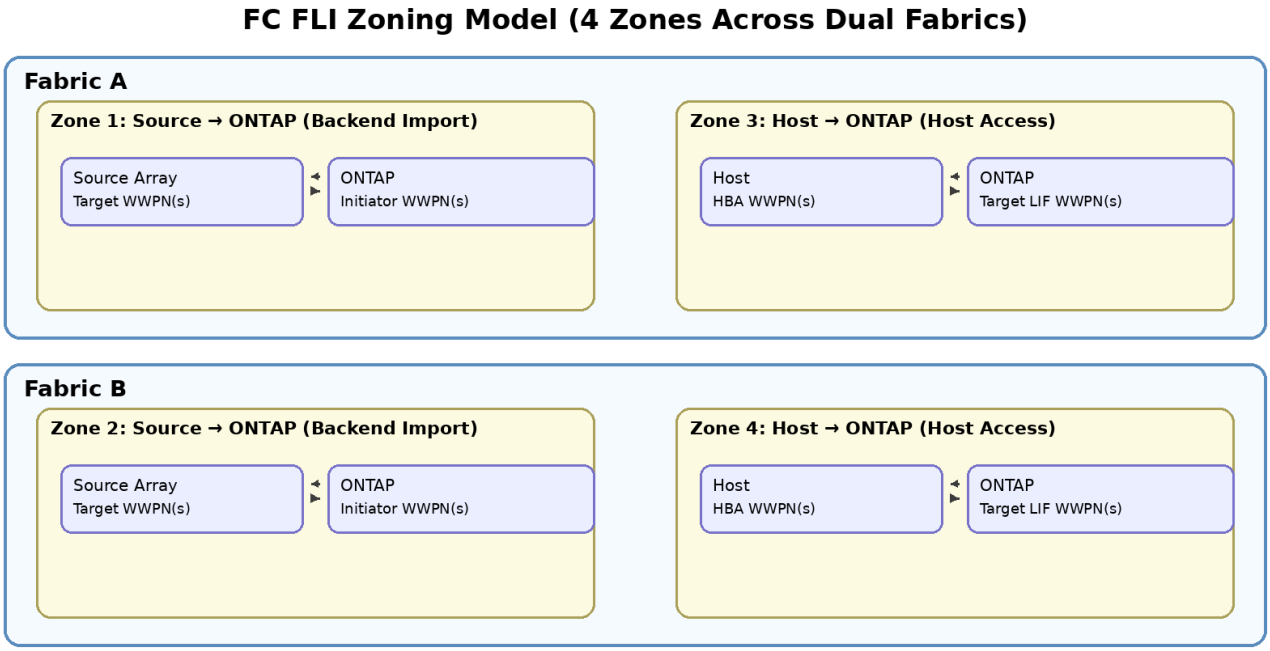
Standard FC FLI scenario uses 4 distinct zones

- Zone 1: Source storage to Destination Storage (Fabric A)
- Zone 2: Source storage to Destination Storage (Fabric B)
- Zone 3: Host to Destination Storage (Fabric A)
- Zone 4: Host to Destination Storage (Fabric B)

Zoning best practices

- Do not mix source target ports and destination target ports in the same zone.
- Do not mix destination initiator ports and host ports in the same zone.

- Do not mix destination target and destination initiator ports in the same zone.
- Zone with at least two ports per controller for redundancy, where possible.
- Prefer single initiator and single target zoning.
- Use the appropriate physical port WWPNs for the zoning model required by the FLI workflow. Do not use NPIV WWPNs where this is explicitly disallowed by the migration zoning guidance.



After zoning source targets to destination initiators, source storage should become visible from ONTAP via discovery commands. If the array does not appear the first time, resetting the switch port connected to ONTAP initiators might be required in some environments.

ONTAP Foreign LUN Import (FLI) recommended FC wiring and zoning practices

ONTAP iSCSI FLI uses an ONTAP software iSCSI initiator that is integrated with the FLI stack and binds outbound iSCSI sessions to intercluster LIFs where the backend connectivity is driven by Intercluster LIF networking, not host data LIFs.

Because sessions are intercluster LIF based, plan intercluster LIF placement, reachability, and redundancy, which is typically on the LUN-owning node and its HA partner, with resilient placement across ports to avoid single points of failure. Before creating sessions, validate end to end routing with VLAN reachability between the intercluster LIF IPs and the foreign array target portal Ips, including allowing TCP port 3260, since successful networking is a prerequisite for LUN discovery.

Sessions must be created explicitly using both the target portal IP and target IQN. iSCSI discovery sessions are not used. The intended resiliency model is full mesh connectivity, where each participating ONTAP node establishes sessions to each foreign target portal, so the foreign LUN is visible through all available paths before starting import.

The backend transport (iSCSI or FC) is independent of the front end protocol you use to present the

destination ONTAP LUN to hosts. You can import using an iSCSI backend and present using FC or iSCSI. Choose between offline or online migration based on whether the host I/O must stop for the full import or can resume after a short cutover while the copy continues in the background.

Irrespective of the backend being FC or iSCSI, the frontend transport the SAN transport protocol can be SCSI FC or iSCSI.

Before you begin

- Use the `version` command to confirm the ONTAP release and that the cluster is on the intended release for iSCSI FLI.

About this task

ONTAP FLI iSCSI backend connectivity setup includes the intercluster LIF, the iSCSI initiator, and sessions. You should do the following to set up and validate iSCSI backend connectivity before starting the import:

- Confirm intercluster LIFs exist on both HA nodes you will use for import (the owning node and the HA partner) and that they are up and reachable.
- Create ONTAP software iSCSI initiators bound to intercluster LIFs (one initiator per LIF).
- Create iSCSI sessions from both nodes to the foreign array target portals and IQN.
- Confirm sessions are healthy and the foreign LUN is discovered.

Steps

1. Validate intercluster LIFs:

```
network interface show -service-policy default-intercluster -fields
vserver,home-node,home-port,curr-node,curr-port,address,ipspace,status-
admin,status-oper
```

Example output

```
vserver         lif             address        home-node home-port curr-
node  curr-port status-oper status-admin ipspace

C1_vsim_cluster iSCSI_FLI_IC_1  172.21.180.220 vsim       e0d      vsim
e0d       up          up           Default
C1_vsim2_cluster iSCSI_FLI_IC_2 172.21.180.228 vsim2      e0d      vsim2
e0d       up          up           Default
2 entries were displayed.
```

2. Validate the network ports are up and in the correct IPSpace:

```
network port show -port e0d -fields port ,ipspace ,broadcast-domain
,link ,mtu,speed-admin ,speed-oper ,health-status
```

Example output

```
node  port link mtu  speed-admin speed-oper ipspace broadcast-domain
health-status
----- ---- ---- ---- ----------- ---------- ------- ----------------
-------------
vsim  e0d  up   1500 auto        1000       Default Default
healthy
vsim2 e0d  up   1500 auto        1000       Default Default
healthy
2 entries were displayed.
```

3. Validate reachability to each foreign target portal from ONTAP (repeat per target portal):

```
network ping -lif <IC_LIF_NAME> -destination <FOREIGN_TARGET_IP>
```

Example output

```
C1_vsim_cluster::*>  network ping -node vsim -destination 172.21.180.238
172.21.180.238 is alive
C1_vsim_cluster::*> network ping -node vsim -destination 172.21.180.238
172.21.180.238 is alive
C1_vsim_cluster::*>
```

4. Check if the iSCSI initiator exists or to create and iSCSI initiator bound to an intercluster LIF (repeat on both HA nodes):

```
storage iswi initiator create -node <NODE_A> -lif <IC_LIF_A> -initiator
-name <INIT_NAME_A>
```

```
storage iswi initiator create -node <NODE_B> -lif <IC_LIF_B> -initiator
-name <INIT_NAME_B>
```

5. Set the privilege level to advanced:

```
set -privilege advanced
```

Example output

```
C1_vsim_cluster::> set -privilege advanced
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
```

6. View the list of iSCSI initiators:

```
storage iscsi-initiator show
```

Example output

```
C1_vsim_cluster::*> storage iscsi-initiator show
This table is currently empty.
```

7. Create the iSCSI initiators:

```
storage iscsi-initiator create -node <node_name> -initiator-name
<initiator_name> -lif <lif_name>
```

Example

```
C1_vsim_cluster::*>  storage iscsi-initiator create -node vsim
-initiator-name init207m  -lif iSCSI_FLI_IC_1
C1_vsim2_cluster::*> storage iscsi-initiator create -node vsim2
-initiator-name init207n  -lif iSCSI_FLI_IC_2
```

8. Verify the initiators were created:

```
storage iscsi-initiator show
```

Example output

```
C1_sti84-vsim-ucs207m_cluster::*> storage iswi initiator show
       Initiator Logical        Source
 Node  Name      Interface      Name                    ISID
State
----- ---------  -----------    ---------------------  ----------------
-------------
vsim  init207m   iSCSI_FLI_IC_1 iqn.1992-
08.com.netapp:sn.4086639599:vs.1  80:0a:75:00:00:00  online
vsim2 init207n   iSCSI_FLI_IC_2 iqn.1992-
08.com.netapp:sn.4086639600:vs.1  80:1f:61:00:00:00  online
2 entries were displayed.
```

9. Create iSCSI sessions to the foreign target from both nodes for each <TARGET_IP>/<TARGET_IQN> pair, ensuring the sessions form a full mesh topology where each node establishes a session to every target portal:

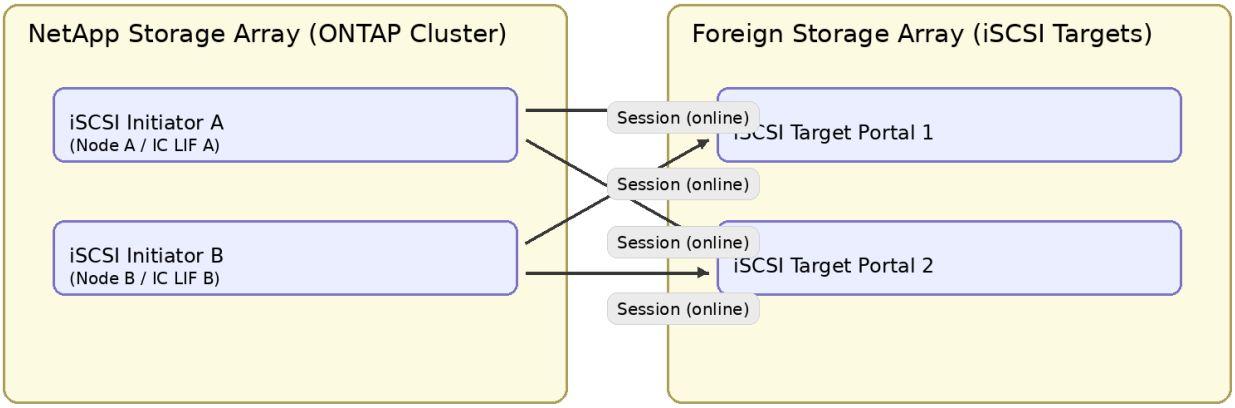
```
storage iswi initiator session create -node <NODE_A> -initiator-name
<INIT_NAME_A> -target-ip <TARGET_IP> -target-name <TARGET_IQN> -target
-port 3260
```

```
storage iswi initiator session create -node <NODE_B> -initiator-name
<INIT_NAME_B> -target-ip <TARGET_IP> -target-name <TARGET_IQN> -target
-port 3260
```

Example

```
C1_vsim_cluster::*> storage iswi initiator session create -node vsim
-initiator-name init207m -target-name iqn.1992-
08.com.netapp:sn.054a3ea61f7c11f1bc73005056acc5b1:vs.3 -target-ip
172.21.180.238
C1_vsim_cluster::*> storage iswi initiator session create -node vsim2
-initiator-name init207n -target-name iqn.1992-
08.com.netapp:sn.054a3ea61f7c11f1bc73005056acc5b1:vs.3 -target-ip
172.21.180.238

C1_vsim_cluster::*> storage iswi initiator session create -node vsim2
-initiator-name init207n -target-name iqn.1992-
08.com.netapp:sn.054a3ea61f7c11f1bc73005056acc5b1:vs.3 -target-ip
172.21.180.230
C1_vsim_cluster::*> storage iswi initiator session create -node vsim
-initiator-name init207m -target-name iqn.1992-
08.com.netapp:sn.054a3ea61f7c11f1bc73005056acc5b1:vs.3 -target-ip
172.21.180.230
```



Full-mesh topology: each initiator connects to each target portal

10. Verify the sessions:

```
storage iswi initiator session show -node <NODE_A> -initiator-name
<INIT_NAME_A>
```

```
storage iswi initiator session show -node <NODE_B> -initiator-name
<INIT_NAME_B>
```

Example

```
C1_sti84-vsim-ucs207m_cluster::*> storage iswi initiator session show
      Initiator  Target                                    Target-ip
Target Tpgroup-tag TSIH State
Node  Name       Name
Port
----- --------- ---------------------------------------- --------------
------ ------      ---- ------
vsim  init207m  iqn.1992-08.com.netapp:sn.054a3eab1:vs.3 172.21.180.230
3260   1026          2  online
vsim  init207m  iqn.1992-08.com.netapp:sn.054a3eab1:vs.3 172.21.180.238
3260   1032          1  online
vsim2 init207n  iqn.1992-08.com.netapp:sn.054a3eab1:vs.3 172.21.180.230
3260   1026          1  online
vsim2 init207n  iqn.1992-08.com.netapp:sn.054a3eab1:vs.3 172.21.180.238
3260   1032          2  online
4 entries were displayed.
```

11. Start the Statistics

    This Statistics data will help to triage any failure during the iSCSI FLI.

    ```
    statistics start -object <pbject> -sample-id <sample_id>
    ```

    Example

    ```
    C1_sti84-vsim-ucs207m::*> statistics start -object iswi_session -sample
    -id iswi_fli_import
    Statistics collection is being started for sample-id: iswi_fli_import
    ```

12. Check the session statistics:

    ```
    statistics show -sample-id <sample_id>
    ```

    Example

```
C1_sti84-vsim-ucs207m_cluster::*> statistics show -sample-id
iswi_fli_import
Object: iswi_session
Instance: (init207m)-(172.21.180.230)
Start-time: 4/5/2026 08:37:15
End-time: 4/5/2026 08:37:34
Elapsed-time: 19s
Scope: sti84-vsim-ucs207m

    Counter                                                     Value
    -------------------------------- --------------------------------
    instance_name                          (init207m)-(172.21.180.230)
    instance_uuid                           iqn.1992-08.com.netapp:sn.
                                   054a3ea61f7c11f1bc73005056acc5b1
                                                                :vs.3
    node_name                                          sti84-vsim-ucs207m
    process_name                                                       -
    read_data                                                          0
    read_ops                                                           0
    session_state                                                 Online
    write_data                                                         0
    write_ops                                                          0
Object: iswi_session
Instance: (init207m)-(172.21.180.238)
Start-time: 4/5/2026 08:37:15
End-time: 4/5/2026 08:37:34
Elapsed-time: 19s
```

13. Check the connectivity on the foreign array:

    At this stage, the foreign storage array iSCSI target must be able to detect and confirm an active login and session from the NetApp iSCSI initiator. Use the vendor-recommended commands on the foreign array to verify that the initiator is connected and the sessions are healthy.

    Example

```
pureport list --initiator --raw --filter "initiator.iqn='<HOST_IQN>'"
pureport list -initiator
purehost list --all
```

Discovery checkpoint: When sessions are established, ONTAP should add storage paths and discover the foreign LUNs in the storage stack, which is the prerequisite to mark the disk as foreign and proceed with the import workflow.

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