



Configure ONTAP FLI

ONTAP FLI

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Table of Contents

- Configure ONTAP FLI. 1
 - Learn about ONTAP FLI configuration 1
 - ONTAP Foreign LUN Import (FLI) connectivity and wiring. 1
 - ONTAP FLI recommended FC wiring and zoning practices. 1
 - Configure FC adapters for initiator mode for ONTAP Foreign LUN Import (FLI) migration 2
 - ONTAP Foreign LUN Import recommended FC wiring and zoning practices 4
 - ONTAP Foreign LUN Import (FLI) recommended FC wiring and zoning practices 5

Configure ONTAP FLI

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.

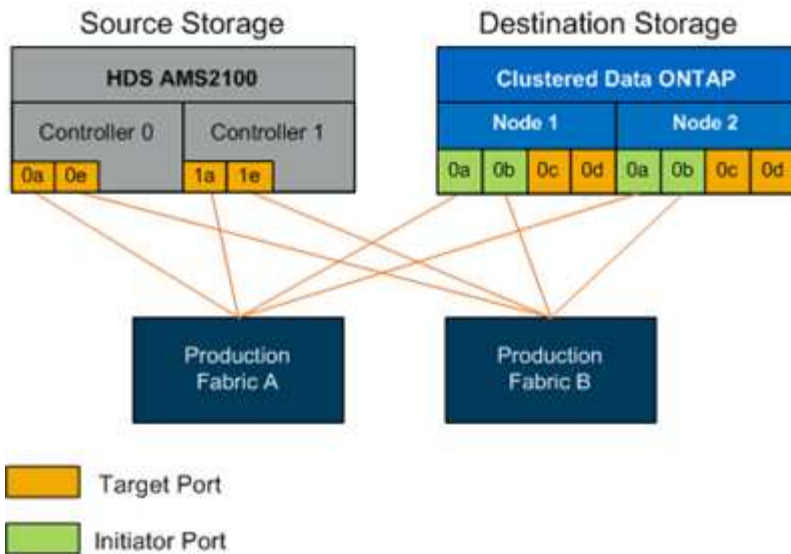
In addition, it details the iSCSI backend FLI model, which uses ONTAP software iSCSI initiator bound to intercluster LIFs (IC LIFs), emphasizing explicit session creation (no discovery sessions), full-mesh connectivity for resiliency, and strict validation of network reachability and session health. 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:

```
fcv adapter show -status-oper online
```

Example output

```
(network fcv adapter show)

Node           Adapter  Connection  Port    Admin   Operational
Topology       Established Address  Status   Status
-----
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:

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

Example output

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

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

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

Example output

```
ssan-a50-06-07::*> fcip 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:

```
fcip 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
```

Node	Adapter	Current Mode	Current Type	Pending Mode	Pending Type	Admin 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

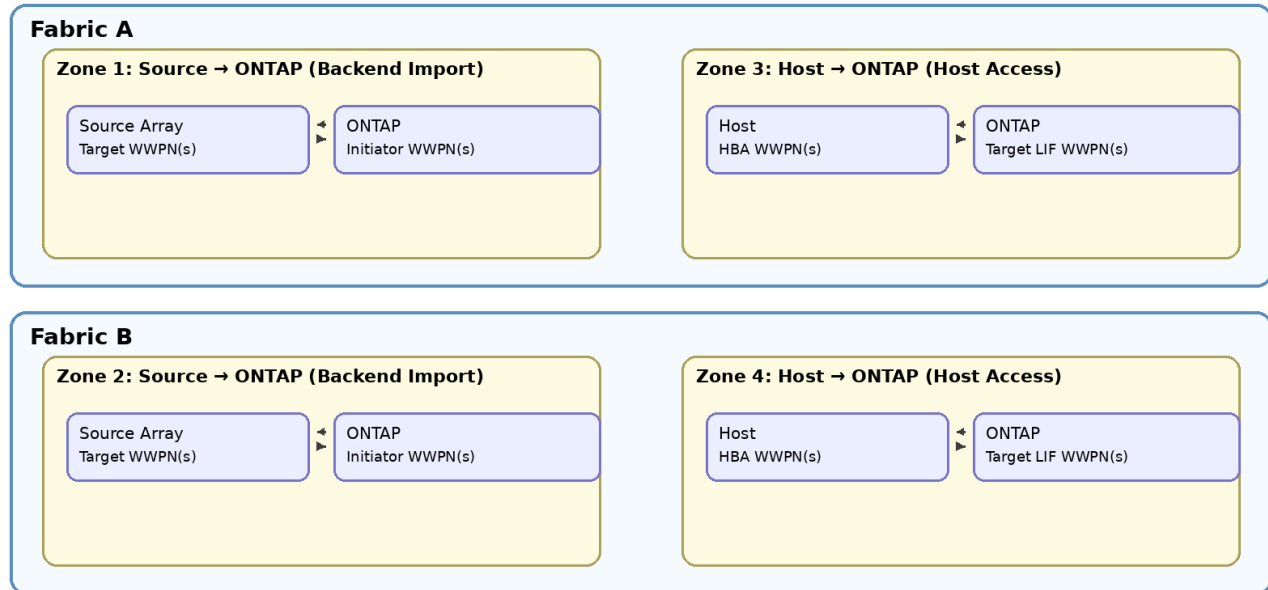
- Zone 1: Source storage to Destination Storage (Fabric A)
- Zone 2: Source storage to Destination Storage (Fabric B)
- Zone 3: Host to Destination Storage (Fabric A)
- Zone 4: Host to Destination Storage (Fabric B)

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.

FC FLI Zoning Model (4 Zones Across Dual Fabrics)



Notes: Zones 1/2 provide backend access for import (Source → ONTAP initiators). Zones 3/4 provide host access (Host → ONTAP target LIFs).



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
```

Node	Initiator Name	Logical Interface	Source 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
```

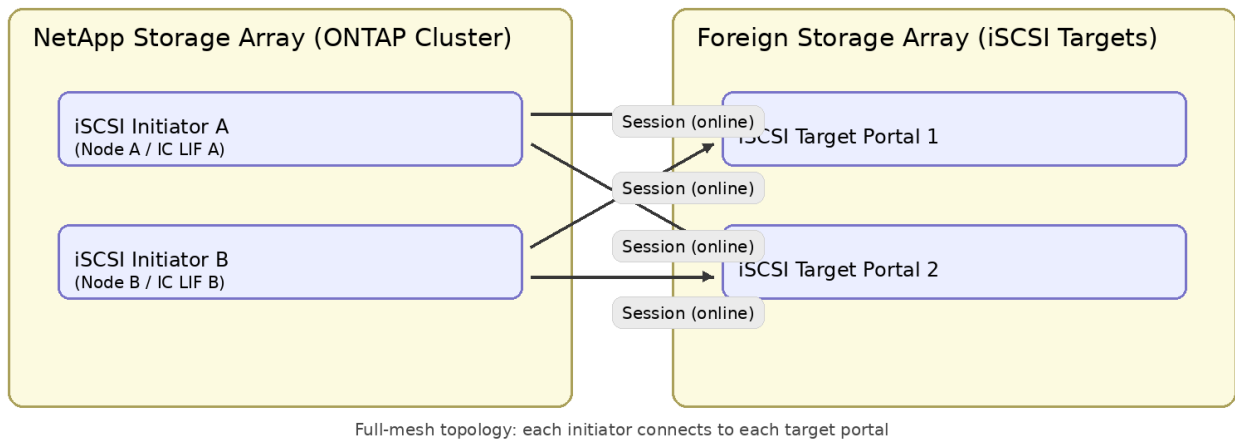
Example

```

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

```



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
3260	1026	2 online
vsim	init207m	iqn.1992-08.com.netapp:sn.054a3eab1:vs.3
3260	1032	1 online
vsim2	init207n	iqn.1992-08.com.netapp:sn.054a3eab1:vs.3
3260	1026	1 online
vsim2	init207n	iqn.1992-08.com.netapp:sn.054a3eab1:vs.3
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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