TOPIC: IMPLEMENTING FAILOVER CLUSTERING

Objective:

To provide hands-on experience in planning, creating, configuring, managing, and testing a high-availability failover cluster using Windows Server 2016, with a focus on highly available file services, quorum management, and cluster resiliency validation.20740A-LAB.pdf

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Pre-requisites:

- **Lab Environment:**
    - VMware Workstation with these VMs:
        1. LON-DC1: Windows Server 2016 Datacenter GUI (Domain Controller)
        2. LON-SVR1: Windows Server 2016 Standard GUI (iSCSI Target)
        3. LON-SVR2: Windows Server 2016 Standard GUI (Cluster Node)
        4. LON-SVR3: Windows Server 2016 Standard GUI (Cluster Node)
        5. LON-CL1: Windows 10 Pro (Client for validation)
        6. LON-CORE: Windows Server 2016 Datacenter CLI
        7. LON-RHEL: Red Hat Enterprise Linux 10 (not joined to the domain)
- All Windows servers (except LON-RHEL) are domain-joined to **RPSLAB.COM**.
- All servers have network connectivity and the necessary resources to enable clustering (storage, rights, etc.).
- Administrative privileges on all servers.
- Screenshots are to be taken at each wizard step or major configuration action.

Procedure:

Lab A: Implementing Failover Clustering

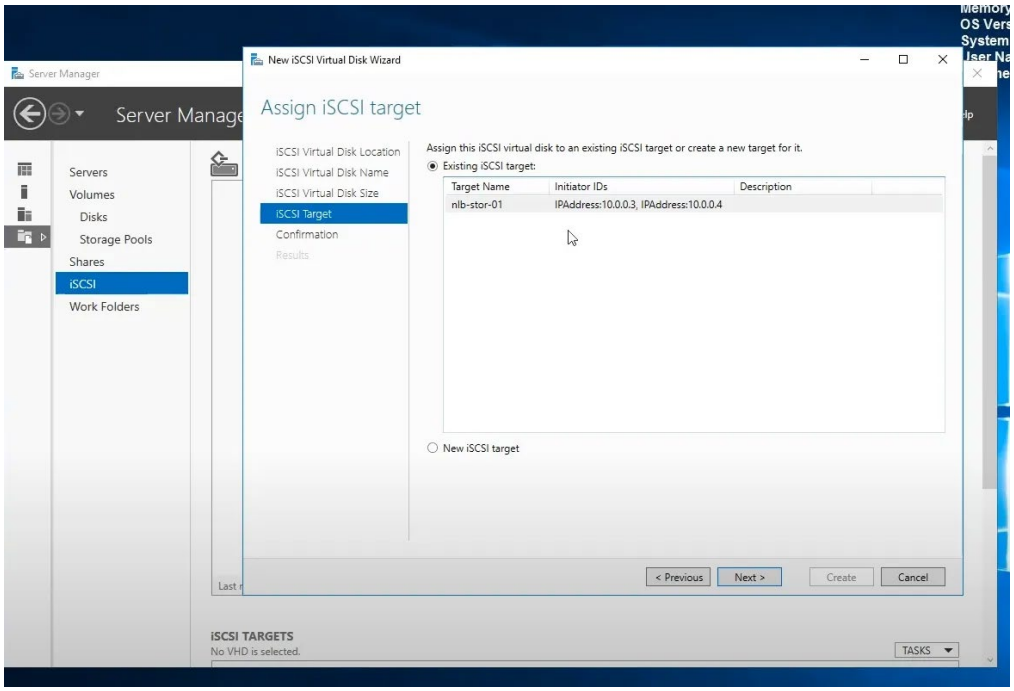
Exercise 1: Creating a Failover Cluster

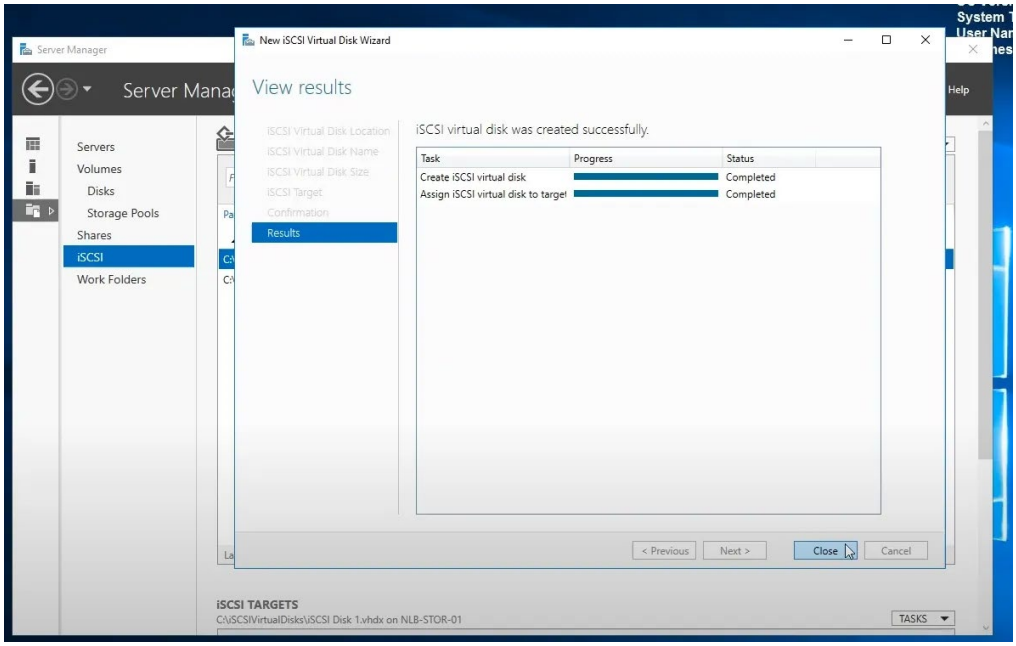
Task 1: Connect Cluster Nodes to iSCSI Shared Storage

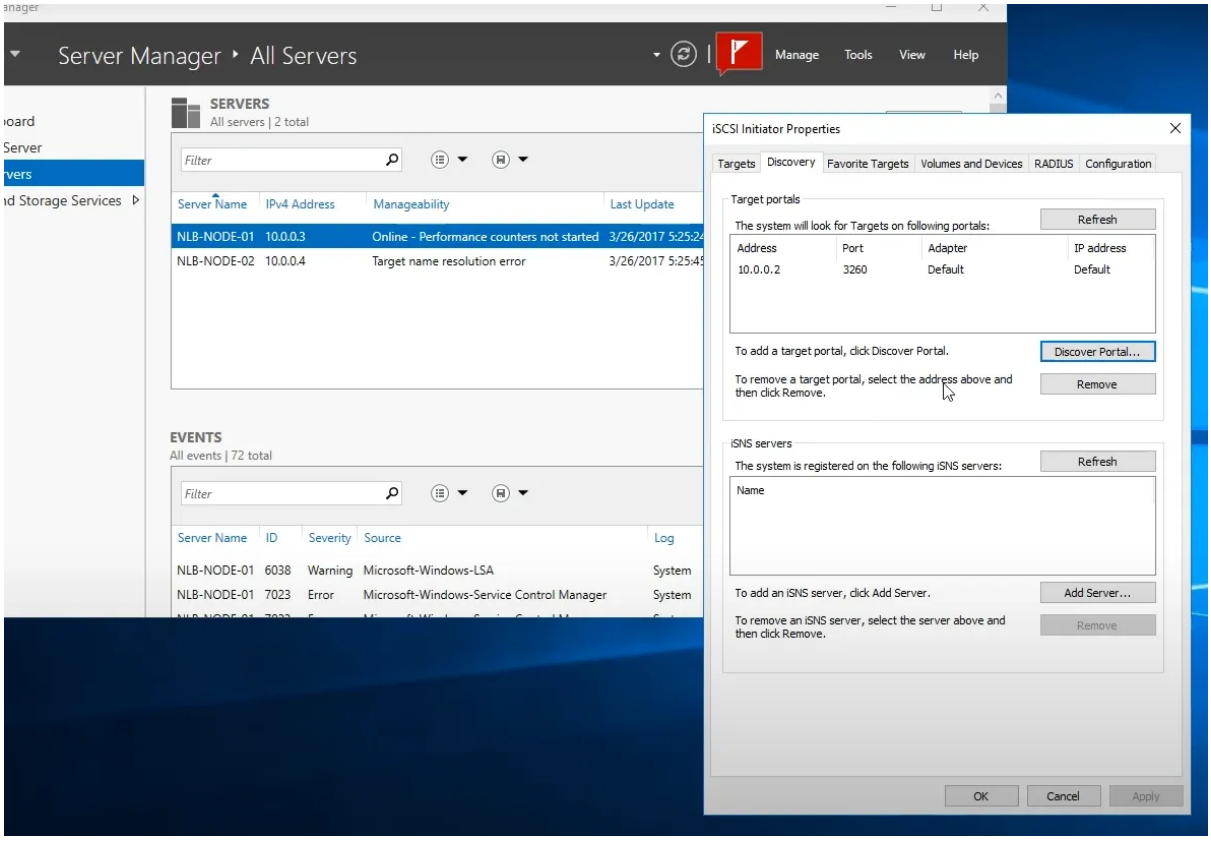
- On **LON-SVR1** (iSCSI Target, domain-joined):

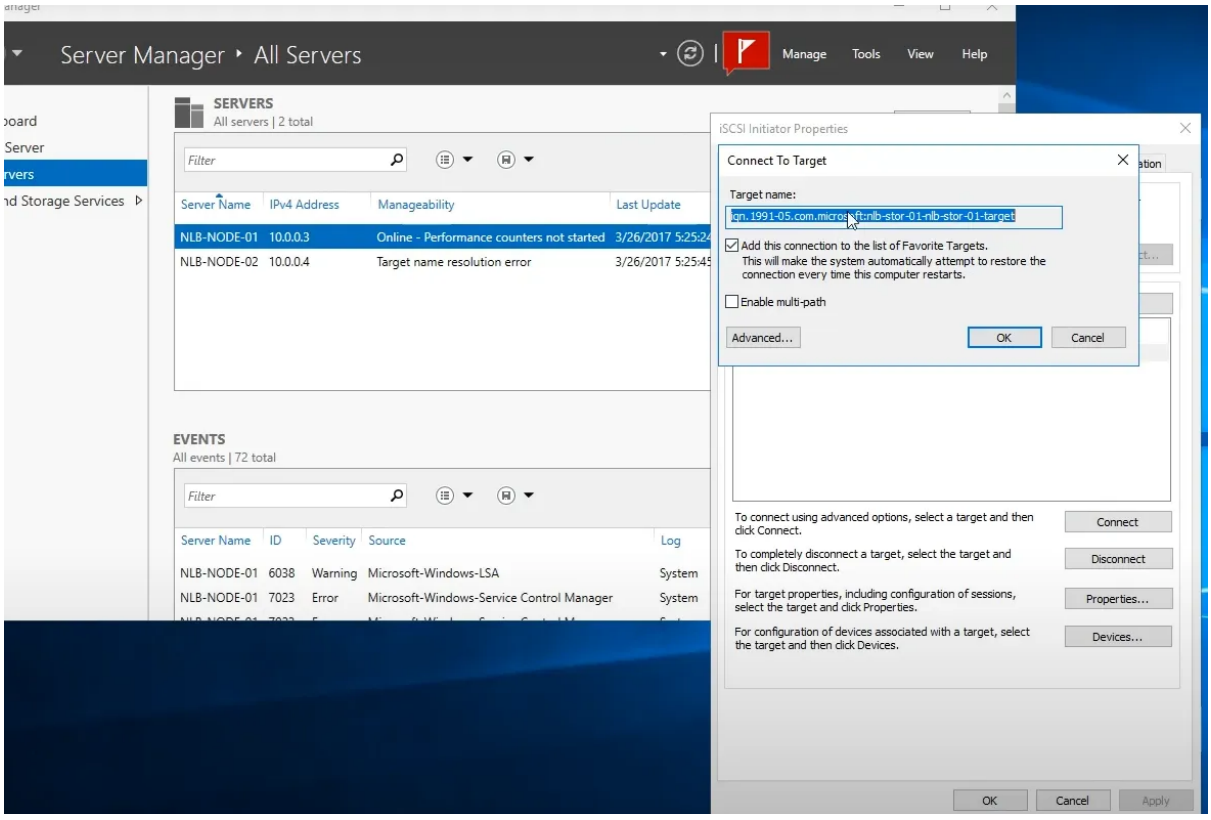
- Use Server Manager > File and Storage Services > iSCSI to create at least 3 iSCSI virtual disks (5 GB each—iSCSIDisk1, iSCSIDisk2, iSCSIDisk3) on C:.
- Assign access to LON-SVR2 and LON-SVR3 (use their IPs).

- On **LON-SVR2** and **LON-SVR3**:
  - Use iSCSI Initiator Tool to discover and connect to LON-SVR1 iSCSI target.
  - In Disk Management, bring new disks online, initialize as GPT, and format as NTFS (labels: Data1, Data2, Data3).






Server Manager ‣ All Servers
Manage
Tools
View
Help
SERVERS
All servers | 2 total
Filter
Server Name
IPv4 Address
Manageability
Last Update
NLB-NODE-01 10.0.0.3 Online - Performance counters not started 3/26/2017 5:25:24
NLB-NODE-02 10.0.0.4 Target name resolution error 3/26/2017 5:25:45
EVENTS
All events | 72 total
Server Name
ID
Severity
Source
Log
NLB-NODE-01 6038 Warning Microsoft-Windows-LSA System
NLB-NODE-01 7023 Error Microsoft-Windows-Service Control Manager System
iSCSI Initiator Properties
Targets
Discovery
Favorite Targets
Volumes and Devices
RADIUS
Configuration
Target portals
The system will look for Targets on following portals:
Refresh
Address
Port
Adapter
IP address
10.0.0.2
3260
Default
Default
To add a target portal, click Discover Portal.
Discover Portal...
To remove a target portal, select the address above and then click Remove.
Remove
iSNS servers
The system is registered on the following iSNS servers:
Refresh
Name
To add an iSNS server, click Add Server.
Add Server...
To remove an iSNS server, select the server above and then click Remove.
Remove
OK
Cancel
Apply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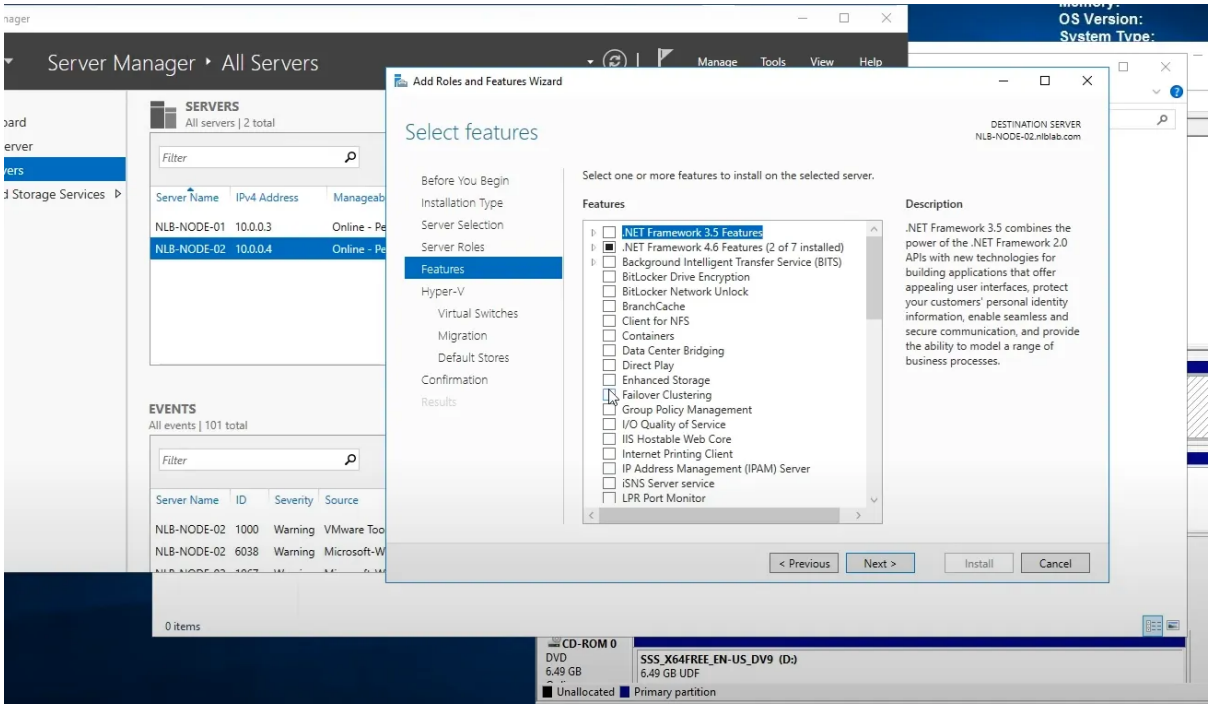
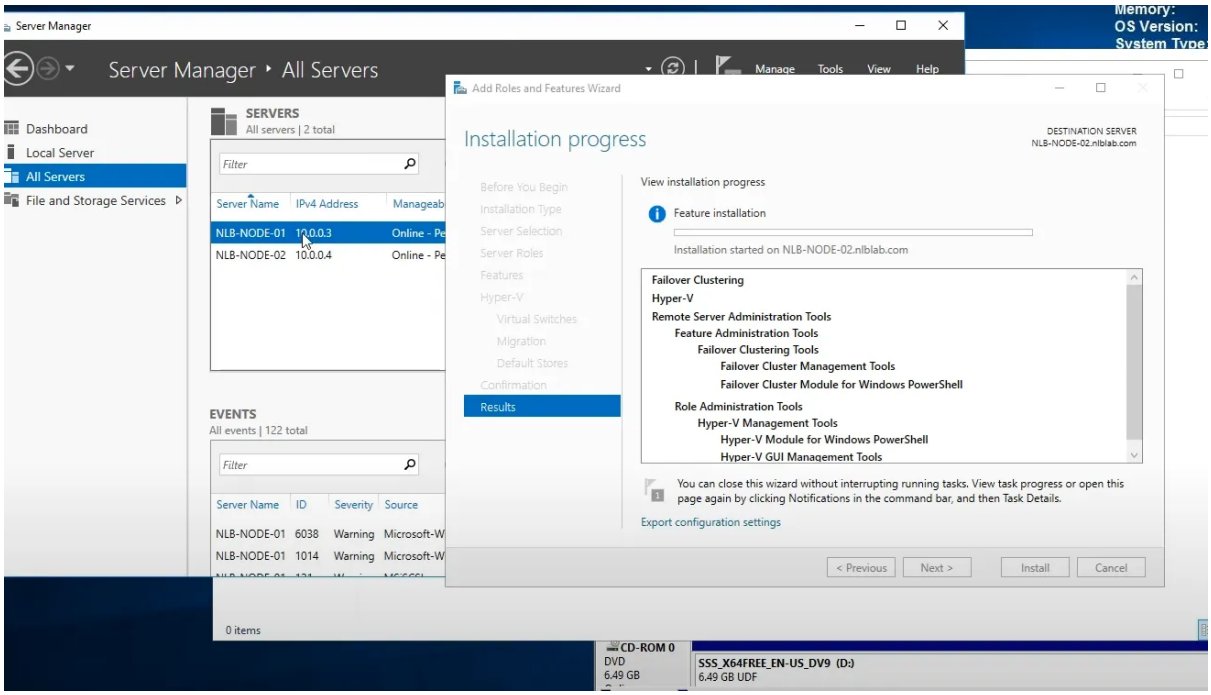
EVENTS
All events | 72 total
Server Name
ID
Severity
Source
Log
NLB-NODE-01 6038 Warning Microsoft-Windows-LSA System
NLB-NODE-01 7023 Error Microsoft-Windows-Service Control Manager System
iSCSI Initiator Properties
Connect To Target
Target name:
iqn.1991-05.com.microsoft:nlb-stor-01-nlb-stor-01-target
Add this connection to the list of Favorite Targets.
This will make the system automatically attempt to restore the connection every time this computer restarts.
Enable multi-path
Advanced...
OK
Cancel
To connect using advanced options, select a target and then click Connect.
Connect
To completely disconnect a target, select the target and then click Disconnect.
Disconnect
For target properties, including configuration of sessions, select the target and click Properties.
Properties...
For configuration of devices associated with a target, select the target and then click Devices.
Devices...
OK
Cancel
Apply

Task 2: Install the Failover Cluster Feature

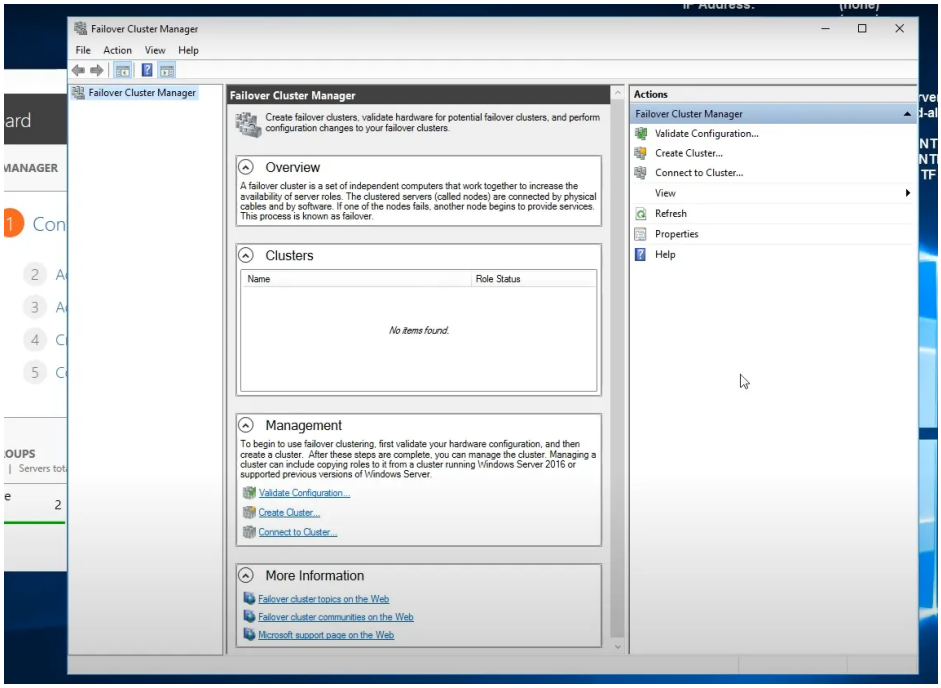
- On **LON-SVR2** and **LON-SVR3**:
    - Server Manager > Add Roles and Features > Features > enable Failover Clustering.

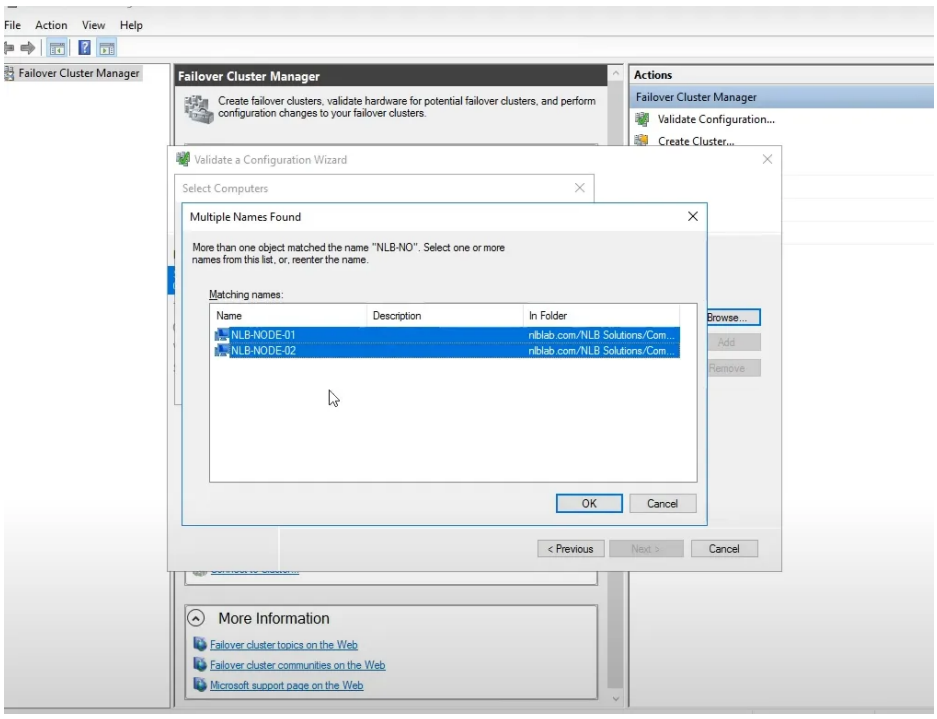


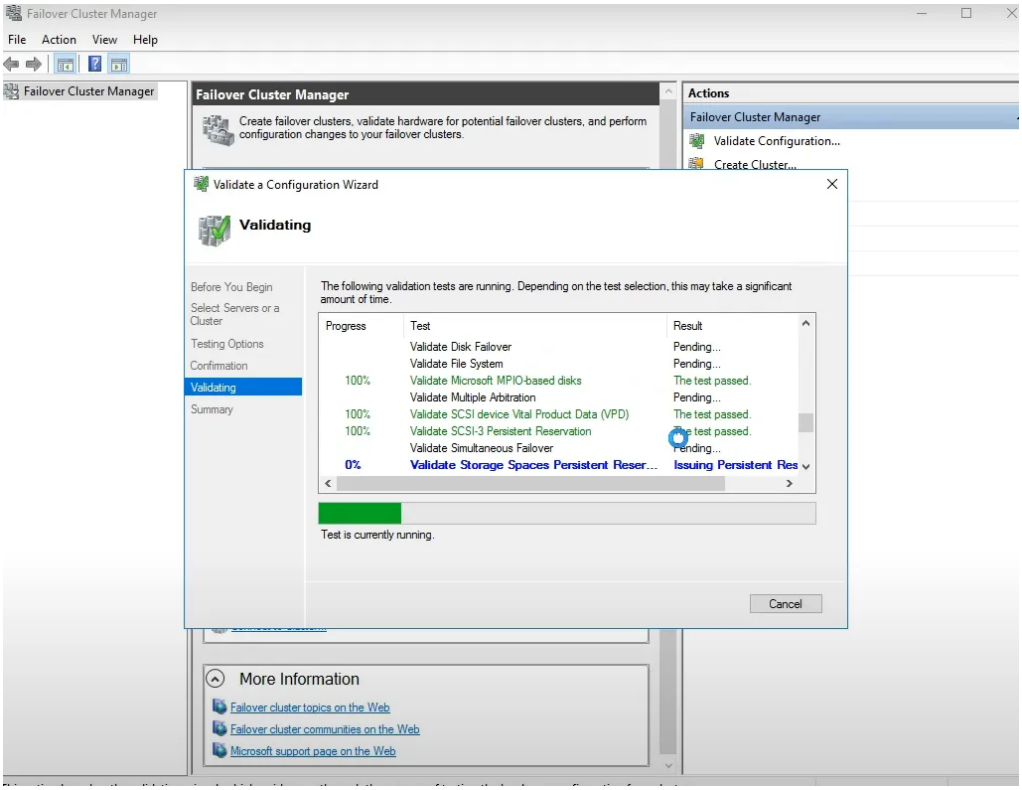


Task 3: Validate the Servers for Failover Clustering

- On **LON-SVR2**:
    - Server Manager > Tools > Failover Cluster Manager > Validate Configuration.
    - Add LON-SVR2 and LON-SVR3.
    - Run all tests and ensure no errors (warnings are allowed).

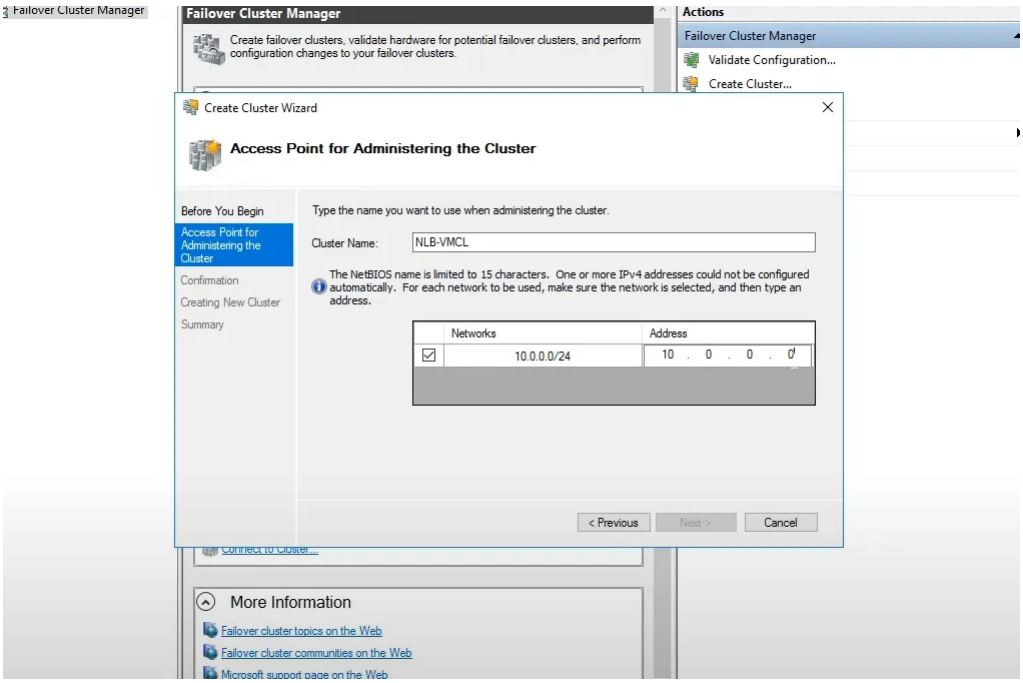


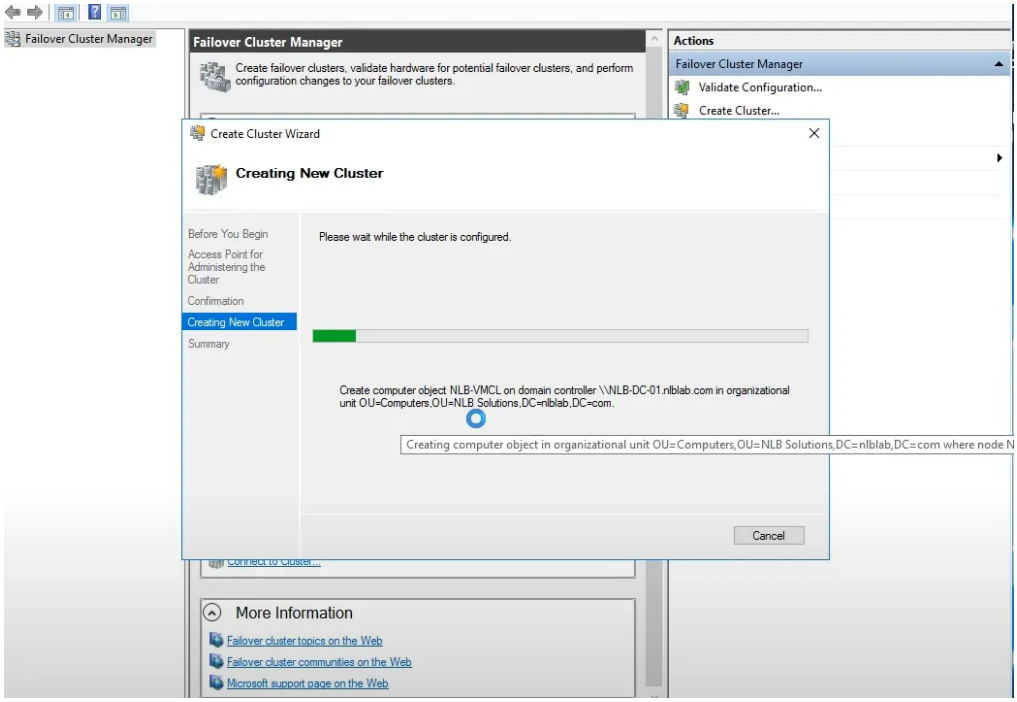




Task 4: Create the Failover Cluster

- On **LON-SVR2**:
  - Failover Cluster Manager > Create Cluster.
  - Add nodes: LON-SVR2, LON-SVR3.
  - Set cluster name (e.g., Cluster1) and IP (e.g., 172.16.0.125).





Task 5: Add the File Server Application to the Cluster

- Use Failover Cluster Manager > Roles > Configure Role.
- Choose File Server for general use.
- Set client access point (e.g., Name: AdatumFS; IP: 172.16.0.130).
- Assign Cluster Disk 2 as shared storage.

Task 6: Add a Shared Folder to a Highly-Available File Server

- On **LON-SVR3**:
    - Failover Cluster Manager > Roles > AdatumFS > Add File Share.
    - SMB Share – Quick, share name: Docs.
    - Complete wizard.

Task 7: Configure Failover and Failback Settings

- On **LON-SVR3**:
    - AdatumFS > Properties > Failover tab: Allow failback between, set timings (e.g., 4 and 5 hours).
    - General tab: Set preferred owners (LON-SVR2, LON-SVR3).

Task 8: Validate the Highly Available File-Server Deployment

- On **LON-DC1** or **LON-CL1**:

- File Explorer > \\AdatumFS\Docs
- Ensure access, create test file.

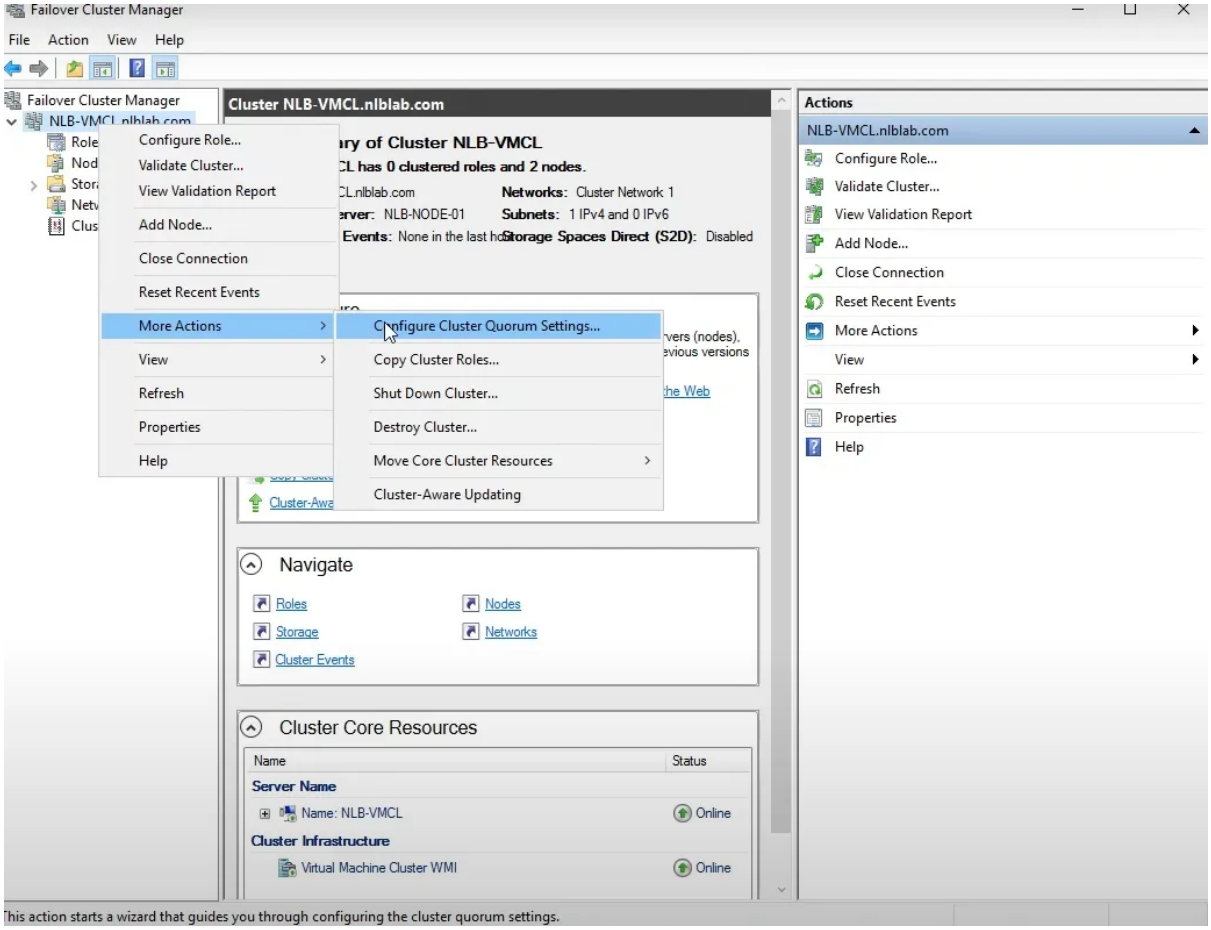
- In Failover Cluster Manager, move AdatumFS role between nodes, verify access at each stage.

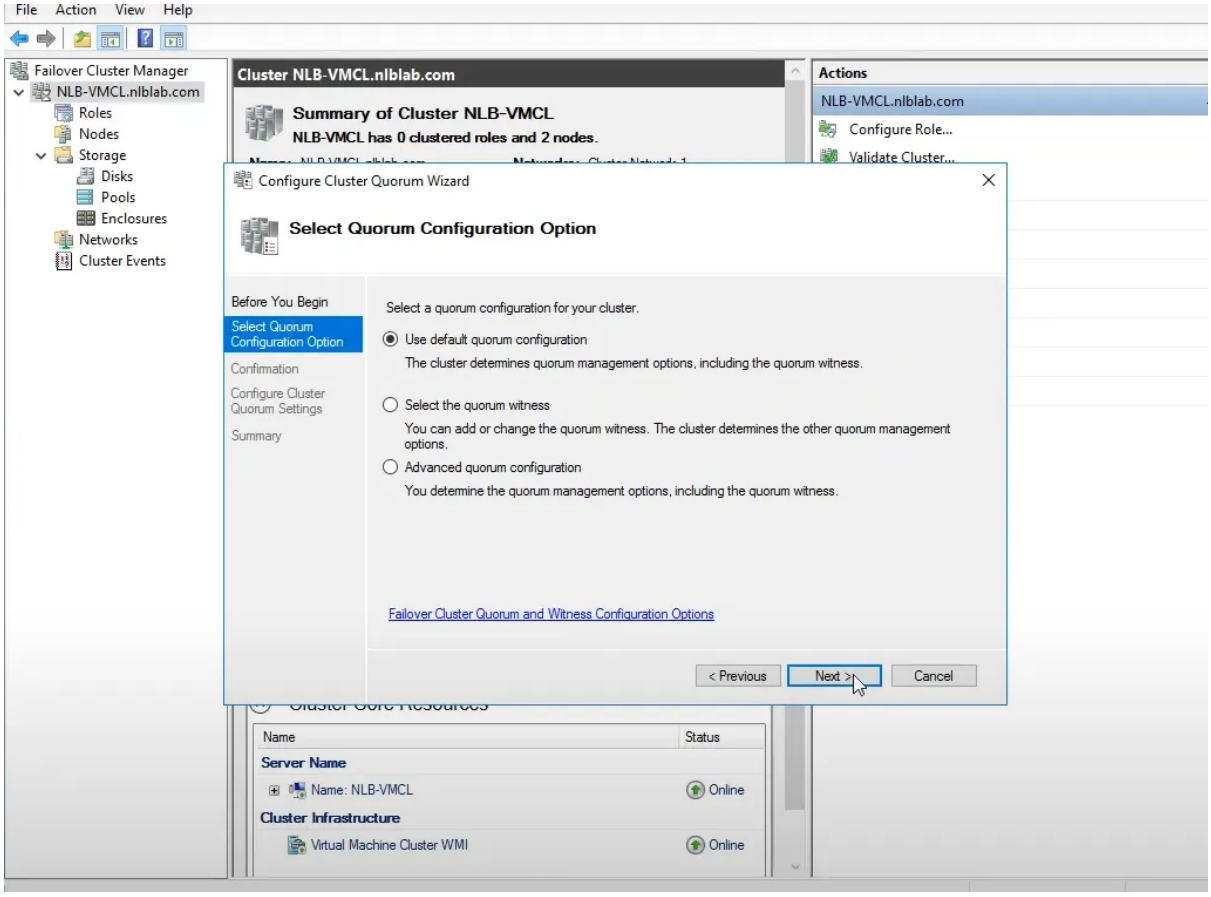
Task 9: Validate Failover and Quorum Configuration

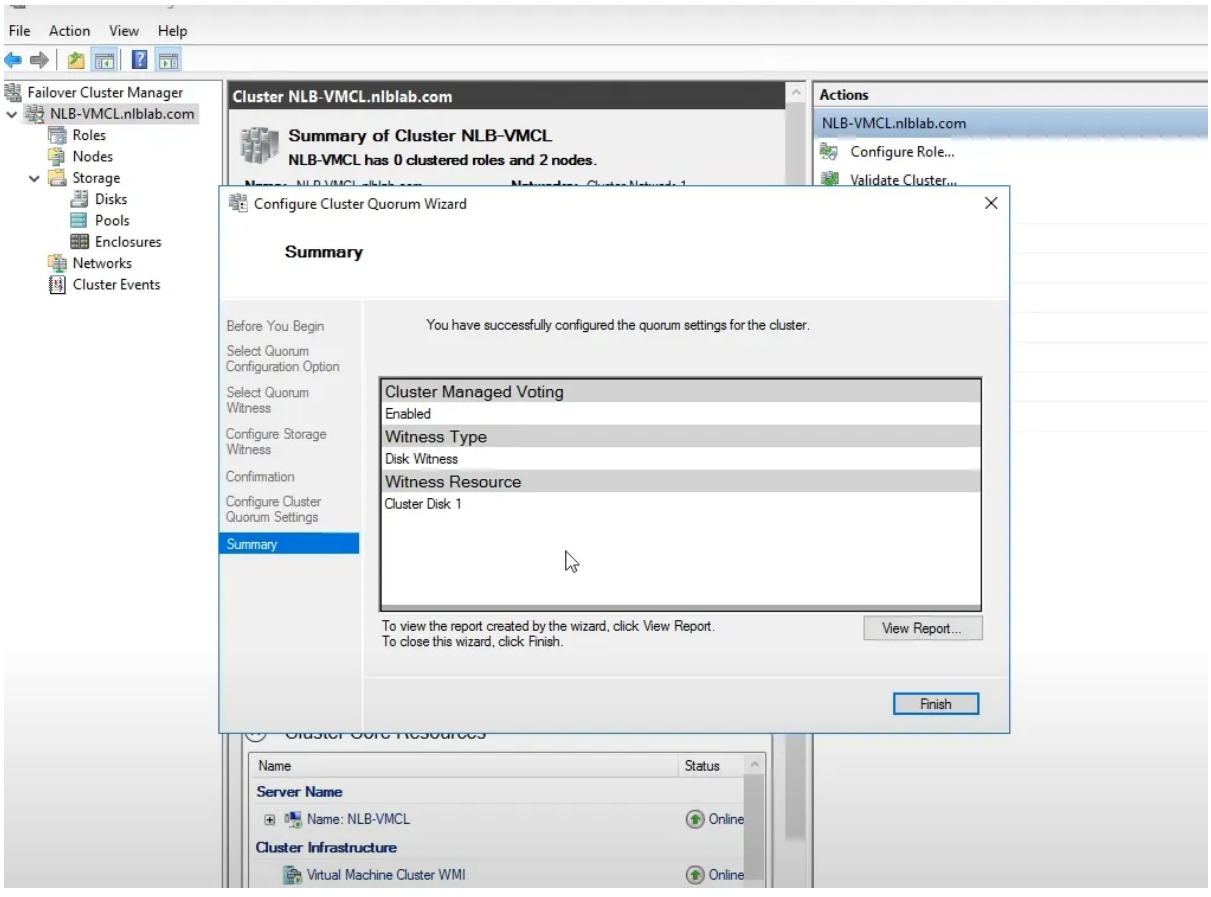
- In Failover Cluster Manager, confirm AdatumFS moves between nodes when their Cluster Service is stopped.
- Put Disk Witness offline and verify access to cluster.

Task 10: Configure Quorum Settings

- On LON-SVR2, use Failover Cluster Manager > Configure Cluster Quorum Settings.
- Set disk witness or file-share witness as needed.




File Action View Help
Failover Cluster Manager
NLB-VMCL.nlblab.com
Roles
Nodes
Storage
Disks
Pools
Enclosures
Networks
Cluster Events
Cluster NLB-VMCL.nlblab.com
Summary of Cluster NLB-VMCL
NLB-VMCL has 0 clustered roles and 2 nodes.
Actions
NLB-VMCL.nlblab.com
Configure Role...
Validate Cluster...
Configure Cluster Quorum Wizard
Select Quorum Configuration Option
Before You Begin
Select Quorum Configuration Option
Confirmation
Configure Cluster Quorum Settings
Summary
Select a quorum configuration for your cluster.
Use default quorum configuration
The cluster determines quorum management options, including the quorum witness.
Select the quorum witness
You can add or change the quorum witness. The cluster determines the other quorum management options.
Advanced quorum configuration
You determine the quorum management options, including the quorum witness.
Failover Cluster Quorum and Witness Configuration Options
< Previous
Next >
Cancel
Name
Status
Server Name
Name: NLB-VMCL
Online
Cluster Infrastructure
Virtual Machine Cluster WMI
Online


File Action View Help
Failover Cluster Manager
NLB-VMCL.nlblab.com
Roles
Nodes
Storage
Disks
Pools
Enclosures
Networks
Cluster Events
Cluster NLB-VMCL.nlblab.com
Summary of Cluster NLB-VMCL
NLB-VMCL has 0 clustered roles and 2 nodes.
Actions
NLB-VMCL.nlblab.com
Configure Role...
Validate Cluster...
Configure Cluster Quorum Wizard
Summary
Before You Begin
Select Quorum Configuration Option
Select Quorum Witness
Configure Storage Witness
Confirmation
Configure Cluster Quorum Settings
Summary
You have successfully configured the quorum settings for the cluster.
Cluster Managed Voting
Enabled
Witness Type
Disk Witness
Witness Resource
Cluster Disk 1
To view the report created by the wizard, click View Report.
To close this wizard, click Finish.
View Report...
Finish
Name
Status
Server Name
Name: NLB-VMCL
Online
Cluster Infrastructure
Virtual Machine Cluster WMI
Online

Lab B: Managing a Failover Cluster:

Exercise 1: Evicting a Node and Verifying Quorum

- On **LON-SVR3**: Use Failover Cluster Manager to evict LON-SVR5 from the cluster.
- On **LON-SVR2**, use PowerShell to confirm node votes (Get-ClusterNode | select name, nodeweight, ID, state).

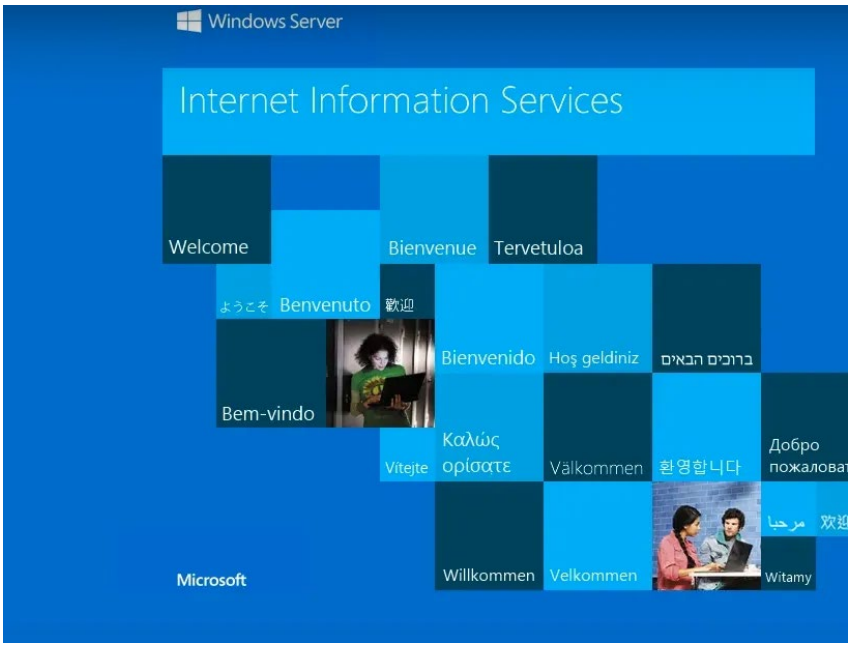
Exercise 2: Changing Quorum from Disk Witness to File-Share Witness, Defining Node Voting

- On **LON-SVR1**: Create and share a folder (FSW), grant Everyone read/write.
- On **LON-SVR2**: Use PowerShell:

```
Set-ClusterQuorum -NodeAndFileShareMajority "\\LON-SVR1\FSW"
Get-ClusterQuorum | Select Cluster, QuorumResource, QuorumType
```

Exercise 3: Verifying High Availability

- Simulate server failure:
    - Move AdatumFS to LON-SVR3, then shut down LON-SVR3.
    - Access \\AdatumFS\Docs from **LON-DC1**/**LON-CL1**.
- Restart LON-SVR3, move role back, verify.
- Confirm HA: files are available regardless of node failure.20740A-LAB.pdf



Conclusion:

By completing the Module 8 lab, you will have:

- Configured a functional two-node failover cluster with shared iSCSI storage.
- Made a file server service highly available with automatic failover/failback.
- Validated cluster role movement, quorum witness changes, and real failover scenarios.
- Demonstrated the ability to sustain service availability during server or storage failure, which is crucial in production and enterprise IT environments.
- Used both GUI and PowerShell tools for advanced cluster management.

Document each significant step in your own environment with screenshots, showing:

- iSCSI target setup and connections,
- Cluster validation and creation,
- Role and file share configuration,
- Cluster role failover (via GUI and client file access),
- Quorum model change and node eviction results.

This showcases your practical understanding of high availability in Windows Server 2016 environments.20740A-LAB.pdf