

Lesson 3: Managing Failover Clustering

MOAC 70-412: Configuring Advanced
Windows Server 2012 Services

Overview

- Objective 1.3: Manage failover clustering roles.
 - Configure role-specific settings including continuously available shares
 - Configure VM Monitoring
 - Configure failover and preferences settings

Managing Failover Clustering Roles

Lesson 3: Managing Failover Clustering

Failover Clustering Roles

- Failover clusters provide high availability and scalability to many server applications (e.g., Microsoft Exchange, Microsoft SQL, and Hyper-V).
- Use the High Availability Wizard to configure a *clustered role* (formerly called a *clustered service* or *application*), which is a service or application that you make highly available.

Failover Clustering Roles

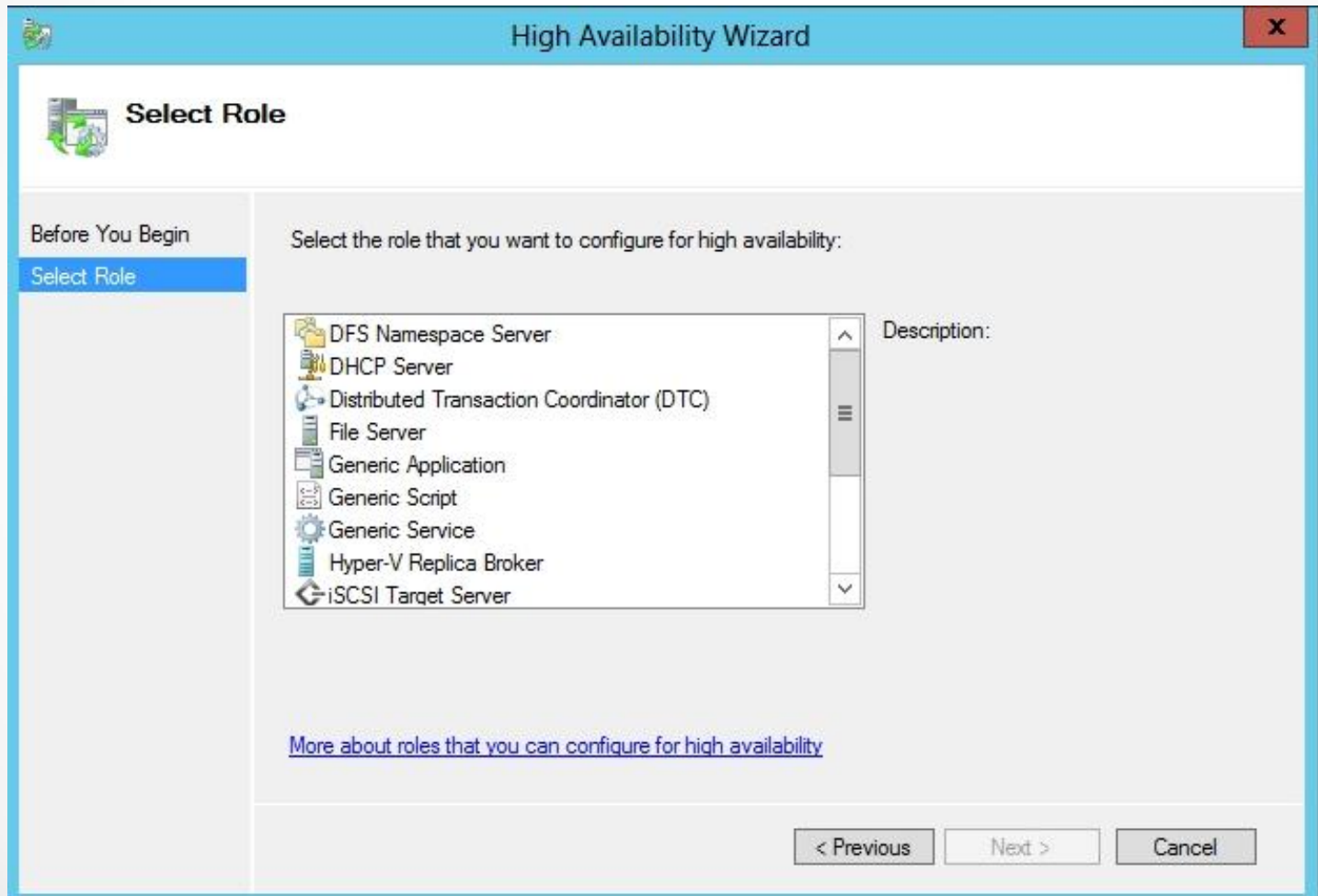
- If a server has a problem, a clustered role can fail over to another server.
- Clustered roles are divided into two types:
 - **Cluster-aware clustered role:** Designed to work with Windows Server 2012 failover clusters. Examples include the File Server clustered role and the Virtual Machine clustered role.
 - **Generic clustered role:** Provides high availability for a service, application, or script that is not originally designed to run in a cluster. As a result, the cluster cannot detect the state of the generic application, script, or service as it can with a cluster-aware role.
 - **Generic application**
 - **Generic script**
 - **Generic service**

Configuring Roles

To add a clustered role, right-click the *Roles* node and click *Configure Role*, which starts the High Availability Wizard.

- | | |
|---|--|
| <ul style="list-style-type: none">• DFS Namespace Server• DHCP Server• Distributed Transaction Coordinator (DTC)• File Server• Generic Application• Generic Script• Generic Service | <ul style="list-style-type: none">• iSCIS Target Server• Internet Storage Name Service (iSNS) Server• Message Queuing• Other Server• Virtual Machine• WINS Server |
|---|--|

Configuring Roles



Understanding SMB 3.0

- **Server Message Block (SMB) 3.0**, previously named *SMB 2.2*, is the newest version of the SMB protocol, which was introduced with Windows 8 and Windows Server 2012.
- It brings significant changes to add functionality and improve performance, particularly in virtualized data centers.

Understanding SMB 3.0

- SMB 3.0 has these features:
 - SMB Transparent Failover
 - SMB Scale Out
 - SMB Multichannel
 - SMB Direct
 - SMB Encryption
 - VSS for SMB file shares
 - SMB Directory Leasing
 - SMB PowerShell

General Use File Server Role

- File servers in a cluster can be configured for general use—**General Use File Server**—which is almost the same as it was in Windows Server 2008 R2.
- It provides a central location for users to share files or for server applications that open and close files frequently.
- It also supports SMB, Network File System (NFS), Data Deduplication, File Server Resource Manager, DFS Replication, and other File Services role services.
- The only significant difference between Windows Server 2008 R2 and Windows Server 2012 is that Windows Server 2012 supports SMB 3.0.

File Server Type

High Availability Wizard

File Server Type

Before You Begin

Select Role

File Server Type

Client Access Point

Select Storage

Confirmation

Configure High Availability

Summary

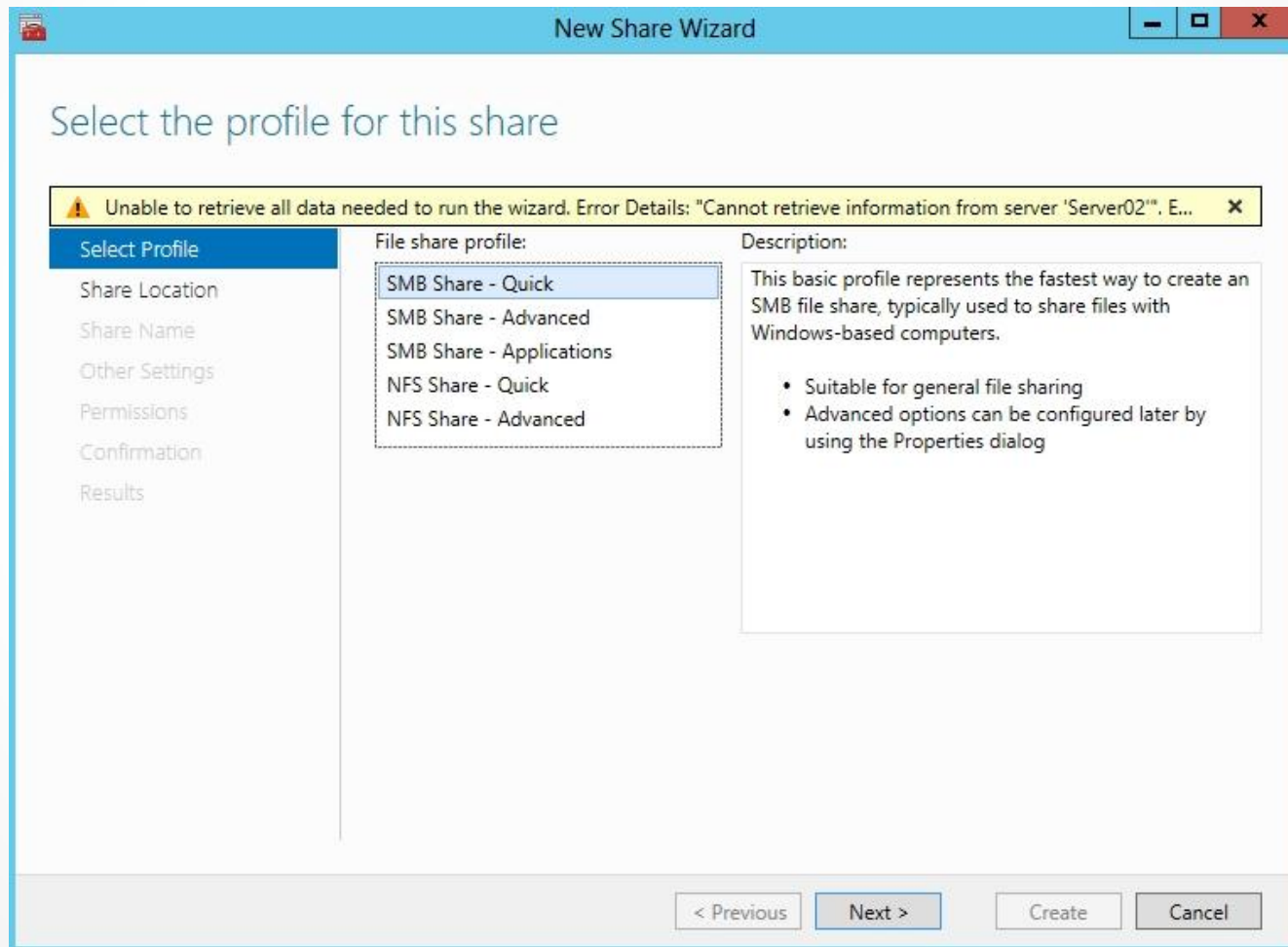
Select an option for a clustered file server:

- File Server for general use
Use this option to provide a central location on your network for users to share files or for server applications that open and close files frequently. This option supports both the Server Message Block (SMB) and Network File System (NFS) protocols. It also supports Data Deduplication, File Server Resource Manager, DFS Replication, and other File Services role services.
- Scale-Out File Server for application data
Use this option to provide storage for server applications or virtual machines that leave files open for extended periods of time. Scale-Out File Server client connections are distributed across nodes in the cluster for better throughput. This option supports the SMB protocol. It does not support the NFS protocol, Data Deduplication, DFS Replication, or File Server Resource Manager.

[More about clustered file server options](#)

< Previous Next > Cancel

File Share Profile



Scale-Out File Server

- The **Scale-Out File Server**, introduced in Windows Server 2012, can be used with a cluster. It is intended for application data such as Hyper-V VM files and for file shares that require reliability, manageability, and high performance.
- Unlike a General Use File Server cluster, the Scale-Out File Server cluster is an active-active failover cluster where all file shares are online on all nodes simultaneously.
- Although the Scale-Out File Server supports SMB, it does not support NFS, Data Deduplication, DFS Replication, or File Server Resource Manager.

Scale-Out File Server

- To support multiple nodes to access the same volume at the same time, the Scale-Out File Server uses a CSV.
- It also uses a CSV cache, which reads cache to significantly improve performance in certain scenarios, such as Virtual Desktop Infrastructure.

Highly Available Virtual Machine

- One popular use of failover clusters is with Hyper-V to provide **highly available virtual machines (VM)**.
- To make a VM highly available, the VM storage location must be on shared storage that all nodes can access. In addition, the storage needs to be configured as a CSV.

Highly Available Virtual Machine

- Physical hosts should have similar hardware.
- Physical hosts require an x64-based processor with hardware-assisted virtualization, and hardware-enforced Data Execution Prevention (DEP).
- The processors should be the same architecture and version.
- To provide network redundancy, connect cluster nodes to multiple networks and/or use teamed network adapters, redundant switches, and redundant routers.
- To provide inter-host communications, you need one network adapter for each host to form the private network.

Highly Available Virtual Machine

- With a Serial Attached SCSI (SAS) or Fibre Channel, the mass-storage device controllers in all physical hosts should be identical and should use the same firmware version.
- With iSCSI, each physical host should have one or more network adapters dedicated to the cluster storage.
- The network adapters used to connect to the iSCSI storage target should be identical, and you should use a gigabit Ethernet or faster network adapter.
- When creating shared storage, use basic disks, not dynamic disks.
- Format the disks with the NTFS file system.

Highly Available Virtual Machine

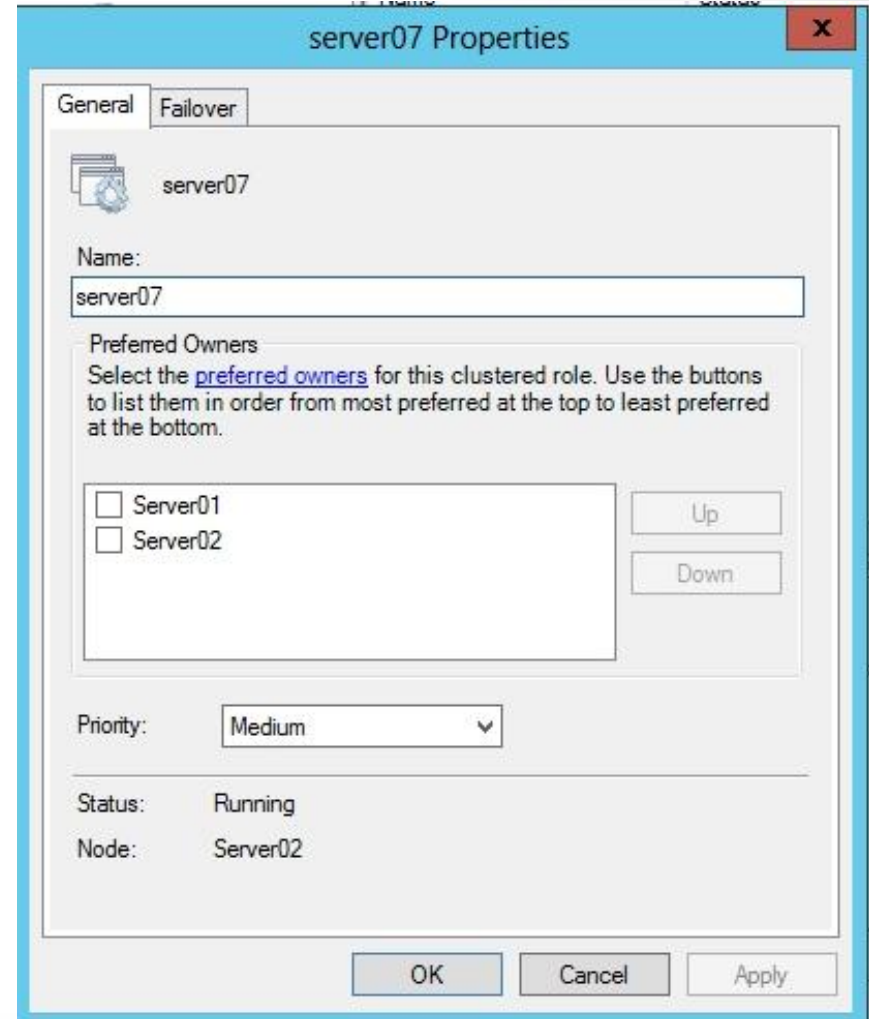
- Use either master boot record (MBR) or GUID partition table (GPT).
- With a storage area network (SAN), the miniport driver that the storage uses must work with the Microsoft Storport storage driver.
- With a SAN, consider using multipath I/O software.

Deploying Hyper-V over SMB 3.0

- Another way to make a VM highly available is to store the VM files on a highly available SMB 3.0 file share, instead of using host or guest clustering.
- To accomplish this, you need:
 - One or more computers running Windows Server 2012 with the Hyper-V role installed.
 - One or more computers running Windows Server 2012 with the File and Storage Services role installed.
 - The servers must be part of the same Active Directory domain.
- After the servers are in place, create a scale-out file server cluster and deploy the new SMB file share for applications.

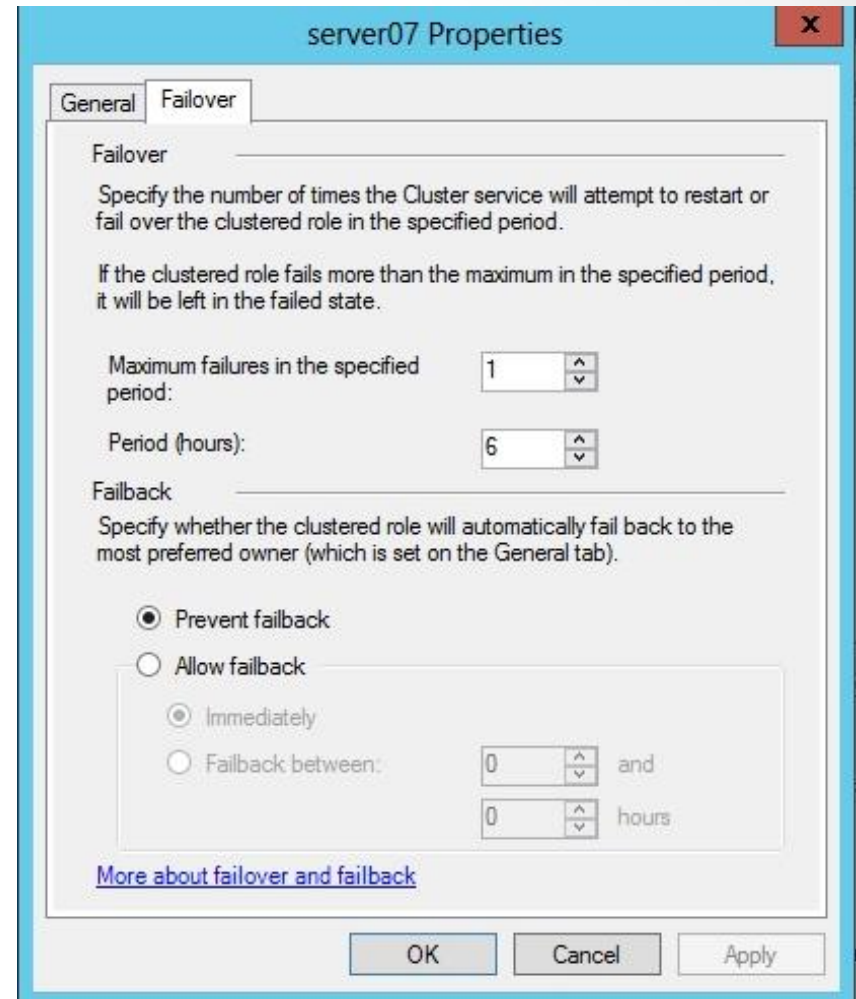
Preferred Node

- You have multiple nodes in a cluster. To specify that one node is the **preferred node**, right-click a role and click *Properties*.
- When the Properties dialog box opens, select the *General* tab.
- Then click the server that you prefer and click the *Up* button to make it first in the list.



Failover Tab

- Click the *Failover* tab to specify the number of times the Cluster service will attempt to restart or fail over the clustered role in the specified period.
- The Failback option allows you to specify when failback will occur and whether or not to failback to the preferred owner after the preferred owner is brought back online.



Virtual Machine Monitoring

- With Windows Server 2012, Virtual Machine Monitoring is used to monitor specific services within the VM and it will react if there is a problem with a service.
- To enable VM Monitoring, right-click the VM in the Failover Cluster Manager, choose *More Actions*, and click *Choose Configure Monitoring*.
- Windows PowerShell command: `Add-ClusterVMMonitoredItem -VirtualMachine "VM_Name" -Service Name_of_Service`

Lesson Summary

- Failover clusters provide high availability and scalability to many server applications (e.g., Microsoft Exchange, Microsoft SQL, and Hyper-V).
- Use the High Availability Wizard to configure a clustered role (formerly called a *clustered service or application*).
- A cluster-aware clustered role is designed to work with Windows Server 2012 failover clusters.
- Generic clustered roles provide high availability for a service, application, or script that is not originally designed to run in a cluster. As a result, the cluster cannot detect the state of the generic application, script, or service as it can with a cluster-aware role.

Lesson Summary

- Server Message Block (SMB) 3.0, previously named *SMB 2.2*, is the newest version of the SMB protocol, which was introduced with Windows 8 and Windows Server 2012. It brings significant changes to add functionality and improve performance, particularly in virtualized data centers.
- File servers in a cluster can be configured for general use—General Use File Server—which is almost the same as it was in Windows Server 2008 R2. It provides a central location for users to share files or for server applications that open and close files frequently.
- Unlike a General Use File Server cluster, the Scale-Out File Server cluster is an active-active failover cluster where all files shares are online on all nodes simultaneously.
- To support multiple nodes to access the same volume at the same time, the Scale-Out File Server uses a Cluster Shared Volume (CSV).

Lesson Summary

- To make a VM highly available, the VM storage location must be on share storage that all nodes can access. In addition, the storage needs to be configured as a CSV.
- Another way to make a VM highly available is to store the VM files on a highly available SMB 3.0 file share, instead of using host or guest clustering.
- Usually, in a cluster, one node is the same as another. However, you do have some control over which server is the preferred node, and if a server fails back when the server is brought back online.
- With Windows Server 2012, Virtual Machine Monitoring can be used to monitor specific services within the VM so that it will react if there is a problem with a service.

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