Lesson 4: Configuring Distributed File System (DFS)

MOAC 70-411: Administering Windows Server 2012



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Overview

- Exam Objective 2.1: Configure Distributed File System (DFS)
- Using Distributed File System

Using Distributed File System (DFS)

Lesson 4: Configuring Distributed File System (DFS)

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DFS

- A set of technologies that enable a Windows server to organize multiple distributed SMB file shares into a distributed file system.
- Although the shares can be on different servers, the location is transparent to the users.
- DFS can provide redundancy to improve data availability while minimizing the amount of traffic passing over the WAN links.
- The two technologies in DFS include:
 - DFS Namespaces
 - DFS Replication

Install/Configure DFS Namespace



Linking to shared folders with DFS Namespace

Install DFS Namespace

B	Add Roles and Features Wizard	_ D X
Select server roles Before You Begin Installation Type Server Selection Server Roles Features Confirmation Results	Add Roles and Features Wizard Select one or more roles to install on the selected server. Roles □ DHCP Server □ DNS Server □ Fax Server ⊿ ■ File And Storage Services (Installed) ▲ ♥ File and iSCSI Services ■ File And Storage Services (Installed) ▲ ♥ File Server □ BranchCache for Network Files □ Data Deduplication ♥ FS Namespaces □ DFS Replication □ File Server VSS Agent Service □ SCSI Target Server	DESTINATION SERVER Win2012Srv2.contoso.com
	iSCSI Target Storage Provider (VDS and VSS	
	< Previous Next	> Install Cancel

Selecting File Server and DFS Namespace

Install DFS Namespace

1	Add Roles and Features Wizard	X
Ado	d features that are required for DFS Namespaces?	
have	to be installed on the same server.	
⊿	Remote Server Administration Tools	
	 A Role Administration Tools 	
	▲ File Services Tools	
	[Tools] DFS Management Tools	
\checkmark	Include management tools (if applicable)	
	Add Features Cancel	

Adding DFS-related features

Configuring DFS Namespaces

There are two types of DFS namespaces:

- **Domain-based namespace**: Configuration is stored in Active Directory, so you don't have to rely on a single server to provide the namespace information to your clients.
- **Stand-alone namespace**: Configuration is stored on the server and the server name becomes part of the main path to the namespace.

Configuring DFS Namespaces

• When you create a namespace, the Windows Server 2008 mode is selected by default.

Supports up to 50,000 folders

• To use Windows Server 2008 mode, Active Directory must use the Windows Server 2008 domain functional level.



Using the DFS Management console

<u>*</u>	New Namespace Wizard	_ 🗆 X
Namespace Se	erver	
Steps:	Enter the name of the server that will host the namespace. The server you specify will be known as the namespace server.	
Namespace Server		
Namespace Name and Settings	Server:	
Namespace Type	Browse	
Review Settings and Create Namespace		
Confirmation		
	< Previous Next >	Cancel

Entering the name of the server on the Namespace Server page

4	New Namespace Wizard
Namespace N	ame and Settings
Steps: Namespace Server	Enter a name for the namespace. This name will appear after the server or domain name in the namespace path, such as \\Server\Name or \\Domain\Name.
Namespace Name and Settings	Name:
Namespace Type Review Settings and Create Namespace	Example: Public
Confirmation	If necessary, the wizard will create a shared folder on the namespace server. To modify the settings of the shared folder, such as its local path and permissions, click Edit Settings.
	< Previous Next > Cancel

Entering the name of the namespace on the Namespace Name and Settings page

Edit Settings	:
Namespace server:	
Win2012Srv2	
Shared folder:	
Share	
Local path of shared folder:	
C:\DFSRoots\Share Browse	
 Shared folder permissions: All users have read-only permissions All users have read and write permissions 	
 Administrators have full access; other users have read-only permissions 	
O Administrators have full access; other users have read and write permissions	
O Use custom permissions: Customize	
OK Cancel	

Opening the Edit Settings dialog box

<u><u></u></u>	New Namespace Wizard
Namespace Ty	уре
Steps: Namespace Server Namespace Name and Settings Namespace Type Review Settings and Create Namespace Confirmation	Select the type of namespace to create. Domain-based namespace A domain-based namespace is stored on one or more namespace servers and in Active Directory Domain Services. You can increase the availability of a domain-based namespace by using multiple servers. When created in Windows Server 2008 mode, the namespace supports increased scalability and access-based enumeration. Image: Enable Windows Server 2008 mode Preview of domain-based namespace: \text{\text{contoso.com\Share}} Stand-alone namespace is stored on a single namespace server. You can increase the availability of a stand-alone namespace by hosting it on a failover cluster. Preview of stand-alone namespace: \text{\text{Win2012Srv2\Share}}
	< Previous Next > Cancel

Selecting the namespace on the Namespace Type page

Add Folders to the Namespace

 File Action View Window Help File Action View	· 🐴	DFS Management	_ D X
Management \\contoso.com\Share (Domain-based in Windows Server 2008 mode) Actions Namespaces Namespace Namespace Servers Delegation Search \\contoso.com\Share \\contoso.com\Share Renlication 0 entries 0 entries Namespace Servers Names	答 File Action View Windo	w Help	_ <i>=</i> ×
Add Namespace Server Delegate Management Permissi Remove Namespace from Displ View New Window from Here Delete Refresh Properties Help	 ➢ DFS Management ✓ ➢ Namespaces ➢ \\contoso.com\Share ➢ Replication 	Image: Namespace Servers Delegation Search 0 entries Type Name	Actions \\contoso.com\Share Mew Folder Add Namespace Server Delegate Management Permissi Remove Namespace from Displ View New Window from Here Delete Refresh Properties Help

Opening the DFS Namespace in the DFS Management console

Add Folders to the Namespace

New Folder X
Name:
Preview of namespace:
\\contoso.com\Share
Folder targets:
Add Edit Remove
OK Cancel

Adding a folder to the namespace

Add Folders to the Namespace

唱	DFS Management	_ D X
Sile Action View Window Help	New Folder X	- 5 ×
DFS Management Namespaces Replication Image: Contoso.com Image:	Name: Public Preview of namespace: \\\contoso.com\Share\Public Folder targets: Add Folder Target Path to folder target: Path to folder target: Example: \\Server\Shared Folder\Folder OK Cancel	Actions \\contoso.com\Share Image: Server Add Namespace Server Delegate Management Permissi Remove Namespace from Displ View New Window from Here Image: Delete Image: Refresh Image: Properties Image: Help
Create a new folder.		

Adding a Folder Target to the namespace

Managing Referrals

- A referral is an ordered list of servers or targets that a client computer receives from a domain controller or namespace server when the user accesses a namespace root or a DFS folder with targets.
- After a computer receives a referral, it reaches the first server on the list.
 - If server is not available, it tries to access the second server.
 - If that server is not available, it goes to the next server.

Managing Referrals

\\contoso.com\share Properties
General Referrals Advanced
Specify the amount of time that clients cache (store) referrals for this namespace.
Cache duration (in seconds): [300
Targets in a client's site are listed first in a referral. Select the method for ordering targets outside of the client's site.
Ordering method:
Lowest cost
Clients fail back to preferred targets
For more information about referral properties, see <u>DFS Management</u> <u>Help.</u>
OK Cancel Apply

Configuring the referrals for a namespace

Managing Referrals

\\contoso.com\dfs1 Properties	
General Referrals Advanced	
Namespace servers poll a domain controller to obtain current namespace metadata. You can optimize polling to increase either namespace consistency or scalability.	
How do you want to optimize polling?	
Optimize for consistency	
Namespace servers poll the primary domain controller (PDC) emulator each time the namespace changes.	
 Optimize for scalability 	
Each namespace server polls its closest domain controller at regular intervals. This is known as namespace scalability mode.	
Access-based enumeration hides folders in this namespace that users do not have permission to view.	
Enable access-based enumeration for this namespace	
For more information about polling, see <u>DFS Management Help.</u>	
OK Cancel Apply	

Optimizing namespace servers polling options

Set Target Priority on a Root Target for a Domain-Based Namespace

\\WIN2012SRV\dfs1 Properties
General Advanced
You can override referral ordering for this target by selecting the following check box, and then specifying where this target appears in referrals.
Override referral ordering:
Target priority:
 First among all targets
 Last among all targets
 First among targets of equal cost
 Last among targets of equal cost
For more information about target priority, see <u>DFS Management</u> <u>Help.</u>
OK Cancel Apply

Overriding referral ordering

Managing DFS Security

- DFS Namespace is a specialized shared folder of shared folders.
- You secure these folders with share permissions and NTFS permissions.
- It is recommended that you first configure the share and NTFS permissions on folders that host namespace roots and folder targets before configuring DFS.
- To control access-based enumeration of files and folders in folder targets, enable accessbased enumeration on each shared folder.

Install/Configure DFS Replication

- Before enabling replication between multiple targets, create a replication group.
- The **replication group** is a collection of servers, each of which holds a target of a DFS folder.
 - At least two targets required to perform DFS Replication
- Designate one server as the primary member of the replication group.

Install/Configure DFS Replication

Limitations when using DFS Replication:

- A replication group can have up to 256 members with 256 replicated folders.
- Each server can be a member of up to 256 replication groups, with as many as 256 connections (128 incoming and 128 outgoing).
- A member server can support up to 1 TB of replicated files.
- You can have up to 8 million replicated files per volume.

Install DFS Replication

2	Add Roles and Features Wizard	_ D X
Before You Begin Installation Type Server Selection Server Roles Features Confirmation Results	Select one or more roles to install on the selected server. Roles Application Server DHCP Server DHCP Server Fax Server File And Storage Services (Installed) File and iSCSI Services (Installed) File Server Resource Manager File Server VSS Agent Service SCSI Target Server	DESTINATION SERVER Win2012Srv2.contoso.com Description DFS Replication is a multimaster replication engine that enables you to synchronize folders on multiple servers across local or wide area network (WAN) network connections. It uses the Remote Differential Compression (RDC) protocol to update only the portions of files that have changed since the last replication. DFS Replication can be used in conjunction with DFS Namespaces, or by itself.
	< <u>P</u> revious <u>N</u> ext	> Install Cancel

Selecting DFS Replication

Configuring DFS Replication Targets

With DFS Replication, you can configure these settings:

- Bidirectional or unidirectional
- Percentage of available bandwidth
- Schedule when replication will occur

*	New Replication Group Wizard	x
Replication Gr	гоир Туре	
Steps:	Select the type of replication group to create.	
Replication Group Type	Multipurpose replication group	
Name and Domain	This option configures replication between two or more servers for publication,	
Replication Group Members	content sharing, and other scenarios.	
Topology Selection	Replication group for data collection	
Hub Members	This option configures two-way replication between two servers, such as a	
Hub and Spoke Connections	branch server and a hub (destination) server. This allows you to collect data at the hub server. You can then use backup software to back up the data on the	
Replication Group Schedule and Bandwidth	hub server.	
Primary Member		
Folders to Replicate		
Review Settings and Create Replication Group		
Confirmation		
	< Previous Next > Cancel	

Selecting the replication group type

6	New Replication Group Wizard
Name and Do	main
Steps:	Type a name and domain for the replication group. The name of the replication group must be unique in the domain that basis the replication group.
Replication Group Type	2 t
Name and Domain	Name of replication group:
Replication Group Members	
Topology Selection	<u>.</u>
Hub Members	Optional description of replication group:
Hub and Spoke Connections	<u>^</u>
Replication Group Schedule and Bandwidth	
Primary Member	Domain:
Folders to Replicate	Contoso.com Browse
Review Settings and Create Replication Group	
Confirmation	
	< Previous Next > Cancel

Specifying a name and domain used in DFS Replication

<u>~</u>	New Repl	ication Group Wizar	d	_ 🗆 X
Replication Gr	oup Members			
Steps:	Click Add and then select two	or more servers that will bec	come members of the	
Replication Group Type	replication group.			
Name and Domain	Members:			
Replication Group Members	Server	Domain		
Topology Selection				
Hub Members				
Hub and Spoke Connections				
Replication Group Schedule and Bandwidth				
Primary Member				
Folders to Replicate				
Review Settings and Create Replication Group				
Confirmation				
		7		
	Add Hemove			
			< Previous Next >	Cancel

Defining replication group members

P	New Replication Group Wizard		_		x
Replication	Select Computers	? X			
Steps:	Select this object type:				
Replication Group Type	Computers Obj	ect Types			
Name and Domain	From this location:				
Replication Group Membe	contoso.com	ocations			
Topology Selection	Enter the object names to select (<u>examples</u>):				
Hub Members	Ch	eck Names			
Hub and Spoke Connectio					
Replication Group Schedu					
Primary Member	Advanced	Cancel			
Folders to Replicate					
Review Settings and Create Replication Group					
Confirmation					
	Add Remove				
	< Previous	Next >	(Cancel	

Select computers used in replication

<u>Na</u>	New Replication Group Wizard	
Topology Sele	ection	
Steps:Replication Group TypeName and DomainReplication Group MembersTopology SelectionReplication Group Schedule and BandwidthPrimary MemberFolders to ReplicateReview Settings and Create Replication GroupConfirmation	 Select a topology of connections among members of the replication group. Hub and spoke This topology requires three or more members in the replication group. In this topology, spoke members are connected to one or two hub members. This topology works well in publication scenarios where data originates from the hub member and replicates out to the spoke members. I full mesh In this topology, each member replicates with all other members of the replication group. This topology works well when there are ten or fewer members in the replication group. This topology No topology Select this option if you want to create a custom topology after you finish this wizard. No replication will take place until you create the custom topology. A previous Next> Cancel	

Selecting a topology for the replication group

<u>6</u>	New Replication Group Wizard	_		x
Replication G	roup Schedule and Bandwidth			
Steps:Replication Group TypeName and DomainReplication Group MembersTopology SelectionReplication Group Schedule and BandwidthPrimary MemberFolders to ReplicateReview Settings and Create Replication GroupConfirmation	 Select the replication schedule and bandwidth to be used by default for all new connections in the replication group. Replicate continuously using the specified bandwidth Use this option to enable replication 24 hours a day, seven days a week using the following bandwidth: Bandwidth: Full Replicate during the specified days and times Use this option to specify the days and times at which replication occurs by default. The initial replication schedule has no replication intervals; you must create at least one replication interval before replication can occur. Edit Schedule Vertice Vertice Vertice Vertice Next>		Cancel	

Specifying the bandwidth and schedule

~	New Replication Group Wizard
Primary Memb	per
Steps:	Select the server that contains the content you want to replicate to other members. This server is known as the primary member
Replication Group Type	
Name and Domain	Primary member:
Replication Group Members	WIN2012SRV2
Topology Selection	
Replication Group Schedule and Bandwidth	It the folders to be replicated already exist on multiple servers, the folders and files on the primary member will be authoritative during initial replication.
Primary Member	
Folders to Replicate	
Review Settings and Create Replication Group	
Confirmation	
	For more information about the primary member and authoritative content, see <u>DFS Management Help</u>
	<pre>< Previous Next > Cancel</pre>

Specifying the primary member server

4	New Rep	lication Group Wizard	ł	-		x
Folders to Rep	olicate					
Steps:	To select a folder on the prim members of the replication or	ary member that you want to re oun, click Add	eplicate to other			
Replication Group Type						
Name and Domain	Replicated folders:					
Replication Group Members	Local Path	Replicated Folder Name	NTFS Permissions			
Topology Selection						
Replication Group Schedule and Bandwidth						
Primary Member						
Folders to Replicate						
Review Settings and Create Replication Group						
Confirmation						
	<u>A</u> dd <u>E</u> dit	Remove				
		[< <u>Previous</u> <u>N</u> ext >		ancel	

Adding folders to replicate

Add Folder to Replicate X
Member:
WIN2012SRV2
Local path of folder to replicate:
Browse
Example: C:\Documents
Select or type a name to represent this folder on all members of the replication group. This name is known as the replicated folder name. Use name based on path:
O Use custom name:
Example: Documents
Permissions >> OK Cancel

Specifying the local folders to replicate

<u>6</u>	New Replication Group Wizard
Local Path of	f Public on Other Members
Steps:	To specify the local path of the replicated folder or whether the folder is read-only, select the appropriate member and then click Edit
Replication Group Type	
Name and Domain	Primary member: WIN2U12SRV2
Replication Group Members	Primary member local path: U:NPublic
Topology Selection	Member details:
Replication Group Schedule	Member Local Path Membership Stat
and Bandwidth	WIN2UT2SHV <not set=""> Disabled</not>
Primary Member	
Folders to Replicate	
Local Path of Public on Other Members	
Review Settings and Create Replication Group	
Confirmation	
	E dit
	< Previous Next > Cancel

Adding the remote folder to replicate

Edit	x
General	
Member:	
WIN2012SRV	
Select the initial status of the replicated folder on this member.	
Membership status:	
 Disabled The replicated folder will not be stored on this member. 	
Enabled Keep the following folder synchronized with other members.	
Local path of folder: Browse	
Example: C:\Data	
Make the selected replicated folder on this member read-only.	
OK Cancel	

Configuring the membership status

<u>N</u>	New Replication Group Wizard
Review Setting	gs and Create Replication Group
Steps:	You selected the following settings for the new replication group. If the settings are
Replication Group Type	Previous, or select the appropriate page in the orientation pane.
Name and Domain	
Replication Group Members	Replication group settings:
Topology Selection	Replication Group Name:
Replication Group Schedule and Bandwidth	Replication Group Description:
Primary Member	
Folders to Replicate	Domain of Replication Group: contoso.com
Local Path of Public on Other Members	Replication Group Members (2): WIN2012SBV2
Review Settings and Create Replication Group	WIN2012SRV
Confirmation	Full mesh
	List of connections (2): WIN2012SRV -> WIN2012SRV2 WIN2012SRV2 -> WIN2012SRV
	Default Connection Schedule: Replicate continuously with Full bandwidth
	< Previous Create Cancel

Reviewing the selected settings

Scheduling Replication

When the replication group is created:

- You can define the scheduled group.
- You can modify the schedule after the replication group is created.

Scheduling Replication



Editing a replication schedule

Scheduling Replication



Specifying the scheduled bandwidth for replication

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Configuring Remote Differential Compression

- DFS Replication:
 - Is a multiple-master replication engine that synchronizes DFS folders and replicates Active Directory Domain Services (AD DS) SYSVOL folder on domain controllers.
 - Replaced the File Replication Service (FRS).
 - Uses the remote differential compression (RDC) compression algorithm to minimize the amount of data that needs to be transferred during replication.

Disable Remote Differential Compression

<u>N</u>	DFS Management	_ _ ×
🐴 File Action View Window	w Help	_ 8 ×
🧇 🏟 🞽 🗊 👔 🗊		
 DFS Management Namespaces Namespaces Namespaces Replication DFS Group 1 	DFS Group 1 (contoso.com) Memberships Connections Replicated Folders Delegation 2 entries	Actions New Neplicated Folders New Connection New Topology Create Diagnostic Report Verify Topology Delegate Management Perm Edit Replication Group Sche Remove Replication Group fr View New Window from Here Delete Refresh Properties Help

Showing a created DFS Replication Group

Disable Remote Differential Compression

*	DFS Management	
🐴 File Action View Window	v Help	_ 8 ×
🗢 🄿 🙍 🖬 🚺		
🐴 DFS Management	DFS Group 1 (contoso.com)	Actions
Namespaces 34 \\contoso.com\share	Memberships Connections Replicated Folders Delegation	DFS Group 1 🔷 🔶
⊿ 🍇 Replication	2 entries	📑 New Member
🍓 DFS Group 1	State Sending Sending S Connecti Receiving Receiving Schedule	🥳 New Replicated Folders
	Sending Member: WIN2012SRV (1 item)	📌 New Connection
	WIN2012S Default-Firs Enabled WIN2012S Default-Firs Benlication	New Topology
		Create Diagnostic Report
	Sending Member: WIN2012SKV2 (Tittem)	Verify Topology
	WINZUIZS Derauk-Firs Enabled WINZUIZS Derauk-Firs Replication	Delegate Management Perm
		Edit Replication Group Sche
		Remove Replication Group fr
		View 🕨
		New Window from Here
		🔀 Delete
		🖪 Refresh
		Properties 🗸

Showing the connections used in DFS Replication

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Disable Remote Differential Compression

WIN2012SR\	/ to WIN2012SRV2 Properties	X	
General Schedule			
WIN2012SRV to V	WIN2012SRV2		
Enable replication on	Enable replication on this connection		
☑ <u>U</u> se remote differentia	l compression (RDC)		
Sending <u>m</u> ember:	WIN2012SRV		
Sending <u>d</u> omain:	contoso.com		
Sending <u>s</u> ite:	Default-First-Site-Name		
Receiving mem <u>b</u> er:	WIN2012SRV2		
<u>R</u> eceiving domain:	contoso.com		
Receiving site:	Default-First-Site-Name		
<u>K</u> eywords:			
	OK Cancel Apply		

Enabling replication and remote differential compression (RDC)

Configuring Staging

- DFS uses staging folders.
- The staging folder acts as a cache for new and changed files that need to be replicated.
- The default size of each staging folder is 4,096 MB, which is determined by a quota.
- When the staging folder reaches 90 percent, it purges the oldest staged file until it reaches 60 percent.
 - The staging folder quota does not determine the largest file that can be replicated.

Configuring Staging

 Each replicated folder has its own Conflict and Deleted folder.

• The quota size of the folder is 660 MB.

• The access control lists (ACLs) on the conflicted files are preserved.

 Only members of the local Administrators group can access the files.

Manage the Staging Folder and Conflict and Deleted Folder

WIN2012SR	V (Public) Properties
General Replicated Folder Sta	ging Advanced
WIN2012SRV (Public)	
Member:	WIN2012SRV
Member domain:	contoso.com
Member site:	Default-First-Site-Name
Replication group:	DFS Group 1
Incoming connections:	1
Outgoing connections:	1
	UK Lancel Apply

Viewing the properties of a DFS replicated folder

Manage the Staging Folder and Conflict and Deleted Folder

WIN2012SRV (Public) Properties	:	
General Replicated Folder Staging Advanced		
The staging folder acts as a queue for changes that will be replicated to receiving members.		
Staging path:		
C:\Public\DfsrPrivate\Staging Browse		
Quota (in megabytes):		
To size the staging folder quota large enough to prevent replication from slowing or stopping, you must take into account the size of the files to be replicated. For more information, see the staging folder optimization guidance.		
OK Cancel Apply]	

Specifying the staging path and quota

Manage the Staging Folder and Conflict and Deleted Folder

WIN2012SRV (Public) Properties	
General Replicated Folder Staging Advanced	
The Conflict and Deleted folder caches files and folders where conflicting changes were made on two or more members. The folder can also cache deleted files and folders.	
Conflict and Deleted path:	
C:\Public\DfsrPrivate\ConflictAndDeleted	
Quota (in megabytes):	
660 🗘	
Move deleted files to Conflict and Deleted folder	
For more information about these folders, see <u>DFS Management</u> <u>Help.</u>	
OK Cancel Apply	

Specifying the Conflict and Deleted path and quota

Configuring Fault Tolerance Using DFS

To build network fault tolerance with DFS Namespace and DFS Replication:

- 1. Create the same folder on multiple servers.
- 2. Share the folders.
- 3. Configure DFS Replication between the folders on the various servers.
- 4. Create a DFS Namespace that includes targets of all target folders for a replication group.

Lesson Summary

- Distributed File System (DFS) is a set of technologies that enable a Windows server to organize multiple distributed SMB file shares into a distributed file system.
- DFS Namespace enables you to group shared folders into a single logical structure.
- With domain-based namespaces, the configuration is stored in Active Directory, which means that you don't have to rely on a single server to provide the namespace information to your clients.
- A referral is an ordered list of servers or targets that a client computer receives from a domain controller or namespace server when the user accesses a namespace root or a DFS folder with targets.

Lesson Summary

- The replication group is a collection of servers, each of which holds a target of a DFS folder. You need to have a minimum of two targets to perform DFS Replication.
- By default, replication groups use a full mesh topology, which means that all members replicate to all other members.
- You can schedule DFS Replication to occur only during the night when the WAN links are not used as much or you can specify the bandwidth used by DFS Replication.
- DFS Replication uses the remote differential compression (RDC) compression algorithm.
- The staging folder acts as a cache for new and changed files that need to be replicated.
- To make shared files fault-tolerant, you need to use DFS Namespace and DFS Replication.

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