



# **SMW Assignment (DFS)**

ST2612

Written by: Lee Yi Terng (1904189)

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Submitted To: Ms Teo Soek Ling

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# Pre-Setup Details

## Prerequisites and Assumptions

Before setting up this DFS system, make sure you fulfill the following prerequisites for yourself and your system:

- Basic knowledge in managing Windows Servers
- Basic knowledge on what a Distributed File System is and what it does
- You have 3 WinServers set up and installed Active Directory Domain Services on your Domain Controller
- All member servers are connected to your Domain Controller successfully
- DHCP and DNS services are set up to provide to the domain
- Local VMnet NAT service is disabled and all servers can ping each other

## Network Configuration

For this lab, the following network configuration and systems will be used.

**Domain Name:** smw.assignment.com

**NetBIOS:** SMW

Name	Server1	Server2	Server3
OS	Win Server 2016	Win Server 2012	Win Server 2016
IP Address	192.168.72.10	192.168.72.11	192.168.72.12
DNS	127.0.0.1	192.168.72.10	192.168.72.10
Status	Domain Controller	Member Server	Member Server

## Final Product

The end result of this lab will be a DFS share with the path “\\SMW\\SMWAssignment” for clients to access, hosted on 3 servers, Server1, Server2 and Server3.

Having 3 servers creates high availability and redundancy and even if one server goes down as the others can continue to provide the DFS service. Furthermore, if there are too many requests to the DFS shared folder, the 3 servers can share load amongst themselves so no one server gets overloaded with too many requests.

The shared folder is located at “C:\\SharingFolder” of each server.

# Step by Step Guide

## Flow

The flow of the setup guide is as follows:

1. Installing DFS Server Roles
2. Setting up DFS Namespace on Primary Server
3. Adding another NameSpace Server
4. Adding Target Folders
5. Setting Up Replication

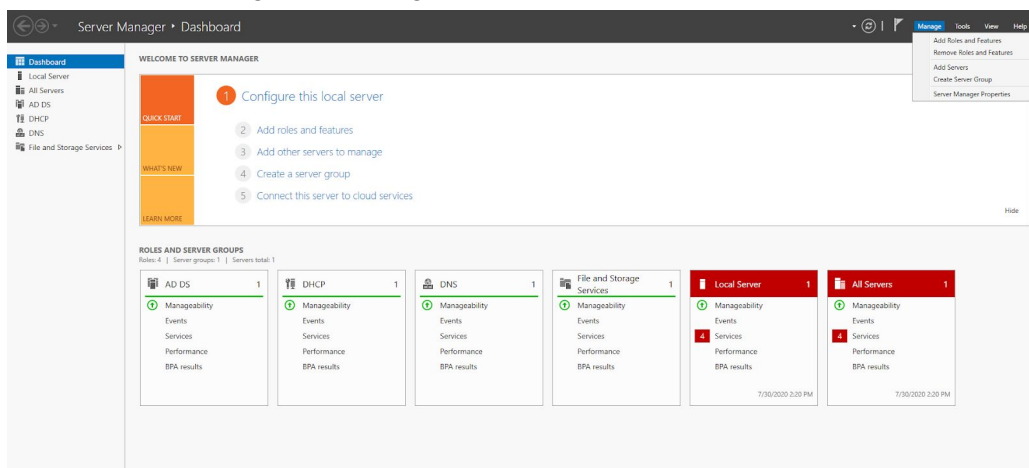
In addition, there are two more optional sections:

1. Further Testing
2. Troubleshooting

## Installing DFS Server Roles

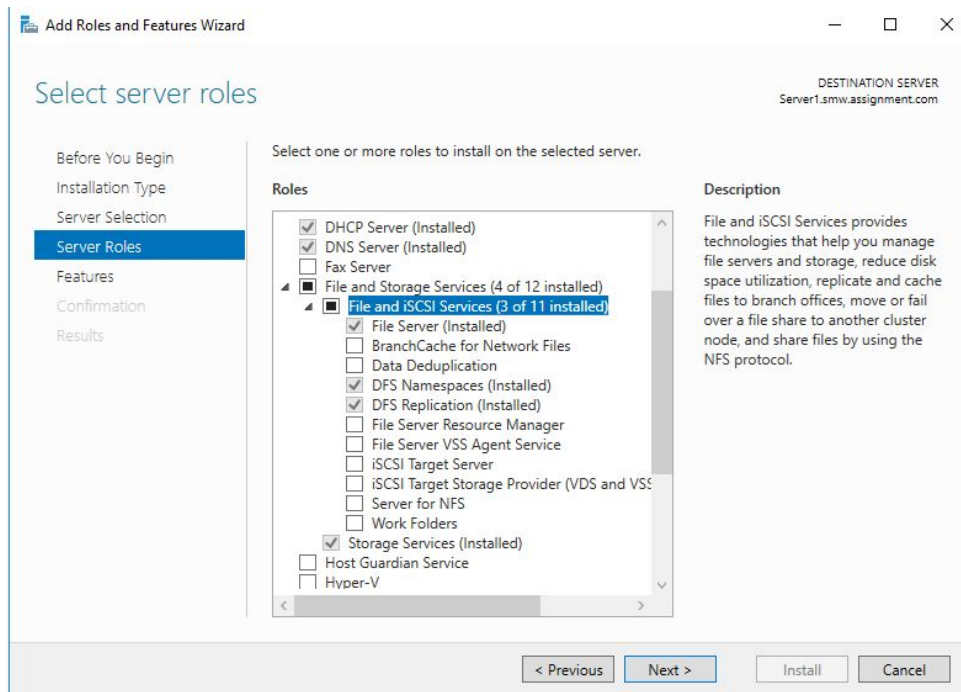
In order to use DFS, we need to install DFS server roles on all the servers we will be using for DFS.

1. Go to Server Manager -> Manage -> Add Roles and Features



2. You will see the “Add Roles and Features Wizard”. Click next, make sure you use “Role-based or feature-based installation” for your installation type, click next, select your primary server from your server pool and click next.

3. You will be at the “Select Server Roles” screen. Click on “File and Storage Services” -> File and iSCSI Services and make sure you check both “DFS Namespaces” and “DFS Replication”

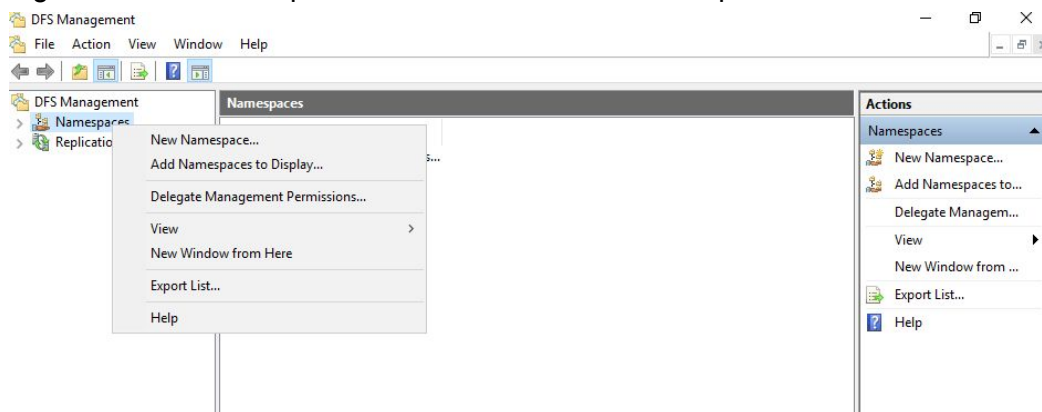


4. You can click next on the “Features” screen, and proceed to install the service. Repeat steps 1-3 on the other 2 servers as well.

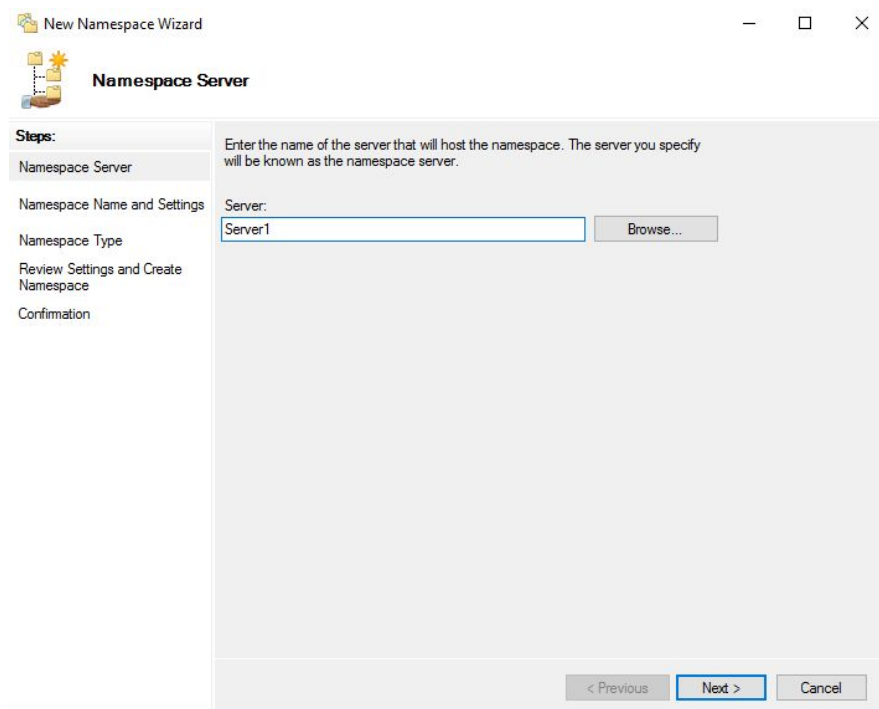
# Setting up your DFS Namespace on Primary Server

Now we will move onto setting up the DFS namespace on your primary server, Server1. Namespaces are how you call your shared file area which is being replicated.

1. Go to Server Manager -> Tools -> DFS Management and expand it to reveal “Namespaces” and “Replication”
2. Right click on “Namespaces” and click on “New Namespace”



3. It will open up the New Namespace Wizard. On the first screen, specify the name of the Server to be used as the namespace server. In this case, put “Server1” and click Next.



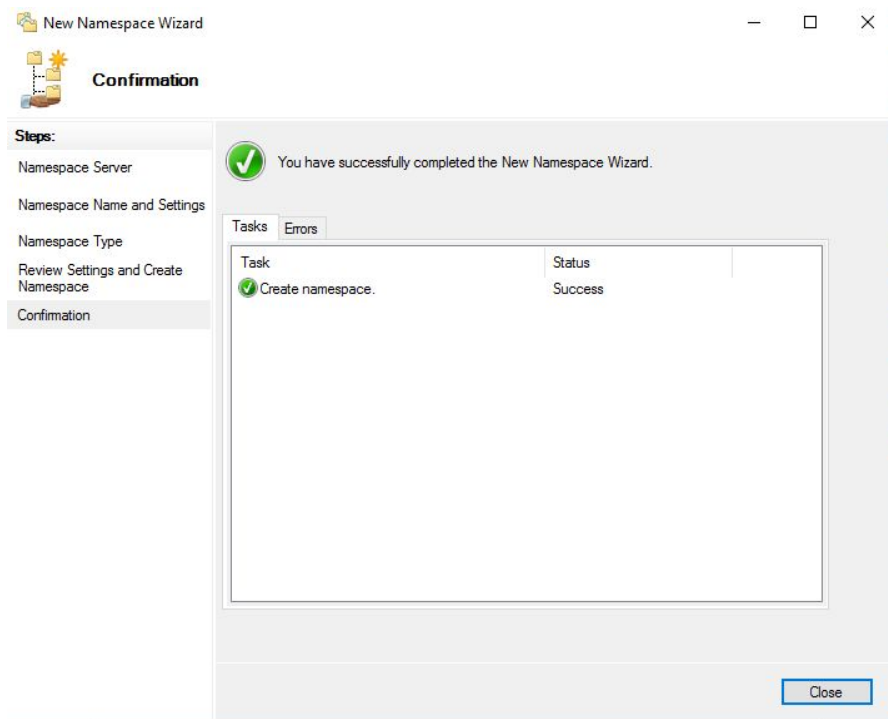
- For Namespace Name and Settings, enter the name you want for your Namespace. In this case, I used "SMWAssignment". You can leave the Edit Settings option alone and click Next.

The screenshot shows the 'New Namespace Wizard' window at the 'Namespace Name and Settings' step. The left sidebar lists the steps: 'Namespace Server', 'Namespace Name and Settings' (selected), 'Namespace Type', 'Review Settings and Create Namespace', and 'Confirmation'. The main area contains instructions: '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.' Below this is a 'Name:' label and a text box containing 'SMWAssignment'. An 'Example: Public' is shown below the text box. Further down, it says: '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.' There is an 'Edit Settings...' button. At the bottom right are '< Previous', 'Next >', and 'Cancel' buttons.

- For Namespace Type, make sure "Domain-based namespace" is chosen and click Next

The screenshot shows the 'New Namespace Wizard' window at the 'Namespace Type' step. The left sidebar lists the steps: 'Namespace Server', 'Namespace Name and Settings', 'Namespace Type' (selected), 'Review Settings and Create Namespace', and 'Confirmation'. The main area contains instructions: 'Select the type of namespace to create.' There are two radio button options: 'Domain-based namespace' (selected) and 'Stand-alone namespace'. Below 'Domain-based namespace' is a description: '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.' There is a checked checkbox 'Enable Windows Server 2008 mode' and a 'Preview of domain-based namespace:' text box containing '\\smw.assignment.com\\SMWAssignmentasdasd'. Below 'Stand-alone namespace' is a description: 'A 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.' There is a 'Preview of stand-alone namespace:' text box containing '\\Server1\\SMWAssignmentasdasd'. At the bottom right are '< Previous', 'Next >', and 'Cancel' buttons.

6. For Review Settings and Create Namespace, click Create. After creation succeeds, click Close and close the Wizard. You should now see the Namespace appear on the left.

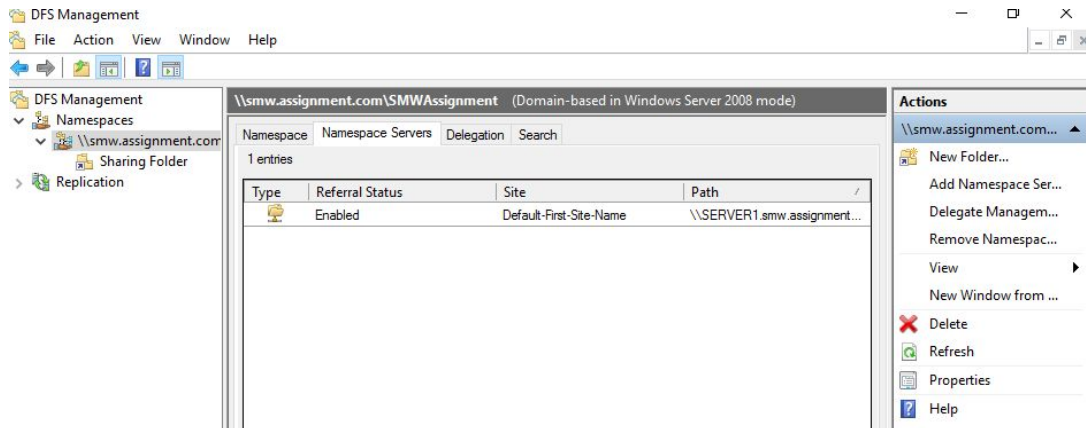




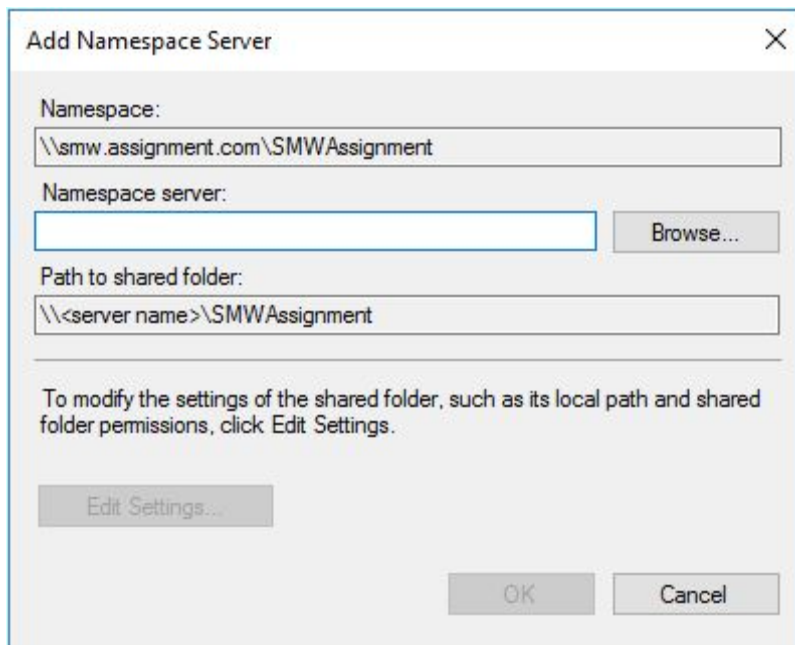
## Adding Another Namespace Server

To ensure redundancy, we need to add at least another Namespace Server in addition to the one already created by default when we set up the Namespace. This is to ensure that even if the primary server, Server1, goes down, there is still another Namespace Server.

1. Click on your Namespace and select Namespace Servers



2. Select "Add Namespace Server" and open up the window.



3. For this example, we will use Server2 as the redundant server. Click OK.

Add Namespace Server

Namespace:  
\\smw.assignment.com\SMWAssignment

Namespace server:  
Server2S

Path to shared folder:  
\\Server2S\SMWAssignment

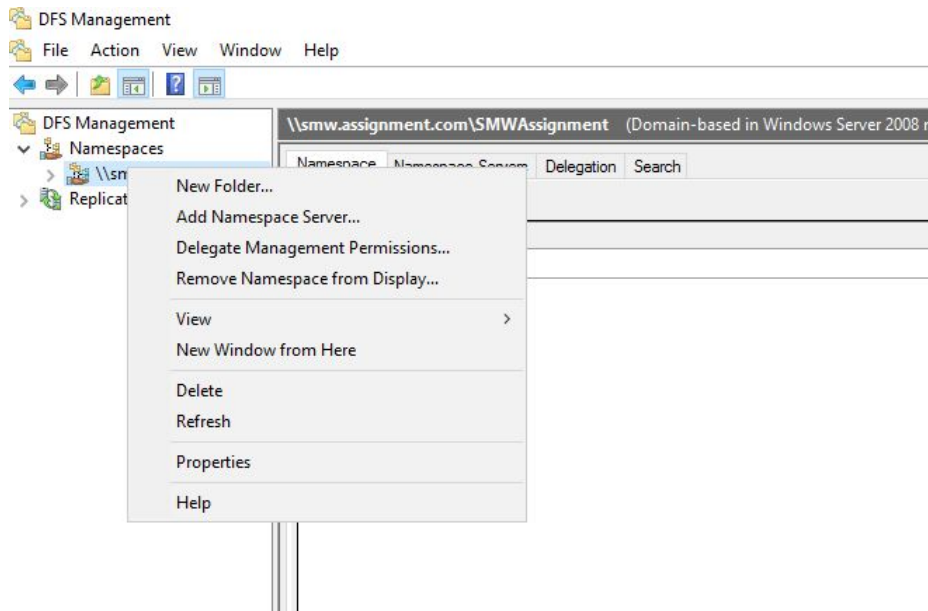
To modify the settings of the shared folder, such as its local path and shared folder permissions, click Edit Settings.

4. You will now see two Namespace Servers there, Server1 and Server2. Repeat steps 1-3 if you want to add Server3 as well for even more redundancy.

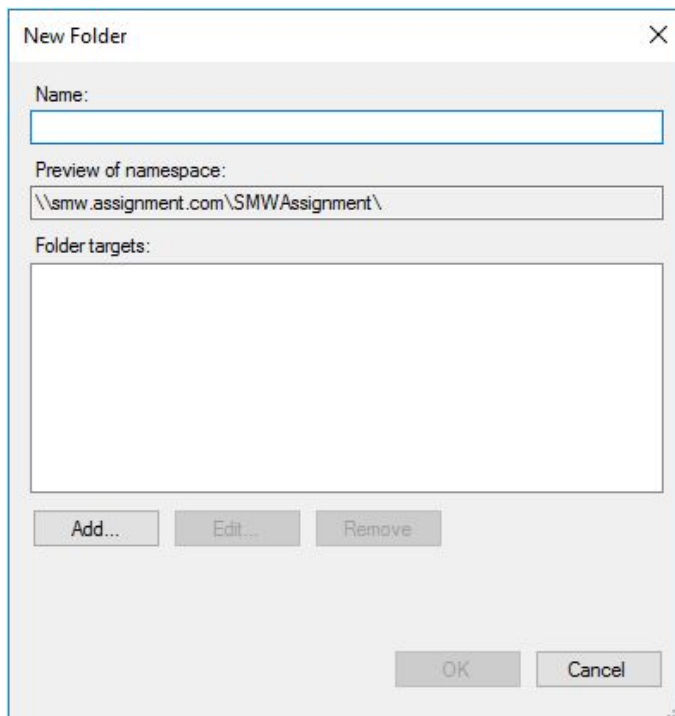
## Adding Target Folders

We now need to create target folders to share on each of our servers.

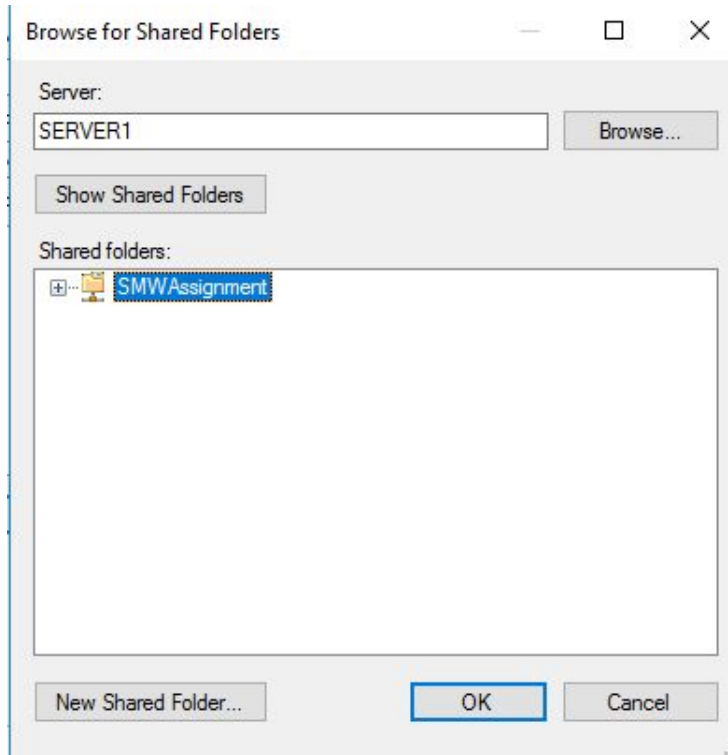
1. Using DFS Management, right click on your Namespace and click “New Folder”



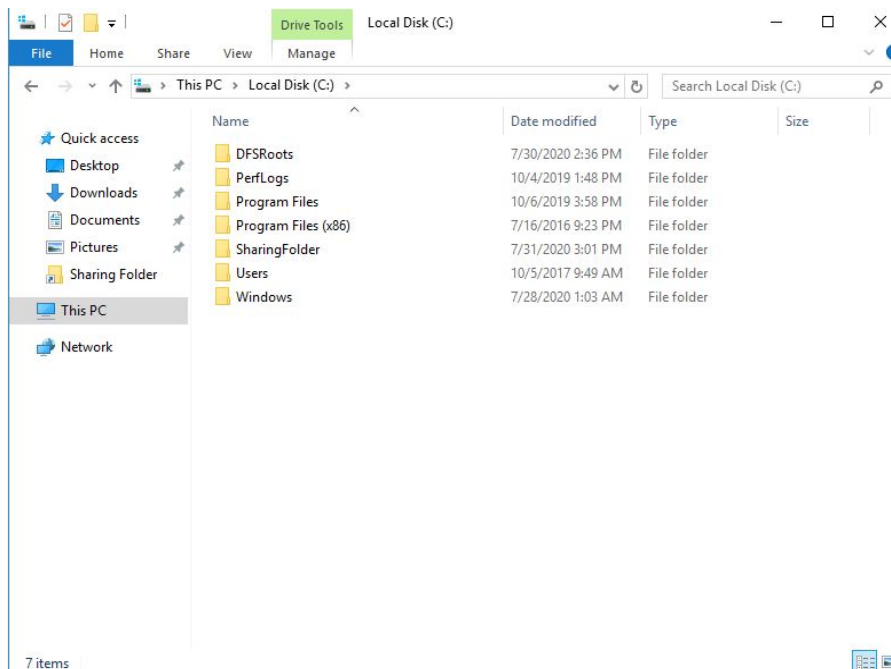
2. Click on Add. Then click Browse.



3. Enter “Server1” into the Server Name and click Show Shared Folders. **Take note:** You will not see the SMWAssignment folder that is reflected on my screen.



4. Create a new file on your Server1 C drive, “C:\\SharingFolder”.



5. There is no folder being shared at the moment, click New Shared Folder. Enter “Sharing Folder” into the Share name. Click Browse and search for “C:\\SharingFolder” and set it as your Local Path of shared folder. Finally, make sure you check “All users have read and write permissions”. Click Ok.

Create Share

Server name:  
SERVER1

Share name:  
SMWAssignment

Local path of shared folder:  
c:\\SharingFolder 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

☐ Administrators have full access; other users have read and write permissions

☐ Use custom permissions: Customize...

OK Cancel

6. You will be back to the New Folder screen. Repeat steps 2-5 for Server2 and Server3 until you have this screen.

New Folder

Name:

Preview of namespace:  
\\smw.assignment.com\\SMWAssignment\\

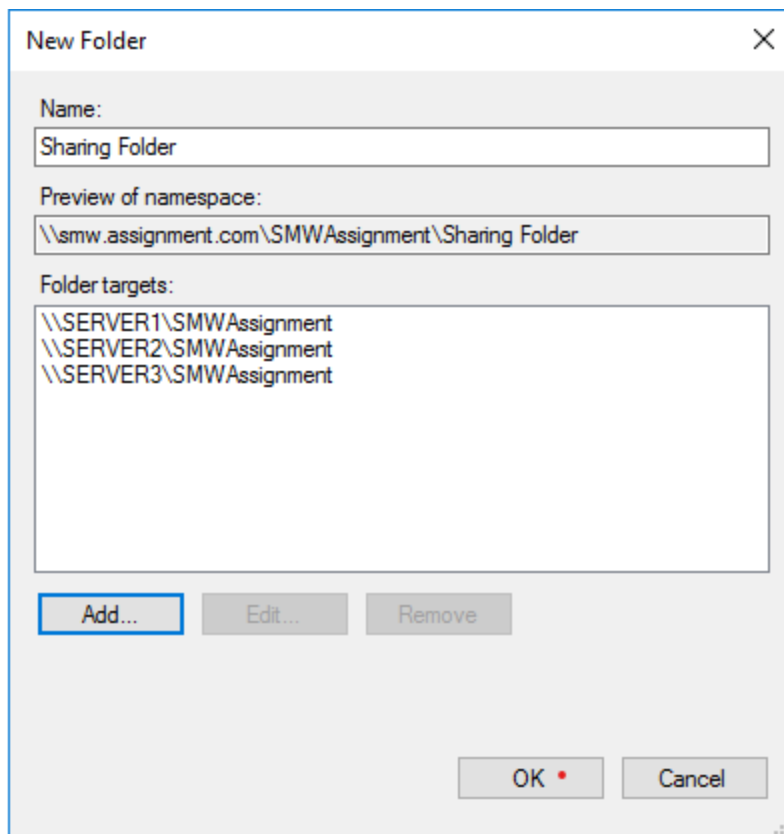
Folder targets:

\\SERVER1\\SMWAssignment  
\\SERVER2\\SMWAssignment  
\\SERVER3\\SMWAssignment

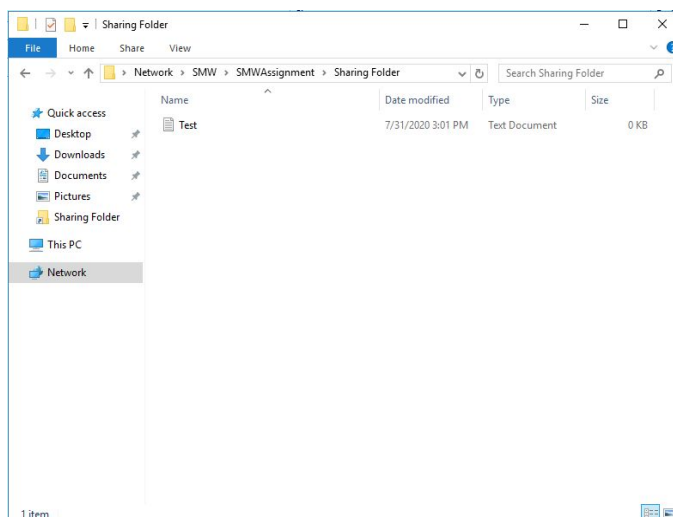
Add... Edit... Remove

OK Cancel

7. Enter Sharing Folder as your name. Click Ok



8. Now open “\\SMW\SMWAssignment\Sharing Folder” and you will be in your DFS share. Create a new file there called “Test.txt” and write anything inside it.

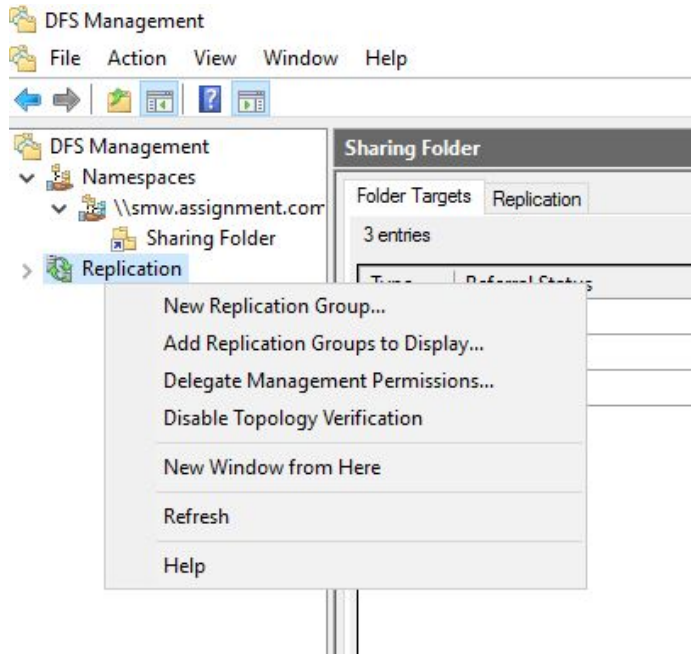


9. Try accessing “\\SMW\SMWAssignment\Sharing Folder” from Server2 and Server3. It should work. However, this folder is only replicated on Server1. We will now create a replication group to Server2 and Server3.

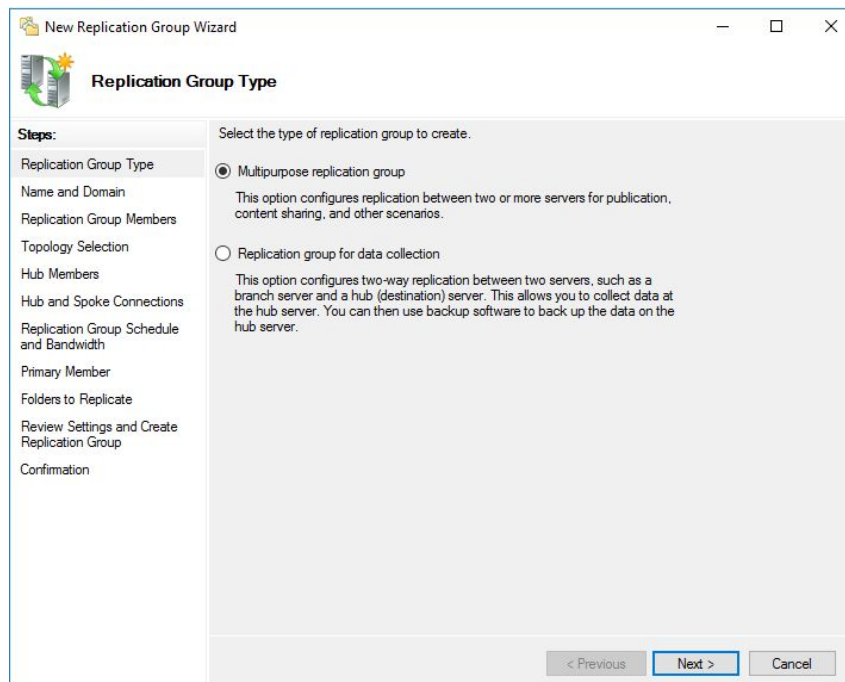
# Setting Up Replication

Now that we created our namespace and target folders, it is time to set up replication so the data stays constant throughout all 3 servers.

1. From DFS Management, right click Replication and click New Replication Group



2. Select Multipurpose Replication Group and click next



3. Enter "SMWAssignment" as Replication Group Name, click Next

The screenshot shows the 'New Replication Group Wizard' window with the 'Name and Domain' step selected in the left-hand 'Steps' pane. The main area contains instructions: 'Type a name and domain for the replication group. The name of the replication group must be unique in the domain that hosts the replication group.' Below this, there are three input fields: 'Name of replication group:' with the text 'SMWAssignment', 'Optional description of replication group:' (empty), and 'Domain:' with the text 'smw.assignment.com' and a 'Browse...' button. At the bottom right are buttons for '< Previous', 'Next >', and 'Cancel'.

Steps:
Replication Group Type
<b>Name and Domain</b>
Replication Group Members
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

Name of replication group: SMWAssignment

Optional description of replication group:

Domain: smw.assignment.com Browse...

< Previous Next > Cancel

4. On the Replication Group Members, Click Add, then add Server1, Server2 and Server3 click Next.

The screenshot shows the 'New Replication Group Wizard' window with the 'Replication Group Members' step selected in the left-hand 'Steps' pane. The main area contains instructions: 'Click Add and then select two or more servers that will become members of the replication group.' Below this is a table with two columns: 'Server' and 'Domain'. The table lists three servers: SERVER1, SERVER2, and SERVER3, all with the domain 'smw.assignment.com'. Below the table are 'Add...' and 'Remove' buttons. At the bottom right are buttons for '< Previous', 'Next >', and 'Cancel'.

Steps:
Replication Group Type
Name and Domain
<b>Replication Group Members</b>
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

Click Add and then select two or more servers that will become members of the replication group.

Members:

Server	Domain
SERVER1	smw.assignment.com
SERVER2	smw.assignment.com
SERVER3	smw.assignment.com

Add... Remove

< Previous Next > Cancel



5. For Topology Selection, select Full Mesh and click Next

The screenshot shows the 'New Replication Group Wizard' window, specifically the 'Topology Selection' step. The window has a title bar with standard Windows controls. On the left, a 'Steps' pane lists the wizard's stages: Replication Group Type, Name and Domain, Replication Group Members, Topology Selection (highlighted), Hub Members, Hub and Spoke Connections, Replication Group Schedule and Bandwidth, Primary Member, Folders to Replicate, Review Settings and Create Replication Group, and Confirmation. The main area is titled 'Select a topology of connections among members of the replication group.' It contains three radio button options: 'Hub and spoke' (selected), 'Full mesh', and 'No topology'. Each option has a descriptive paragraph and a corresponding network diagram. The 'Hub and spoke' diagram shows a central node connected to three peripheral nodes. The 'Full mesh' diagram shows four nodes, each connected to every other node. The 'No topology' option has no diagram. At the bottom right, there are three buttons: '< Previous', 'Next >' (highlighted with a blue border), and 'Cancel'.

**Steps:**

- Replication Group Type
- Name and Domain
- Replication Group Members
- 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

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.

☐ 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.

☐ 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.

< Previous   Next >   Cancel

6. For Replication Group Schedule and Bandwidth, select “Replicate continuously using specified Bandwidth” and set it to “Full”. Click Next

The screenshot shows the 'New Replication Group Wizard' window, specifically the 'Replication Group Schedule and Bandwidth' step. The window has a title bar with standard Windows controls. On the left, a 'Steps' pane lists the wizard's stages: Replication Group Type, Name and Domain, Replication Group Members, Topology Selection, Replication Group Schedule and Bandwidth (highlighted), Primary Member, Folders to Replicate, Review Settings and Create Replication Group, and Confirmation. The main area is titled 'Select the replication schedule and bandwidth to be used by default for all new connections in the replication group.' It contains two radio button options: 'Replicate continuously using the specified bandwidth' (selected) and 'Replicate during the specified days and times'. The first option has a sub-section 'Bandwidth:' with a dropdown menu set to 'Full'. The second option has a sub-section '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.' and an 'Edit Schedule...' button. At the bottom right, there are three buttons: '< Previous', 'Next >' (highlighted with a blue border), and 'Cancel'.

**Steps:**

- Replication Group Type
- Name and Domain
- Replication Group Members
- Topology Selection
- Replication Group Schedule and Bandwidth**
- Primary Member
- Folders to Replicate
- Review Settings and Create Replication Group
- Confirmation

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

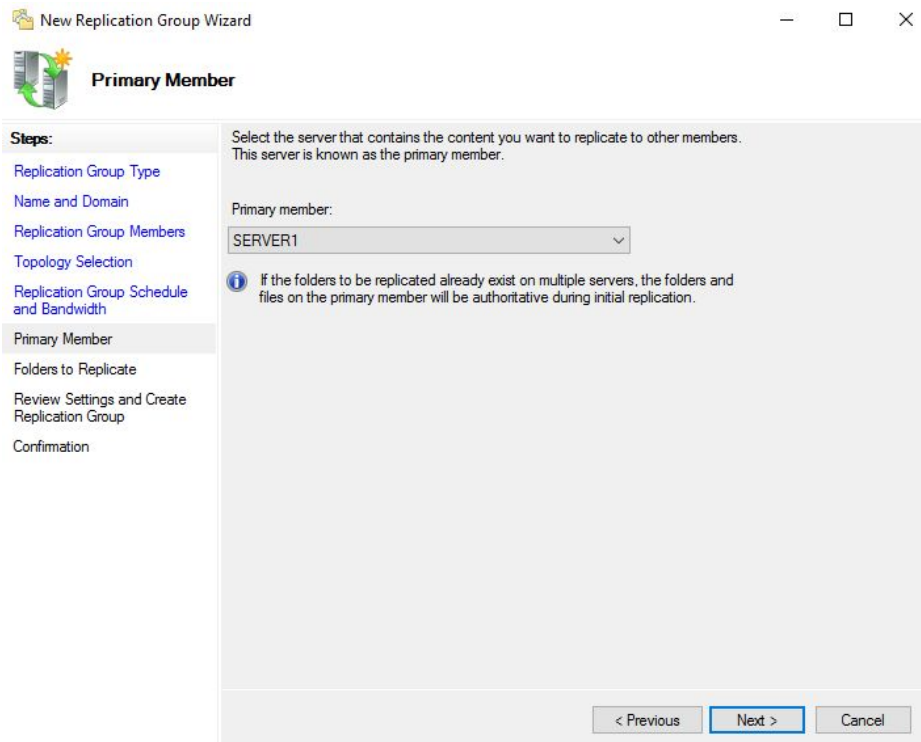
☐ Replicate during the specified days and times

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...

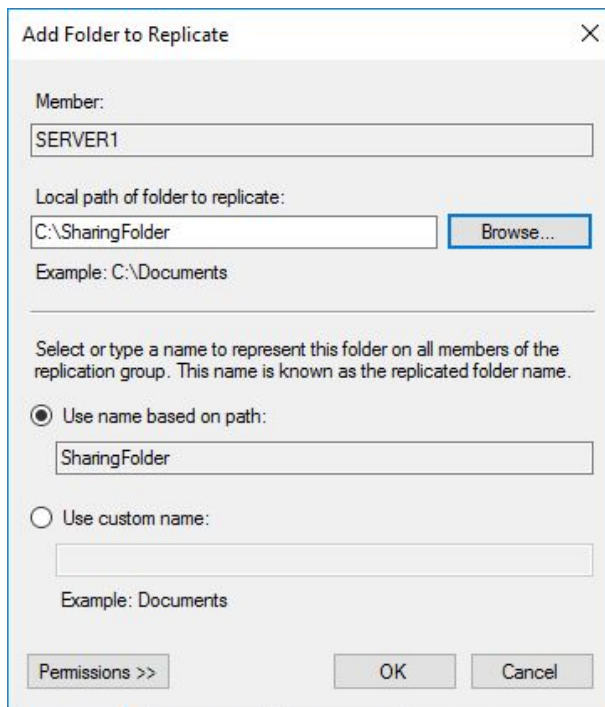
< Previous   Next >   Cancel

7. For Primary Members select Server1, click Next



The screenshot shows the 'New Replication Group Wizard' window, specifically the 'Primary Member' step. The window title is 'New Replication Group Wizard'. On the left, there is a 'Steps:' list with the following items: 'Replication Group Type', 'Name and Domain', 'Replication Group Members', 'Topology Selection', 'Replication Group Schedule and Bandwidth', 'Primary Member' (which is highlighted), 'Folders to Replicate', 'Review Settings and Create Replication Group', and 'Confirmation'. The main area of the wizard has a heading 'Primary Member' and a sub-heading 'Select the server that contains the content you want to replicate to other members. This server is known as the primary member.' Below this, there is a 'Primary member:' label and a dropdown menu showing 'SERVER1'. An information icon (i) is followed by the text: 'If the folders to be replicated already exist on multiple servers, the folders and files on the primary member will be authoritative during initial replication.' At the bottom right, there are three buttons: '< Previous', 'Next >', and 'Cancel'.

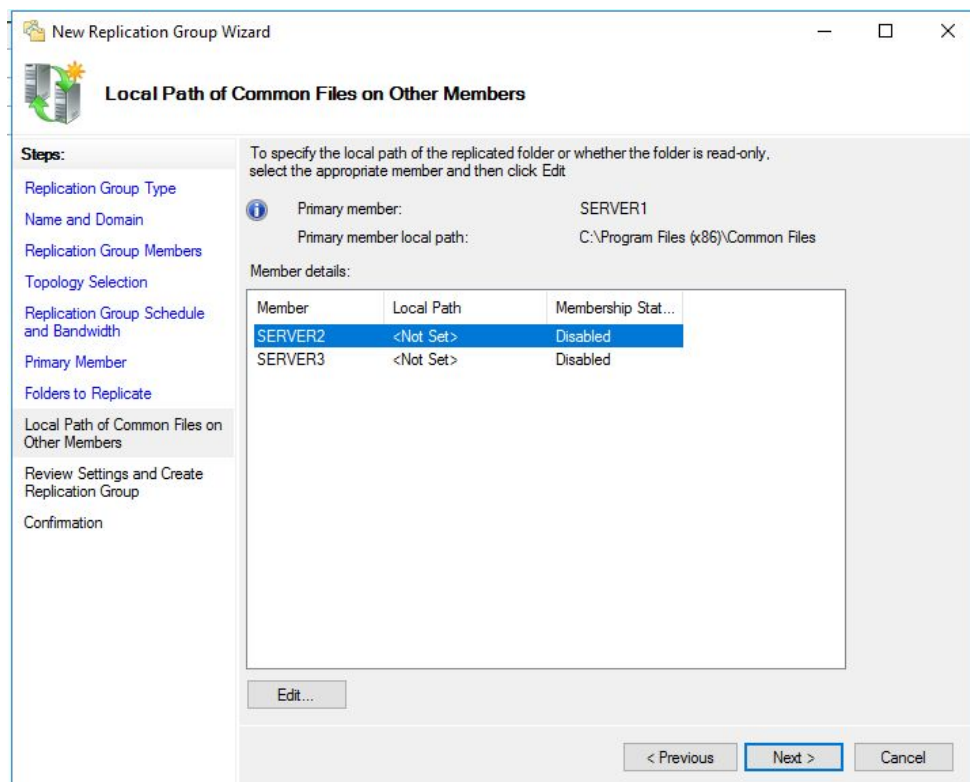
8. For Folders to Replicate, click Add, browse to your C:\\SharingFolder and select it



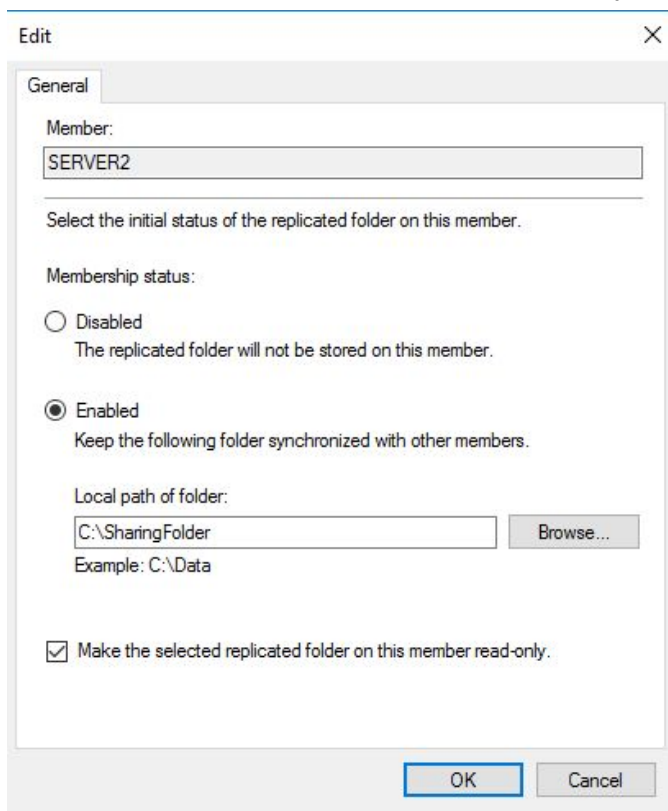
The screenshot shows the 'Add Folder to Replicate' dialog box. The title bar says 'Add Folder to Replicate' with a close button (X). Inside, there is a 'Member:' label and a text box containing 'SERVER1'. Below that is a 'Local path of folder to replicate:' label and a text box containing 'C:\\SharingFolder'. To the right of this text box is a 'Browse...' button. Below the text box is an 'Example: C:\\Documents' label. A horizontal line separates this section from the next. The next section has a label '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.' Below this label are two radio buttons. The first is 'Use name based on path:' and it is selected. Below it is a text box containing 'SharingFolder'. The second radio button is 'Use custom name:' and it is not selected. Below it is an empty text box. Below the text boxes is an 'Example: Documents' label. At the bottom left is a 'Permissions >>' button. At the bottom right are 'OK' and 'Cancel' buttons.

9. Click Ok and click Next.

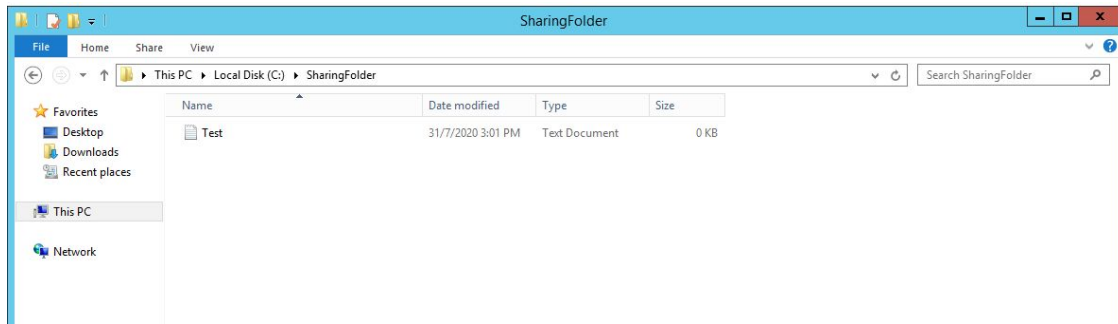
10. For Local Path of Common Files on Other Members, click on Server2 and click Edit



11. Select "Enabled" and click Browse, then select your "C:\\SharingFolder". Click OK



12. Repeat steps 10-11 for Server3 as well, then click Next
13. Click Create and close the wizard after successfully creating the replication group
14. Give it a few minutes. Go to Server2 and open "C:\\SharingFolder". You should see the "Test.txt" you created previously



15. Repeat step 14 for Server3 and you should see it. This shows that replication is working

## Further Testing

1. Create a file or folder in Server3 and check if it is replicated on Server1 and Server2
2. Edit the file in Server2 and see if the file is updated on Server1 and Server3 as well
3. Delete a file from Server1 and see if the file is deleted in Server2 and Server3
4. Take down Server1 and Server2, see if you can still access the DFS folder from an external client (Requires a 4th VM running Win10 Client)

## Troubleshooting

1. If you cannot read or write in the shared folder from any machine or account, make sure the permissions you set are correct (Everyone can Read and Write etc)
2. If your DFS is not replicating, make sure the Replication Group was created correctly.
3. If your DFS is not accessible when one server goes down, make sure all servers are Namespace Servers and all are grouped together in the Replication Group
4. If your folders are not syncing, make sure you are accessing the correct folder

# Demonstration Agenda

## Assumptions

These are the following assumptions I will be basing the demonstration on:

- The servers can all ping one another and are in the same domain
- The client is a Windows 10 VM connected to the domain

## Plan and Flow of Demonstration

This will be the flow for the demonstration agenda:

1. Setup Configuration
2. Successful replication of updates and changes made to files or folders
3. High Redundancy and Availability of DFS service
4. Replication of offline editing

I will be going through the setup configuration used to set up the DFS service, which includes the DFS role installation on all servers, namespace servers and other important configurations.

For Successful Replication of updates and changes made to files or folders, I will be showing that replication works by creating two text files and editing them on one of the servers.

For High Redundancy and Availability of DFS service, I will be taking one server down and proving with the client that the files can still be accessed as there is still at least one namespace server still alive.

For replication of offline editing, I will create files and folders and edit them while offline. When the server boots back up I will show that the offline edits were replicated.

## Testing Data Set

I will be using the following for purposes of the demonstration:

- Windows 10 client VM
- Text files "Test1", "Test2" and "OfflineFile"
- Folders "Folder1" and "Folder2"

*<End of Report>*

# References

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