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TECHNICAL BRIEF: DFS



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TECHNICAL BRIEF: DFS

This Technical Brief is a valuable resource to learn how to integrate DFS Namespaces and DFS Replication into your LaCie professional server. While an exhaustive explanation of Windows® File Services is beyond the scope of this Technical Brief, LaCie encourages users and network administrators to further their understanding via the numerous books, instruction manuals, courses, and web sites on this subject.

DISTRIBUTED FILE SYSTEM (DFS)

A network administrator uses a distributed file system (DFS) to maintain and share the numerous files stored on the company server(s). Important functions such as data security, permissions, and accessibility are integrated into the DFS.

A key feature for LaCie professional servers is DFS Management, a role service that is part of Windows Server File Services. This document highlights two key role services that are part of DFS Management:

- DFS Namespaces (DFS-N)
- DFS Replication (DFS-R)

Technical note: File Services DFS-N and DFS-R must be installed on your LaCie professional server before creating Namespaces and enabling replication. Go to **Server Manager > Roles > Add Role Services**. Select the role services **Distributed File System** and click Install.

ADMINISTRATOR

In order to review, confirm, or redefine the software settings on your LaCie professional server, you must have Administrative rights to the device.

NAMESPACES (DFS-N)

During the course of a business day, a user must access multiple files from many servers that may populate multiple domains on a network. A user may search through a list of Shared Folders that are mounted on his workstation as network drives. Shared Folders contain the data that users must access to complete their projects. The user can spend much of his day filtering through numerous network drives to find specific files required for a task at hand.

However, creating Shared Folders for one or more users in a single mounted network drive would help ease the burden. The Namespace, a virtual location for important folders and documents, becomes the sole network drive seen by the user.

While Namespaces are ideal for large networks, they are more than useful for smaller configurations with limited or single domains. In fact, administrators may find that Namespaces allow for easier file management for the users and more efficient network performance.

NAMESPACE EXAMPLE - BRANCH OFFICE

Table 01 - Folder Types

Folder Type	Use
Shared Folder	A Shared folder has many features, including a directory for data folders.
Target Folder	A virtual folder that links to Shared Folders assigned by the administrator.
Tree Folder	A virtual folder used in DFS to organize folders and data. It can contain Target folders or other Tree folders.

A company called LaCie has offices in Paris and New York. The network administrator wants to provide access to data stored in Paris to the branch in New York and vice-versa. However, there are growing concerns that employee assets and time are being wasted as users in both offices manually search through numerous server volumes for important files.

The Paris office has heavy network storage demands. In addition to the Active Domain (AD) server that acts as the domain controller, the administrator has two LaCie 12big Rack Storage Servers for storage. The New York office has just installed a LaCie 5big Office+.

Since the servers are powered by Windows Storage Server 2008, they can receive critical user and permission instructions from Windows Server Active Directory. In the domain *lacie.com*, the administrator adds Shared Folders based upon business unit and geography (i.e. Accounting Americas and Accounting Europe, Marketing Americas and Marketing Europe, Software Development Americas and Software Development Europe, etc.). Users may create individual folders within each Shared Folder to properly organize individual documents (budget spreadsheets, corporate presentations, etc.).

Branch business units must have access to the data of their overseas counterparts in order to avoid waste and needless duplication. That is, New York Accounting must see the latest data from Paris Accounting and Paris Accounting must see the New York Accounting files. As well, department managers require data from other business units.

An administrator will receive the data storage requirements from each department to plan for optimal network organization. He will create one Namespace for the company, making it easier for users. Access to data is based upon permissions granted to users on a Shared Folder basis.

Technical Note: A Namespace appears as a network volume to the user. An administrator assigns Shared Folders to a Namespace based upon the data needs of the user(s).

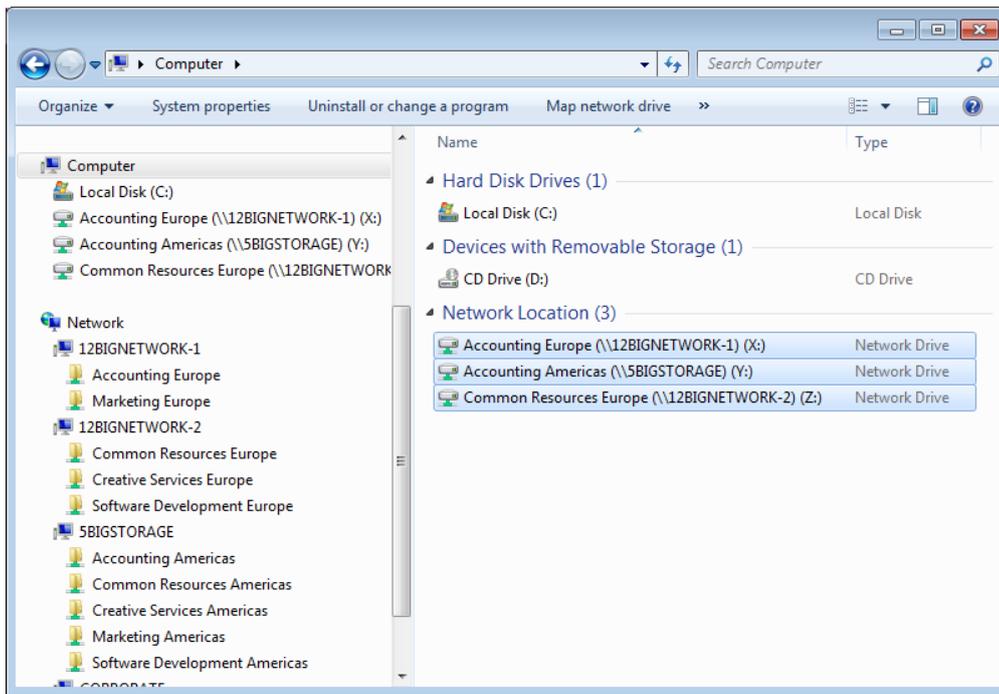
Tables 02 - *LaCie Shared and Data Folders* and 03 - *A Single Namespace with Folder Hierarchy* offer small samplings of the Shared Folders and data folders stored on the LaCie professional servers that the administrator must manage.

Table 02 - *LaCie Shared and Data Folders*

LaCie	12big Rack Storage Servers (x2) - Paris	5big Office+ - New York
Shared Folders <i>Data Folders</i>	Accounting Europe <i>Accounts Payable Europe</i> <i>Accounts Receivable Europe</i> <i>Projected Budgets Europe</i> <i>Accounts Budgetary Planning Europe</i>	Accounting Americas <i>Accounts Payable Americas</i> <i>Accounts Receivable Americas</i> <i>Projected Budgets Americas</i> <i>Accounts Budgetary Planning Americas</i>
Shared Folders <i>Data Folders</i>	Marketing Europe <i>Product Testing Europe</i> <i>Product Road Maps Europe</i> <i>Products in Development Europe</i> <i>Top Secret Products Europe</i> <i>Marketing Budgetary Planning Europe</i>	Marketing Americas <i>Product Testing Americas</i> <i>Product Road Maps Americas</i> <i>Products in Development Americas</i> <i>Top Secret Products Americas</i> <i>Marketing Budgetary Planning Americas</i>
Shared Folders <i>Data Folders</i>	Software Development Europe <i>Project Manager Reports Europe</i> <i>Alpha Programs Europe</i> <i>Beta Programs Europe</i> <i>Release Candidates Europe</i> <i>Dev Budgetary Planning Europe</i>	Software Development Americas <i>Project Manager Reports Americas</i> <i>Alpha Programs Americas</i> <i>Beta Programs Americas</i> <i>Release Candidates Americas</i> <i>Dev Budgetary Planning Americas</i>
Shared Folders <i>Data Folders</i>	Creative Services Europe <i>Illustrations Europe</i> <i>Ads Europe</i> <i>Logos Europe</i> <i>Documentation Budgetary Planning Europe</i> <i>CS Budgetary Planning Europe</i>	Creative Services Americas <i>Illustrations Americas</i> <i>Ads Americas</i> <i>Logos Americas</i> <i>Documentation Budgetary Planning Americas</i> <i>CS Budgetary Planning Americas</i>
Shared Folders <i>Data Folders</i>	Common Resources Europe <i>Travel Expenses Europe</i> <i>PR Presentations Europe</i> <i>IT Documentation Europe</i> <i>Training Europe</i>	Common Resources Americas <i>Travel Expenses Americas</i> <i>PR Presentations Americas</i> <i>IT Documentation Americas</i> <i>Training Americas</i>

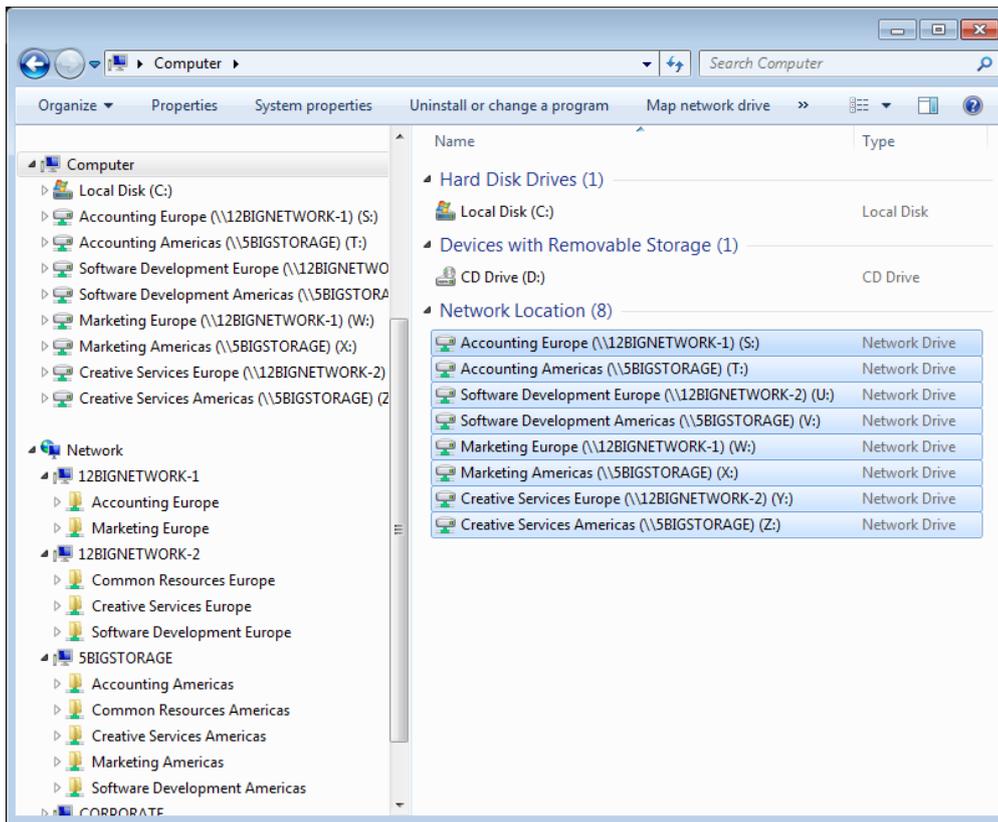
Seeing so many Shared Folders, it is very easy to understand why a Namespace would help with file management and data security. According to the list of Shared Folders in *Table 02 - LaCie Shared and Data Folders*, a salaried employee who works in accounting must use files from three Shared Folders:

- Accounting Americas
- Accounting Europe
- Common Resources



An accounting manager must use files in eight of the ten Shared Folders:

- Accounting Americas
- Accounting Europe
- Marketing Americas
- Marketing Europe
- Software Development Americas
- Software Development Europe
- Creative Services



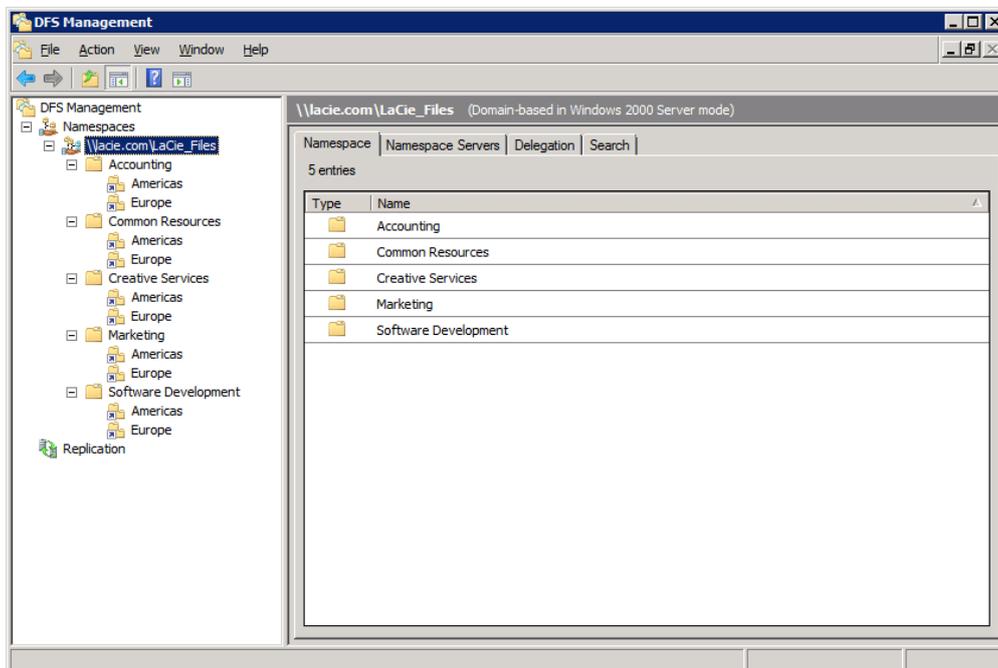
The amount of Shared Folders becomes somewhat unwieldy for the employees as they attempt to hunt for files located in numerous network volumes. It is far more efficient to limit the mounted drives. In our example, we can create a single Namespace to contain the company files.

Table 03 - A Single Namespace with Folder Hierarchy

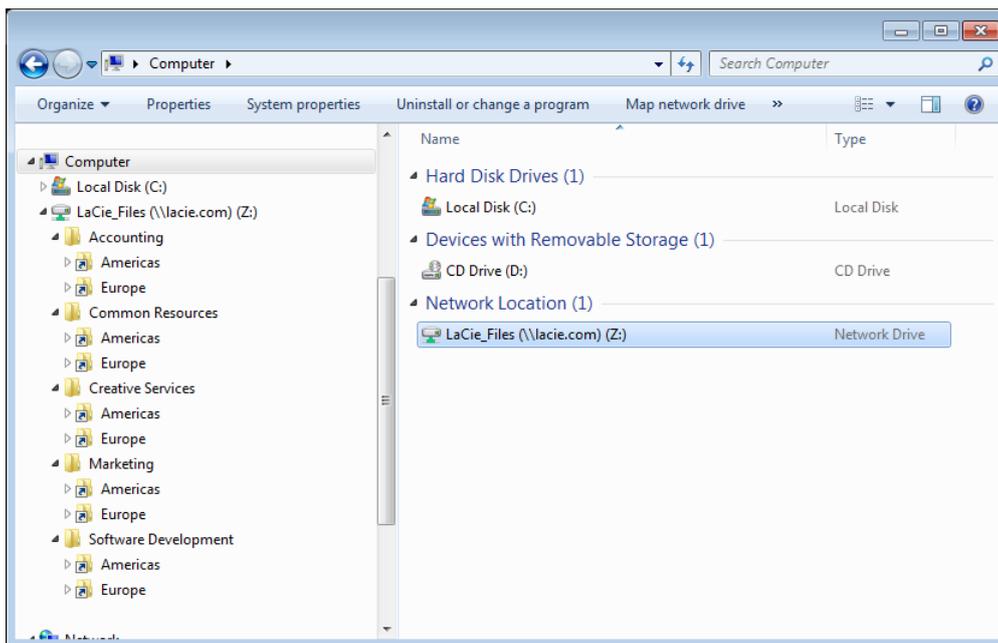
Namespace	Tree Folder	Target Folders	Shared Folder	Server Location
LaCie_Files	Accounting	Americas Europe	Accounting Americas Accounting Europe	5big Office+ (New York) 12big Rack Storage Server-1 (Paris)
LaCie_Files	Common Resources	Americas Europe	Common Resources Americas Common Resources Europe	5big Office+ (New York) 12big Rack Storage Server-2 (Paris)
LaCie_Files	Creative Services	Americas Europe	Creative Services Americas Creative Services Europe	5big Office+ (New York) 12big Rack Storage Server-2 (Paris)
LaCie_Files	Marketing	Americas Europe	Marketing Americas Marketing Europe	5big Office+ (New York) 12big Rack Storage Server-1 (Paris)
LaCie_Files	Software Development	Americas Europe	Software Development Americas Software Development Europe	5big Office+ (New York) 12big Rack Storage Server-2 (Paris)

With the single Namespace **LaCie_Files** acting as a virtual volume, all LaCie employees mount only one network drive. This is very helpful when users search for their data since there is no need to hunt through a series of mounted network volumes. For the administrator, management is simplified due to a single network drive for everyone. Access to files is granted when a Shared folder is created.

As *Table 03 - A Single Namespace with Folder Hierarchy* demonstrates, **LaCie_Files** provides easy access to Shared Folders that are dispersed among all three LaCie professional servers in New York and Paris. The DFS Management window lists the Tree folders and their Target folders.



All users in New York and Paris will have access to **LaCie_Files**. Note the Tree and Target folders on the left of the screenshot below.



From our example earlier, a salaried employee in the Accounting department has been granted permission to open the Accounting Americas and Accounting Europe Shared Folders. Both are accessible within the Accounting Target folder. He can search his assigned Shared Folders within the Namespace LaCie_Files for important data that relates to his job. However, he will not have access to other Shared Folders without receiving additional permission(s) from the administrator.

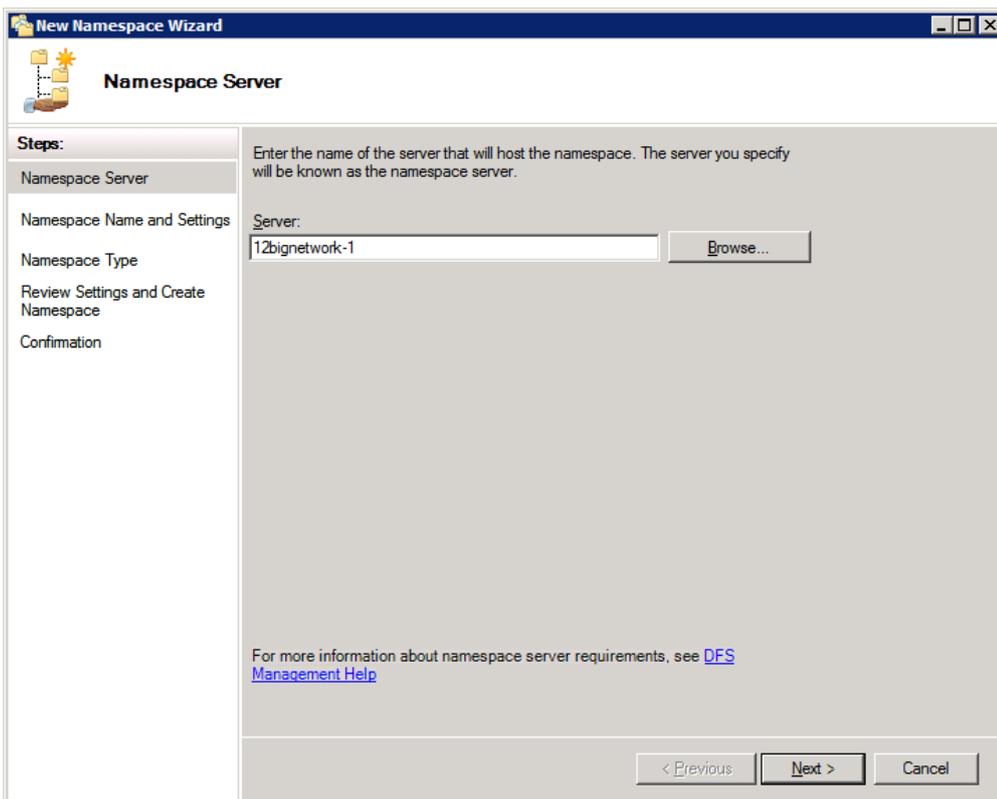
NAMESPACES

Once DFS has been installed on your LaCie professional server, you can create Namespaces to organize Target folders and files.

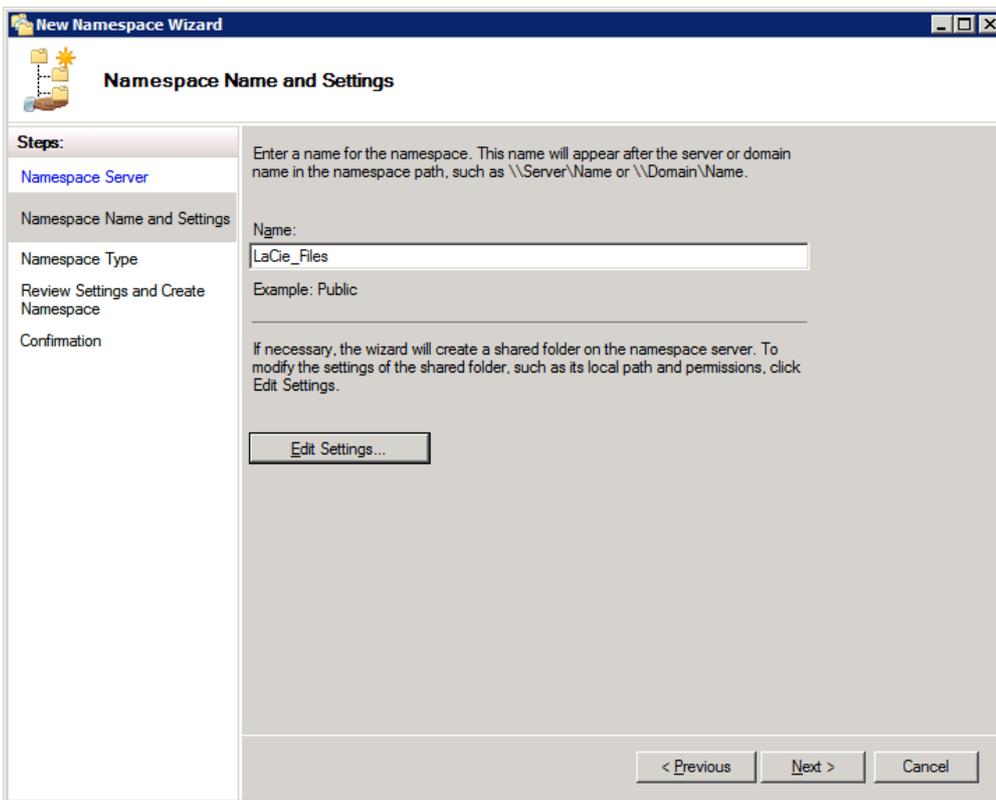
CREATE THE NAMESPACE

New Namespace

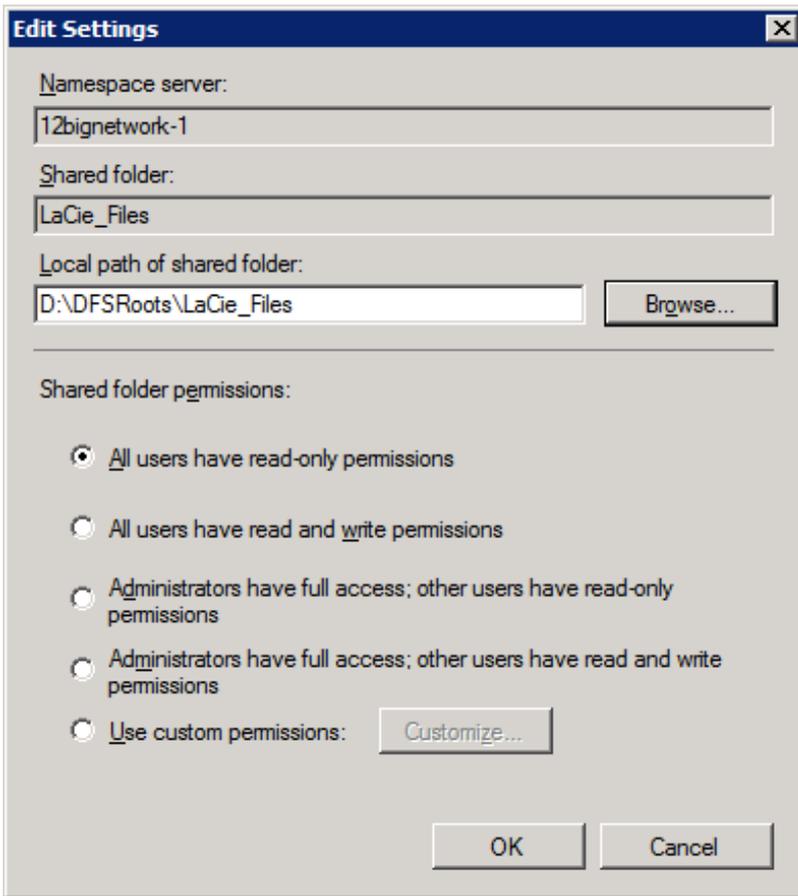
1. To launch the *New Namespace Wizard*, go to **Start > Administrative Tools > DFS Management > New Namespace**.
2. The first window prompts you to select the server that will host the Namespace. You can type the name of the server or search for it using the **Browse...** button. Click **Next>**.



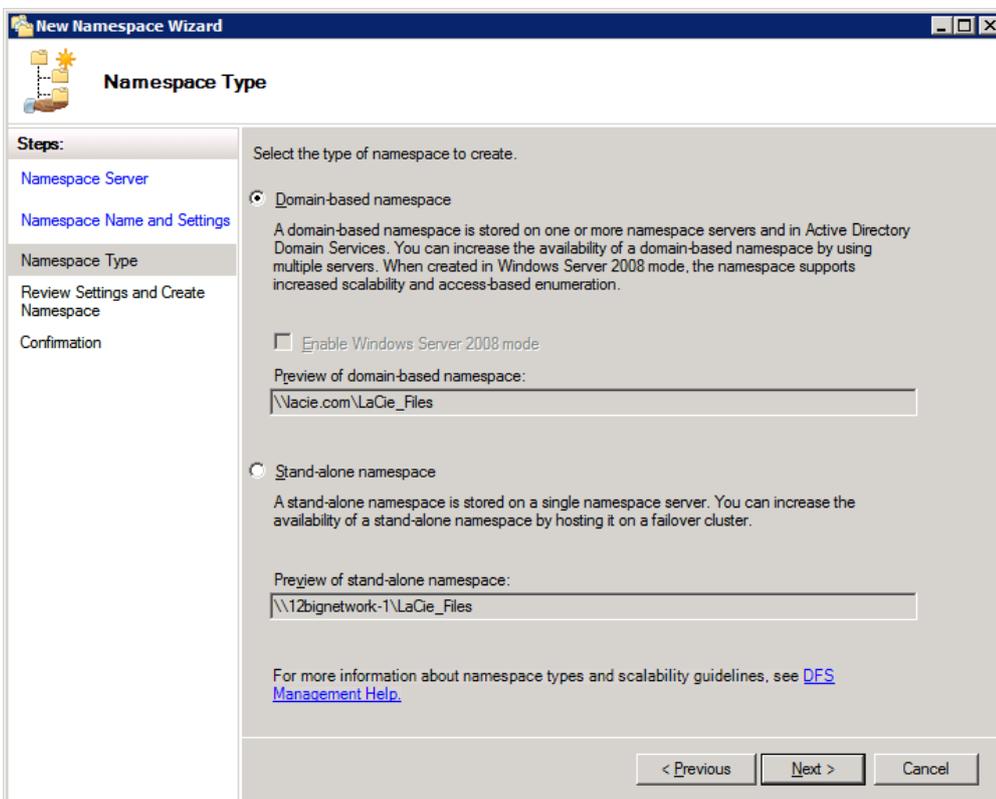
3. Enter a name for the new Namespace.



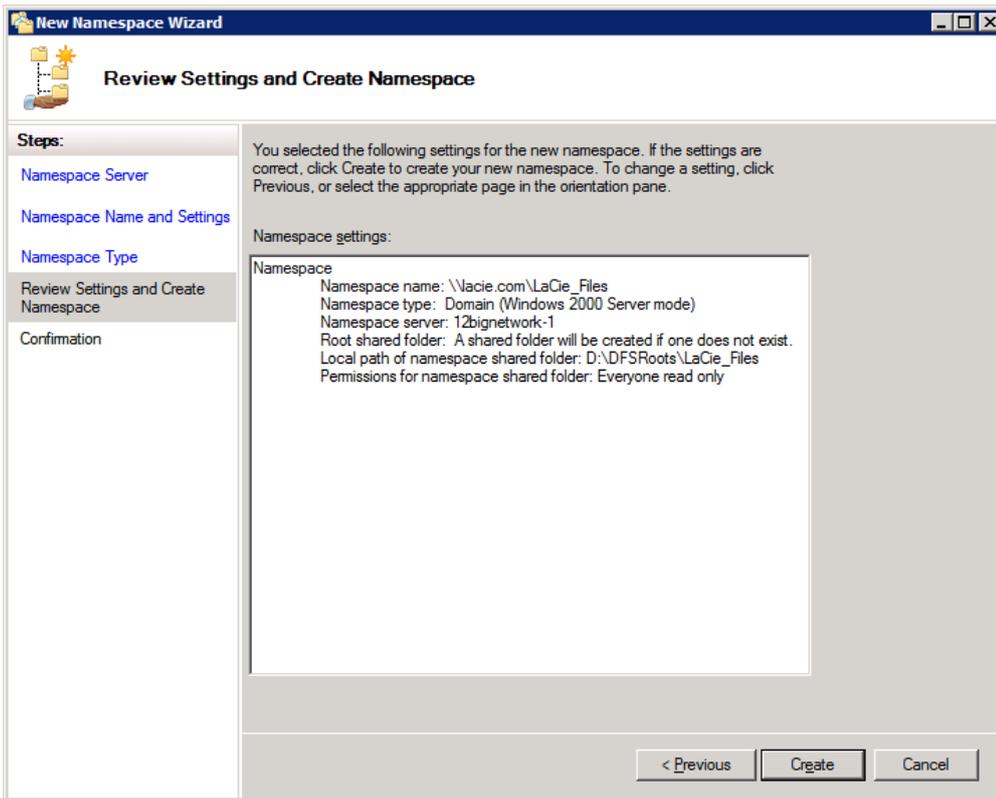
4. To modify the settings for the Namespace, click **Edit Settings...** and see the next step.
5. In this example, we are creating a path for the Namespace in D, the letter assigned to the 12big Rack Storage Server-1 (12BIGNETWORK-1) Data volume. As a default, Windows Storage Server creates *DFSRoots* to better identify the DFS in comparison with other files. The name can be changed by the administrator. Click **OK** then **Next>**.



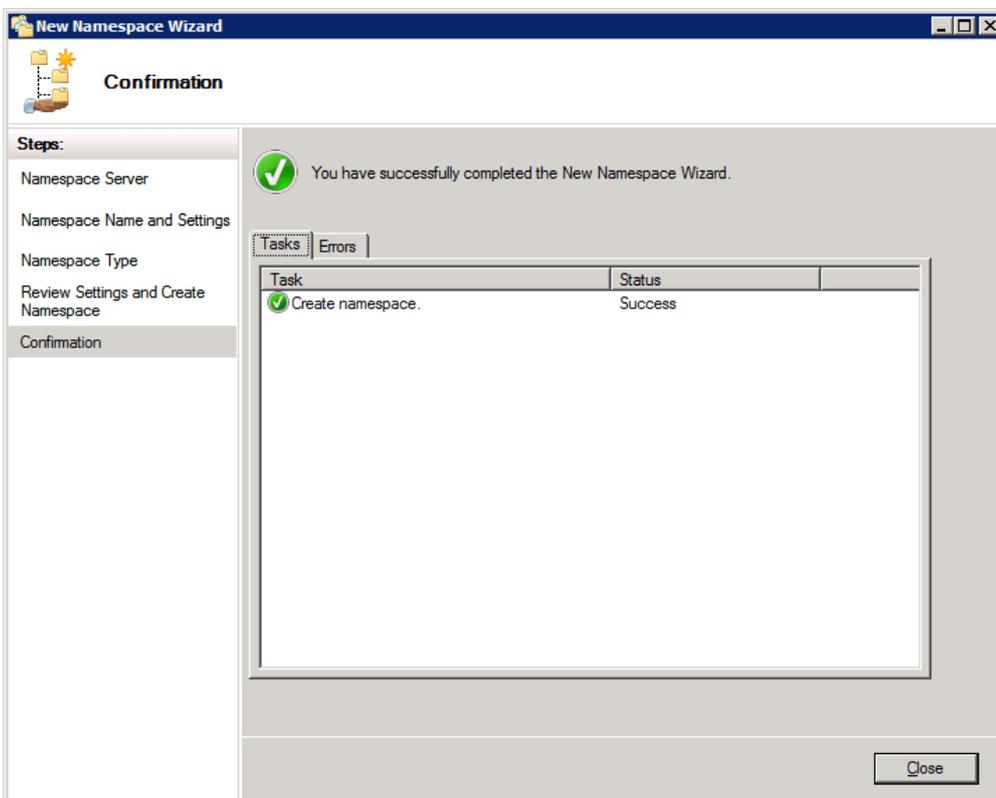
6. Choose the type of Namespace you wish to create: domain-based or stand-alone. Click **Next>**.



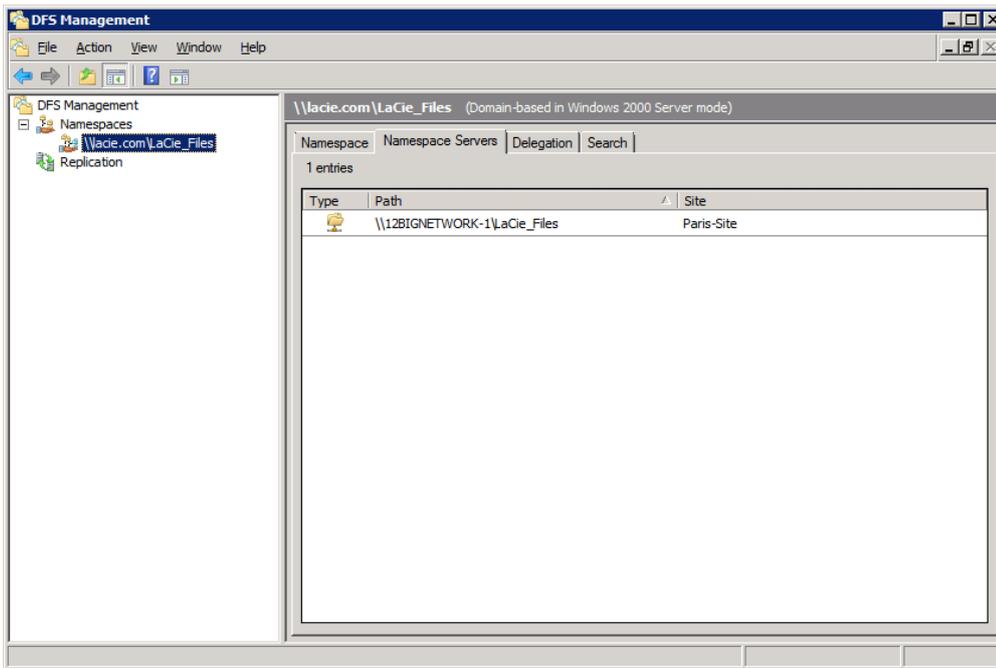
7. Review the choices you have made for the Namespace and click **Create**.



8. Once finished, a *Confirmation* window will appear.



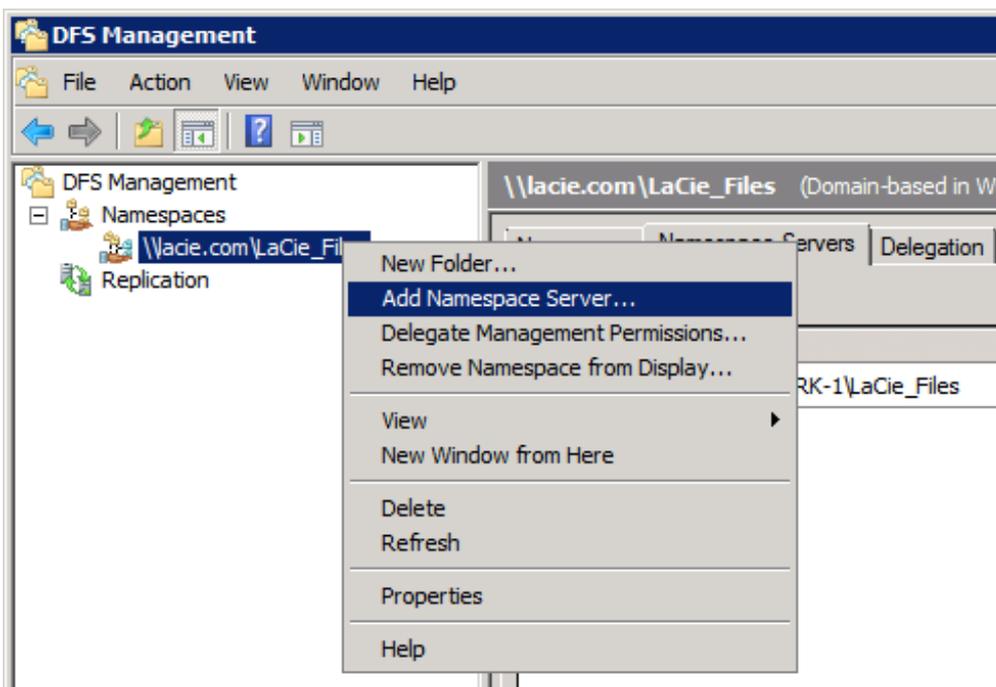
9. The Namespace has been added to the server.



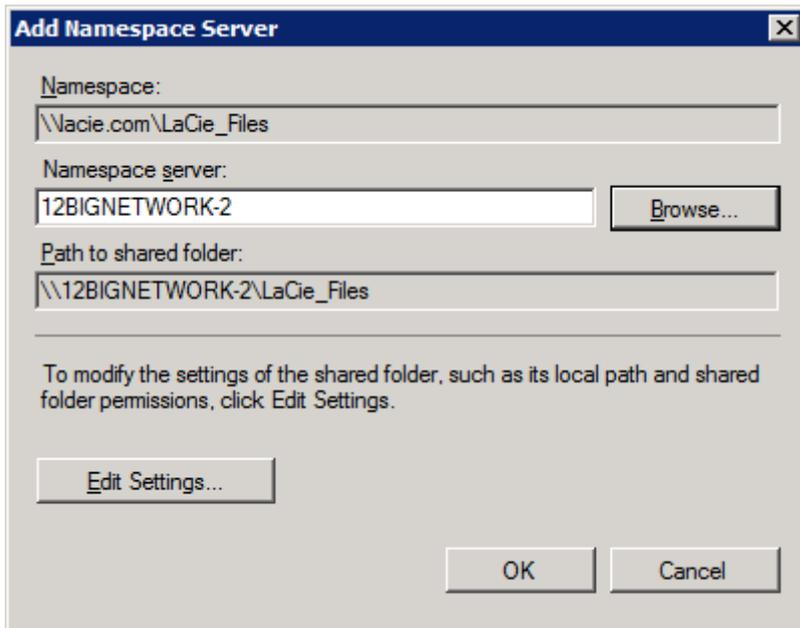
Add a Namespace Server (Domain only)

Once a new Namespace is created, you can add it to other servers in the domain. While many of the steps are similar, this process is not the same as making a new or separate Namespace.

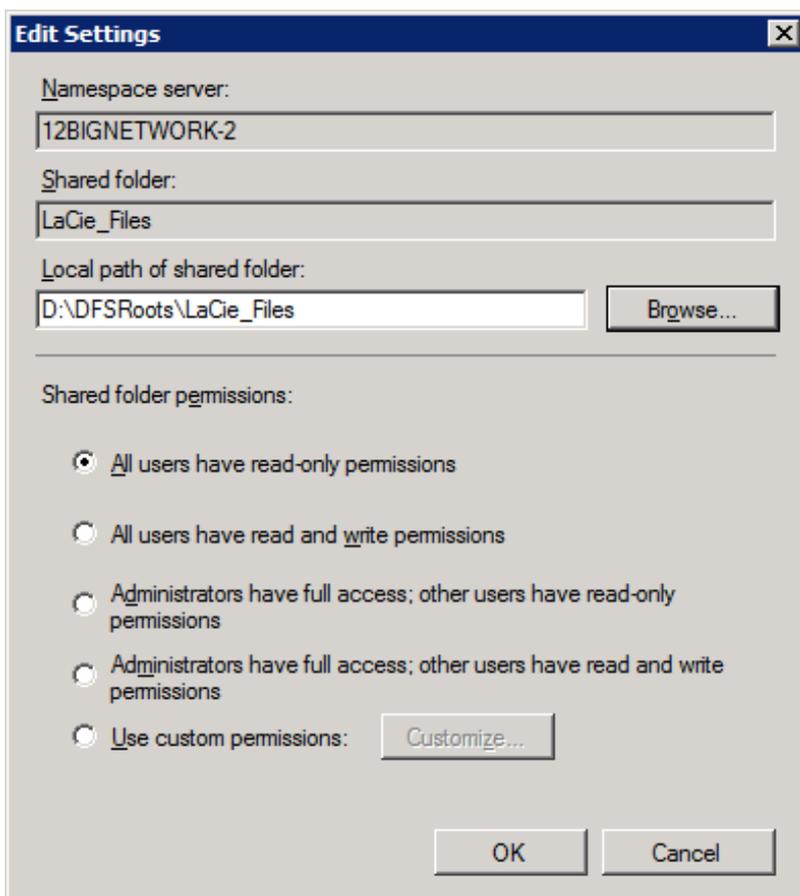
1. Create the first Namespace as instructed above.
2. Go to **Start > Administrative Tools > DFS Management > Namespaces**.
3. Right-click on the Namespace to select **Add Namespace Server...**



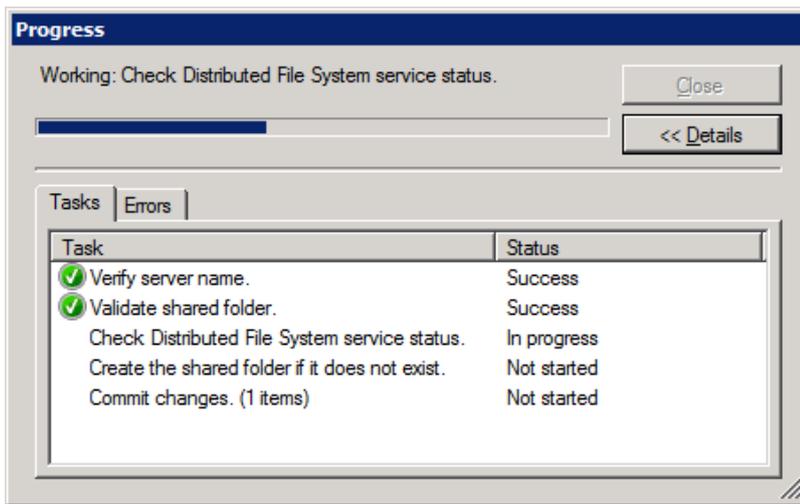
4. Choose the destination server. Click **Edit Settings...**



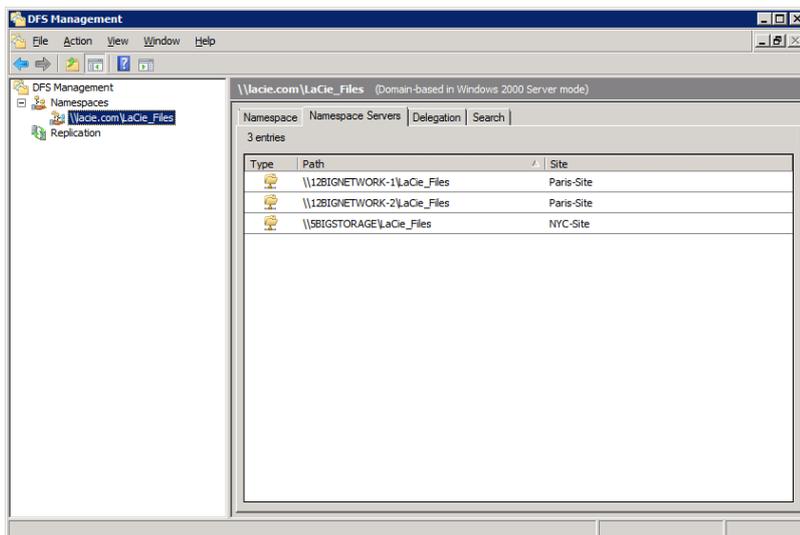
5. Choose the path for the Namespace folder on the server. Click **OK**.



6. The Namespace will be created on the new server.



7. For our example, the same steps would be repeated for the third LaCie professional server, the 5big Office+ (5BIGSTORAGE).
8. This screenshot shows the Namespace on all three servers in the domain *lacie.com*.

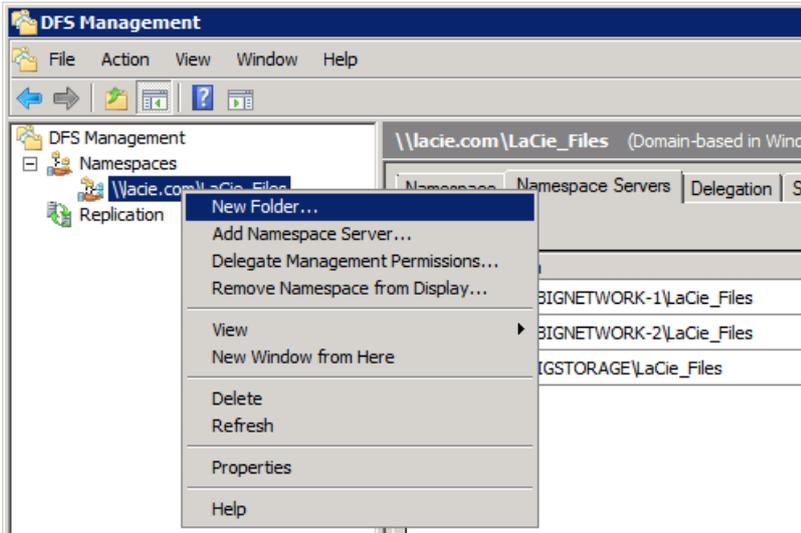


Namespace: Creating Tree Folders and Adding Shared Folders

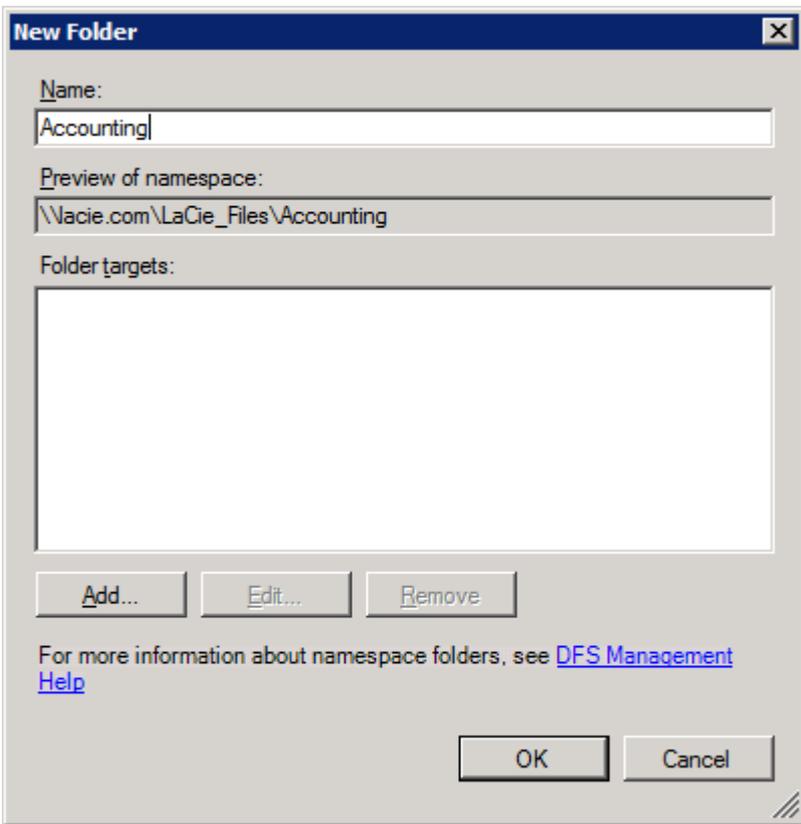
Once the Namespace has been created and added to other servers in the domain, the administrator can begin to create Tree folders. The Tree folders will help to organize the Shared Folders within the Namespace. In this example, Tree folders are based upon the department or business unit (i.e. Accounting).

Create Tree Folders

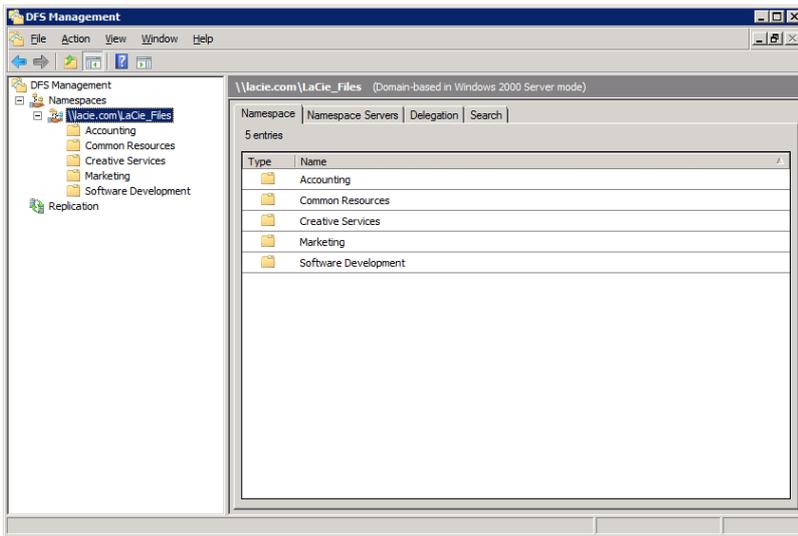
1. Go to **Start > Administrative Tools > DFS Management > Namespaces (LaCie_Files)**.
2. Right-click on the server **Namespace** and choose **New Folder...**



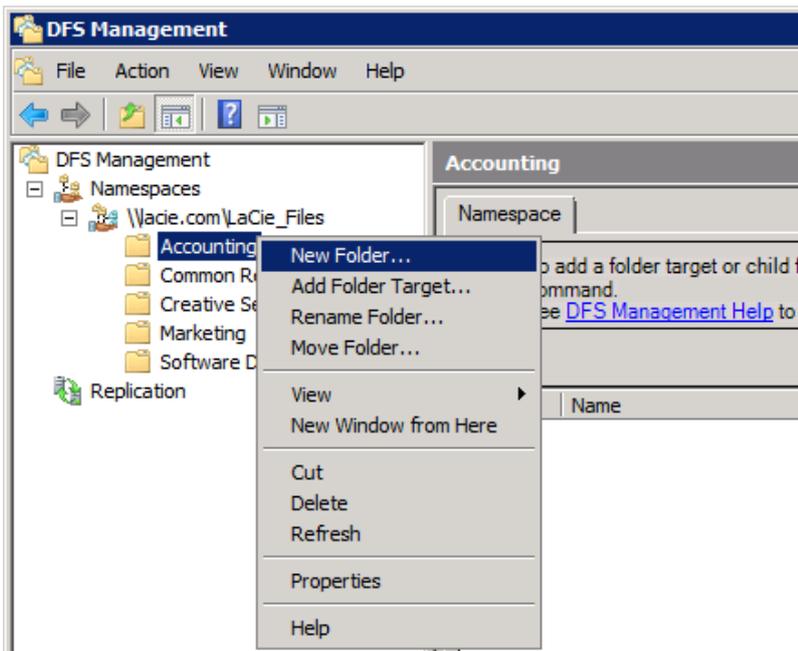
3. Type the name of the folder. This is the name of one of the Tree folders. Click **Add...**



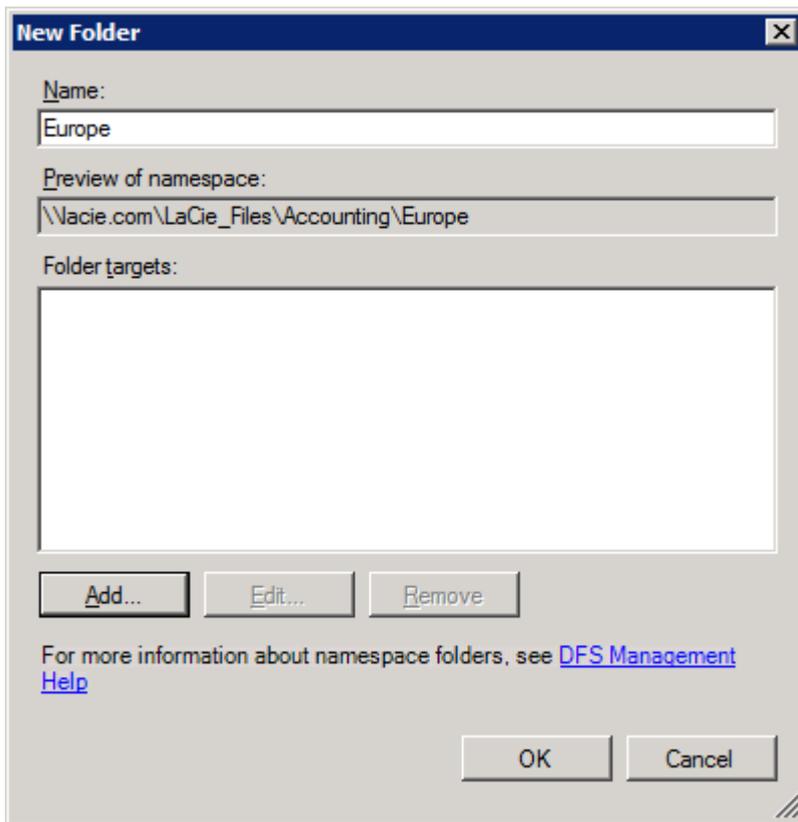
4. Create additional Tree folders as in Step 3. Click **OK** when finished.
5. The screenshot below illustrates the Tree folders shown earlier on *Table 03 - A Single Namespace with Folder Hierarchy*.



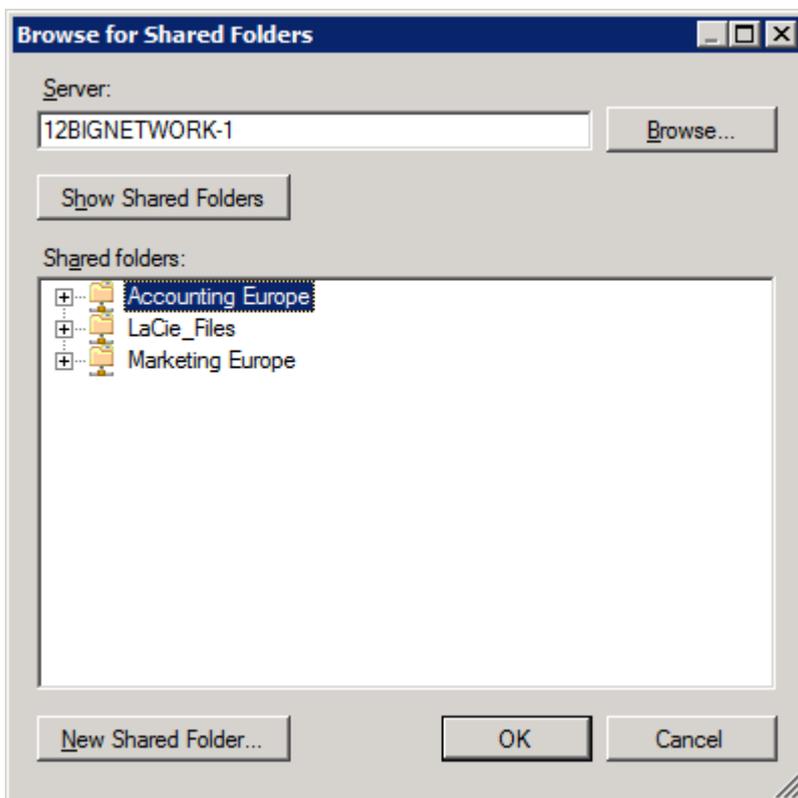
- Our example has offices in New York and Paris. Earlier, the administrator created Shared Folders for the Americas and Europe. Now, he will create Target folders to act as links to the Shared Folders. Right-click on one of the Tree folders and select **New Folder...**



- Type the name of the folder. This is the name of one of the Target folders.

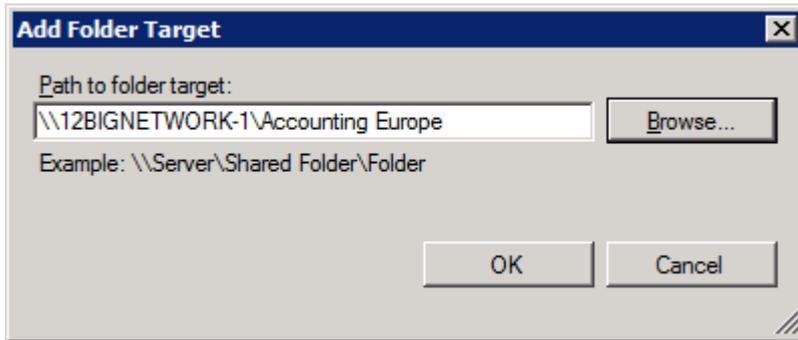


8. To create the links to Shared Folders, click **Add...**
9. The *Browse for Shared Folders* window will appear. Click **Browse...** to select the Server with the Shared folder. From *Table 03 - A Single Namespace with Folder Hierarchy*, we know that Accounting Europe is stored on 12BIGNETWORK-1.

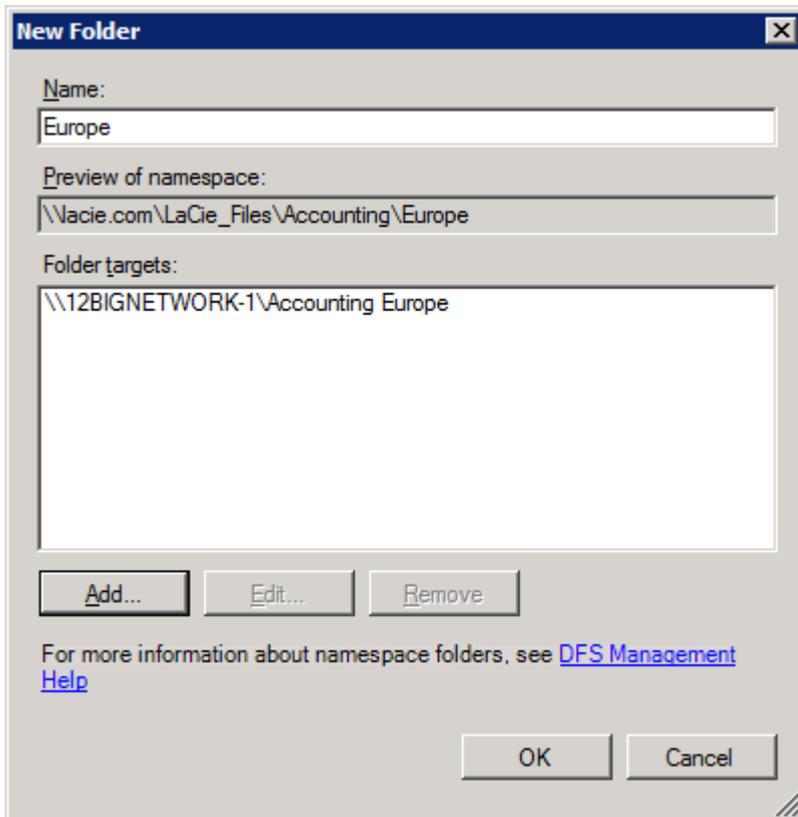


10. Select the Shared folder then click **OK**.

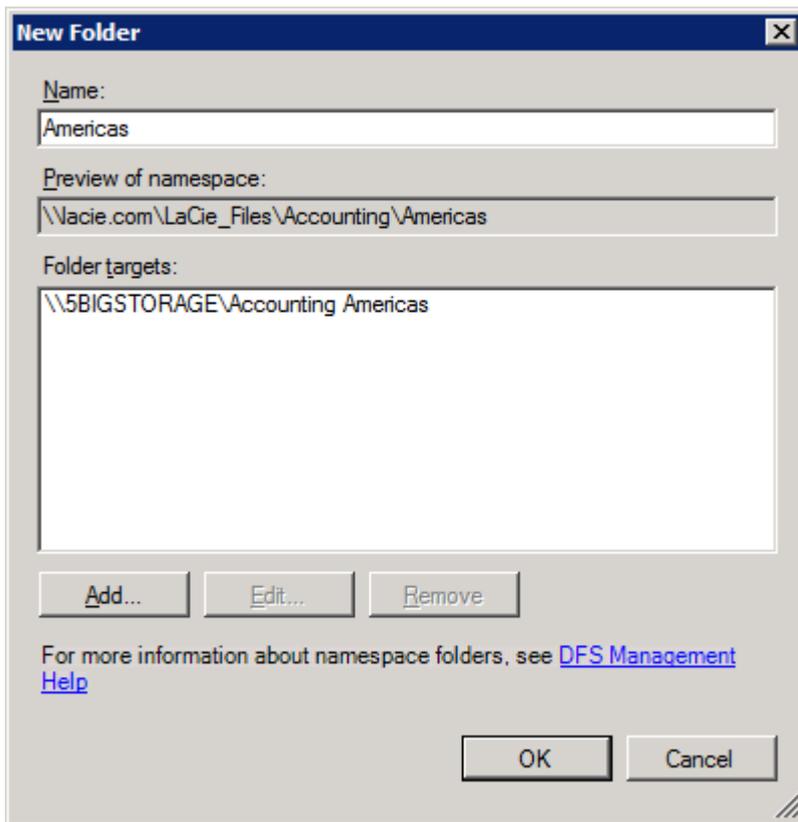
11. An *Add Folder Target* pop-up window will appear. Confirm your selection and click **OK**.



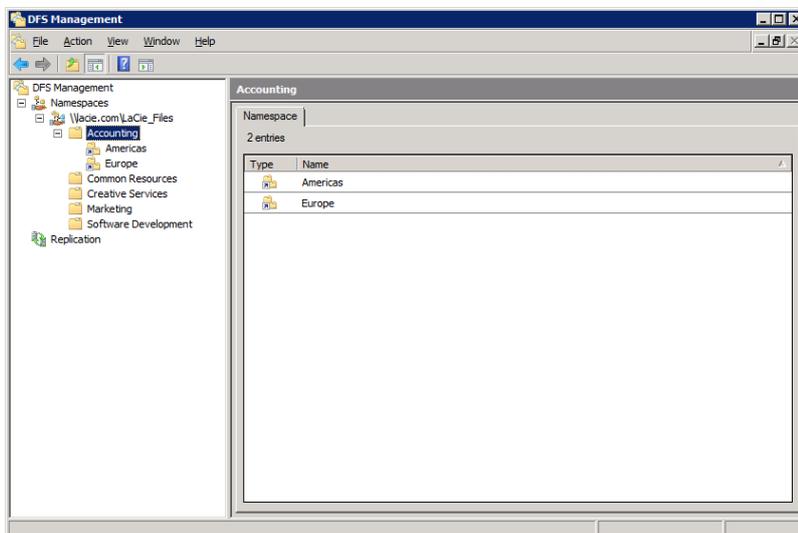
12. Click **OK** again.



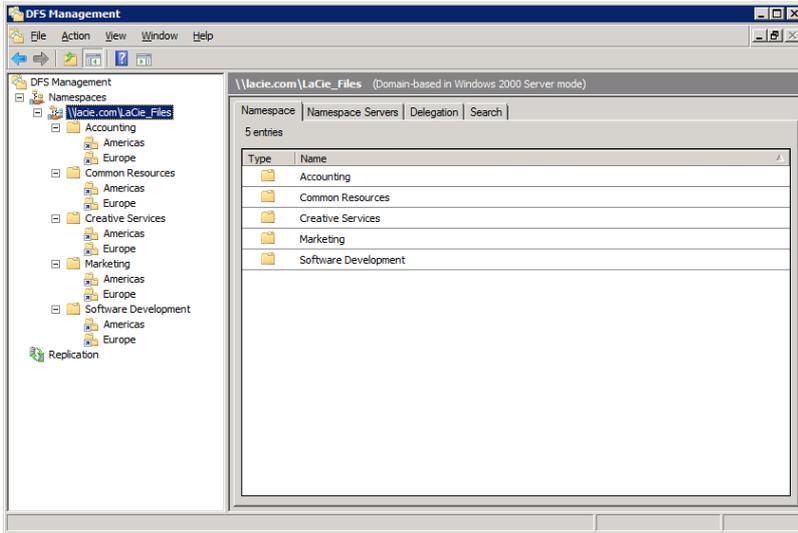
13. Repeat the same steps for additional Target folders.



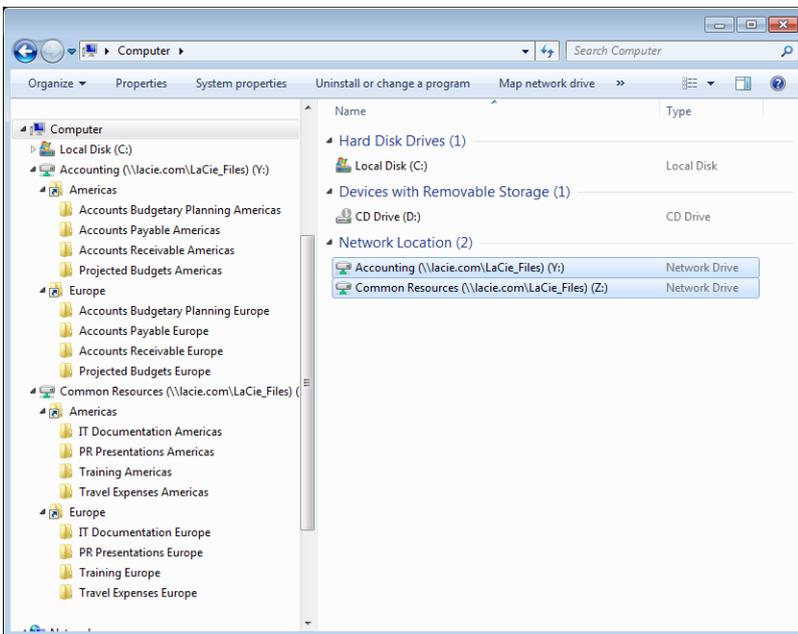
14. The screenshot below shows the server directory after creating the Accounting Tree folder and adding the Target folders.



15. This screenshot shows the same directory after adding all the Target folders to the Tree folders.



16. Here we see the workstation directory. Note that only one network drive is mounted, the Namespace *LaCie_Files*. Access to the folders and files is now easy to manage.



REPLICATION (DFS-R)

DFS-R is a file service that can help administrators control bandwidth issues over a wide area network (WAN). Users accessing files from their local network, or LAN, usually experience limited to no delays. However, lags in viewing files are not uncommon when many users attempt to work with multiple files stored on one or more remote servers.

This offers serious challenges to companies with branch offices due to lost time. Branch office users must access data stored on servers at the company headquarters and, in many instances, users at the home office must retrieve data from their affiliates' servers. A company's bandwidth could find itself coming to a crawl with so many requests for data over the WAN.

In such cases, replicating files using DFS-R can dramatically improve bandwidth bottlenecks and enable employees to use their time more efficiently. DFS-R will replicate data from a remote server to a server on the LAN, providing faster access to files for the users. Further, DFS-R uses remote differential compression (RDC), an intelligent engine for updating files across the WAN. The RDC knows when a file has been edited, revised, or removed, and makes the necessary adjustments on all the replicated servers. If a file needs to be updated, RDC knows to only replicate the changes rather than the whole file.

For low to medium bandwidth WANs, DFS-R can help control bottlenecks by significantly decreasing demand for data stored on remote servers. DFS-R may be implemented without DFS-N to replicate any type of folder among two or more servers. For example, to backup folders across servers or to push information from one server to many others.

Important info: DFS-R is compatible with NTFS formatted disk drives.

REPLICATION EXAMPLE - BRANCH OFFICE

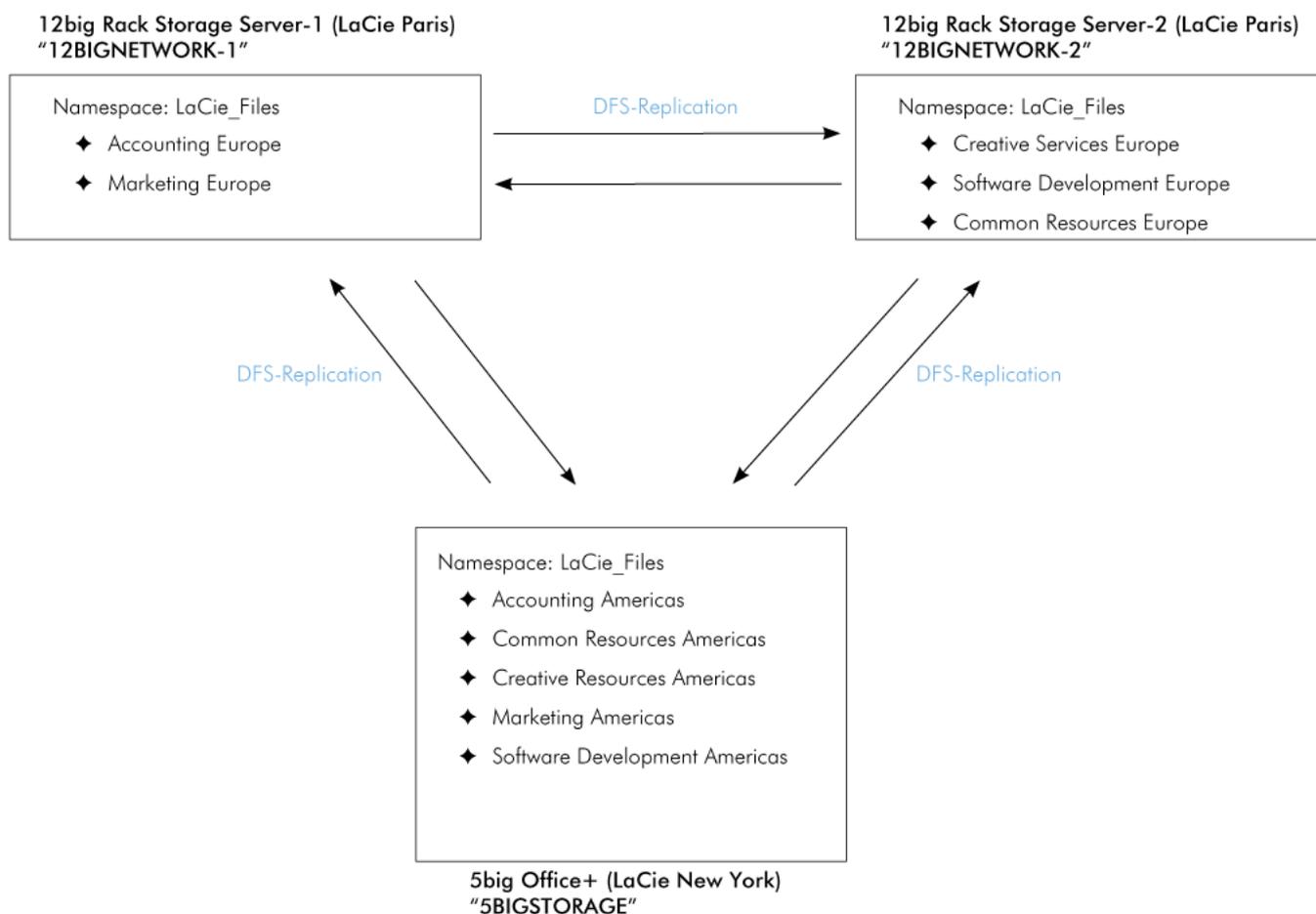
Returning to LaCie, we see that the administrator has created Shared Folders to store the company data. He has also assigned a Namespace for convenient access to data folders. Each user no longer looks for data over a large group of server volumes and Shared Folders.

However, after a few days testing the network, the administrator discovers that employees in New York and Paris are losing valuable time accessing files on remote servers. For example, when an accounting manager in New York wants to see last month's payroll data for Europe, he has to wait due to network bandwidth limitations. This is not the case when reviewing the equivalent file for the Americas stored on his LAN-based server.

By enabling DFS-R on folders, the administrator can replicate data stored on remote servers to LAN-based servers. Since a user's access is prioritized by geography, data will no longer be dragged across the WAN. Instead, files are retrieved from the replicated folders on the LAN. Best of all, the replication is transparent to users since they still see the same Namespace and its contents. The RDC engine works in the background, discovering changes to files and updating them on all the pertinent servers.

Table 04 - Replicating Folders shows a sampling of the folders in the Namespace that will be replicated to the other LaCie professional servers. Now, when the accounting manager in New York looks for last month's payroll data for Europe, the lengthy delay will be gone since the file is replicated on his LAN.

Table 04 - Replicating Folders



DFS-R AS BACKUP

While the primary goal of our example is to improve bandwidth performance, there are other advantages to employing DFS replication. As it turns out, replicating data to other servers is a simple and effective way to configure an automatic backup.

As seen in *Table 04 - Replicating Folders*, folders are replicated across three servers. In the event that one of the servers requires temporary servicing or must be updated, the data will still be available to users due to replication on the other two servers. Further, it is relatively transparent since the DFS-R knows to go to an available server for the requested file(s).

DFS-R AND SIMULTANEOUS FILE SHARING

While DFS-R is perfect for providing local (LAN) access to files stored on remote servers (WAN), users are cautioned when sharing or working on a document within the same period of time. DFS-R does not look to a "master" server that sets the rules on how a file is replicated. Rather, it is more democratic, intuitively updating replicated files in all locations, no matter where the changes occur. If a file is opened on one workstation at LaCie New York and another workstation at LaCie Paris at the same time, DFS-R will replicate the changes from the last user who chooses Save ("last writer wins"). Edits registered just before the last user will go into a folder called "Conflict and Deleted" on one of the servers. Access to the Conflict and Deleted folder is limited to members of the local Administrators group.

On a LAN, a user receives a warning if a file is in use. DFS-R, however, does not search the WAN for replicated versions when a file is opened. This means that users at LaCie Paris and LaCie New York can work on the same accounting spreadsheet at the same time. If LaCie Paris logs changes at 11:02 EST and LaCie New York saves a version at 11:03 EST, the New York version is used by the RDC for replication. The Paris version goes into the Conflict and Deleted folder.

A second potential conflict could arrive when users are not working on a document at the same time but within a period between file replications. For example, the user at LaCie Paris edits a file and saves it. Soon after, the user at LaCie New York opens the same file, makes changes, and saves. If there was no replication during the interval that LaCie Paris and LaCie New York saved their respective files, only the changes made by LaCie New York will be replicated. The changes made by LaCie Paris will be ignored and the file stored in the Conflict and Deleted folder.

An administrator should consider how often files must be simultaneously accessed or revised in a limited period of time. If users will work on replicated files at the same time, there are third-party software solutions for DFS-R to integrate file locking over a WAN.

REPLICATION

Setting up DFS-R requires a number of steps but the level of difficulty is not high. However, it is important to remember the reasons for replicating folders and how it will help to resolve certain bandwidth issues.

WHY DFS-R?

In our ongoing example with the professional servers, we have used two offices for the company LaCie. There is a 5big Office+ in New York and two 12big Rack Storage Servers in Paris. For improved data organization, the administrator created:

- Shared Folders based upon department and office location (Accounting, Marketing, etc.; Americas and Europe)
- A Namespace, *LaCie_Files*, to act as a single virtual network drive. All users, no matter the office location, mount only one network drive, *LaCie_Files*, as opposed to numerous Shared Folders. Rather than searching haphazardly through many mounted drives, users can easily find the Shared Folders that contain the data required for their department.

The data is now easy to manage but the administrator has noticed a growing problem with network transfer rates. He knows that users from Paris require documents stored on the 5big Office+ in New York (5BIGSTORAGE). As well, users in New York must access files from both of the 12big Rack Storage servers (12BIGNETWORK-1 and 12BIGNETWORK-2) in Paris. The high demand for data on WAN servers highlights a common problem with bandwidth. There are no bandwidth issues when files are accessed on the LAN servers.

Table 05 - A LAN or WAN? Server Status by Branch Office

LaCie Server	New York	Paris
5big Office+ ("5BIGSTORAGE")	LAN	WAN
12big Rack Storage Server-1 ("12BIGNETWORK-1")	WAN	LAN
12big Rack Storage Server-2 ("12BIGNETWORK-2")	WAN	LAN

Windows Storage Server allows the administrator to set up DFS-R on all the servers. Data is replicated as follows:

- 12BIGNETWORK-1 data will be available on 5BIGSTORAGE and 12BIGNETWORK-2
- 12BIGNETWORK-2 data will be available on 5BIGSTORAGE and 12BIGNETWORK-1
- 5BIGSTORAGE data will be available on 12BIGNETWORK-2 and 12BIGNETWORK-1

Individual servers do not have priority once the initial replication is complete. When a user in Paris seeks a document that was created in New York (WAN), he will open a replicated version stored on a server in Paris (LAN). The DFS-R optimizes data availability by replicating on a regular basis, which means that users will always have access to the latest versions of the files via their LAN.

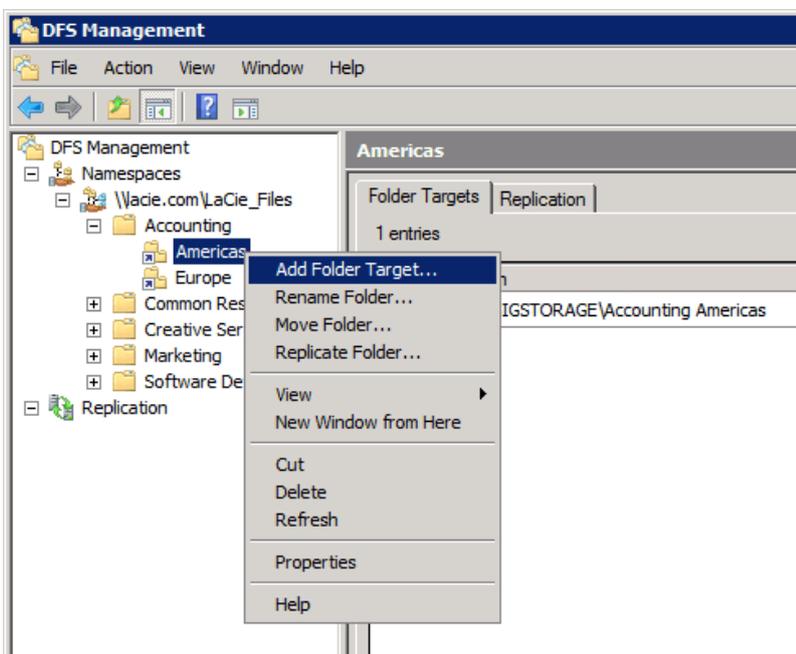
DFS-R SETUP

Table 06 - Initial Replication

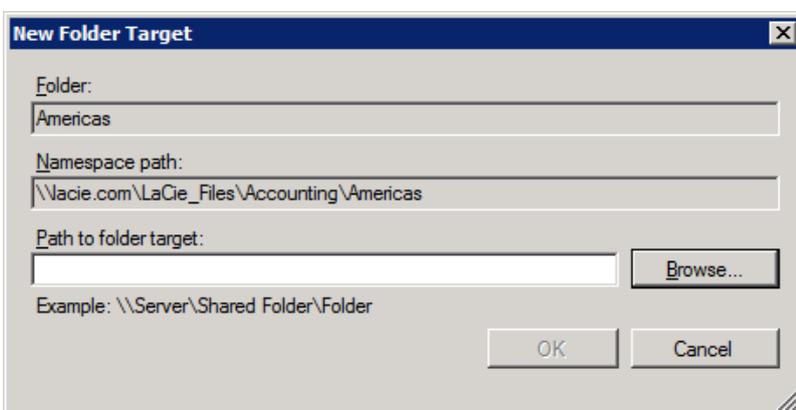
Server	Replication
12big Rack Storage Server-1 ("12BIGNETWORK-1")	Receives replicated data from the Shared Folder <i>Accounting Americas</i> .
5big Office+ ("5BIGSTORAGE")	Original server location for the Shared Folder <i>Accounting Americas</i> .
Both servers	After the initial replication, new and updated data stored on <i>Accounting Americas</i> will be replicated in both direction.

For DFS-R to work, the administrator must add the Target folders to the servers that will receive the replicated files. Select the Target folder that you wish to replicate. In our example, we will choose the Target folders, *Americas* and *Europe*.

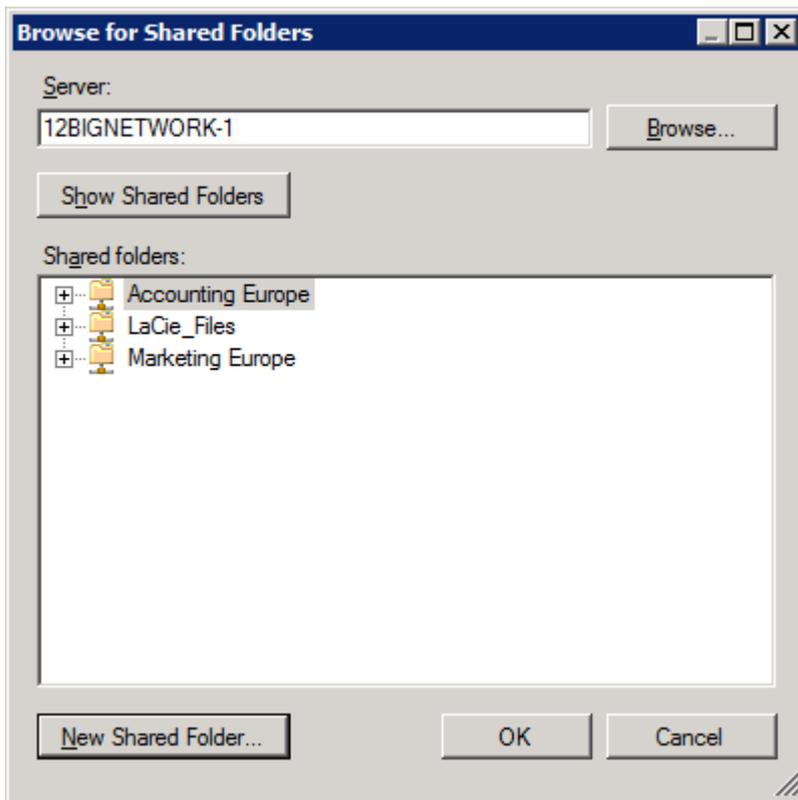
1. To begin, go to **Start > Administrative Tools > DFS Management > Namespaces > Domain [lacie.com] > Target folder [Americas]**.
2. Right-click on the **Target folder [Americas]** to select **Add Folder Target...**



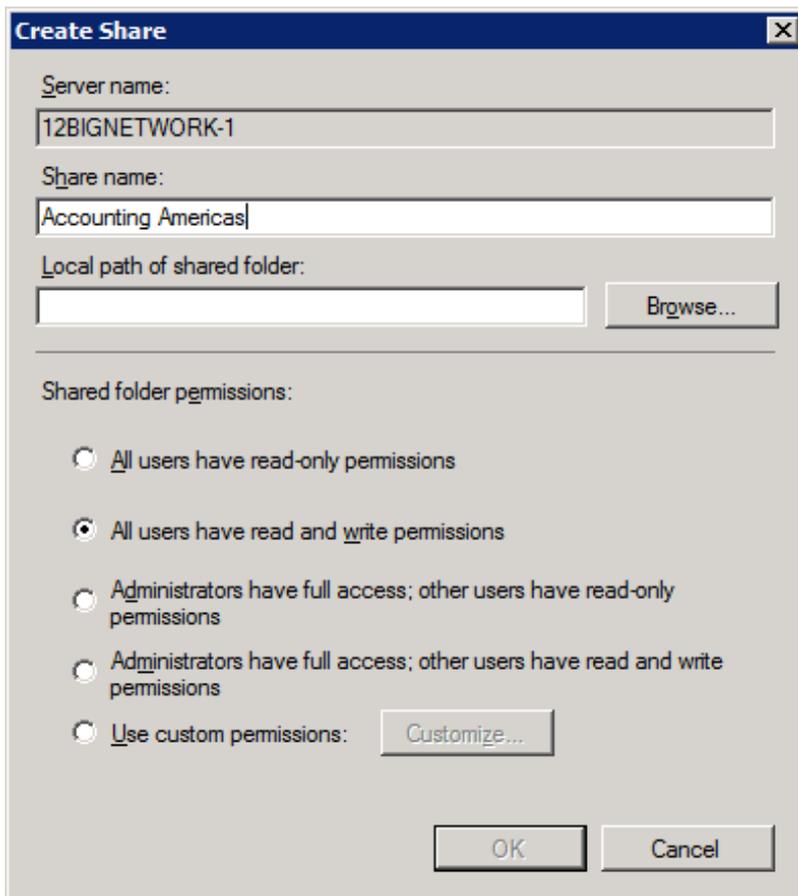
3. Select **Browse...**



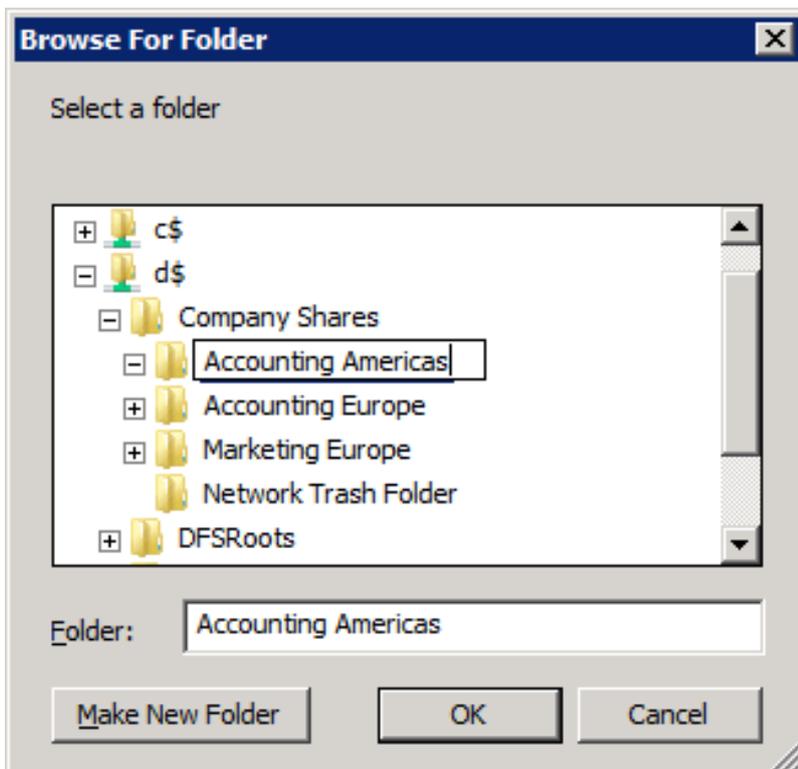
4. Select the server that will receive the replicated files. For this step, the administrator chooses 12BIGNETWORK-1 to receive data stored on 5BIGSTORAGE.



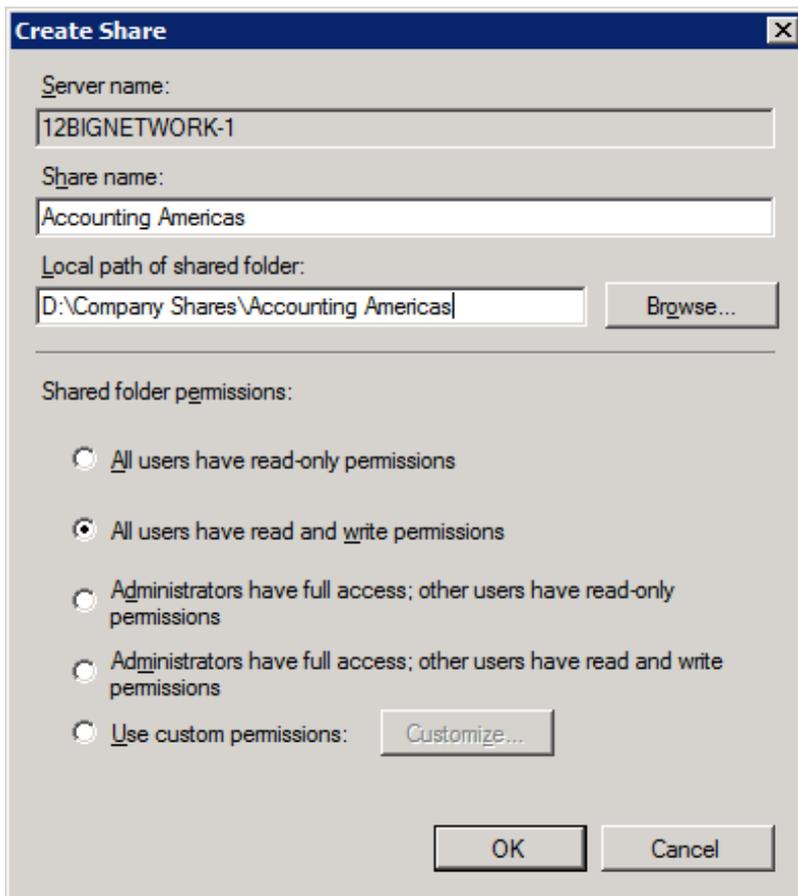
5. A Shared Folder must be created on the receiving server as a match for the original folder. That is, a new Shared Folder to receive replicated data from 5BIGSTORAGE to 12BIGNETWORK-1.
6. Click **New Shared Folder...**
7. While it is possible to give this folder any name, the administrator uses the same name as the original Shared Folder to avoid confusion. Confirm the permissions.



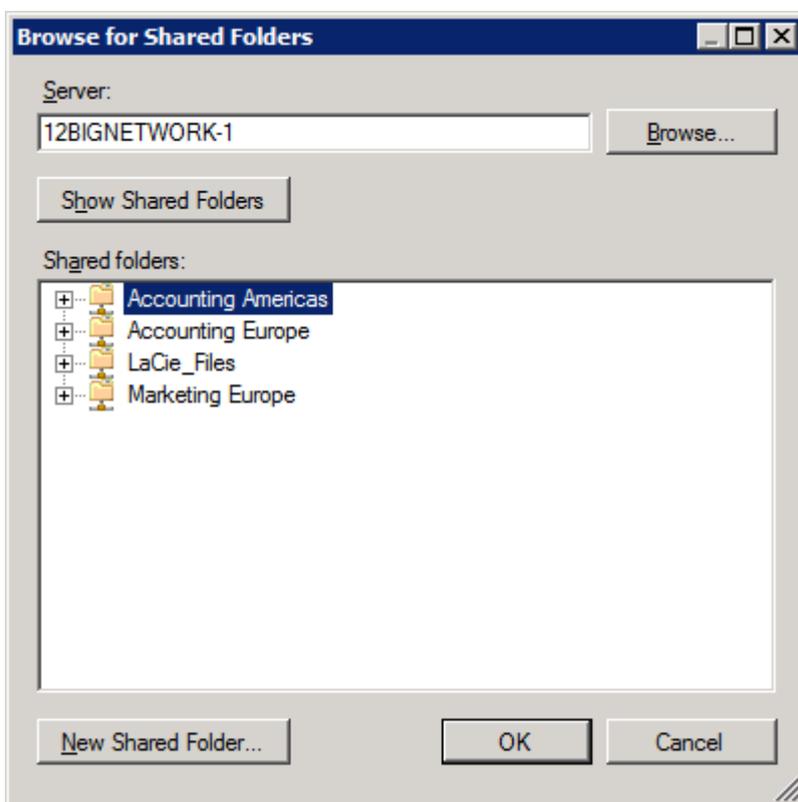
8. Click **BROWSE...** to choose a local path for the Shared Folder.
9. The administrator chooses the "d" partition for data. Click **Make New Folder** to enter the name of the Shared Folder. Select the new folder and click **OK**.



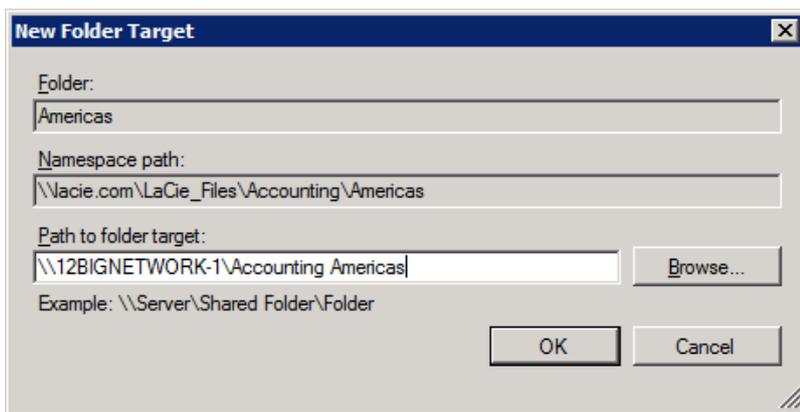
10. Click **OK**.



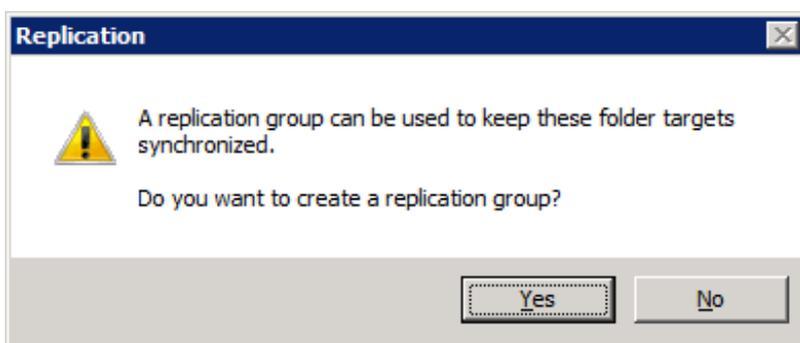
11. The Shared Folder on 12BIGNETWORK-1 is now ready to receive replicated data. Select it and click **OK**.



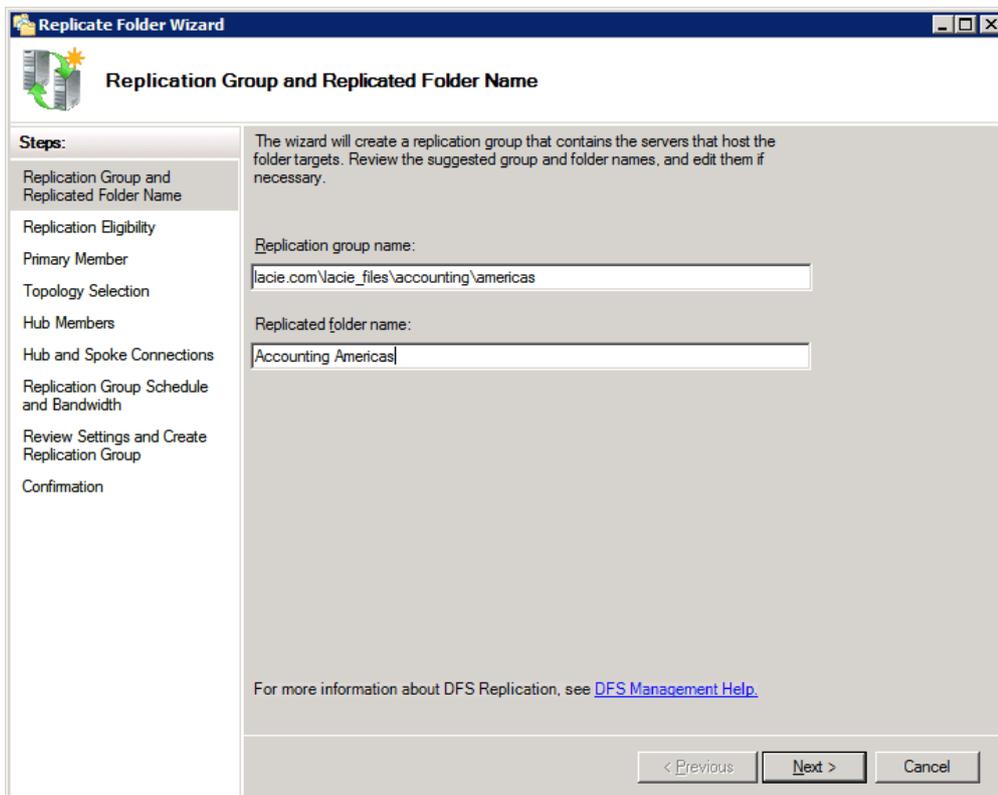
12. Note the path to the new Shared Folder. Click **OK** to enter the *Replicate Folder Wizard*.



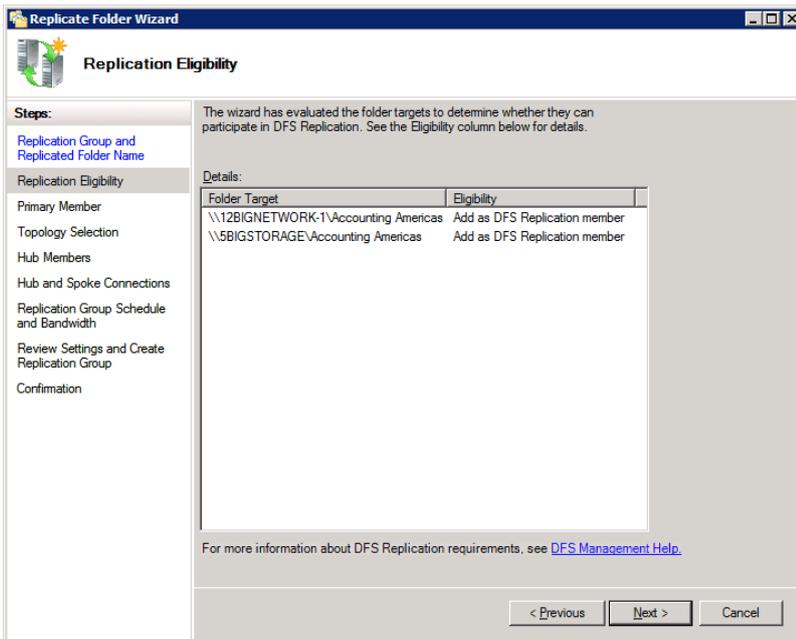
13. A *Replication* window will appear, asking if you wish to keep the two folders synchronized. In this case, it is the Shared Folder on 12BIGNETWORK-1 and the original folder on 5BIGSTORAGE. Click **Yes**.



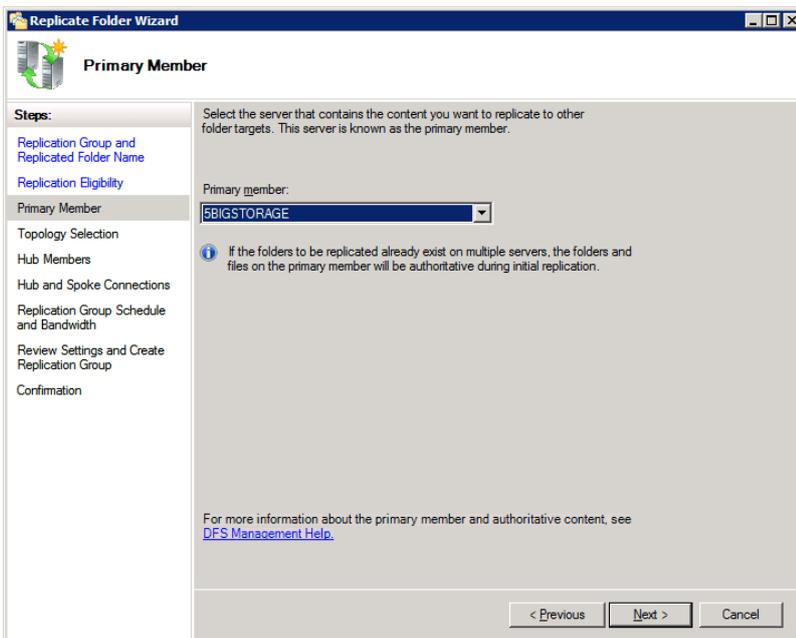
14. The *Replicate Folder Wizard* appears. Note that the fields contain the information from the earlier steps. Click **Next>**.



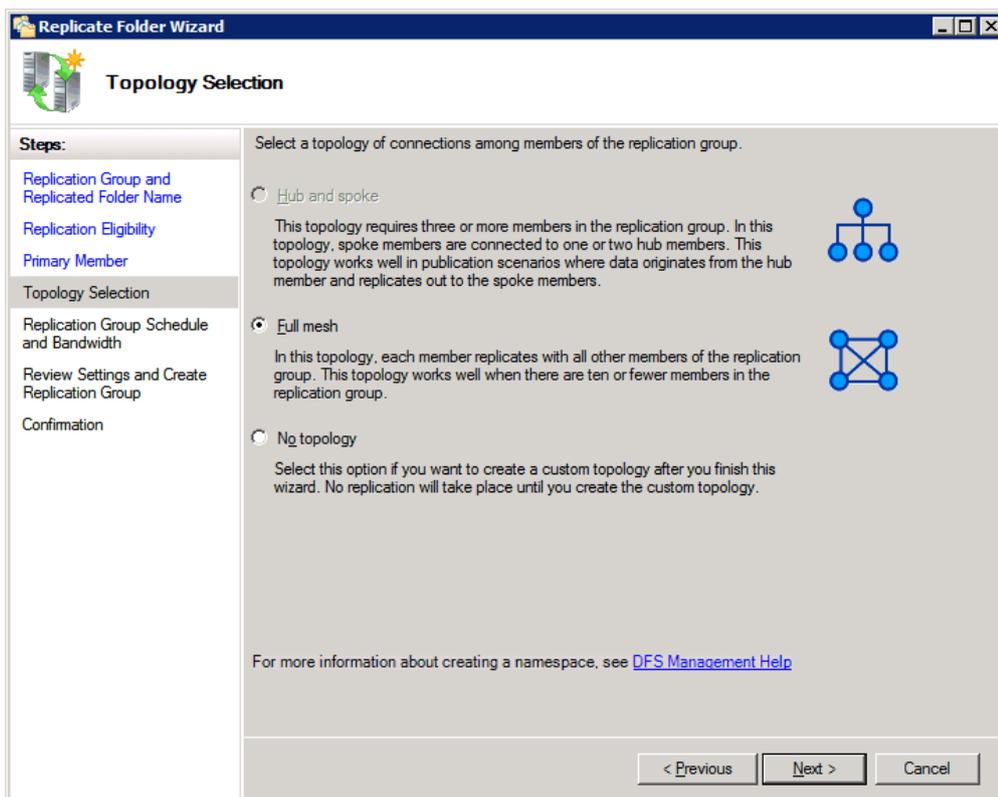
15. The wizard will list the folder based upon the name provided. Click **Next>**.



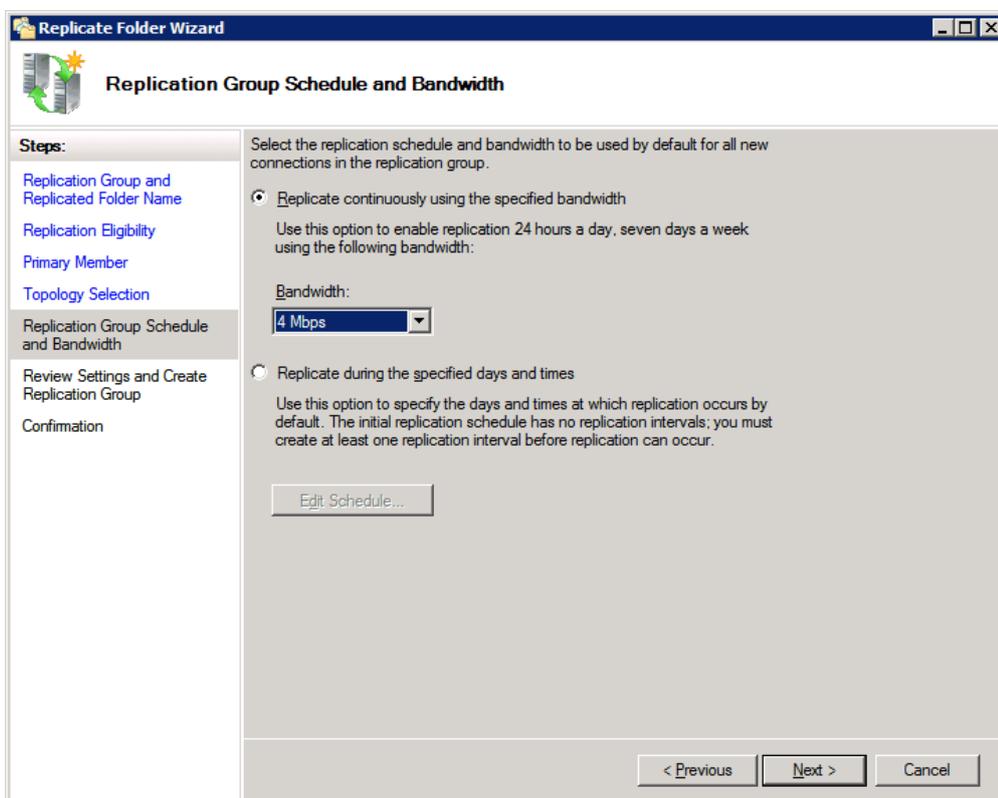
16. Choose the server that has the Shared Folder with the data. 5BIGSTORAGE is considered the *Primary member* at this stage since it holds the data we wish to replicate. Once the replication is finished, both Shared Folders will be equal, each containing the same data. Select the *Primary member* and click **Next>**.



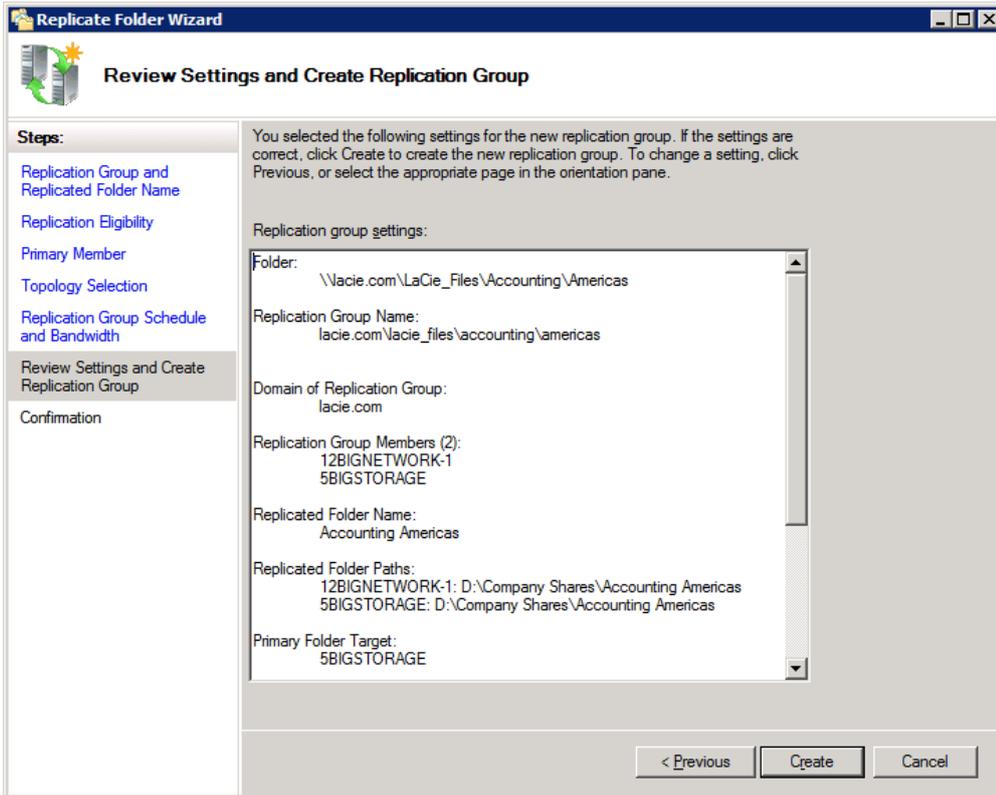
17. **Full mesh** will replicate data in all directions between the servers in a replication group. This is the ideal choice for our example since data added to 12BIG NETWORK-1 will be automatically replicated onto 5BIGSTORAGE, and vice-versa. Click **Next>**.



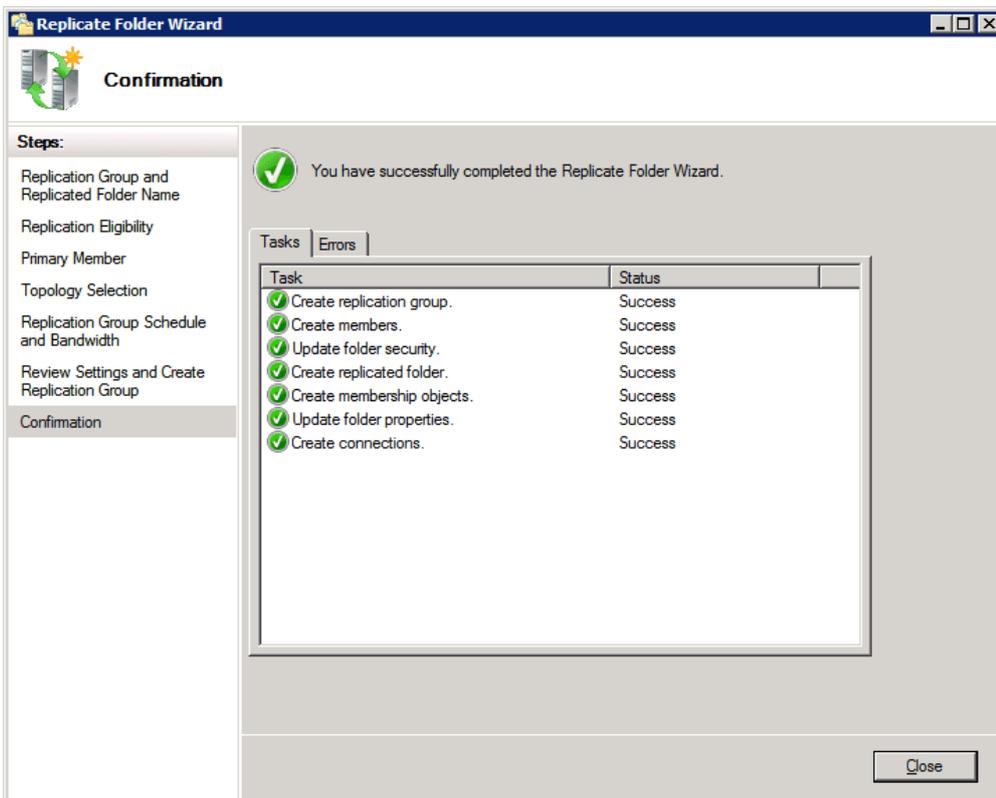
18. Select how the replication should occur, continuously or on a fixed schedule. The administrator may also select the amount of bandwidth to assign the replication. Click **Next>**.



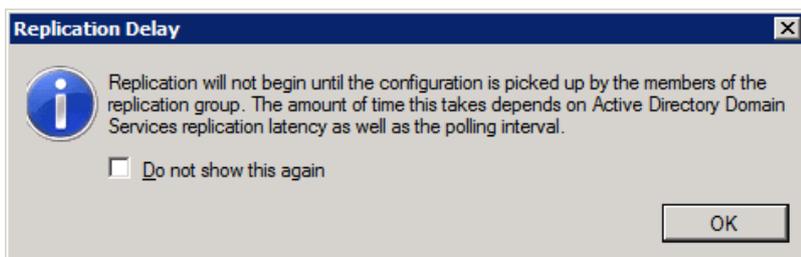
19. Review the settings and click **Create**.



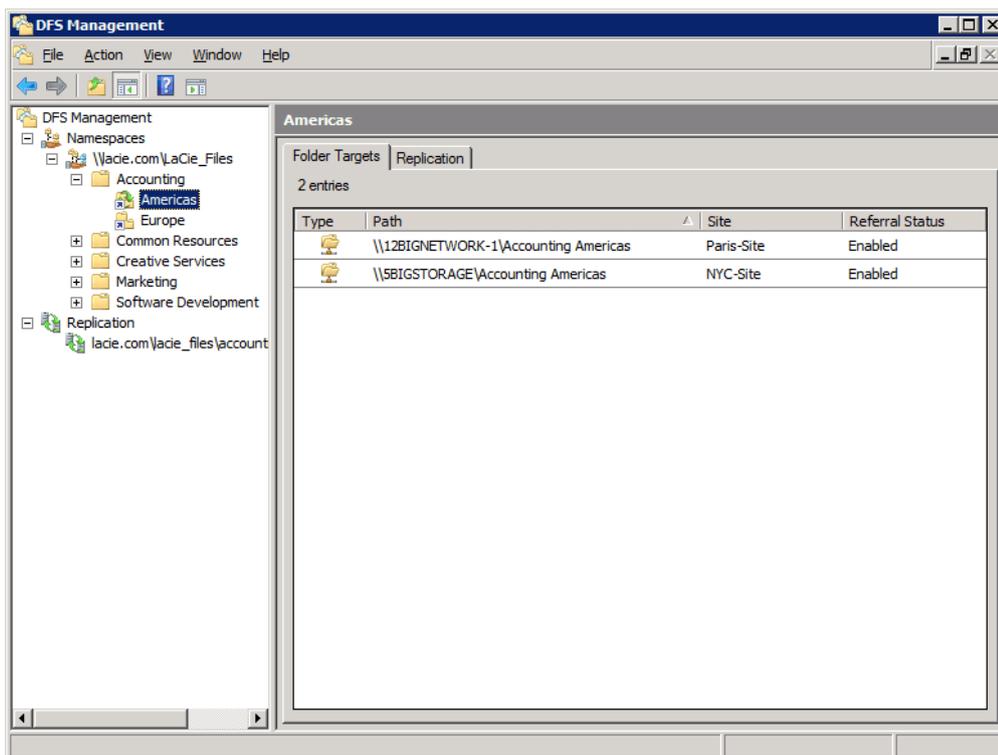
20. The *Confirmation* window will appear once the replication is complete. Click **Close**.



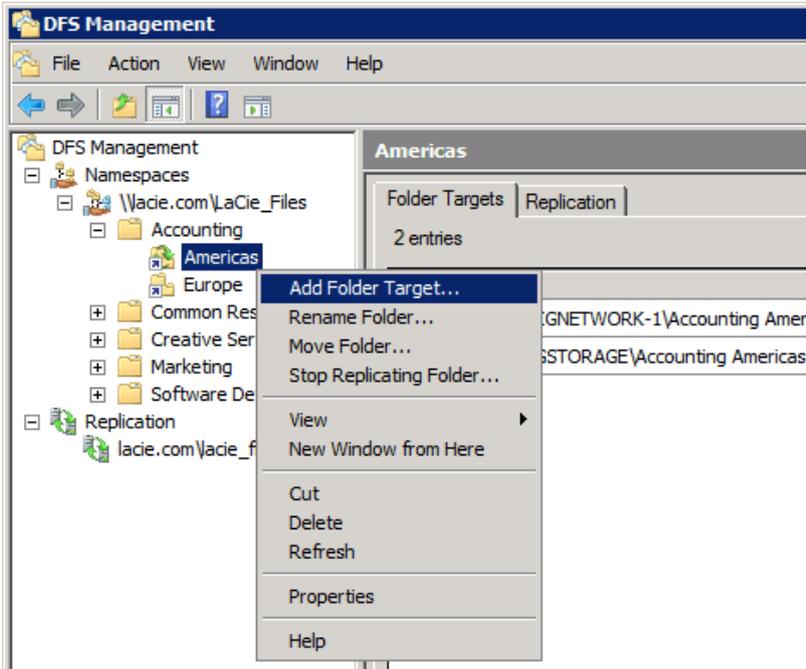
21. A notification window provides details on the *Replication Delay*.



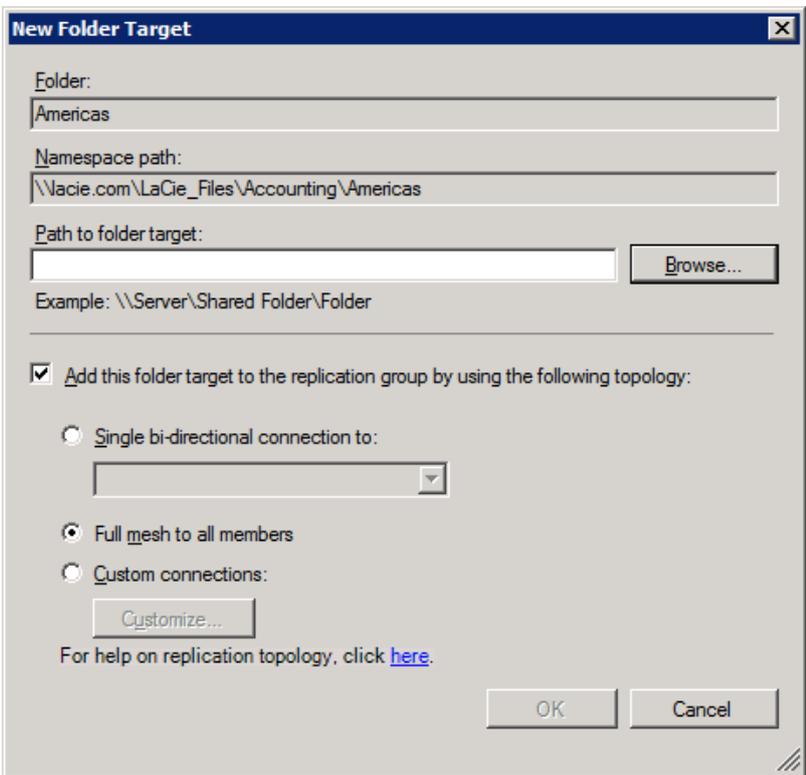
22. There are now two replicated folders in New York and Paris. Please note the green arrow above the *Americas* Target folder. It means that data is being replicated.



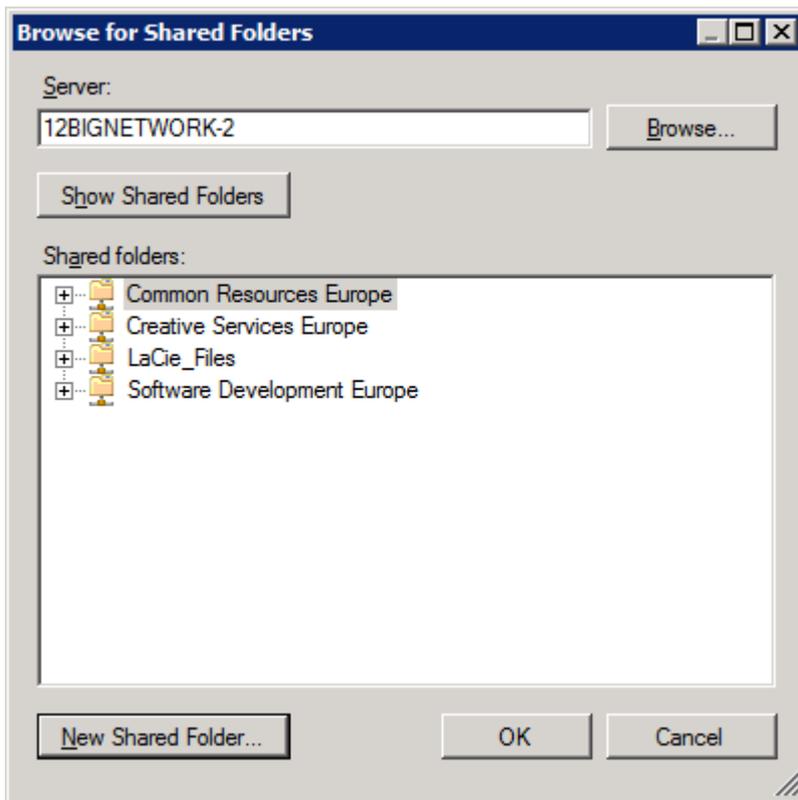
23. The administrator will now add a third server to the replication group. For some companies, additional servers may be located at other branch sites. For this example, the administrator is providing greater flexibility to the network by replicating onto 12BIGNETWORK-2. The steps are a bit different now that the replication group has been created. Right-click on **Americas** and select **Add Folder Target....**



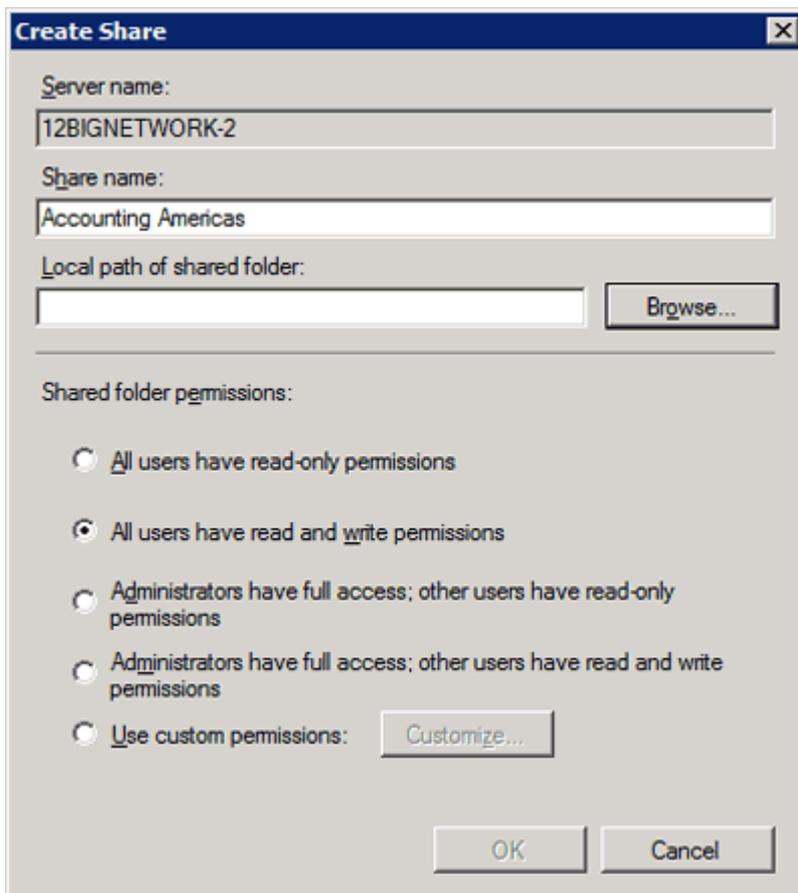
24. In the *New Folder Target* window, the administrator may choose how to replicate data to the third server. For the full replication, choose **Full mesh** to all members. Click **Browse...** to create the Shared Folder on 12BIGNETWORK-2.



25. Click **Browse...** or type the name of the server.
 26. In the *Browse for Shared Folders* window, click **Show Shared Folders** to see the current folders on the third server.

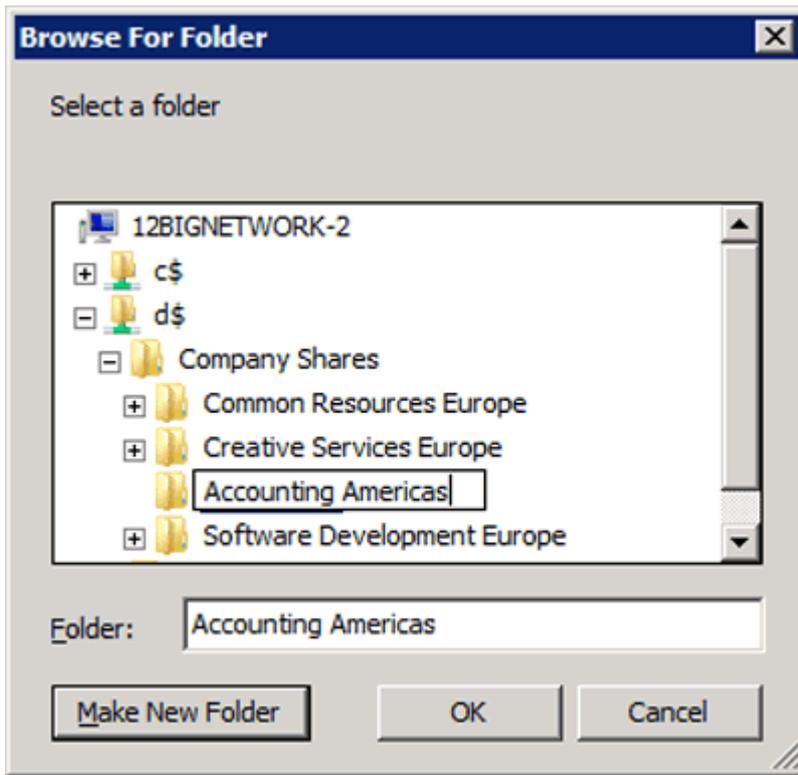


27. Click **New Shared Folder**.
28. In the *Create Share* window, write the name of the Shared Folder in the *Share name* field.

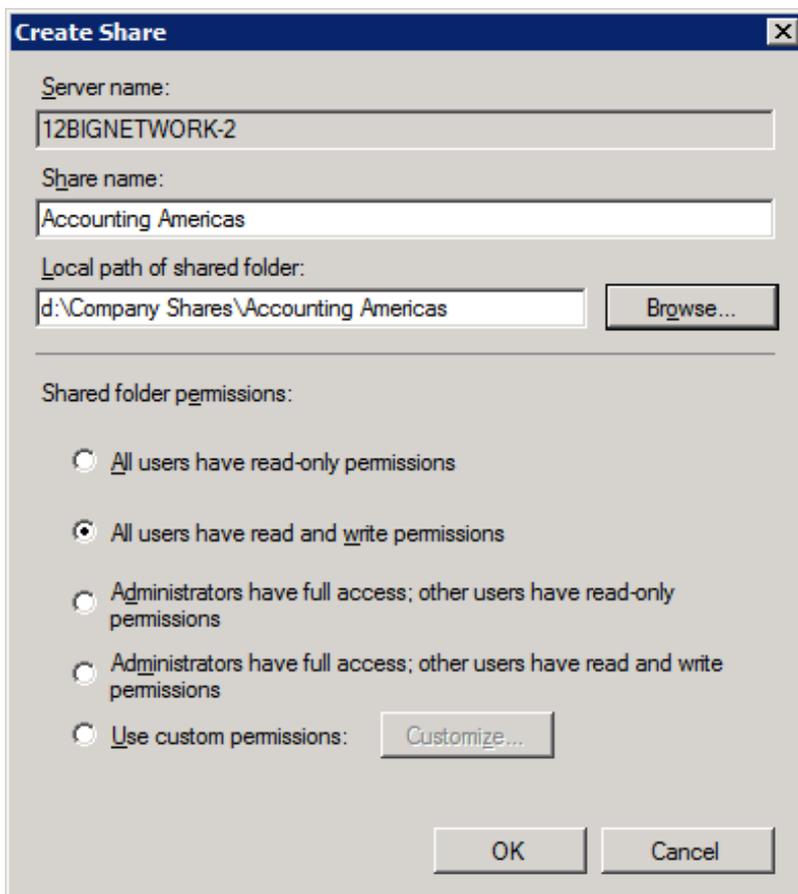


29. Click **Browse...** to create the path to the 12BIGNETWORK-2.

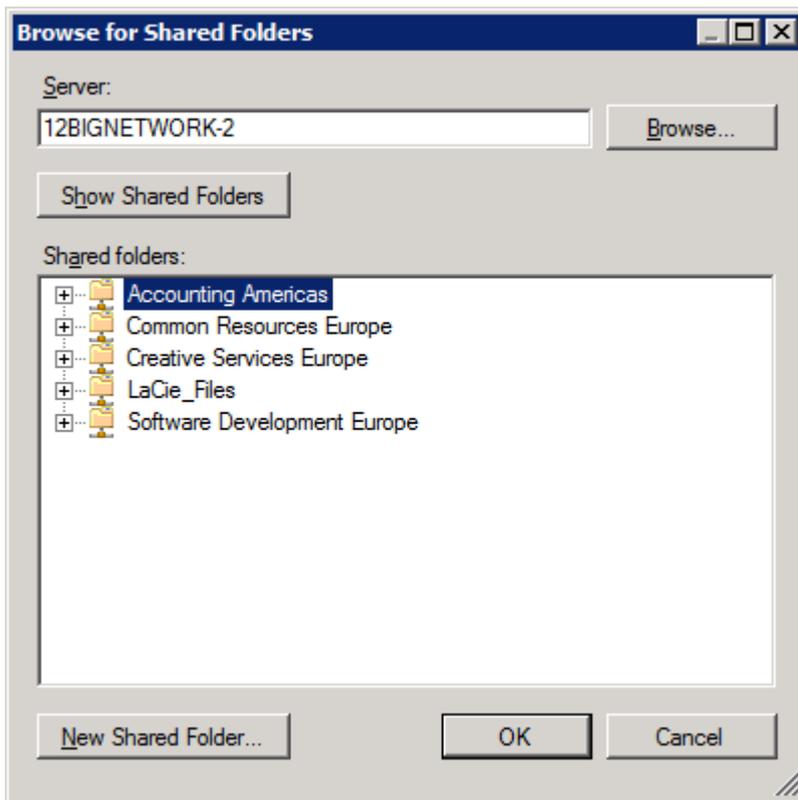
30. Type the name of the Shared Folder for the third server. Click **Make New Folder** to enter the name of the Shared Folder. Select the new folder and click **OK**.



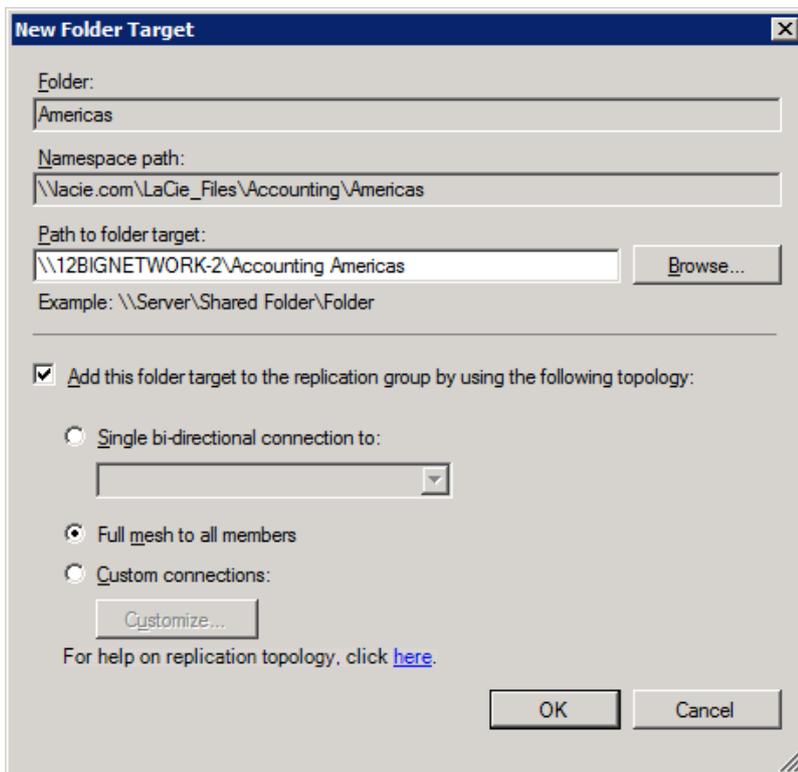
31. In the *Create Share* window, confirm the Shared Folder settings and click **OK**.



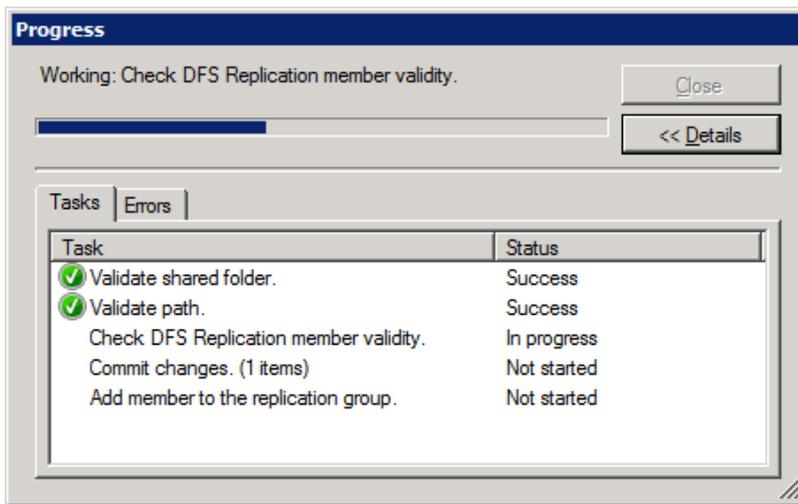
32. In the *Browse for Shared Folders* window, click once on the newly created Shared Folder. Click **OK**.



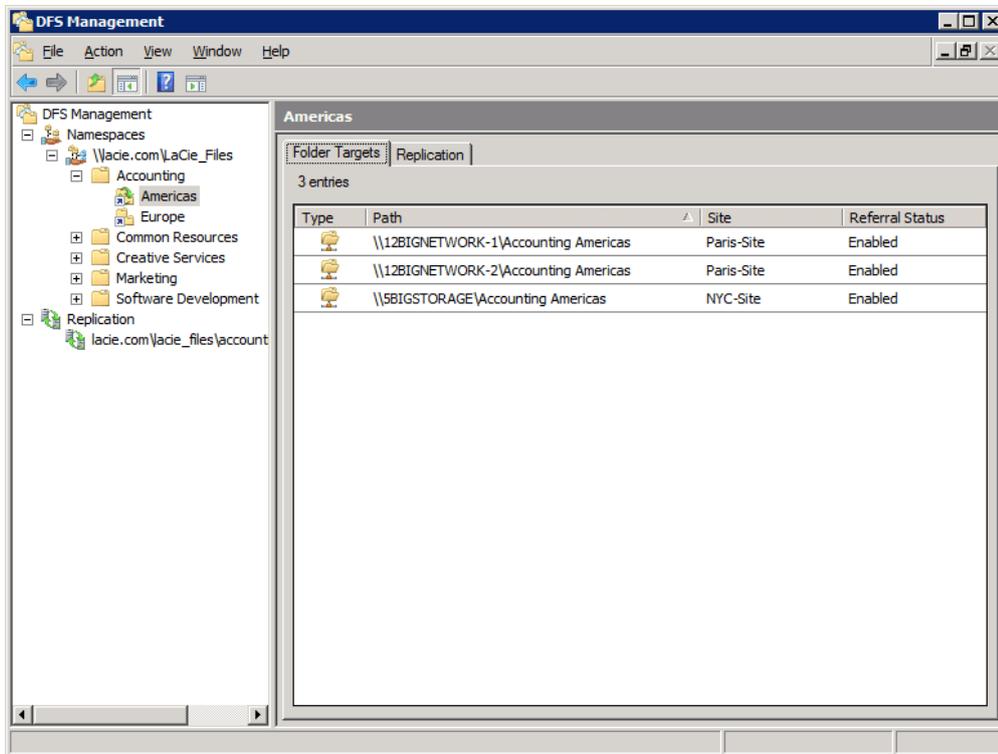
33. The Shared Folder has been created. In the *New Folder Target* window, confirm the settings and path before clicking **OK**.



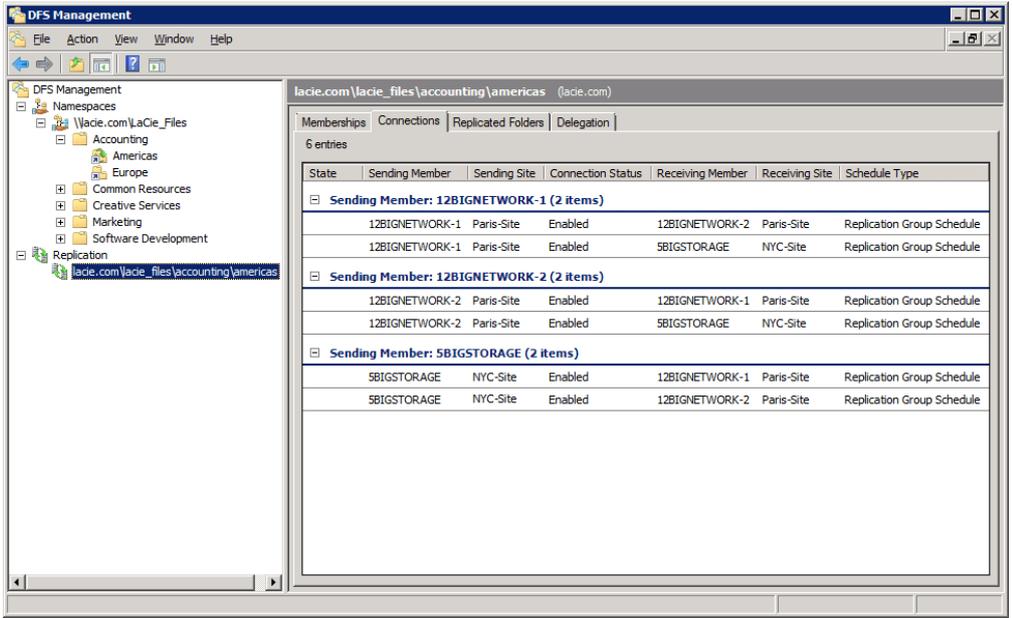
34. The replication *Progress* window will appear.



35. The Shared Folder is now replicated on three servers.



36. To view the servers in the replication group, go to **Start > Administrative Tools > DFS Management > Replication > Domain [lacie.com]\Shared Folder [Accounting Americas]**.



37. Repeat the steps to enable DFS replication for additional Target folders.

GETTING HELP

If you are having problems with your LaCie product, consult the table below for a list of available resources.

Order	Source	Description	Location
1	Quick Install Guide	Concise steps to follow for getting your product up and running	Printed and included in the product box, or download PDF from the product page
2	Support Pages	Includes interactive troubleshooting topics for most common problems	www.lacie.com/support/ , select your product, then click the "Troubleshooting" tab
3	Customer Support	Create an account on lacie.com , register your product, and fill out a support ticket	Create an account here: www.lacie.com/us/mystuff/login.htm?logout&rtn=mystuff

Note: LaCie is dedicated to providing high quality products that enrich the lives of our customers. To help LaCie offer the best customer support, we encourage you to create an account and [Register](#) your product. You can give us important feedback as well as receive updated information on your LaCie device.

PRECAUTIONS

Caution: It is essential that you use only the power supply that shipped with your product, since it is a shielded-type power cord that meets FCC emission limits as well as to prevent interference to the nearby radio and television reception.

Caution: Modifications not authorized by the manufacturer may void the user's authority to operate this device.

Important info: Any loss, corruption or destruction of data while using a LaCie drive is the sole responsibility of the user, and under no circumstances will LaCie be held liable for the recovery or restoration of this data. To help prevent the loss of your data, LaCie highly recommends that you keep TWO copies of your data; one copy on your external hard disk, for instance, and a second copy either on your internal hard disk, another external hard disk or some other form of removable storage media. If you would like more information on backup, please refer to our website.

Important info: 1TB (Terabyte) = 1,000GB. 1GB = 1000MB. 1MB = 1,000,000 Bytes. Total accessible capacity varies depending upon operating environment (typically up to 10% less per TB).

HEALTH AND SAFETY PRECAUTIONS

- Only qualified persons are authorized to carry out maintenance on this device.
- Read this User Manual carefully and follow the correct procedure when setting up the device.
- Do not open a disk drive or attempt to disassemble or modify it. Never insert any metallic object into the drive to avoid any risk of electrical shock, fire, short-circuiting or dangerous emissions. The disk drives shipped with your LaCie device contain no user-serviceable parts. If it appears to be malfunctioning, have it inspected by a qualified LaCie Technical Support representative.
- Never expose your device to rain, or use it near water, or in damp or wet conditions. Never place objects containing liquids on the LaCie device, as they may spill into its openings. Doing so increases the risk of electrical shock, short-circuiting, fire or personal injury.
- Make sure that the computer and LaCie device are electrically grounded. If the devices are not grounded, there is an increased risk of electrical shock.

GENERAL USE PRECAUTIONS

- Power requirements 100-240 V~, 50-60 Hz, (supply voltage fluctuations not exceeding $\pm 10\%$ of the nominal and transient over-voltages according to over-voltage category II).
- Do not expose the LaCie device to temperatures outside the range of 5° C to 30° C (41° F to 86° F); or to operational humidity beyond 10-80%, non-condensing, or non-operating humidity beyond 10-90%, non-condensing. Doing so may damage the LaCie device or disfigure its casing. Avoid placing your LaCie device near a source of heat or exposing it to sunlight (even through a window). Inversely, placing your LaCie device in an environment that is too cold may damage the unit.
- Rated cooling for altitudes up to 2000 meters.
- If your drive features a power cable, always unplug it from the electrical outlet if there is a risk of lightning or if it will be unused for an extended period of time. Otherwise, there is an increased risk of electrical shock, short-circuiting or fire.
- Use only the power supply shipped with the device (if applicable).
- Do not use the LaCie device near other electrical appliances such as televisions, radios or speakers. Doing so may cause interference which will adversely affect the operation of the other products.
- Do not place the LaCie device near sources of magnetic interference, such as computer displays, televisions or speakers. Magnetic interference can affect the operation and stability of your LaCie device.
- Never use excessive force on your LaCie device. If you detect a problem, consult the troubleshooting section in this manual.
- Protect your LaCie device from excessive exposure to dust during use or storage. Dust can build up inside the device, increasing the risk of damage or malfunction.
- Never use benzene, paint thinners, detergent or other chemical products to clean the outside of the LaCie device. Such products will disfigure and discolor the casing. Instead, use a soft, dry cloth to wipe the device.

WARRANTY INFORMATION

LaCie offers first-rate service and support through our generous three-tiered warranty policy. Our 1-, 2-, 3-, and 5-year policies include comprehensive, complimentary web-based resources, expert in-house technical support, and worldwide repair and/or replacement coverage. To benefit from this warranty, please contact LaCie Support at www.lacie.com/us/support where you can find online support and contact information. You may also contact representatives at the original point of purchase who will be able to help guide you.

Standard warranties vary depending on the product. To verify your product's warranty status and to see which standard warranty is included with your product, type in your product's serial number at www.lacie.com/us/support. If no warranty is listed under your product's name, this means that the warranty has expired.

WARRANTY UPGRADES

If you wish to extend your warranty coverage, you can purchase Silver, Gold, or Platinum Care or Advanced Exchange. For details, see www.lacie.com/warranties.

LEGAL INFORMATION

A standard LaCie limited warranty is included with all products. Please read the terms and conditions below.

LaCie Limited Warranty Policy

LaCie ("LaCie") warrants, to the original purchaser, that this equipment shall be free of defects in materials and workmanship for a period of one (1), two (2), three (3), or five (5) years, depending on the model, from LaCie's date of original shipment when the equipment is used normally and is properly serviced when needed. If you discover a defect covered by the warranty set forth above, your sole and exclusive remedy will be for LaCie, in its sole discretion to (i) repair or replace the product at no charge to you; or, if a repaired unit or replacement product is not available, (ii) to refund the current market value of your product. You acknowledge and agree that replacement product, at the sole option of LaCie, may be a new product or a remanufactured product. In order to receive the remedy set forth above, you must return the product during the warranty period and include with each returned product (i) a copy of your original purchase invoice to verify your warranty; (ii) a Return Material Authorization number; (iii) your name, address and telephone number; (iv) a copy of the bill of sale bearing the appropriate LaCie serial numbers as proof of date of original retail purchase; and (v) a description of the problem. The customer must pay all transportation costs for a returned product. The product will need to be returned to LaCie within the country of original retail purchase. This warranty applies only to hardware products; LaCie software, media, and manuals are licensed and warranted pursuant to separate written agreement. This warranty does not apply if the product has been misused or has been damaged by accident, abuse, misuse, or misapplication; if it has been modified without permission of LaCie; or if any LaCie serial number has been removed or defaced. If a customer has purchased a LaCie Advance Care Option (ACO) to go with this equipment, the ACO shall be valid for three (3) years from activation.

EXCEPT FOR THE LIMITED WARRANTY SET FORTH ABOVE, ALL PRODUCTS ARE SOLD "AS IS" AND LACIE EXPRESSLY DISCLAIMS ALL WARRANTIES OF ANY KIND, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY, NONINFRINGEMENT AND FITNESS FOR A PARTICULAR PURPOSE. WITHOUT FURTHER LIMITING THE GENERALITY OF THE FOREGOING, DOES NOT WARRANT (1) THE PERFORMANCE OR RESULTS OBTAINED FROM USING THIS PRODUCT, (2) THAT THE PRODUCT IS APPROPRIATE FOR THE CUSTOMER'S PURPOSES, (3) THE MANUAL IS ERROR FREE, OR (4) THAT NO DATA WILL BE LOST WHILE USING THE PRODUCT. THE ENTIRE RISK AS TO THE RESULTS AND PERFORMANCE IS ASSUMED BY THE CUSTOMER. THE WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHERS, ORAL OR WRITTEN, EXPRESS OR IMPLIED.

EXCLUSIONS AND LIMITATIONS

This Limited Warranty applies only to hardware products manufactured by or for LaCie that can be identified by the "LaCie" trademark, trade name, or logo affixed to them. The Limited Warranty does not apply to any non-LaCie hardware products or any software, even if packaged or sold with LaCie hardware. Manufacturers, suppliers, or publishers, other than LaCie, may provide their own warranties to the end user purchaser, but LaCie, in so far as permitted by law, provides their products "as is". Software distributed by LaCie with or without the LaCie brand name (including, but not limited to system software) is not covered under this Limited Warranty. Refer to the licensing agreement accompanying the software for details of your rights with respect to its use.

LaCie does not warrant that the operation of the product will be uninterrupted or error-free. LaCie is not responsible for damage arising from failure to follow instructions relating to the product's use. This warranty does not apply: (a) to consumable parts, unless damage has occurred due to a defect in materials or workmanship; (b) to cosmetic damage, including but not limited to scratches, dents and broken plastic on ports; (c) to damage caused by use with non-LaCie products; (d) to damage caused by accident, abuse, misuse, flood, fire, earthquake or other external causes; (e) to damage caused by operating the product outside the permitted or intended uses described by LaCie; (f) to damage caused by service (including upgrades and expansions) performed by anyone who is not a representative of LaCie or a LaCie Authorized Service Provider; (g) to a product or part that has been modified to alter functionality or capability without the written permission of LaCie; or (h) if any LaCie serial number on the product has been removed or defaced.

No LaCie dealer, agent, or employee is authorized to make any modification, extension, or addition to this warranty.

Any loss, corruption or destruction of data while using a LaCie drive is the sole responsibility of the user, and under no circumstances will LaCie be held liable for the recovery or restoration of this data. To help prevent the loss of your data, LaCie highly recommends that you keep TWO copies of your data; one copy on your external hard disk, for instance, and a second copy either on your internal hard disk, another external hard disk or some other form of removable storage media. LaCie offers a complete line of CD and DVD drives. If you would like more information on backup, please refer to our website.

LACIE IS NOT RESPONSIBLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY, OR UNDER ANY LEGAL THEORY, INCLUDING LOST PROFITS, DOWNTIME, GOODWILL, DAMAGE TO OR REPLACEMENT OF EQUIPMENT AND PROPERTY, AND ANY COSTS OF RECOVERING, REPROGRAMMING, OR REPRODUCING ANY PROGRAM OR DATA STORED IN OR USED WITH LACIE PRODUCTS EVEN IF IT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Some states do not allow the exclusion or limitation of implied warranties or liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may have other rights, which vary from state to state.

Your opening of your package, your use of the product, or your return of the enclosed Registration Card acknowledges that you have read and agree to the terms of this Agreement. You further agree that it is the complete and exclusive state of the agreement between us and supersedes any proposal or prior agreement, oral or written, and any other communications between us relating to the subject matter of this Agreement.

Read carefully all information related to warranty and precautions of use of your new LaCie product in the user manual.

For products purchased in the United States, you may contact LaCie at 7555 Tech Center Drive, Tigard, Oregon 97223 USA. Email: sales@lacie.com. Website: www.lacie.com. Customer service: 503-844-4503.

Service DOA

On rare occasions, a newly purchased LaCie product may be delivered in non-working order. We are working to avoid these issues, but unfortunately, these situations may arise from time to time. Within the 15 calendar days of purchase, should you experience an issue with your new LaCie product, we ask you to return the product to the place where it was originally bought. You will be required to give a proof of purchase.

Customer Warning

Please be sure to back up your data before returning your drive to LaCie for repair. LaCie cannot under any circumstances guarantee the integrity of data remaining on a returned drive. We make no provisions for data recovery and cannot be held liable for any data loss on drives or media returned to LaCie.

All products returned to LaCie must be securely packaged in their original box and shipped with postage prepaid, except for Products registered under the Advance Care Option.

NOTE TO AUSTRALIAN CUSTOMERS

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

Contact us:

LaCie Australia, 6/151 Beauchamp Rd, Matraville NSW 2036 AUSTRALIA

Phone: 02 8063 3711

Email: info.au@lacie.com

For fast technical support, create a support ticket after registering your product at www.lacie.com/au/register.

LEGAL INFO

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FEDERAL COMMUNICATION COMMISSION INTERFERENCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Important info: FCC Radiation Exposure Statement: This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. The availability of some specific channels and/or operational frequency bands are country dependent and are

firmware programmed at the factory to match the intended destination. The firmware setting is not accessible by the end user.

WEEE



This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designed collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service, or the shop where you purchased the product.

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This list of licenses can evolve over time and can be found on the user interface under the heading "Credits."

CANADA COMPLIANCE STATEMENT

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

CAN ICES-3 (B)/NMB-3(B)

JAPAN COMPLIANCE STATEMENT

This is a Class B product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio/TV receiver, it may cause radio interference. Install the equipment according to the manual. This statement does not apply to the LaCie CloudBox.

MANUFACTURER'S DECLARATION FOR CE CERTIFICATION



We, LaCie, solemnly declare that this product conforms to the following European standards:
Electromagnetic Compatibility Directive (2004/108/EC); Low-Voltage Directive: 2006/95/EC