



# VFM (Virtual File Manager) v5.8

## Transfer Data



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# Preface

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>What the guide covers</b>   | <p>This guide describes how you can use VFM® (Virtual File Manager) technology to migrate and replicate CIFS and NFS data seamlessly.</p> <p>The guide is divided into the following sections:</p> <ul style="list-style-type: none"><li>• <b>Chapter 1 Introduction</b> –Provides information about things you should consider before transferring data and explains the four policies that VFM provides to transfer data.</li><li>• <b>Chapter 2 Migration Policies</b> – Explains how to create and manage policies to transfer CIFS and NFS data.</li><li>• <b>Chapter 3 Replication Policies</b> – Explains how to create and manage policies to distribute CIFS and NFS data to heterogeneous devices using VFM replication.</li><li>• <b>Chapter 4 SnapMirror Policies</b> – Explains how to create and manage SnapMirror replication on NetApp filers.</li><li>• <b>Appendix A Specifying migration tasks from a file</b> – Explains how you can customize a migration policy.</li><li>• <b>Appendix B Example Task Creation Batch file</b> – Provides an example Task Creation batch file that you can specify in a migration policy.</li><li>• <b>Appendix C Example Task Description file</b> – Provides an example Task Description file.</li><li>• <b>Appendix D VFM Documentation</b> – Provides a list and description of the VFM documents.</li><li>• <b>Glossary</b> – Provides definitions of terms used in this guide.</li></ul> |
| <b>Audience</b>                | <p>This guide is for network administrators who are familiar with Windows NT®, Windows® 2000, Windows Server™ 2003, and DFS. It does not cover basic system or network administration topics.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Typographic conventions</b> | <ul style="list-style-type: none"><li>• <b>Bold</b> text - Items on a dialog box or page on the VFM console that you are instructed to click.</li><li>• <i>&lt;text in italics&gt;</i> - Substitute the text within the greater than and less than symbols with the value requested.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Using the online help</b>   | <ul style="list-style-type: none"><li>• Certain icons appear to the left of a topic title to indicate that the information provided applies only to a specific operating system, type of DFS root, or data transfer protocol.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

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| Icon                                                                              | Description                                                                                                          |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
|  | Indicates that the information applies only to DFS roots on Windows 2000 or Windows Server 2003, Enterprise Edition. |
|  | Indicates that the information applies only to domain-based roots.                                                   |
|  | Indicates that the information applies only to DFS roots on Windows Server 2003.                                     |
|  | Indicates that the information applies only to CIFS data transfer.                                                   |

- In the table of contents, a new topic is represented as a page with a red asterisk , and an entire section of new topics is represented as a book with a red asterisk .
- Definitions of new terms are available wherever they appear in help topics. The first time a new term appears in a help topic, it appears as a [green hyperlink](#).
- Context help contains detailed information about a dialog box or view, and might include links to related topics. Press **F1** or click  **Help**.

## Support

Contact NetApp technical support, 24 x 7.

Support is either through the web at <http://now.netapp.com> or by phone. See <http://www.netapp.com/support> for details.

Support phone numbers:

- 888 4-NETAPP (US and Canada)
- (1-888-463-8277)
- (408) 822-4700
- 800-44-NETAPP (EMEA/Europe)
- 800-800-0800 (Asia/Pacific)

### Notes:

- You can also contact technical support by clicking **Support** on the **Help** menu.
- To get your product build number and license information, click **About Virtual File Manager** on the **Help** menu.

## Enter new license key

Enter a new license key for the VFM client and server components when you want to extend the VFM evaluation period or when you purchase additional licenses from VFM.

1. Contact NetApp to request a new license key.
2. On the **Help** menu, click **About Virtual File Manager**.

3. Click **Edit Serial Numbers**.
4. In the License Type list, click the appropriate item.
5. If you selected "Evaluation" as the license type, type the new activation key.
6. If you selected "Full" as the license type, select a product number from the Product list and type the new activation key.
7. Click **OK**.



# Chapter 1 Introduction

This guide provides instructions about how to create policies to transfer data. VFM provides four policies to move data. Select the policy that best meets your needs.

- **Migration policies** enable you to balance free space and data throughput capacity across volumes, or migrate data prior to maintaining or consolidating servers. Use migration policies to transfer data in heterogeneous environments. Before you create your first policy, see "Data migration considerations."
- **Replication policies** enable you to centrally manage tasks associated with replicating data across a network. You can select the optimal replication mechanism for your configuration, whether this is VFM for heterogeneous environments, SnapMirror for NetApp filers, or another mechanism suited for your environment. VFM provides status information about replication operations performed using the VFM replication agent. Use replication policies to replicates data from a central location to remote sites and from remote sites to a central location. Before you create your first policy, see "Replication planning considerations."
- **SnapMirror policies** enable you to create and centrally manage replication between NetApp filers in your network. You can integrate SnapMirror data replication with your namespace. VFM provides a central view of events from all managed NetApp filers. You receive detailed reporting of filer configuration and status information.
- **Storage load balancing policies** enable you to automatically balance the storage space among a group of storage locations containing directories that are targets of links in your namespace. The policy periodically evaluates the space distribution of the group of storage locations, calculates a solution, and automatically creates and runs migration tasks to move directories and retarget links to balance the storages. You can view migration suggestions and decide which suggestions you want to use to create migration tasks.

**IMPORTANT:** If you have users and applications that are tied to specific shares and file locations through hard-coded UNC pathnames, you need to take extra precautions to see that such links are maintained as part of the migration process. UNC references can occur in a variety of settings, including Microsoft Office documents, applications, and other files. The **UNCUpdate utility** is a tool you can use to report on files containing UNC references to storage resources under consideration for migration. **UNCUpdate** can report on UNC entries encountered in a wide variety of files. **UNCUpdate** enables you to update UNC references to target the storage resources at their new location. Contact Brocade for more information about this product.

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## Data migration considerations

Before you migrate data, it is important that you understand transfer results when different file systems, such as FAT and NFS are involved.

### Planning considerations

- Users and applications should not be accessing the source or destination folders while the migration is taking place.
- Do not use differential replication on a LAN. The computational cost of calculating the file differences is more expensive in terms of time than it is to simply copy the entire file from source to destination when operating on a high-speed network.
- When you perform full backups during a migration operation, backups can change archive attribute settings and trigger massive differences between source and destination. With VFM you can avoid this problem, because migration policies enable you to specify how you want to set attributes of destination files.
- When configuring replication options, carefully consider how much event detail you need. If you gather information about all files, it affects performance. As a compromise between performance and the need for feedback, it is recommended that you gather information only when an error is encountered.
- It is not recommended that you enable real-time virus scanning on filers because migration throughput can be severely reduced.
- When planning a migration, consider the available time you have to complete the operation and how much data you have to migrate.
  - Use include and exclude lists sparingly because they add processing time to the migration operation.
  - Depending on your environment, you might not want to set the replication option to "retry on error." For example, among the files you want to migrate are a large number of locked files.
- (CIFS only) By default, VFM copies the security descriptor every time a file is copied. VFM provides various options for controlling how a file's security is copied during data migration. See "Select file security replication options" for details.
- Exclusive locks on files on source or destination prevent VFM from accessing the file for transfer. Find out who or what program is locking the files and make the files available to VFM.
- When configuring replication, you should not configure overlapping source and destination directory hierarchies. This can result in unintended repeated duplication of files and can interfere with VFM replication.
- API support limitations in the NetWare® server affect the operation of VFM. VFM can transfer data from Novell to CIFS shares. Security settings are updated to reflect the destination security. Legacy settings from the Novell® source are not maintained.
- (CIFS only) The account used by the VFM server, a replication agent, or a VFM monitoring agent must have the following permissions:
  - **SeBackupPrivilege** ("Back up files and directories") - required to open source directories/files with backup semantics
  - **SeRestorePrivilege** ("Restore files and directories") - required to open

- destination directories/files with backup semantics
- **SeSecurityPrivilege** ("Manage auditing and security log") - required to access SACLs (System Access Control Lists)
- **SeTakeOwnershipPrivilege** ("Take ownership of files or other objects") - required to delete directories/files
- (NFS only) The account under which the UNIX replication agent is running must have root-equivalent access to the source and destination exports. The exports must be writable on the destination.

## Transferring NTFS file security attributes

- When you transfer file security attributes, VFM looks up the trustees configured as the owner and those referenced in the source file's ACL. If the owner of the file is set to an unknown SID and you attempt a transfer, VFM reports error 1332, "No mapping between account names and security IDs was done." You can correct this by assigning ownership.
- When transferring data between NTFS source and destination, you need to think about inherited permissions and how they will affect permissions on the source and destination. If the source and destination are inheriting different permission settings from their parents, the result will be different file permissions between the source and destination.

## Transferring between dissimilar file systems

Some file attribute information (for example, security attribute) might be lost when copying or moving files from one file system to another because of the inherent differences between the file systems. The following table displays transfer results between different file systems.

| Source   | Destination                         |                       |                                           |                                           |                       |                                           |
|----------|-------------------------------------|-----------------------|-------------------------------------------|-------------------------------------------|-----------------------|-------------------------------------------|
|          | NTFS W2K                            | NTFS NT4              | FAT16                                     | FAT32                                     | NetApp /CIFS          | NFS                                       |
| NTFS W2K | Attributes maintained<br>see Note 4 | Some attributes lost  | Some attributes lost<br>See Notes 2 and 6 | Some attributes lost<br>See Notes 2 and 6 | See Note 5            | Some attributes lost<br>See Notes 1 and 3 |
| NTFS NT4 | Attributes maintained               | Attributes maintained | Some attributes lost<br>See Notes 2 and 6 | Some attributes lost<br>See Notes 2 and 6 | See Note 5            | Some attributes lost<br>See Notes 1 and 3 |
| FAT16    | Attributes maintained               | Attributes maintained | Attributes maintained                     | Attributes maintained                     | See Note 5            | Some attributes lost<br>See Notes 1 and 3 |
| FAT32    | Attributes maintained               | Attributes maintained | Some attributes lost                      | Attributes maintained                     | See Note 5            | Some attributes lost<br>See Notes 1 and 3 |
| NetApp   | Attributes maintained               | Attributes maintained | Some attributes lost                      | Some attributes                           | Attributes maintained | Some attributes                           |

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| Source  | Destination                             |                                         |                                      |                                         |                                         |                              |
|---------|-----------------------------------------|-----------------------------------------|--------------------------------------|-----------------------------------------|-----------------------------------------|------------------------------|
|         | NTFS<br>W2K                             | NTFS<br>NT4                             | FAT16                                | FAT32                                   | NetApp<br>/CIFS                         | NFS                          |
| CIFS    |                                         |                                         |                                      | lost                                    |                                         | lost<br>See Notes<br>1 and 3 |
| NFS     | See Note 3                              | See Note 3                              | See Note 3                           | See Note 3                              | See Note 3                              | See Note 3                   |
| NetWare | Some<br>attributes<br>lost<br>See Note7 | Some<br>attributes<br>lost<br>See Note7 | Some attributes<br>lost<br>See Note7 | Some<br>attributes<br>lost<br>See Note7 | Some<br>attributes<br>lost<br>See Note7 | Not<br>applicable            |

**Note 1:** NFS maintains a very limited set of attributes relative to the set maintained by NTFS. When files are transferred to an NFS file system from NTFS, their security and extended attributes are subsumed by NFS attributes. VFM UNIX replication agents perform NFS to NFS data transfer. Other file systems require redirector client software on the machine hosting the Windows replication agent.

**Note 2:** NTFS stores access times in UTC while FAT stores access time in LocalTime. VFM does not adjust between UTC and LocalTime.

**Note 3:** Copying files from NFS sources is supported. This is typically done by using the VFM UNIX replication agent. The account under which the UNIX replication agent is running must have root-equivalent access to the source and destination exports

**Note 4:** Copying hard links, reparse points or NTFS encrypted files is not supported

**Note 5:** You can configure security on NetApp filers in a variety of ways. These variables affect how security attributes are maintained when copying to NetApp filers. When files are transferred from Windows systems to a NetApp filer and sparse or compressed attributes are set, the attributes have no effect on how the files are stored on the filer.

**Note 6:** FAT maintains a very limited set of attributes relative to the set maintained by NTFS. When files are transferred to a FAT file system from NTFS, their access times extended attributes, indexing attributes, and alternate streams (including security) are lost when the files are written to the FAT destination.

**Note 7:** Security settings are updated to reflect the destination security. Legacy settings from the Novell source are not maintained. If the version of NetWare is 5.1 or earlier, the Novell client must be installed on the same machine where the replication agent is installed. Windows and Novell accounts must be configured with identical user name and passwords. The VFM console and server components must also run under the same user name.

## Replication planning considerations

You can choose the optimal replication mechanism for your configuration whether this is the VFM agent for heterogeneous environments or another mechanism for homogeneous environments. VFM enables you to configure replication at the folder level.

### How it works

- A replication policy is created and the schedule is defined.
- A single-target link is added to the policy as the source link. You can add the link during the creation of the replication policy or drag it from the Logical View tree or the right pane to the policy.
- A multi-target link is added to the policy as the destination link. You can add the link during the creation of the replication policy or drag it from the Logical View tree or the right pane to the policy. You can quickly add additional targets to the destination link.
- When you select a replication policy in the Admin View, several tabs appear in the right pane. The **Replication Topology** tab provides a graphical display of the distribution path of the policy
  - From this tab, you can change the distribution path by a simple drag-and-drop operation.
  - You can view monitoring status of the links and each of their targets.
  - You can add additional targets to the destination link by right-clicking the link.

### VFM replication planning considerations

VFM uses file-to-file copy to synchronize data across a network.

- Exclusive locks on files on source or destination prevent VFM from accessing the file for transfer. Find out who or what program is locking the files and make the files available to VFM.
- It is not recommended that you perform full backups during a replication operation because backups can change archive attribute settings and trigger massive differences between source and destination.
- When configuring replication options, carefully consider how much event detail you need. If you gather information about all files, it affects performance. As a compromise between performance and the need for feedback, it is recommended that you gather information only when an error is encountered.
- When planning replication, consider the available time you have to complete the operation and how much data you have to replicate.
  - Use include and exclude lists sparingly because they add processing time to the replication operation.
  - Depending on your environment, you might not want to set the replication option to "retry on error." For example, among the files you want to replicate are a large number of locked files.
- It is not recommended that you enable real-time virus scanning on filers because replication throughput can be severely reduced.
- The benefits of differential replication are realized on slower links rather than on a LAN.

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Computational costs outweigh the benefits of differential replication on a LAN.

- A replication policy synchronizes from its source to a number of read-only copies.
- There is a replication time delay between primary and secondary contents. If a primary target becomes unavailable, there is no guarantee that all the contents of the primary target are replicated to the standby targets.
- When configuring replication, you should not configure overlapping source and destination directory hierarchies. This can result in unintended repeated duplication of files and can interfere with VFM replication.
- The VFM client does not have to be running for replication policies to function.

## Transferring NTFS file security attributes

For information about transferring file security attributes, see "Data migration considerations."

## Permissions

For information about setting permissions for the account used by the VFM server, a replication agent, or a monitoring agent, see "Data migration considerations."

## Status monitoring

When you use the VFM replication agent, status information about replication operations performed is available for the policy and its targets.

- If status monitoring is turned on for the links and folders contained in a policy, status indicators appear for the items on the **Replication** tab that appears when you select a policy.
- Monitoring DFS resources generates network traffic between the VFM console and the resources being monitored. Slower polling rates generate less traffic but provide less timely notification of problems in the monitored namespace.

# Chapter 2 Migration policies

VFM migration policies enable you to easily manage CIFS and NFS data migration. In addition to the data, VFM transfers attributes and permissions.

## Migration limitations

The following files are not supported:

- Encrypted
- Reparse points
- Hard links

## Integrated namespace management

When the source participates in the namespace, VFM enables you to update the namespace.

- **DFS namespace management**
  - Retarget link - The destination folder becomes the new link target.
  - Add link replicas - The destination folder is added as a new replica of the link.
- **UNIX namespace management**

VFM updates the references to the automount files you specify.

---

## How to create and manage migration policies

To create your first policy, follow the basic steps listed below:

1. Create a migration policy.
2. Select migration actions.
3. Specify namespace options.
4. Schedule when and how often you want to run the policy.
5. Add a migration task to the policy. A migration task identifies the source and destination. A policy can have multiple migration tasks.

## Create a migration policy

Create a migration policy to migrate CIFS and NFS data between machines in your network. When you migrate CIFS data referenced from a namespace, your links are updated and the underlying data is migrated in a single operation. VFM enables you to select the steps you want to execute and gives you the option of always suspending the migration process after a step, suspending the migration only if errors occur (the default), or continuing to the next step.

1. Perform one of the following actions:
  - On the **Tools** menu, click **New Policy**, point to **Data Movement Policy**, and then click **Migration Policy**.
  - Drag a machine from the Physical View to the Migration Policies folder and click **New Policy**.

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- Right-click the **Data Movement Policies** folder, point to **New**, and then click **Migration Policy**.
  - Right-click the **Migration Policies** folder and click **New Migration Policy**.
  - Right-click  **Admin View**, click **New**, point to **Data Movement Policy**, and then click **Migration Policy**.
2. Type a word or phrase that best describes this policy. The name appears under the Migration Policies folder and on the Properties tab of items that are members of the policy.
  3. In the **Use the Monitor on** list, select the machine that contains the agent that you want to use to process the migration policy. Normally, VFM uses the current VFM server to process the migration policy. If you installed VFM monitoring agents on other machines, you can select one of the locations where VFM monitoring agents are installed as the location from which this policy is processed.
  4. Select **Run task creation batch** to run a batch file that specify the source and destination of data transfers. Type the path and name of a batch file or click **Browse** to locate the file in your network. See "Data migration considerations" for information about creating a migration tasks file.

**Note:** If you uninstall a monitoring agent, ensure that migration policies that formerly used the uninstalled agent are reassigned to a currently available agent. Do this by selecting the desired agent through the properties dialog box for the policy.

## Select migration actions

Select the migration actions that all tasks associated with the policy run.

1. Right-click the policy and click **Properties**.
2. Click **Actions**.
3. Optionally select **Run batch file** and type the name of a script file, or browse for a script file to run before the migration operation. VFM provides sample batch files that you can modify. The sample batch files are in the **Examples\Scripts\Migration** directory in the VFM server installation directory.
4. Optionally **Scan for potential problems copying the data** to check for potential problems, such as loss of file attributes and permission problems, before data is migrated.
5. By default, **Copy data** is selected. Clear this option, for example, if you only want to update DFS by replacing the targets of links.
6. By default, **Update Namespace** is selected. Clear this option if you want to migrate data that does not participate in the namespace.
7. **(CIFS only)** Optionally select **Hide the source share** to "hide" the source shared folder from users. VFM renames the source shared folder during the migration process.
8. Optionally select **Do a final replication prior to deleting the source data** if the data transfer might be interrupted, or if it is possible that source files changed since they were first copied to the destination. VFM performs data synchronization before the source data is deleted.
9. Optionally select **Delete the source data** to delete the source data after the data is copied

to the destination.

10. Optionally select **Stop sharing the source share or export** if you do not want the source data accessible through its former share or export, but you want to retain the data. Only the specified source share is unshared or the specified source export is removed. If there are multiple shares or exports of the source directory, the other shares or exports remain in effect.
11. Optionally select **Run batch file** and type the name of a script file, or browse for a script file to run after the migration operation. VFM provides sample batch files that you can modify. The sample batch files are in the **Examples\Scripts\Migration** directory in the VFM server installation directory.
12. Click **OK**.

## Specify namespace options

Specify how you want to update the namespace.

### How automount files are updated

- The shell credentials for the machines hosting automount files must be set in VFM so that they can be managed. See "Add the shell credentials of a UNIX machine" or "Add the shell credentials of a filer" in the VFM [Manage Physical Resources Guide](#) for instructions.
- During the data transfer process, the entries that referenced the source location are updated to reference the data at the new location on the destination. For example, you want to migrate data from *SourceServer* to *NewServer*.
  - **Source** - SourceServer.domain.com:/export/home
  - **Destination** - newServer.domain.com:/export/legacy/home

The automount file contains a line that references the source:

```
/home SourceServer:/export/home/myHome
```

When the migration task runs, the line in the automount file is updated to reference the destination:

```
/home NewServer.domain.com:/export/legacy/home/myHome
```

- VFM automatically runs a script named "namespaceupdate" if it is found in the directory containing an automount file you are updating. VFM runs the script after the automount file is updated. The script can be used to perform custom processing of your automount files. For example, an updated automount file is named *nis:/var/local/yp/automount.new*. VFM searches for the namespaceupdate script file in the directory *nis:/var/local/yp/namespaceupdate*. If the script file is found, VFM executes it and returns the status.
  - If the namespaceupdate script is not found in the directory containing an updated automount file, VFM runs the command "make" in the same directory as the automount file. The command "make" searches for a file named "Makefile" and executes the commands in the file. For example, if the automount file is in the directory *nis:/var/local/yp/automount.new*, the command "make" searches for a

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"Makefile" file in the directory *nis:/var/local/yp/Makefile*.

- If the "Makefile" file is not found in the same directory as the automount file, VFM shows an error status.

### To specify namespace options:

1. Right-click the policy and click **Properties**.
2. Click **Update Namespace Options**.
3. Perform the following actions:
  - If you are transferring CIFS data, you can select to replace the target of a link or add another target to the link.
    - **Retarget links** - VFM replaces the destination data with the source data and has the link reference the source data.
    - **Add link replica** - VFM adds the source data as another target of a link.
  - If you are transferring NFS data, you can update references in automount files. Add the automounts files you want to update. The automount files must be specified with a UNIX fully qualified path (for example, `<hostname>:/<root>/<subdirectory>/<file>`).
4. Click **OK**.

## Select replication options

Select the VFM replication options for a policy or enable VFM to select the options based on the optimization you want.

**Note:** To set application-wide default settings for use in creating new policies, click **Options** on the **Tools** menu. Changes affect only new policies. Existing policies are not affected.

1. Perform one of the following actions:
  - Right-click a policy and click **Properties**.
  - Select a policy and click  **Edit** on the **Properties** tab that appears in the right pane.
2. Click **Replication Options**.
3. Click **Optimize For Speed** if you want VFM to automatically set replication options when the time it takes to transfer the data is very important.
4. Click **Optimize For Security** if you want VFM to automatically set replication options when the completeness and accuracy of the data transfer is very important.
5. Clear **Include subfolders** if you do not want to copy the source target subfolders and their contents to the destination targets.
6. When **Delete orphaned files in destination folders** is selected, files in the destination targets are deleted if they do not have a corresponding file in the source target.
  - See the "Note" for Step 7 for information about what happens when this option and the NTFS Change Journal are selected.
  - See the "Note" for Step 11 for information about what happens when this option

is selected and the policy contains an exclusion list.

7. **(CIFS only)** In cases where the destination targets do not support auxiliary file streams supported by the source target, you can select **Allow loss of additional file streams** if you want to copy files to the destination targets that lose auxiliary streams.
8. When you select **Enable Copy-in-place**, the source file directly replaces the destination file. This decreases the time required to perform a replication operation. When this option is not selected, VFM copies the source file to a temporary file in the destination directory, renames the current destination file, renames the temporary file to the actual file name, and then deletes the destination file. This minimizes the chance of network errors adversely affecting file contents.
9. **(CIFS only)** VFM takes advantage of the NTFS Change Journal on the replication source to determine which files are to be replicated rather than scanning the entire source to detect files that have changed. This option saves time when replicating large directory trees with limited changes scattered throughout the directory hierarchy.

**Notes:**

- The NTFS Change Journal is supported on Windows 2000 NTFS which is available on Windows 2000 and later versions of the operating system.
- When you enable the NTFS Change Journal on a volume, the size of the volume is used to determine the amount of space dedicated to the change journal. For each 50 GB of space on the volume, 128 MB is assigned for use by the change journal up to a maximum of 10 GB. On Windows 2000 SP2 or below, the amount of space dedicated to the change journal is always 128 MB, regardless of the size of the volume.
- Use of this option requires that VFM deploy a replication agent on the machine where the source data resides and enable the Change Journal on the NTFS volume hosting the source data. The VFM machine properties dialog box enables you to control whether the replication agent can be deployed to a machine and whether VFM can enable the NTFS Change Journal for volumes on the machine.
- Use of this option means that changes made on the source are replicated to the destination and changes made on the destination are not overwritten by data from the source unless the corresponding file on the source changes as well. This differs from standard VFM replication, wherein changes made on the destination are detected and overwritten with data from the source.
- In cases where the NTFS Change Journal wraps, VFM must perform a full scan of the source and destination to determine what files need to be transferred.
- When both **Delete orphaned files in destination folders** and **Use NTFS Change Journal** are selected, VFM deletes a destination file when its corresponding source file is deleted. If a new file is added to the destination, the file is not deleted unless the file is contained in a directory that is deleted on the source.

10. When **Use snapshot data** is selected, VFM takes a snapshot of or shadow copies the volume in which the source data is located and uses the snapshot as the source. This reduces the possibility of not being able to transfer source files that are held open for exclusive access by an external application at the time of replication. The source data must be on a NetApp filer (CIFS protocol) or Windows Storage Server 2003 or Windows Server 2003 system.

### Notes:

- To reduce the number of snapshots VFM must create, try to group sources in the same volume under the same policy.
- When "Use snapshot data" is selected, you cannot enable NTFS Change Journal or file differential replication using cached hash information because snapshot data resides on read-only volumes and NTFS Change Journal and file differential replication require that the data be on writable volumes.

11. In the **Copy files** list, select one of the following options:
  - **If destination file is different or missing** - Replace files in the destination targets if the time stamp does not match the time stamp of files in the source target, and copy the files in the source target that are not found in the destination targets.
  - **If destination file is older or missing** - Replace files in the destination targets that have time stamps older than files in the source target, and copy the files in the source target that are not found in the destination targets.
  - **If destination file is missing** - Only copy files in the source target that are not found in the destination targets.
12. Type the number of times and the frequency, in seconds, that you want the policy to try to open a file.
13. Type how long, in minutes, a policy should run unsuccessfully before it is aborted.
14. Type directory exclusions delimited by double quotes, or click **Expand** to specify multiple directories to exclude.
15. Type file exclusions delimited by double quotes, or click **Expand** to specify multiple files to exclude.

**Note:** When **Delete orphaned files in destination folders** is selected in a policy that contains an exclusion list, VFM does not copy files that match the exclusion list and files on the destination that match the exclusion list are not deleted. The following example illustrates what happens to files when a policy contains an exclusion list and the **Delete orphaned files in destination folders** option is selected.

- PolicyA excludes ".doc" files.
- When PolicyA runs and finds ".doc" files in the source, the files are not transferred to the destination.
- When PolicyA finds ".doc" files in the destination, the files are not deleted.

16. Type directory inclusions delimited by double quotes, or click **Expand** to specify multiple directories to include.
17. Type file inclusions delimited by double quotes, or click **Expand** to specify multiple files to include.
18. Select one of the following options in the **Events Details** list:
  - a. **Only list files that encounter errors** - Provide a detailed report of only the files that encounter errors during the replication process.
  - b. **Don't list files** - Do not provide a report of the files included in the replication

process.

- c. **List all files** - Provide a detailed report of all the files included in the replication process.

19. Click **OK**.

**Notes:**

- After you add an item to an exclusion list, specifying it in a subsequent include list does not include the item.
- Exclusions and inclusions are case sensitive when they list directories and files on UNIX machines.
- See the [Troubleshooting Guide](#) or the online help for examples of valid exclusion and inclusion formats.

## Select differential replication options

Select file differential replication options for the policy. VFM enables you to send only the parts of a file that change instead of sending the entire file. Replication time and network traffic are decreased considerably.

**Notes:**

- When data is replicated using differential replication, the source and destination must have replication agents installed. VFM deploys a replication agent to both the source and destination. If VFM cannot deploy a replication agent to either the source or destination, you must designate a proxy.
- When NFS data is replicated using differential replication, the machines hosting the replication agents must be running the same operating system. The source and destination machines or a proxy machine and the source or destination machine must be running Solaris or Linux.
- File differential replication is not recommended for files in compressed format (for example, JPEG, MP3, and MPEG) because a small change to the content of these files causes changes throughout the entire file.
- To set application-wide default replication differencing options for all new policies, click **Options** on the **Tools** menu.
- To specify a proxy machine, see "Specify a proxy machine" in the VFM [Manage Physical Resources Guide](#).

1. Perform one of the following actions:
  - Right-click a policy and click **Properties**.
  - Select a policy and click  **Edit** on the **Properties** tab that appears in the right pane.
2. Click **Replication Differencing**.
3. Select **Enable file differential replication**.
4. Change the minimum and maximum files sizes or accept the default options. VFM performs differencing only on files that meet the size criteria.

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5. Type file exclusions delimited by double quotes or click **Expand** to specify multiple files to exclude.
6. Type file inclusions delimited by double quotes or click **Expand** to specify multiple files to include.
7. Change how large the data to be transferred can be or accept the default option. When the data exceeds the limits set, VFM replicates the entire file instead of differencing.
8. Change the differencing block size or accept the default option.
9. Select **Fail replication if differential replication is not available**, if you want VFM to cancel the replication of a file if it cannot be transferred using differential replication.
10. Select **Use cached information if available**, if you want VFM to save hash sets. Some systems cannot take advantage of this option.
11. Click **OK**.

## Select file security replication options

VFM provides various options for controlling how a file's security is copied with a file during replication. By default, VFM copies the security descriptor every time a file is copied.

### Notes:

- When transferring data between NTFS source and destination, you need to think about inherited permissions and how they will affect permissions on the source and destination. If the source and destination are inheriting different permission settings from their parents, the result will be different file permissions between the source and destination.
- To set application-wide default settings, click **Options** on the **Tools** menu. Changes affect only new policies. Existing policies are not affected.

1. Perform one of the following actions:
  - Right-click a policy and click **Properties**.
  - Select a policy and click  **Edit** on the **Properties** tab that appears in the right pane.
2. Click **Replication Security**.
3. **(CIFS only)** You can choose how you want VFM to handle security descriptors when replicating files for the policy. Choose to copy security descriptors:
  - **Each time the file or folder is copied** - Copies security descriptors from source to destination each time the file or folder is copied. This is the default option.
  - **Only if target file or folder does not exist** - Preserves security descriptors of files that exist in the destination and only copies security descriptors of source files if the files do not exist in the destination. Use this option if you want to preserve the security setting on files that already exist on the destination.
  - **Never** - Does not copy the security descriptor of source files. Use this option when you set security on the destination and you want the files to inherit the security of the destination rather than having the security match that of the

source.

- **Always copy security descriptor** - Copies the security descriptor from the source file to the destination file whether or not the files are different. This can be useful in scenarios where file contents are already synchronized between the source and destination but permission changes have been made to source files after their contents have been replicated to the destination.
4. **(CIFS only)** Select **Process local trustees in security descriptor** to translate or remove security identifiers (SIDs) from security descriptors of files copied from the source. The default option is to translate the SID. If a local group is not found on the destination, VFM creates a local group, and if the SID cannot be translated, VFM translates it to the Local Administrators group in the destination. When transferring data to a domain controller, you must clear the "Process local trustee in security descriptor" check box. Domain controllers only have domain SIDs and the processing of local SIDs is not applicable.
    - **Remove the SID from the security descriptor** - Deletes access control entries containing local SIDs from the destination copy of the file. The source files are not modified. Use this option when you do not want to migrate local security settings from the source to the destination. If the owner or primary group of a file or directory being transferred corresponds to a local SID, it is translated to the local administrators group in the destination because the owner and group IDs cannot be removed.
    - **Translate the SID to the same trustee name and type on the target** - Translates local SID in the source files to a local SID in the destination that corresponds to a trustee of the same name and type. Use this option to preserve local security settings in the destination.
  5. **(CIFS only)** Select **Create local groups on the target if not found** if you did not already create local security groups on the destination. This is the default if "Translate the SID to the same trustee name and type on the target" is selected.
  6. **(CIFS only)** If the SID cannot be translated, select one of the following options:
    - **Leave it as it is** - Copies the source files without modifying the SID. Use this option to preserve the ACE even though the SID cannot be translated.
    - **Remove the SID from the security descriptor** - Deletes access control entries containing local SIDs. Use this option when the SIDs cannot be translated. If the owner or primary group of a file or directory corresponds to a local SID, it is translated to the local administrators group in the destination because the owner ID cannot be removed.
    - **Translate to local administrators group** - Replaces the SID read from the source files with the SID of the local administrators group in the destination. Use this option when you want the SID to be meaningful in the destination. This is the default if the SID cannot be translated. Security settings on the source files are not modified.
  7. Choose whether you want to allow loss of security information.
    - **(CIFS only)** In cases where the destination targets do not support security information supported in the source target (for example, when you are copying from NTFS to FAT), you can select **Allow loss of security information**. This copies files to the destination targets that lose security information.
    - **(NFS only)** Whether this option is selected or not selected, VFM copies the

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contents of the source target to the destination targets. When this option is selected and VFM cannot copy the security information of the source target to the destination targets, error messages are suppressed. When this option is not selected and VFM cannot copy the security information of the source target to the destination targets, VFM shows error messages.

8. Click **OK**.

## Select file attribute replication options

Select VFM file attributes replication options for a policy.

**Note:** To set application-wide default settings for use in creating new policies, click **Options** on the **Tools** menu. Changes affect only new policies. Existing policies are not affected.

1. Perform one of the following actions:
  - Right-click a policy and click **Properties**.
  - Select a policy and click  **Edit** on the **Properties** tab that appears in the right pane.
2. Click **Attribute Replication**.
3. Determine whether the source and destination files have changed. You can select to **compare** files when you specify "Set", "Clear", or "Unchanged" as the action to perform on the destination files.
  - **When "Compare" is selected** and the source and destination files are the same, but the attribute of the source and destination files are different, VFM copies the source and performs the task you specified for the destination file.
  - **When "Compare" is not selected** and the source and destination files are the same, but the attribute of the source and destination files are different, VFM does not copy the source file.
4. Specify how you want to configure the attribute of destination files. For each attribute listed, select one of the following actions:
  - Preserve the attribute of the source files (Match).
  - Turn on the attribute of the destination files (Set).
  - Turn off the attribute of the destination files (Clear).
  - Do not change the destination files (Unchanged).

**Note:** When transferring NFS data and you "Clear" the Read-Only attribute, write permission is granted to users and groups.

5. VFM performs the replication and then sets the last access time of the source file back to what it was prior to the replication operation. When **Preserve last access time** is not selected, the replication operation causes the last accessed time stamp on the source target to be updated. Selecting this option incurs extra processing and slows replication performance.

**Note:** When you migrate data from Novell sources, you must clear the "Preserve last access time" option.

6. Specify the retention information for files copied to SnapLock™ volumes on NetApp filers. You can specify a time and date or the length of time files are to be locked after they are copied.

**Notes:**

- When you copy files to be locked on a SnapLock volume, you must "Set" the Read-Only attribute.
- For more information about SnapLock volumes, see the [Data ONTAP™ 6.5 Data Protection Online Backup and Recovery Guide](#) (Part number 210-00476).

7. Click **OK**.

### Run customized commands during migration

VFM enables you to specify batch files to run as the first action in a migration task or as the last action.

1. Perform one of the following actions:
  - Right-click a migration policy and click **Properties**.
  - Select a migration policy and click  **Edit** on the **Properties** tab that appears in the right pane.
2. Click **Actions**.
3. Select **Run batch file** and type or browse for the batch files that you want to run.
4. Click **OK**.

**Notes:**

- See "Running batch files" in the VFM [Advanced Configuration and Techniques Guide](#) for detailed information about configuring batch files to run in VFM storage policies.
- See "Batch files" in the VFM [Advanced Configuration and Techniques Guide](#) for detailed information about the example scripts provided by VFM.

### Add a migration task

Specify the source and destination of data transfers in a migration task. VFM makes it easy to create a migration task by providing a wizard that guides you through the process. You can associate multiple tasks with a given policy.

#### Notes:

- When transferring data between NTFS source and destination, you need to think about inherited permissions and how they will affect permissions on the source and destination. If the source and destination are inheriting different permission settings from their parents, the result will be different file permissions between the source and destination.
- Data transfer must occur within the same protocol (for example, CIFS to CIFS or NFS to NFS).
- A migration task can only contain CIFS source and destinations or NFS source and destinations, but not both protocols.
- CIFS physical paths must be UNC paths (for example, \\<machine>\<share>).

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- The source and destination must be UNIX fully qualified paths (for example, <hostname>:/<root>/<subdirectory>/<file>).
- NFS 3 or higher must be running on the source and destination.
- A replication agent must be installed on the source or destination or you can specify a default proxy.
  - See "Specify default replication agents" in the VFM [Advanced Configuration and Techniques Guide](#) for instructions about how to specify default Windows and UNIX proxy machines.
  - See "Specify a proxy machine" in the VFM [Advanced Configuration and Techniques Guide](#) for instructions about how to specify a Windows or UNIX proxy machine.
- During the data transfer process, the entries that referenced the source location are updated to reference the data at the new location on the destination. For example, you want to migrate data from *SourceServer* to *NewServer*
  - **Source** - SourceServer.domain.com:/export/home
  - **Destination** - newServer.domain.com:/export/legacy/home

The automount file contains a line that references the source.

- /home SourceServer:/export/home/myHome

When the migration task runs, the line in the automount file is updated to reference the destination.

- /home NewServer.domain.com:/export/legacy/home/myHome
- VFM automatically runs a script named "namespaceupdate" if it is found in the directory containing an automount file you are updating. VFM runs the script after the automount file is updated. The script can be used to perform custom processing of your automount files. For example, an updated automount file is named *nis:/var/local/yp/automount.new*. VFM searches for the namespaceupdate script file in the directory *nis:/var/local/yp/namespaceupdate*. If the script file is found, VFM executes it and returns the status.
  - If the namespaceupdate script is not found in the directory containing an updated automount file, VFM runs the command "make" in the same directory as the automount file. The command "make" searches for a file named "Makefile" and executes the commands in the file. For example, if the automount file is located in the directory *nis:/var/local/yp/automount.new*, the command "make" searches for a "Makefile" file in the directory *nis:/var/local/yp/Makefile*.
  - If the "Makefile" file is not found in the same directory as the automount file, VFM shows an error status.

1. Perform one of the following actions:
  - Drag a share (UNC path) from Windows Explorer to a migration policy.
  - Right-click a migration policy and click **Add task to policy**.
  - Drag a machine, share, or export from the Physical View to a migration policy.
  - Drag a machine, share, or export from the Physical View to the Migration Policies folder. Select an existing policy or create a new policy.
  - Right-click a machine, share, or export in the Physical View and then click **New Migration Task**. Select an existing policy or create a new policy.
  - Select a machine in the Physical View to display a Properties tab in the right pane and drag a share or export to a migration policy.
  - Select a link in the Logical View to display a Properties tab in the right pane and drag a share under Target to a migration policy.
2. Type the source path in the **Original Path** field or click **Browse** to locate a shared folder, export, or machine.
3. Type the destination path or click **Browse** to locate a shared folder, export, or machine.
4. Click **Next**. If the source path is a machine, you can select whether to migrate all shares, only migrate shares referenced by the logical namespace, or migrate all exports. To continue, click **Next**.
5. Review the list of source and destinations:
  - Clear the items that you do not want to include in the migration.
  - To change a destination path, click the destination path and type a new path or click  **Browse** to locate a new share or export.
  - **(CIFS only)** Clear **Warn if destination already contains files or folders** if you do not want VFM to check for destination shares that are not empty.
6. Click **Next**. VFM checks for duplicate paths in other tasks. If VFM finds a match, a dialog box lists the name of the policy containing the duplicate path and highlights the path. Click **Back** to make changes.
7. Click **Next**. VFM checks for empty destinations (CIFS only) and destinations that do not exist (CIFS and NFS).
8. If VFM finds destinations that are not empty, the items appear in a list. You can continue or select each destination and type a different destination, browse for another destination, or remove the destination from the migration process.
9. If VFM finds destinations that do not exist, the destinations appear in a list with a suggested local path for each destination.
  - **(CIFS only)** To change the local path for multiple items, select the items and click **Rebase**. Type your changes and click **OK**. To change the local path for one item, select the item and type the new local path.
  - **(NFS only)** To change an export point, select it and type a new local path. The export point must be the same as or a parent of the destination export. The following example shows acceptable export points.

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| Destination export                | Acceptable Export Points                                 |
|-----------------------------------|----------------------------------------------------------|
| morla:/home/directory1/directory2 | /home<br>/home/directory1<br>/home/directory1/directory2 |

- To accept all or some of the suggested local paths, select the items on the list and click **Create Destination Share (CIFS only)** or click **Create Destination Export (NFS only)**.

### Notes:

- When you create an export on a NetApp filer, the path must begin with "/vol/" followed by a valid name of a volume (for example, /vol/vol1/<directory> or /vol/vol0/<directory>/<subdirectory>). The volume must not already be exported.
- If part of the destination export path is already exported, VFM creates the new export path under the current export and no new export is created.
- When you create an export on a UNIX machine, VFM creates all the path elements specified.
- The permissions on the source are copied to the destination.
  - If data transfer is between different platforms (for example, Linux, Solaris, or a filer), VFM translates the applicable security permissions for the new export.
  - If the directory already exists, the source permissions are copied to the destination. The ability to set UID and GID permissions must be enabled on the NFS volume where you want to create the export. The VFM server runs with NFS credentials of root. The export must be configured to enable the machine hosting VFM to log in as root. If you are overriding the NFS credentials set for VFM, you must be the current owner of the destination directory.
- To create exports on the destination machine, you must set shell credentials for UNIX machines and filers participating in data transfer. See "Change the shell credentials of a filer" or "Change the shell credentials of a UNIX machine" in the VFM [Manage Physical Resources Guide](#) for instructions about how to set shell credential in VFM.

10. Click **Next**.
11. VFM displays a list of source and destination paths that are validated. You can clear items that you do not want to migration or change the destination path of an item.
12. Click **Next**.
13. **(CIFS only)** If the policy has the action to update the namespace, a list of links to be updated appears. Clear any links that you do not want to update.
14. Click **Finish**.

**Note:** VFM enables you to monitor the progress of a migration task. See "View progress of a task."

## Schedule to run tasks

Schedule to run all the tasks of a policy. After a migration task is complete, VFM does not run the task again.

1. Right-click a migration policy and click **Properties**.
2. Click **Schedule**.
3. Click **Add** and configure the schedule.
4. Click **OK**.

## Specify migration tasks from a file

VFM enables you to specify the source and destination of data transfers from a batch file.

1. Perform one of the following actions:
  - Right-click a migration policy and click **Properties**.
  - Select a migration policy to show a Properties tab in the right pane. Click  **Edit**.
2. Click **General** and select **Run task creation batch**.
3. Type the path and name of a batch file or click **Browse** to find a file in your network.
4. Click **OK**.

**Note:** See "Data migration considerations" for information about creating a migration tasks file.

## Update the properties of a migration task

VFM enables you to update the properties of a migration task before it starts. You can change the source and destination and determine which links targeting the source you want to update.

1. Right-click a  scheduled task and click **Properties**.
2. Update the task properties.
3. Click **OK**.

## Start a migration task immediately

You can bypass the replication schedule and manually start a migration task.

Perform one of the following actions:

- Open a folder under a migration policy, double-click a machine, right-click a task, and

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then click **Start task now**.

- Select a migration policy to show a Properties tab in the right pane. Under "Tasks", right-click a task and click **Start task now**.

## Start all tasks for a policy immediately

You can bypass the replication schedule and manually start all the tasks associated with a policy.

Perform one of the following actions:

- Right-click a policy and click **Start policy now**.
- Select a policy to show a Properties tab in the right pane. Right-click anywhere on Properties tab and click **Start policy now**.

## View progress of a task

After you start a migration task, VFM provides detailed information about the progress of the task.

1. Select the task to display tabs in the right pane.
2. Click the **History** tab.
3. Click **Show Details** to view detailed information about the progress of a task.

**Note:** To create a report of a task history, click  **Save Report**. The report appears under **Reports** in the tree.

## User action required

When a task  requires user action, VFM provides a list of actions from which you can choose

1. Select the task to display tabs in the right pane.
2. Click the **History** tab.
3. Under "User action is required...", click an action. The results of the action appear on the page.

The following table lists the actions and provides an explanation for each action.

| Action                                                  | Explanation                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Go back to the first action <b><u>now</u></b> .         | Restart the migration from the beginning immediately. Going back to the first action starts with the first checked action for the policy. If you make changes to the selected actions for the policy and then use this option, the changed settings are used on the reprocessing of the policy. |
| Go back to the first action <b><u>the next time</u></b> | Restart the migration from the beginning                                                                                                                                                                                                                                                        |

| Action                                                              | Explanation                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>the policy runs.</u>                                             | when the task is scheduled to run. Going back to the first action starts with the first checked action for the policy. If you make changes to the selected actions for the policy and then use this option, the changed settings are used on the reprocessing of the policy.                                                     |
| Retry the last action <u>now.</u>                                   | Start the last action immediately.                                                                                                                                                                                                                                                                                               |
| Retry the last action <u>the next time the policy runs.</u>         | Restart the migration task at last action completed when the task is scheduled to run.                                                                                                                                                                                                                                           |
| Continue with the next action <u>now.</u>                           | Start the next action immediately.                                                                                                                                                                                                                                                                                               |
| Continue with the next action <u>the next time the policy runs.</u> | Restart the migration task with the next action when the task is scheduled to run.                                                                                                                                                                                                                                               |
| Suspend the task <u>now.</u>                                        | Cancel the current action and stop the migration process. A suspended task appears with no status  . To take action on a suspended task, select the task to display tabs in the right pane. Click the <b>History</b> tab and select an action. |

## Suspend a migration task

Interrupt the current action and stop the migration process. A suspended task appears with no status .

Perform one of the following actions:

- Right-click a task and click **Suspend task now.**
- Select a policy folder to display a Properties tab in the right pane. Under Tasks, right-click a task and click **Suspend task now.**

**Note:** To resume or take another action on a suspended task, select the task to display tabs in the right pane. Click the History tab and select an action.

## Remove a task

VFM enables you to easily delete migration tasks. When a task is removed from a policy, the task history is also deleted. If you want to keep this information, select the task to display a History tab in the right pane. Print or save the information as a report.

1. Perform one of the following actions:
  - Right-click a migration task and click **Remove from Policy.**
  - Select the policy to show a Properties tab in the right pane. Under Task, right-click a task and click **Remove from Policy.**
2. Click **Yes.** A status report appears.

### Delete a migration policy

When you delete a migration policy, the machines, shares, and exports that are members of the policy are not deleted from the namespace.

1. Perform one of the following actions:
  - Right-click the policy and click **Delete**.
  - Select the Migration Policies folder to view a list of policies in the right pane. Right-click a policy and click **Delete**.
2. Click **Yes**. A status report appears.

**Note:** If a migration task is in progress when you delete the policy, the migration task runs until it is complete.

# Chapter 3 Replication policies

VFM replication policies enable you to transfer CIFS and NFS data. In addition to the data, VFM transfers attributes and permissions.

Before you get started creating a replication policy, review the information in the topic "Replication planning considerations." The topic covers detailed information, such as the permissions the account used by the VFM server and monitoring agent must have.

---

## How to create and manage replication policies

To create your first policy, follow the basic steps listed below:

1. Create a replication policy.
2. Add or replace the source link.
3. Add or replace the target link.
4. Optionally change the data distribution path.
5. Schedule data distribution.

### Create a replication policy

Add a data distribution policy and centrally manage the policy from the Replication Policies folder in the Admin View. The VFM replication agent supports replication across heterogeneous Windows and UNIX devices.

1. Perform one of the following actions:
  - On the **Tools** menu, click **New Policy**, point to **Data Movement Policies**, and then click **Replication Policy**.
  - Drag a link to the Replication Policies folder.
  - Right-click the **Data Movement Policies** folder, point to **New**, and then click **Replication Policy**.
  - Right-click the **Replication Policies** folder and click **New Replication Policy**.
  - Right-click  **Admin View**, click **New**, point to **Data Movement Policy**, and then click **Replication Policy**.
2. Type a word or phrase that best describes this policy in the **Name** field. The name appears under the Replication Policies folder and on the **Properties** tab of items that are members of the policy.
3. In the **Source** field, type a CIFS or NFS physical path or the name of a  link that references a single CIFS target, or click **Browse** to locate the source. If the source is a single target link , it must be writable. The source can be a member of more than one replication policy.
4. In the **Target** field, type CIFS physical paths and/or links that reference CIFS targets **or**

## Transfer Data

- NFS physical paths. A target  link can reference multiple targets. The target can only be a member of one replication policy.
5. You can select another location where operation of the replication policy is performed. The default is to run from the VFM server. From the **Use the Monitor on** list, select the hostname of another monitoring agent.
  6. Click **OK** to save the policy.

### Notes:

- Data transfer must occur within the same protocol (for example, CIFS to CIFS or NFS to NFS).
- A policy can only contain CIFS source and destinations or NFS source and destinations, but not both protocols.
- NFS physical paths must be UNIX fully qualified paths (for example, <machine>:/<UNIX local path>).
- CIFS physical paths must be UNC paths (for example, \\<machine>\<share>).
- **(CIFS only)** It is recommended that you add only links that have shared folders as their targets to replication policies. Due to replication agent location considerations, it is not recommended that you add links to replication policies that have a DFS root or another link as their target.
- When configuring replication, you should not configure overlapping source and destination directory hierarchies. This can result in unintended repeated duplication of files.
- If you uninstall a monitoring agent, ensure that replication policies that formerly used the uninstalled agent are reassigned to a currently available agent.

## Select replication options

VFM enables you to configure replication, file security, and replication differencing options. See the following migration policy topics:

- "Select replication options"
- "Select file security replication options"
- "Select differential replication options"
- "Select file attribute replication options"

**Note:** When transferring data between NTFS source and destination, you need to think about inherited permissions and how they will affect permissions on the source and destination. If the source and destination are inheriting different permission settings from their parents, the result will be different file permissions between the source and destination.

## Schedule data distribution

Select how and when you want to distribute content automatically from remote machines across a network.

- Before you schedule data replication, review your network bandwidth and infrastructure. For example, review the rate of data changes and link speeds.
  - VFM enables you to set the data transfer rate or throttling for a machine. In the Physical View tree, right-click a machine, click **Properties**, and click the **Agent** tab.
  - To set application-wide default settings, click **Options** on the **Tools** menu. Changes affect only new policies. Existing policies are not affected.
1. Right-click a policy and click **Properties**.
  2. Click **Use replication schedule**.
  3. Click **New** and configure the schedule.
  5. Optionally, select **Use alternate schedule when the policy fails**, and type a frequency (in minutes) to run the schedule any time replication fails.
  6. Click **OK**.

### Notes:

- You can bypass the replication schedule and manually start the replication process anytime you want. Right-click a replication policy and click **Start Replication Now**.
- The tool tips for Replication policies in the tree view display the time that a replication last occurred and the location of the agent handling the replication.

## Change data distribution path

Reconfigure a data distribution path to more effectively move data to targets that are geographically close together. When you create a replication policy, VFM configures data distribution to be from the source target to each destination target. You can change the configuration to create a cascaded replication topology.

1. Select a replication policy.
2. Click the **Replication Topology** tab that appears in the right pane.
3. Drag a source target to the intended destination or child target to transfer data **from** the dragged target **to** the destination or child target. **Show me**
4. Repeat Step 3 until you configure the data distribution the way you want it.
5. Click **Apply Changes**.

## Change replication for a target

Normally, all targets use the VFM replication agent. You can select to use another replication.

1. Select a policy.
2. Click the **Replication Topology** tab that appears in the right pane.

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3. Right-click a target path and click **Use other replication**.
4. Click **Apply Changes**.

### Notes:

- Replication status monitoring is only available for targets using the VFM replication agent.
- If a source target is using another replication, all targets of the source must use the same replication. To change back to the VFM replication agent, you must first change the replication of the source target.

## Add or replace the source

Easily add a source to a replication policy or replace the existing source of a policy.

1. Perform one of the following actions:
  - Drag a  single target link from the Logical View, a shared folder from the Physical View, a shared folder (UNC path) from Windows Explorer, or an export from the Physical View. Select **As the source path**.
    - If the policy did not have a source, the newly added item becomes the source.
    - If the policy already had a source, the newly added item replaces the current source.
  - Drag a shared folder from the Physical View or a shared folder (UNC path) from Windows Explorer. Select **Replace the existing source link's target**. The shared folder replaces the share of the policy's source link.
2. Click **OK**.

### Notes:

- When transferring data between NTFS source and destination, you need to think about inherited permissions and how they will affect permissions on the source and destination. If the source and destination are inheriting different permission settings from their parents, the result will be different file permissions between the source and destination.
- Links that are already members of disaster recovery policies cannot be members of a replication policy because links contained in disaster recovery policies can only have one active target.
- An item that is already a destination in a replication policy cannot be a source of another replication policy.
- It is recommended that you add a link that has a shared folder as its target to a replication policy. Due to replication agent location considerations, it is not recommended that you add a link to a replication policy that has a DFS root or another link as its target.
- When configuring replication, you should not configure overlapping source and destination directory hierarchies. This can result in unintended repeated duplication of files.
- See the "Notes" in "Create a replication policy" for more information.

## Add or replace the target

Easily add a target to a replication policy or replace the existing target of a policy.

1. Perform one of the following actions:

- Drag a  single target link or  replicated link from the Logical View to a replication policy. Select **Add it to the list of destination paths** to add a new target or select **Replace existing destination path** and select the destination in the policy you want to replace from the list.
- Drag a shared folder from the Physical View or a shared folder (UNC path) from Windows Explorer to the replication policy. Select **Add it to the list of destination paths** to add a new target or select **As an additional target for an existing destination link** and select the destination link in the policy you want to add the share.
- Drag an export from the Physical View to the replication policy. Select **Add it to the list of destination paths** to add a new target.

2. Click **OK**.

## Transfer Data

### Notes:

- Links that are already members of disaster recovery policies cannot be members of a replication policy because links contained in disaster recovery policies can only have one active target.
- A link that is already a destination link in a replication policy cannot be a destination link of another replication policy.
- It is recommended that you add only links to a replication policy that have shared folders as their targets. Due to replication agent location considerations, it is not recommended that you add links to a replication policy that have a DFS root or another link as their target.
- When configuring replication, you should not configure overlapping source and destination directory hierarchies. This can result in unintended repeated duplication of files.

## Change the replication schedule

Change the time and date of a schedule or add another schedule.

1. Right-click a policy and click **Properties**.
2. Click **Replication Schedule**.
3. Update an existing schedule or add a new schedule.
4. Click **OK**.

## Start replication immediately

You can bypass the replication schedule and manually start the data distribution process any time you want.

Perform one of the following actions:

- Right-click a replication policy and click **Start Replication Now**.
- Select a replication policy to show tabs in the right pane. Right-click anywhere on the Properties or Status tab and click **Start Replication Now**.

### Notes:

- This menu item is disabled if a data replication operation is in progress.
- To view information about any replication in progress, click the Replication Tasks tab on the right pane and click .

## Cancel a replication in progress

Perform one of the following actions to stop a data distribution operation:

- Right-click a replication policy and click **Cancel Replication In Progress**.
- Select a replication policy to show tabs in the right pane. Right-click anywhere on the Properties or Status tab and click **Cancel Replication In Progress**.

**Note:** To view information about any replication in progress, click the Replication Tasks tab and click .

## Run customized commands

VFM enables you to specify batch files to run before and after a replication operation.

1. Perform one of the following actions:
  - Right-click a replication policy and click **Properties**.
  - Select a replication policy and click  on the **Properties** tab that appears in the right pane.
2. Click **Replication Scripting**.
3. Select the options you want and type or locate the batch files you want to run.
4. Click **OK**.

**Notes:**

- See "Running batch files" in the VFM [Advanced Configuration and Techniques Guide](#) for detailed information about configuring batch files to run in VFM storage policies.
- See "Batch files" in the VFM [Advanced Configuration and Techniques Guide](#) for detailed information about the example scripts provided by VFM.

## View information about replication operations

View information about replication operations configured in VFM. By default, the information for all replication operations appears. You can filter the information to see only replication operations with problems or only replication operations in progress.

- To view information about replication operations for all policies, select the Replication Manager Policies folder in the Admin View and click the Replication Tasks tab in the right pane.
- To view information about replication operations for one policy, select the policy and click the Replication Tasks tab in the right pane.

### Compare contents of targets in a replication policy

Quickly compare the contents of the source with the contents of each of the targets in the destination contained in a replication policy.

1. Right-click a replication policy, point to **Reports**, point to **Physical**, and then click **File Differences**. The source target appears in the **Compare** field and the destination targets appear in the **To** field.
2. Click **Next**.
3. Type a name for your report and select how you want to save it.
4. Click **Finish**.

### View properties of a replication policy

View the properties of a replication policy.

Perform one of the following actions:

- Right-click a policy and click **Properties**.
- Select a policy. A **Properties** tab appears on the right pane.

### Delete a destination target

When you delete a target, it is removed from the replication policy. If the target is referenced by a link, it is also removed from the logical namespace. The target is not deleted from the machine where it resides.

1. Select a policy and click the **Replication Topology** tab in the right pane.
2. Right-click a folder and click **Delete**.
3. Click **Yes**. A status report appears.

### Delete a replication policy

Deleting a replication policy does not delete the targets that are members of the policy.

1. Perform one of the following actions:
  - Right-click the policy and click **Delete**.
  - Select the Replication Policies folder to view a list of policies in the right pane. Right-click a policy and click **Delete**.
2. Click **Yes**.

# Chapter 4 SnapMirror policies

SnapMirror policies enable you to create and centrally manage replication between NetApp filers in your network. You can integrate SnapMirror data replication with your namespace. VFM provides a central view of events from all managed NetApp filers. You receive detailed reporting of filer configuration and status information.

This chapter is arranged in the following sections:

- "Manage SnapMirror policies" explains how to create and manage SnapMirror policies.
- "Manage SnapMirrors" explains how to create and manage SnapMirrors using VFM.
- "Manage qtrees" explains how to create and manage qtrees using VFM.

## Prerequisite

When administering SnapMirror information, the account running VFM must have administrator privileges on any managed filers to access the `\\filer\C$` share and read and write files in the *etc* directory of the filer. VFM also uses *RSH* to communicate with filers when managing SnapMirrors and qtrees. The administrator user name and password for VFM to use when communicating with filers is configured through the machine properties dialog box for the filer.

- If the filer participates in namespace:
  1. Right-click the filer in the Physical View and click **Properties**.
  2. Click the **NetApp Filer** tab, type the information requested, and click **OK**.
- If the filer does not participate in the namespace but is a member of a SnapMirror policy:
  1. Double-click the SnapMirror policy to show all the filers that are members of the policy.
  2. Right-click the filer and click **Properties**.
  3. Click the **NetApp Filer** tab, type the information requested, and click **OK**.

---

## Manage SnapMirror policies

This section provides instructions about how to create and manage SnapMirror policies to replicate data between filers.

### Create a SnapMirror policy

Manage data replication on your NetApp filers using SnapMirrors.

- Make sure that VFM can access the filers that are members of the policy. If you did not provide VFM with the system or administrative user account and password for each filer, you cannot manage the filers in your policy. To add the account and password of a filer, first add the filer to the policy as stated below, select the filer, click **Properties**, and click the **Filer Account** tab.

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- You must be able to access the C\$\etc directory on the filer to read and write SnapMirror-related files. If the account running VFM does not have appropriate privileges to the filer shares, you must explicitly map to the share using a user name and password for a privileged account and then add the filer to the SnapMirror policy.
1. Perform one of the following actions:
    - On the **Tools** menu, click **New Policy**, point to **Data Movement Policies**, and then click **SnapMirror Policy**.
    - Drag a filer from the Physical View to the SnapMirror Policies folder in the Admin View.
    - Right-click the **Data Movement Policies** folder in the Admin View, point to **New**, and then click **SnapMirror Policy**.
    - Right-click the **SnapMirror Policies** folder and click **New SnapMirror Policy**.
    - Right-click  **Admin View**, click **New**, point to **Data Movement Policy**, and then click **SnapMirror Policy**.
    - Select the SnapMirror Policies folder to display the Properties tab in the right pane. Right-click anywhere on the tab and click **New SnapMirror Policy**.
  2. Type a word or phrase that best describes this policy in the **Name** field.
  3. Click **ADD** and type the name of a filer, or click  **Browse** to locate a filer in your namespace or network.
  4. Repeat Step 3 to add additional filers.
  5. Click **OK**. The new policy appears under the **SnapMirror Policies** folder.

## Remove a filer from a policy

If a filer is also a member of the namespace, removing the filer from a policy does not delete the filer from the namespace.

1. Right-click the SnapMirror policy in which the filer is a member and click **Properties**.
2. Select the filer and click **Remove**.
3. Click **OK**.

## Add filers to a policy

Add filers to a SnapMirror policy to configure SnapMirror or to manage existing SnapMirrors.

1. Perform one of the following actions:
  - Drag a filer from the Physical View to the policy. Continue with Step 3.
  - Right-click a SnapMirror policy and click **Properties**.
  - Select a policy to display a Properties tab in the right pane and then click  **Edit**.
2. Click **ADD** and type the name of a filer, or click  **Browse** to locate a filer in your namespace or network.

3. Click **OK**.

## Update properties of a SnapMirror policy

Update the properties of a SnapMirror policy.

1. Open the **SnapMirror Policies** folder in the Admin View.
2. Perform one of the following actions:
  - Right-click a policy and click **Properties**.
  - Select a policy to display the **Properties** tab in the right pane and then click  **Edit**.

## Delete a SnapMirror policy

Deleting a SnapMirror policy does not affect portions of the logical namespace referencing filers contained in the policy. SnapMirrors contained in SnapMirror policies remain configured on filers after you delete a SnapMirror policy. To delete a SnapMirror see "Delete a SnapMirror."

1. Perform one of the following actions:
  - Right-click the policy and click **Delete**.
  - Select the SnapMirror Policies folder to view a list of policies in the right pane. Right-click a policy and click **Delete**.
2. Click **Yes**.

---

## Manage SnapMirrors

This section explains how you can use VFM to configure SnapMirrors on NetApp filers. For detailed information about SnapMirror data replication or a specific SnapMirror command, see the NetApp [Data ONTAP Data Protection Guide](#).

### Create a SnapMirror

Configure a SnapMirror on a NetApp filer. To manage filers, VFM must be configured with the system or administrative user account and password of the filer and have privileges to read and write files in the \\filer\C\$\etc directory of the file. See "SnapMirrors Policies" for more information. Check with NetApp for SnapMirror version compatibility.

1. Right-click the SnapMirror policy that contains the filer and click **Properties**.
2. Click **SnapMirrors** and click **Create**.
3. Under Source, perform one of the following actions:
  - Select a filer and volume.

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- Select a filer and qtree.
- 4. Under Destination, perform one of the following actions:
  - Select a filer and volume.
  - Select a filer and type the name of a new qtree. When you create a SnapMirror and the destination is a qtree, you must also create the qtree. Do not use an existing qtree as the destination.
- 5. Click **OK**.

**Note:** For detailed information about SnapMirror data replication, see the NetApp [Data ONTAP™ Data Protection Guide](#).

## Schedule replication

Set up automatic data transfer on a SnapMirror.

1. Right-click the SnapMirror policy that contains the SnapMirror and click **Properties**.
2. Click **SnapMirrors** and click **Modify**.
3. Click the **Options and Schedules** tab.
4. Under Schedule, select a preset schedule or a custom schedule. Preset Schedule is the default.
5. Set the schedule. Create a custom schedule using the SnapMirror schedule format. The schedule should be written in the following format with a space between each field:

*<minute hour dayofmonth dayofweek>*

See NetApp documentation for details about SnapMirror schedule formats.

6. Click **OK**.

## Initialize a SnapMirror

Run a baseline SnapMirror data transfer.

1. Right-click a policy and click **Properties**.
2. Click **SnapMirror**, select the SnapMirror, and click **Initialize**.
3. Click **OK**.

## Interrupt a data transfer in progress

Stop a data transfer in progress.

1. Right-click a policy and click **Properties**.
2. Click **SnapMirrors**, select the SnapMirror, and click **Interrupt**.
3. Click **OK**.

## Restart a data transfer

Restart data replication at the next scheduled update.

1. Right-click a policy and click **Properties**.
2. Click **SnapMirrors**, select the SnapMirror, and click **Resume**.
3. Click **OK**.

## Replicate data immediately

Run an unscheduled update of a SnapMirror.

1. Right-click a policy and click **Properties**.
2. Click **SnapMirrors**, select the SnapMirror, and click **Update**.
3. Click **OK**.

## Break a SnapMirror

Break the source/destination relationship.

1. Right-click a policy and click **Properties**.
2. Click **SnapMirrors**, select the SnapMirror, and click **Break**.
3. Click **OK**.

## Quiesce a SnapMirror

Wait for all existing transfers to be complete and then block any further updates.

1. Right-click a policy and click **Properties**.
2. Click **SnapMirrors**, select the SnapMirror, and click **Quiesce**.
3. Click **OK**.

## Resynchronize a SnapMirror

Put a volume back in a mirrored state and synchronize its contents with the source without the initial baseline transfer.

1. Right-click a policy and click **Properties**.
2. Click **SnapMirrors**, select the SnapMirror, and click **Resync**.
3. Click **OK**.

## Transfer Data

### Update properties of a SnapMirror

Modify the properties of a SnapMirror.

1. Right-click a SnapMirror policy and click **Properties**.
2. Click **SnapMirrors**, select the SnapMirror you want to update, and click **Modify**.
3. Update the appropriate information.
4. Click **OK**.

### View information about replication operations

View information about replication operations for one or all policies. By default, the information for all replication operations appears. You can filter the information to see only replication operations with problems or only replication operations in progress.

- To view information about replication operations for all policies, select the SnapMirror Policies folder and click the Replication Tasks tab in the right pane.
- To view information about replication operations for one policy, select the policy and click the **Replication Tasks** tab in the right pane.
- To update SnapMirror information, click  **Refresh SnapMirror Information**.
- To update SnapMirror information at set intervals, click  **Auto Refresh SnapMirror Information**. The information is automatically updated while you are viewing it. By default, VFM updates the information every 60 seconds. You can change the refresh period by clicking **Options** on the **Tools** menu.

### Delete a SnapMirror

Delete a SnapMirror from a filer.

1. Right-click a SnapMirror policy and click **Properties**.
2. Click **SnapMirrors**, select the SnapMirror you want to delete, and click **Delete**.
3. Click **OK**.

---

## Manage qtrees

This section explains how you can use VFM to configure qtrees on NetApp filers.

### Create a qtree

Configure a qtree on a NetApp filer. To manage filers, you must configure VFM with the system or administrative user account and password of the filer and have administrative access to read and write files in the \\filer\C\$\etc directory of the file. See "SnapMirrors Policies" for more information.

1. Right-click a SnapMirror policy and click **Properties**.
2. Click **QTrees** and click **Create**.
3. Select the filer.
4. Select the volume on the filer where you want to create the qtree.
5. Type a name for the qtree.
6. Select the appropriate security style.
7. Select to enable or disable oplocks.
8. Click **OK**.

### Update the properties of a qtree

Change the properties of a qtree.

1. Right-click the policy of which the qtree is a member and click **Properties**.
2. Click **QTrees** and click **Modify**.
3. Update the appropriate information.
4. Click **OK**.

### Delete a qtree

Delete a qtree from a volume in a NetApp filer.

1. Right-click the policy of which the qtree is a member and click **Properties**.
2. Click **QTrees** and click **Delete**.
3. Click **OK**.



# Appendix A Specifying migration tasks from a file

VFM migration policies provide the option of running a batch file to add migration tasks to the policy. You can specify the batch file in the **Run task creation batch** field on the **General** tab of a data migration policy properties dialog box.

## How it works

- Each time the migration policy runs, it invokes the task creation batch file.
- The task creation batch file creates a task description file.
- After the batch file exits, the VFM server performs the following actions:
  - Reads the task description file created by the BAT file.
  - Adds the tasks described in the task description file to the policy.
  - Deletes the task description file.

This enables you to schedule repeated transfers of data for the locations described in the tasks added by the batch file.

## The task creation batch file

VFM invokes the task creation batch file with the following arguments:

<policy name> <taskfile name> <optional user-specified arguments>

The <policy name> is the name of the VFM data migration policy that is invoking the task creation batch file. The <taskfile name> parameter specifies the name and location of a file to which the task creation batch file can write a list of migration tasks for VFM to process. VFM does not create the file. The batch job creates the task file in the task file format described below. VFM processes the contents of the <taskfile name> and processes data migration tasks described in it. After the task is complete, VFM deletes the <taskfile name>.

For example, if you specify TaskCreation.bat in MyMigrationPolicy, VFM invokes your batch file as shown below.:

```
TaskCreation.bat MyMigrationPolicy c:\temp\taskfile0001.xml
```

You can also specify additional arguments to the batch file. If you specify the following in MyMigrationPolicy:

```
ComplexTaskCreation.bat arg1 arg2 arg3
```

VFM invokes your batch file as:

```
ComplexTaskCreation.bat MyMigrationPolicy  
c:\temp\taskfile1234.xml arg1 arg2 arg3
```

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### Task File Description Syntax

- **DFSMIGRATION** (element): required
  - Version: required, must be set to "1"
- **Task** (element): optional (though nothing will happen if you don't have at least one of these)
  - **CurrentTarget** (attribute): required
    - Must be a valid UNC path with at least the \\server\share portions of the path specified.
    - Cannot be a DFS path
    - Cannot be the same as **NewTarget**
  - **NewTarget** (attribute): required
    - Must be a valid UNC path with at least the \\server\share portions of the path specified.
    - Cannot be a DFS path
    - Cannot be the same as **CurrentTarget**
  - **AutoDelete** (attribute): optional
    - If set to "1", then the task is automatically deleted from the policy if it is completed successfully
    - If not present or set to anything other than "1", the task is not automatically deleted
  - **Link** (element): optional
    - "Update DFS" must be selected. Click the **Actions** tab of the policy properties to verify that this action is selected.
    - Only links listed in the task file are updated when the policy runs.
    - **LinkName** (attribute): required
      - The full path of a link to be retargeted
      - Must be a valid UNC path with at least the \\server\share\path portions specified (Note that specifying just \\server\share is invalid).
    - **CurrentTarget** (attribute): optional
      - Indicates the current replica of the link that is to be retargeted
      - If not present, default value is the value of Task>CurrentTarget attribute
      - If present, must indicate the same directory or a subdirectory of the path specified in the Task>CurrentTarget attribute

## Appendix B Example Task Creation batch file

The following example shows a task creation batch file that creates the task description file illustrated in Appendix C.

```
@echo off
rem
rem *****
rem *****
rem FILE: CreateTasks.bat
rem
rem PURPOSE:
rem     Illustrate creating a task-description file
rem
rem
rem INPUT:
rem     %1 Name of the migration policy calling this BAT file.
rem     This is supplied from VFM.
rem     %2 Name of the output xml file. This is supplied from
rem     VFM.
rem
rem COPYRIGHT:
rem     Copyright (c) 2006 Brocade Communications Systems, Inc.
rem     All rights reserved.
rem
rem
rem *****
rem *****/
rem
rem Next two lines set up the start of the XML file to be handed
rem to VFM
rem
echo ^<?xml version="1.0" encoding="UTF-8" ?^> > ExampleTasks.xml
echo ^<DFSMIGRATION Version="1"^> >> ExampleTasks.xml
rem Add first task
echo ^<Task CurrentTarget=^"\\SERVERA\Test\Src1^"
NewTarget=^"\\SERVERB\Test\Dst1^" ^/^> >> ExampleTasks.xml
rem Add second task
echo ^<Task CurrentTarget=^"\\SERVERA\Test\Src2^"
NewTarget=^"\\SERVERB\Test\Dst2^" AutoDelete=^"1^" ^/^> >>
ExampleTasks.xml
rem Add third task
echo ^<Task CurrentTarget=^"\\SERVERA\Test\Src3^"
```

## Transfer Data

```
NewTarget=^"\SERVERB\Test\Dst3^" AutoDelete=^"0^" ^/^> >>
ExampleTasks.xml
rem Add fourth task
echo ^<Task CurrentTarget=^"\SERVERA\Test\Src4^"
NewTarget=^"\SERVERB\Test\Dst4^" AutoDelete=^"1^" ^/^> >>
ExampleTasks.xml
echo ^<Link LinkName=^"\ROOTSERVER\Root\Link^" ^/^> >>
ExampleTasks.xml
echo ^<Link LinkName=^"\ROOTSERVER\Root\OtherLink^" ^/^> >>
ExampleTasks.xml
echo CurrentTarget=^"\SERVERA\Test\Src4\Subdir^" ^/^> >>
ExampleTasks.xml
echo ^</Task^> >> ExampleTasks.xml
rem
rem Terminate the XML file and copy it to where VFM told us to
put it
rem
echo ^</DFSMIGRATION^> >> ExampleTasks.xml
copy ExampleTasks.xml %2
rem
rem Delete our temporary file
rem
del ExampleTasks.xml

exit 0
```

## Appendix C Example Task Description file

The following example shows the task description file created by the batch file illustrated in Appendix B that adds four tasks to a migration policy.

- The first task migrates data from `\\SERVERA\Test\Src1` to `\\SERVERB\Test\Dst1` and leaves the task in the policy after it is completed successfully.
- The second task migrates data from `\\SERVERA\Test\Src2` to `\\SERVERB\Test\Dst2` and the task is automatically removed from the migration policy after the task is completed successfully.
- The third task migrates data from `\\SERVERA\Test\Src3` to `\\SERVERB\Test\Dst3` and explicitly specifies that the task is not to be removed from the policy after it is completed successfully.
- The fourth task migrates data from `\\SERVERA\Test\Src4` to `\\SERVERB\Test\Dst4`, retargets `\\ROOTSERVER\Root\Link` to reference the data at its new location and retargets the link replica of `\\ROOTSERVER\Root\OtherLink` currently targeted at `\\SERVERA\Test\Src4\Subdir` to reference beneath the new location.

```
<?xml version="1.0" encoding="UTF-8" ?>
  <DFSMIGRATION Version="1">
    <Task CurrentTarget="\\SERVERA\Test\Src1"
NewTarget="\\SERVERB\Test\Dst1" />
    <Task CurrentTarget="\\SERVERA\Test\Src2"
NewTarget="\\SERVERB\Test\Dst2" AutoDelete="1" />
    <Task CurrentTarget="\\SERVERA\Test\Src3"
NewTarget="\\SERVERB\Test\Dst3" AutoDelete="0" />
    - <Task CurrentTarget="\\SERVERA\Test\Src4"
NewTarget="\\SERVERB\Test\Dst4" AutoDelete="1">
      <Link LinkName="\\ROOTSERVER\Root\Link" />
      <Link LinkName="\\ROOTSERVER\Root\OtherLink"
CurrentTarget="\\SERVERA\Test\Src4\Subdir" />
    </Task>
  </DFSMIGRATION>
```



# Appendix D Documentation

The following table lists the VFM guides. The list is arranged in ascending order by document title.

| No. | Title                                 | File name                | Contents                                                                                                                                                                                                                                                                                                                                                      |
|-----|---------------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.  | Advanced Configuration and Techniques | VFMAdvConfig.pdf         | <ul style="list-style-type: none"><li>• Explains how to use VFM to configure security permissions</li><li>• Explains how to manage replication and monitoring agents</li><li>• Explains how to run batch files in policies and reports</li><li>• Explains how to make the VFM server highly available</li></ul>                                               |
| 2.  | Create and Manage Namespaces          | VFMNamespace.pdf         | Explains how to create a DFS namespace (roots, links, and link targets), how to quickly populate the namespace, make the namespace highly available, create multiprotocol namespaces, virtualize user home directories, and back up the namespace.                                                                                                            |
| 3.  | Getting Started                       | VFMGettingStarted.pdf    | A tutorial to get you started using VFM. It explains how to install VFM and steps you through the process of creating a logical namespace, making the namespace highly available, making data highly available, transferring CIFS and NFS data, creating multiprotocol namespaces, virtualizing user home directories, and backing up data and the namespace. |
| 4.  | Make Data Highly Available            | VFMMakeDataAvailable.pdf | Explains how to make data highly available by creating client, filer, and server disaster recovery policies                                                                                                                                                                                                                                                   |
| 5.  | Manage Physical Resources             | VFMPhysicalResources.pdf | Explains how to use VFM to Work with NetApp filers, set replication properties, and work with Windows and UNIX machines                                                                                                                                                                                                                                       |

## Transfer Data

| No. | Title                      | File name              | Contents                                                                                                                                                                                                                                 |
|-----|----------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.  | Manage Snapshots on Filers | VFMSnapshots.pdf       | Explains how to use VFM to manage snapshots on NetApp filers using snapshot access and snapshot scheduling policies                                                                                                                      |
| 7.  | Optimize Storage           | VFMOptimizeStorage.pdf | <ul style="list-style-type: none"> <li>Explains how to create and manage archival migration policies to optimize storage.</li> <li>Explains how to load balance Windows servers by creating storage load balancing policies</li> </ul>   |
| 8.  | Reports                    | VFMReports.pdf         | Explains how to create and publish reports                                                                                                                                                                                               |
| 9.  | Transfer Data              | VFMTransferData.pdf    | <ul style="list-style-type: none"> <li>Explains how to transfer CIFS and NFS data by creating migration and replication policies</li> <li>Explains how to transfer data between NetApp filers by creating SnapMirror policies</li> </ul> |
| 10. | Troubleshooting            | VFMTroubleshooting.pdf | <ul style="list-style-type: none"> <li>Includes diagnostic information, such as troubleshooting, event IDs, migration, replication, and status indicators</li> <li>Provides examples of file exclusions and inclusions</li> </ul>        |

# Glossary

## A

**ACE:** Access Control Entry, an entry in an Access Control List.

**ACL:** Access Control List, a list associated with a file that contains information about which users or groups have permission to access or modify the file.

**Alternate volume:** SEE Replica.

## C

**Child node:** SEE DFS link.

**CIFS:** Common Internet File System. A file-sharing protocol based on the Microsoft Server Message Block (SMB). It enables you to share file systems over the Internet and Intranet. The CIFS protocol is used primarily for file sharing by Windows platforms.

**Client:** The user interface component of the application.

**Consolidation DFS root:** A special stand-alone DFS root that has its configuration information stored locally on a member server. The root must be hosted on Windows Server 2003.

## D

**Dependencies:** The servers, drives, and shared folders that together contain the data published through the DFS namespace

**DFS:** Microsoft Distributed File System consists of software residing on network servers and clients that transparently links shared folders on different file servers into a single namespace for improved load balancing and data availability. NOTE: This should not be confused with Transarc's DFS product, which is a separate distributed file system product that is not interoperable with the Microsoft product.

**DFS branch:** SEE Shared folder.

**DFS leaf:** SEE Shared folder.

**DFS link:** Located under the DFS root. Forms a connection to one or more shared folders, DFS links, or another DFS root. NOTE: In Windows NT 4 terminology, this is referred to as a child node, a junction point, or an inter-DFS link.

**DFS namespace:** The logical view of shared file resources seen by users.

**DFS path:** A UNC path starting at a DFS root. Stand-alone DFS paths are rooted at a stand-alone root, while domain-based paths are rooted at a domain-based DFS root.

**DFS root:** The share at the top of the DFS topology. The starting point for the DFS links and shared folders that make up the DFS namespace.

**DFS topology:** Overall logical hierarchy of a distributed file system, including elements such as roots, links, shared folders, and replica sets.

**DFS tree:** The consolidated DFS view provided by the application, which includes the Admin View, Logical View, Physical View, and Reports.

## Transfer Data

**DFS volume:** SEE Shared folder.

**Domain-based DFS root:** A DFS root that has its configuration information stored in Active Directory. The root can have multiple root targets, which offers fault tolerance and load sharing at the root level.

## E

**Export:** SEE NFS export

## F

**Fault-tolerant DFS:** SEE Domain-based DFS root

**FQDN:** Fully-qualified Domain Name. A host, domain name, and a top-level domain. For example, www.brocade.com is a fully-qualified domain name where www is the host, .brocade is the second-level domain, and .com is the top-level domain.

**FRS:** Microsoft File Replication Service.

## G

**GID:** Group Identification Number. A unique number assigned to identify a group of users in UNIX environments.

## I

**Inter-DFS link:** SEE DFS link.

## J

**Junction point:** SEE DFS link.

## K

**Key-pair:** Consists of a public key and a corresponding private key. It is safe to distribute a public key, but a private key must be kept secret.

## L

**Link target:** A DFS link can have as targets: 1 to N shared folders, OR 1 to N stand-alone DFS paths, OR only 1 domain-based DFS path.

## M

**Migration candidates:** Items that match migration criteria in an archival migration policy. You can select which items you want to migrate. Items not selected for migration are automatically added to the exclusion list of the archival migration policy.

**Migration tasks:** Items to be migrated during a scheduled migration or manually at any time.

**Monitoring agent:** The component that can be installed to evaluate storage policies from a

different machine than the one where the application server is installed.

## N

**NFS:** Network File System developed by Sun Microsystems. A file-sharing protocol that enables you to share file systems over the Internet and Intranet. NFS is used with both UNIX and non-UNIX computers.

**NFS export:** A directory that is published for access by NFS clients. The export specifies a directory to be exported and which machines have access to the directory. NFS exports are similar to CIFS shares in that they provide access to directories.

## P

**Pool:** A group of storage locations.

**Primary server:** An active application server or monitoring agent.

**Primary target:** In a disaster recovery policy, this is the active target to which users are referred by the DFS root.

## Q

**qtree:** A special directory of the root of a volume that behaves like a virtual subvolume with special attributes.

## R

**RAID:** Redundant Array of Independent Disks enables file access even when a disk in a RAID group is damaged.

**References:** The DFS link targeting the selected physical item. For example, when you click a server under the Physical View tree, properties and associated DFS links appear.

**Replica:** A DFS root or DFS shared folder that provides an alternate path for a DFS link. NOTE: In Windows NT 4 terminology, this is referred to as an alternate volume.

**Replica set:** Two or more DFS roots or DFS shared folders that provide alternate paths for a DFS link.

**Replication agent:** The component deployed by the application server or monitoring agent component during configuration of storage policies that transfer CIFS data, or when you run a file differencing report. NOTES: Deployment of replication agents can be controlled through a machine's properties dialog box accessible from the Physical View. For data transfer using the NFS protocol, the replication agent must be installed manually.

**Report schedule group:** Enables you to set a schedule to automatically gather information. A report schedule group can be configured to start during off hours to offload network and computing resources during business hours. You can produce multiple reports from the data gathered without generating additional network traffic.

**Report source group:** Specifies the location where you want to gather information. It is assigned to a report schedule group. A report source group also enables you to specify batch files to run before and/or after the information is gathered.

## Transfer Data

**Report type:** Determines what information is gathered. Report types are assigned to report source groups.

## S

**Secondary target:** SEE Standby target.

**Server:** The component that responds to requests from the client component, monitors the DFS namespace, and processes storage policies.

**Shared folder:** File or folder in the DFS namespace that can be accessed by users who have proper permissions. NOTE: In Windows NT 4, this is referred to as a DFS volume, leaf, or branch.

**SID:** Security identifier that uniquely identifies a Windows user or group.

**Stand-alone DFS root:** A DFS root that has its configuration information stored locally on the host server. The root has a single root target. When the root target is unavailable, the data referenced by links under the root is inaccessible.

**Standby target:** A target in a disaster recovery policy that is offline. During a failover, a standby target can become the active target.

**Storage location:** A combination of a server UNC path and the local path pointing to a directory in the file system. For example, \\rama:c:\ is a storage location representing the C drive on machine "rama" and \\secure.npb.com:/vol/vol0/myqtree is a storage location representing the qtree "myqtree" on volume vol0 on secure.npb.com.

## T

**Target:** LINK TARGET: A shared folder, a DFS link, or a DFS root that is referenced by a DFS link. ROOT TARGET: A shared folder that is referenced by a DFS root. SEE ALSO Link target.

**Trustee:** The user account, group, or logon session to which an Access Control Entry (ACE) applies.

## U

**UID:** User Identification Number. A unique number assigned to identify a user in UNIX environments.

**UNIX file permissions:** Control access to files and directories. Permissions can be applied to the owner of a file, a group, or everyone on the UNIX network.

## W

**Widelink namespace:** A logical namespace hosted on a NetApp filer CIFS share that provides the benefits of a namespace without requiring additional Windows servers.

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