



Replicating data with the HP StorageWorks All-in-One Storage System using HP StorageWorks Storage Mirroring

Introduction	2
Replication alternatives–DFS-R versus StorageWorks Storage Mirroring	2
Reference configuration	3
Installation	4
Minimum requirements.....	4
Replication source HP StorageWorks All-in-One Storage System	4
Replication target system	4
Application server system	5
Networking	5
Installation.....	5
On the replication source and replication target HP StorageWorks All-in-One Storage Systems	5
iSCSI virtual disk file considerations.....	5
Storage Mirroring credentials	6
Configuring replication	6
When migrating application data	6
Already migrated application data	7
Replication options.....	7
Storage options.....	7
Network options.....	9
Other replication considerations	9
Replicating user-defined instances	9
Replication credentials	9
Replication network utilization options	10
Replacing a failed replication target system	10
Data recovery	11
Recovering individual application data areas	11
Recovering iSCSI virtual disk files	11
Stop replication	12
Restore the replication set corresponding to the application’s data	12
Restart Microsoft iSCSI Software Target service	13
Verify virtual disk files	13
Restart replication	14
Recovering shared folders	14
Stop replication	14
Restore the replication set corresponding to the folders data	14
Restart replication	15
Recovering an entire All-in-One Storage System by replacement	15
Summary	17
For more information.....	18

Introduction

To build and maintain competitiveness in a 24 x 7 global economy every business relies on the availability and reliability of their computer systems, and especially the data they create and use, to run their businesses. Small-to-medium businesses (SMBs) are no different; they rely on the data in these critical systems to promote their business, sell and deliver their products, and to support their customers. If anything, the availability and reliability of data is more critical for SMBs because they are less able to absorb the high costs and lost productivity that the loss of critical business data represents. Losing even a single day's worth of orders, or e-mail communications with customers, can seriously harm a small business.

In the past, the costs of solutions that provide better data protection and recovery have been outside the reach of SMBs. With the HP StorageWorks All-in-One Storage System's iSCSI Target capability, and the HP StorageWorks Storage Mirroring (SWSM) data replication solution, businesses of every size can now easily and cost-effectively implement high-availability data storage and protection solutions.

This document contains detailed information regarding the configuration and usage of the All-in-One Storage System's replication solution, and HP StorageWorks Storage Mirroring, to implement a consolidated storage solution with continuous data protection and recoverability.

Replication alternatives—DFS-R versus StorageWorks Storage Mirroring

This document considers two replication technologies available for replicating All-in-One Storage System data: Microsoft's DFS Replication (DFS-R) and HP StorageWorks Storage Mirroring (SWSM). These two tools use different techniques to replicate data, and therefore are best suited for different usage scenarios.

DFS-R is a file-based replication technology that only replicates files when they are closed. iSCSI Software Target does not close the virtual disk files (.vhd files) while they are in use, and so these files are not replicated during normal usage when replicating using DFS-R. Therefore, if iSCSI Software Target virtual disk files need to be replicated, DFS-R should not be used. If you are only replicating shared folders, then DFS-R can be considered. When replicating shared folders, DFS-R can enable one-way or two-way (multi-master) replication which can be useful in collaboration environments.

HP StorageWorks Storage Mirroring software asynchronously replicates each write into the file system to a replication target system; therefore, it can be used to effectively replicate iSCSI Software Target virtual disk files. It can also be used to effectively replicate shared folders as well, but only in a one-way replication topology.

The following table summarizes some of the differences to consider when choosing your replication technology.

Replication Characteristics	Microsoft DFS-R	HP StorageWorks Storage Mirroring
Replicates shared folders	Yes	Yes
Replicates active iSCSI LUNs	No	Yes
Allows multi-master (two-way) replication	Yes	No
Servers must be Active Directory members	Yes	No
Restore assistance	No	Yes

Because the All-in-One Storage System contains a mix of both shared folder data and iSCSI Software Target data, this document focuses on setting up and using StorageWorks Storage Mirroring software to replicate All-in-One Storage System data. The Microsoft web site has information on setting up DFS-R to replicate between servers, if that is preferable.

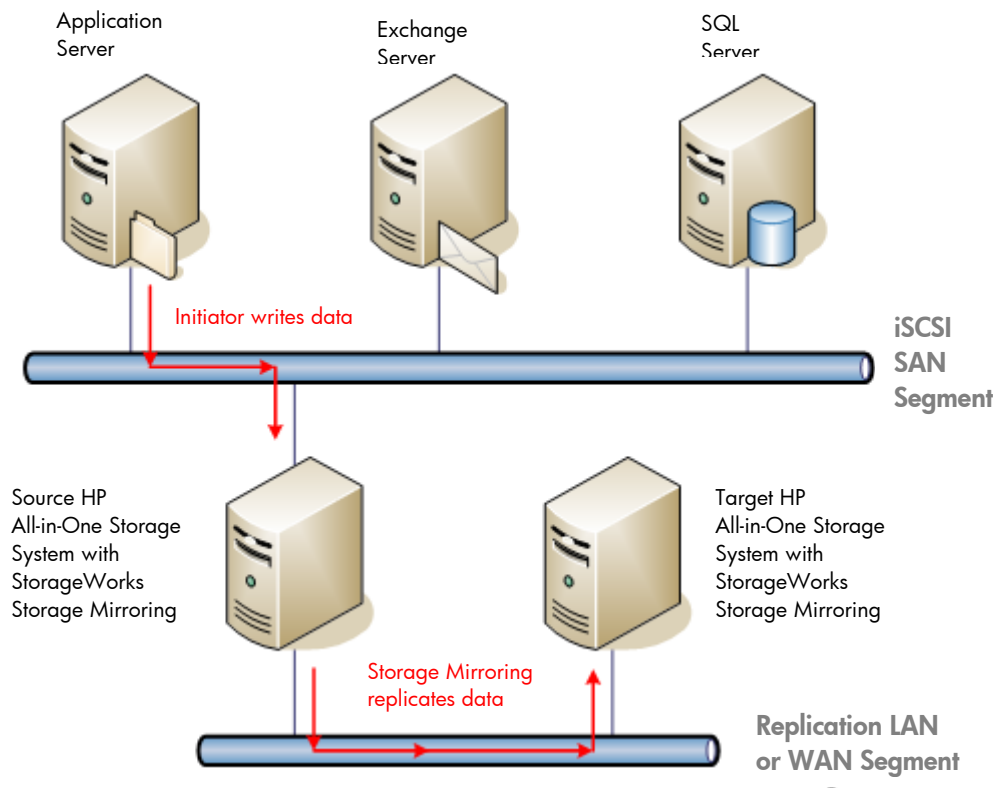
Reference configuration

Figure 1 illustrates a typical All-in-One Storage System storage network architecture with Storage Mirroring data replication for continuous data protection and recoverability. In this example, Microsoft's iSCSI Software Target provides block-level data storage services to application servers, such as Exchange and SQL Servers. The All-in-One Storage System also uses the Windows Storage Server 2003 R2 OS to provide file sharing (CIFS/NFS) access. Storage Mirroring provides automated data replication services between the replication source and replication target All-in-One Storage Systems. For optimal performance, a separate dedicated network segment may be desired to carry replication traffic. If network traffic is not a bottleneck, use of a common network segment may be considered.

In this example, the replication target All-in-One Storage System stores a duplicate copy of the data residing on the replication source All-in-One Storage System. Data is automatically and asynchronously replicated from the replication source to replication target All-in-One Storage System using Storage Mirroring. The highly efficient StorageWorks Storage Mirroring replication engine allows the replication target All-in-One Storage System to be located at the replication source facility or at a remote disaster recovery site.

If the replication source All-in-One Storage System fails, the duplicate copy of all data maintained on the replication target All-in-One Storage System can be used to restore critical services.

Figure 1. Reference architecture



Installation

Minimum requirements

Replication source HP StorageWorks All-in-One Storage System

HP StorageWorks All-in-One Storage System v1.4 or later, containing:

- Microsoft Windows Storage Server 2003 R2
- Microsoft iSCSI Software Target v3.1

HP StorageWorks Storage Mirroring 5.0.2

Replication target system

The replication target system can be another StorageWorks All-in-One system or a non-AiO system. Certain advantages are realized if the replication target system is an AiO.

StorageWorks All-in-One requirements

- HP StorageWorks All-in-One Storage System v1.4, containing:
 - Microsoft Windows Storage Server 2003 R2
 - Microsoft iSCSI Software Target v3.1
- HP StorageWorks Storage Mirroring 5.0.2

Non-AiO system

- HP StorageWorks Storage Mirroring 5.0.2

Application server system

HP StorageWorks All-in-One Storage Manager agent required for user-defined applications.

Networking

Correctly configured DNS entries (both forward and reverse lookup) are required to fully use the replication features in the All-in-One Storage Manager. The replication source and replication target systems must be able to resolve each other's FQDN (fully qualified domain name).

Installation

On the replication source and replication target HP StorageWorks All-in-One Storage Systems

Install HP StorageWorks Storage Mirroring using the default settings. See the *HP StorageWorks Storage Mirroring Users Guide* for information on adjusting the default settings.

Enter the word *evaluation* when prompted for the activation key to enable a 60-day trial of Storage Mirroring. After the 60-day trial period expires, a full license is required to continue using the Storage Mirroring product.

iSCSI virtual disk file considerations

The Microsoft iSCSI Software Target creates virtual disk files in such a way that, by default, only the first 64 blocks are initialized with zeros, and the remainder of the file is un-initialized on disk. While this technique speeds up creation time, it can cause unexpected behavior during the replication process.

When replicating an existing virtual disk file using SWSM, the entire file is copied to the replica system, but the un-initialized portion of the file (which could be several hundreds of gigabytes) does not compress well, which causes additional network traffic to flow across the network to perform the replication.

Additionally, when replicating a directory in which a new virtual disk file is created by the iSCSI Software Target, replication completes very quickly (almost instantaneously). However, the un-initialized portions of the virtual disk are different between the replication target and the replication source system.

This is not a problem, except the first time the replication process is stopped and restarted, then the files are checked for equivalence, and the un-initialized portions are found to be different, and are replicated to make them the same. At this time, potentially hundreds of gigabytes of un-initialized data are replicated to the replica system taking a very long time. What is unexpected is that most of the replication happens not at creation time but at re-replication time.

This behavior can be controlled by forcing the Microsoft iSCSI Software Target to initialize the virtual disk file, thus making the replication more predictable. A registry key controls how much of each virtual disk is initialized. The registry key that controls this behavior is:

```
HKLM\Software\Microsoft\iSCSI Target\NumClearBootSectorBlocks
```

Setting this registry key value to "0xFFFFFFFF" increases virtual disk creation time (which may be sizable for large iSCSI LUN sizes depending on the disk subsystem), but can significantly reduce overall replication time.

Storage Mirroring credentials

StorageWorks Storage Mirroring requires credentials to operate in a secure way. After installing SWSM the first time, the All-in-One Storage Manager displays an alert indicating that the license state could not be determined for SWSM. You must enter valid credentials for SWSM by selecting the Configure Application Credentials action:

1. Expand the credentials list for your system by clicking + (the plus sign) next to your system.
2. Select the Replication application.
3. Click **Update Credentials** and enter the credentials for a user that has administrative rights for SWSM. The user must be in the local DoubleTake-Admin group.

When you have entered the proper credentials, the alert should be removed.

Configuring replication

You can configure replication when migrating application data or after application data has already been migrated.

When migrating application data

A prerequisite to replicating data from one All-in-One Storage System to another is that application data is residing on the replication source All-in-One Storage System. Begin by migrating application data onto the replication source All-in-One Storage System. This can be accomplished using any of the All-in-One Storage Manager wizards, such as:

- Host an Exchange Storage Group
- Host a SQL Server Database
- Host a User-Defined Application
- Create a Shared Folder

When you are asked to select data protection features, select the **Replication** check box.

Note:

If the replication check box is disabled or not present, confirm that you have successfully entered SWSM credentials (and those credentials match a user in the DoubleTake-Admin group), that you have properly licensed SWSM, and that the license has not expired.

When prompted, enter the host name or IP address of the replication target system. If the replication target system is an All-in-One Storage System, you can automatically provision storage or you can choose to manually enter a replication target path. If the replication target system is not a Storage System, you are only able to manually enter replication target paths.

More information on these choices is given in the Replication options section. When you complete the replication configuration, select other data protection features or complete the wizard. The result of the wizard is a job that runs on the replication source system. If the replication target is an All-in-One Storage System and you elected to automatically provision storage, one of the first steps in the task list represents the provisioning job on the replication target system. You can observe the progress of that task by opening the task viewer on the replication target system. The final task creates an SWSM replication set. The StorageWorks Storage Mirroring Management Console, shows the new replication set associated with the replication source system.

Additional information on running the All-in-One Storage Manager wizards is available in the All-in-One Storage Manager's online help.

Already migrated application data

There are two ways to configure replication for application data that has already been migrated to an AiO. Select the instance that you would like to replicate and then either right-click or select the **Configure Replication** action. At the prompt, enter the host name or IP address of the replication target system. If the replication target system is an All-in-One Storage System, you can either automatically provision storage, or you can choose to manually enter a replication target path. If the replication target system is not a Storage System, you are only able to manually enter replication target paths.

More information on these choices is given in the Replication options section. When you accept and apply the replication configuration, the result is a job that runs on the replication source system. If the replication target is an All-in-One Storage System and you elected to automatically provision storage, one of the first steps in the task list represents the provisioning job on the replication target system. In fact, you can observe the progress of that task by opening the task viewer on the replication target system. The final task creates a SWSM replication set. On the StorageWorks Storage Mirroring Management Console, you can see the new replication set associated with the replication source system.

Replication options

Storage options

Note:

A known issue arises when you attempt to configure replication to the same system that is the replication source of the data. That is, if you enter the replication source system name or IP address when prompted for the replication target name and you select automatic storage provisioning, a deadlock situation results when the replication target storage is provisioned. Do not specify the replication source system as the replication target and/or do not select automatic storage provisioning to avoid this condition.

Automatic storage provisioning

When the replication target system is an All-in-One Storage System, you can automatically provision replication target storage. The default storage configuration is optimized to use the least costly redundant storage (for example, SATA and RAID-5). You can change the storage settings by clicking the **Modify storage configuration** link. You cannot change the amount of space allocated because it will match the size of the replication source instance. Otherwise, you can change any other advanced storage option that allows the amount of space needed.

If you automatically provision storage, the path to the replicated data looks like:

```
Drive\Data Protection\Replication\Source System Name\Source Instance Name\Source Area Name
```

Where:

Drive = drive letter (including colon) for the storage volume or a mount path (for example, D:\Data Volumes\Data Volume 4)

Replication source system name = the FQDN for the source server

Replication source instance name = the name of the instance that you are replicating

Replication source area name = the name of the area that you are replicating

When you replicate an instance, each storage area contained in the instance is replicated to a different sub-directory, which is why there is a Source Area Name portion of the replication target path.

Manual storage provisioning

When the replication target system is an All-in-One Storage System but you want to manually specify where replicated data will be stored, provision storage on the All-in-One before configuring replication on the replication source system:

1. Use the **Host a User-Defined Application** action and select **Local Storage Only**.
2. Complete the wizard to provision the storage remembering to specify any options that you want the replication target storage to have.
3. After the storage is provisioned, determine the path to the newly provisioned storage:
 - a. Right-click the new User-Defined area and
 - b. Select **Properties** and then select the **Storage** tab.

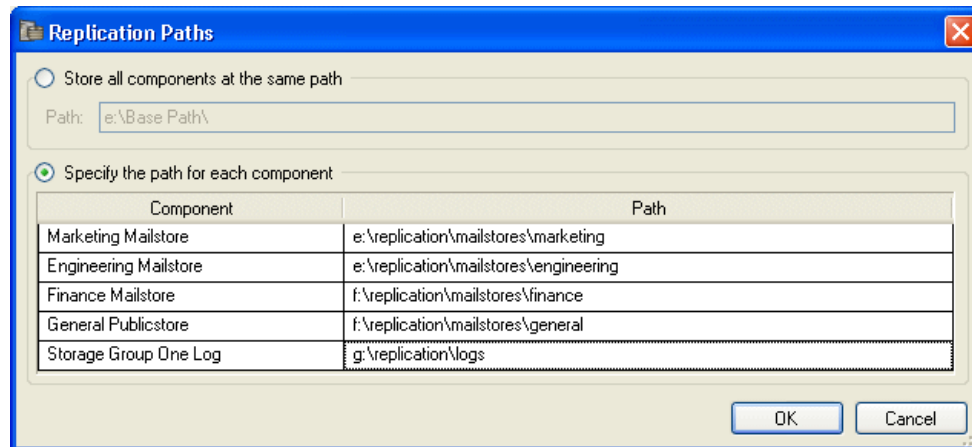
The **Application Path** is the storage property that you can use to specify the path to the newly provisioned storage. This method is useful when the replication target system is an All-in-One when you need to re-create a replication configuration and begin replicating to the same replication target location (for example, if the replication source system has been replaced for some reason).

When the replication target system is not an All-in-One Storage System, ensure that the volumes that contain your replicated data have enough available free space. After you determine where to store your replicated data, enter the replication target system's path in the **Replication Target Properties** dialog.

When replicating an instance that has multiple areas (for example, Microsoft Exchange), you can specify individual paths for each area by clicking the **Configure multiple paths** link.

Figure 2 show that you can enter specific storage paths for each area. This is helpful when the replication target system does not have a single volume with sufficient free space or when there are other needs to utilize multiple volumes.

Figure 2. Storage paths



Network options

SWSM uses the replication target IP address as the means to control what network the replication traffic flows through. The network selection is made on the **Replication Target Properties** dialog in the **Replication Set** section. When configuring replication, select the IP address on the replication target system that is on the subnet that you want the replication traffic to flow through. Only addresses that SWSM on the replication target system is aware of are presented. After you have selected this IP address, you cannot change the address without removing the replication configuration and creating a new one.

Other replication considerations

Replicating user-defined instances

If a user-defined iSCSI LUN or user-defined Remote Windows Application is replicated, unexpected behavior may result if you then use the iSCSI LUN to store Exchange or SQL data. The Application Storage Manager attempts to connect to the application servers associated with an iSCSI target and determine if any of the LUNs contain SQL and/or Exchange data. If they do, then the associated user-defined instance is promoted to an Exchange or SQL instance. Assuming the replication target is an All-in-One Storage Server, storage was provisioned automatically, and replication was configured for the user-defined instance before this promotion happens; the replication target does not display the replication target area properly. Replication target instances are not promoted with the replication source instance.

User-defined iSCSI LUNs or user-defined remote applications may also be containers for multiple components—for example, both the database and log files for a SQL server database. Typically, it is not a best practice to use iSCSI LUNs in this manner (for example, multiple components in the same iSCSI LUN); however, this is necessary at times. If a user-defined iSCSI LUN or Remote application is used in this way, it is promoted as noted above. If you then configure replication, the replication target space requirement will be equal to the sum of the products of the components in the iSCSI LUNs. For example, suppose a 500 MB LUN contains a 100 MB SQL database mdb file and an associated 50 MB log file. After configuring replication, the provisioned storage on the replication target system includes space for two 500 MB iSCSI VHD files (the replicated vhd files).

Consider a second example—Microsoft Exchange mail stores include multiple components. Suppose two 300 MB LUNs contain the components—one LUN contains a private mail store and the log files and the other LUN contains the public mail store and a second private mail store. When replication is configured for the Exchange instance, the replication target system's provisioned storage is composed of four areas each 300 MB in size (2 components x 300 MB + 2 components x 300 MB = 1200 MB). These examples show that it is better to use the data migration wizards rather than configure the storage using user-defined applications.

Replication credentials

Replication credentials are stored by system FQDN or IP address. If the system's name changes or the IP address changes, you may encounter an alert indicating that the replication credentials are no longer valid. Using the **Configure Application Credentials** action, update the credentials to eliminate this problem.

The credentials that one uses for replication must also be in the local Double-Take Admin group. Using the **Computer Management** console, expand the **Local Users and Groups** tool and then expand the **Groups** collection. Double-click the **Double-Take Admin** group and verify that the user that you would like to use is part of this group; if it is not, then click the **Add** button. Local and domain users are allowable.

Encrypted credentials are stored in the `hpkas-state.xml` file. As such, if the `hpkas-state.xml` file is removed or renamed, the credentials used to connect to the replication source(s) and replication target(s) are lost. You must use the Configure Application Credentials action to re-enter the credentials for these systems.

Replication network utilization options

The All-in-One Application Storage Manager software allows you to easily configure basic replication between a replication source and replication target system. More advanced configuration options such as bandwidth throttling, transmission window scheduling, and compression settings are managed through the SWSM Management Console. Keep in mind, however, that the settings affect all replication sets that utilize the same network connection. In other words if four replication sets are present and are configured to replicate data to the same replication target system (the same IP address), changing a setting on one replication set affects the same change on the other three replication sets. Using different network interfaces for each replication set allows you to manage the settings individually. Other advanced settings are also available using the SWSM Management Console.

Replacing a failed replication target system

When a replication target system must be replaced due to failure or if SWSM is removed and then re-installed, the configuration of the replication source should be considered. The default configuration includes a feature named `re-mirror on reconnect`. This feature is enabled to accommodate temporary network outages, among other things. If a network outage occurs between the replication source and replication target systems, this feature automatically re-mirrors the replication source system data so the replication target system has a current copy. When a replication target system is replaced and SWSM is installed on the new system, the replication source system begins to re-mirror the replication source system data. If SWSM is installed before any storage can be provisioned, the re-mirrored data is written to the system drive—provisioned storage is located on volumes mounted on mount points that are rooted on the system drive. To prevent this behavior, pause replication on the replication source system before you install SWSM on the replication target system. When the replication target system has been properly configured (for example, storage provisioned, and so on) resuming replication on the replication source system re-synchronizes the data to the replication target system.

Data recovery

It is sometimes important to know where the replicated data is stored on the replication target system regardless of the type of the system. If the replication target system is an All-in-One Storage System, right-click each of the replication target instance areas and select **Properties**. The value of the Replication Target Path property on the Storage tab is the path to the replicated data. If the replication target system is not an All-in-One Storage System, use the SWSM Management Console to determine the replication target path or refer to configuration notes. Whether the replication target system is an All-in-One Storage System or not, recovering the data can be accomplished in several ways. For the sake of description, it is assumed that the replication target system is an All-in-One Storage System. The steps presented are also applicable to other replication target systems. Three ways to recover data are:

Recover individual application data—Restore individual application areas (such as shared folders or iSCSI target disks).

Recover entire All-in-One Storage System by replacement—Replace the replication source All-in-One Storage System with the replication target All-in-One Storage System (thus eliminating the need to copy all of the data).

Recover entire All-in-One Storage System by restoring—Restore all application data using the duplicate copy residing on the replication target All-in-One Storage System.

Recovering individual application data areas

Individual application areas can be recovered by copying the replicated data associated with the application area from the replication target All-in-One Storage System back to the replication source All-in-One Storage System. To accomplish, perform the following tasks.

Recovering iSCSI virtual disk files

Due to the size of the iSCSI target virtual disk files, which could exceed hundreds of gigabytes, it is highly recommended that you perform the recovery over a high-speed gigabit network. If the replication target All-in-One Storage System is located at a remote location, you may need to relocate the server to the replication source site for recovery purposes.

CAUTION:

HP strongly recommends that you run an integrity check tool, such as `chkdsk` or `eseutil` (for Exchange databases), on the restored iSCSI target disk(s) to ensure data consistency after completing the restoration.

This first step in restoring an application area consisting of an iSCSI target disk is to ensure that the disk is not being used by any iSCSI initiator during the recovery process, and to remove it from the iSCSI Target interface.

Perform these steps on the replication source All-in-One Storage System:

1. Select **Start > All Programs > Administrative Tools > Microsoft iSCSI Software Target** to open the iSCSI Target console.
2. Select **Devices** in the left-hand pane.
3. Double-click the iSCSI Target Disk in the right-hand pane that is being recovered.
The iSCSI Target Disk Properties dialog window opens.
4. Select the **Disk Access** tab and make note of the mount points under which the selected virtual disk file is mounted.

5. Right-click the iSCSI Target Disk and select **Disk Access > Dismount**.
6. When the confirmation dialog appears, select **Yes**.
7. Repeat steps 4 through 6 for each virtual disk that is to be restored.
8. Right-click the iSCSI target of interest and select **Properties**.
9. On the **iSCSI Initiators** tab, note all of the identifiers and their corresponding types.
10. Select each identifier and delete them.
11. Close the Microsoft iSCSI Software Target GUI.
12. Select **Start > Control Panel > Administrative Tools > Services**.
13. Stop the Microsoft iSCSI Software Target service.

This causes most iSCSI initiators to begin attempts to reconnect to the replication target. In some situations you may need to manually log off from the replication target before a successful reconnection can occur after restoration is complete.

Note:

If you stop the Microsoft iSCSI Software Target service while the iSCSI Target GUI is open, an error results. It is safe to ignore and acknowledge the error.

CAUTION:

Stopping the Microsoft iSCSI Software Target service causes iSCSI targets to become unavailable. It is important to understand what impact this may have on applications using the iSCSI targets during the process of restoring virtual disk files.

Stop replication

If the replication source All-in-One Storage System is still replicating changes to the replication target All-in-One Storage System, this must be stopped.

On the replication target All-in-One Storage System:

1. Select **Start > Programs > HP StorageWorks Storage Mirroring > Management Console** to open the StorageWorks Storage Mirroring console.
2. Right-click the replication set you want to stop and click **Disconnect**.

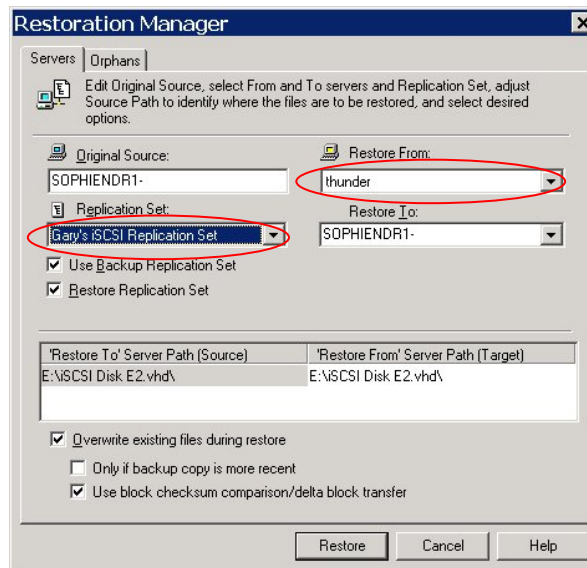
This causes any additional replication to cease while restore operations are occurring.

Restore the replication set corresponding to the application's data

You may now restore the replication set associated with the application being restored from the replication target All-in-One Storage System back to the replication source All-in-One Storage System.

1. On the replication target All-in-One Storage System, select **Start > Programs > HP StorageWorks Storage Mirroring > Management Console** to open the StorageWorks Storage Mirroring console.
2. Select the replication source All-in-One Storage System.
3. Select **Tools > Restoration Manager** to start the restoration manager.
4. Select the **Restore From** host to be the replication target All-in-One Storage System.

5. Select the replication set containing the data for the application to restore as shown.



6. Click **Restore** to restore the data set back to the replication source All-in-One Storage System.

Note:

You can monitor the progress of the restoration by clicking the replication target All-in-One Storage System in the StorageWorks Storage Mirroring Management Console. When the restoration is complete, the connection is removed from the list in the right portion of the window. If you are restoring a substantially identical file, there may be no apparent progress as StorageWorks Storage Mirroring goes through the file finding differences.

Restart Microsoft iSCSI Software Target service

After restoring iSCSI data, these steps must be performed on the replication source All-in-One Storage System to bring the new iSCSI disk back online.

1. Select **Start > Control Panel > Administrative Tools > Services**.
2. Start the Microsoft iSCSI Software Target service.

If you encounter an error, it may be the result of not un-mounting all of the virtual disks from the local system.

Verify virtual disk files

Using `chkdsk`, `eseutil`, or other appropriate utility, you can optionally verify the contents of the restored virtual disks. HP strongly recommends that you verify the contents of the virtual disks.

1. Verify that a mounted virtual disk is not accessed by an application during the verification process.
2. Right-click the virtual disk of interest and select **Disk Access > Mount Read/Write**.
3. Click **Yes** and then **OK** to finish mounting the disk.
4. Use the appropriate disk checking tool to verify the restored disk is as you expect it.
5. When the check is complete, right-click the virtual disk and select **Disk Access > Dismount**.
6. Click **Yes** to confirm the dismount.

Repeat these steps for each virtual disk.

Note:

Some initiators detect the re-assignment and begin using the iSCSI Target Disk. There are certain initiators that do not detect this and require a manual log in. Some initiators may require you to logoff the replication target and the log in again.

Restart replication

After restoration is complete, the replication from the replication source All-in-One Storage System to the replication target All-in-One Storage System should be restarted.

On the replication target All-in-One Storage System:

1. Select **Start > Programs > HP StorageWorks Storage Mirroring > Management Console** to open the StorageWorks Storage Mirroring console.
2. Right-click the replication set to restart and then select **Connection Manager**.
3. Select the replication properties as you did when you setup the replication connection and then click **Connect**.

Perform these steps for each replication set to restore.

Recovering shared folders

Stop replication

If the replication source All-in-One Storage System is still replicating changes to the replication target All-in-One Storage System, this must be stopped.

On the replication target All-in-One Storage System:

1. Select **Start > Programs > HP StorageWorks Storage Mirroring > Management Console** to open the StorageWorks Storage Mirroring console.
2. Right-click the replication set you want to stop and select **Disconnect**.

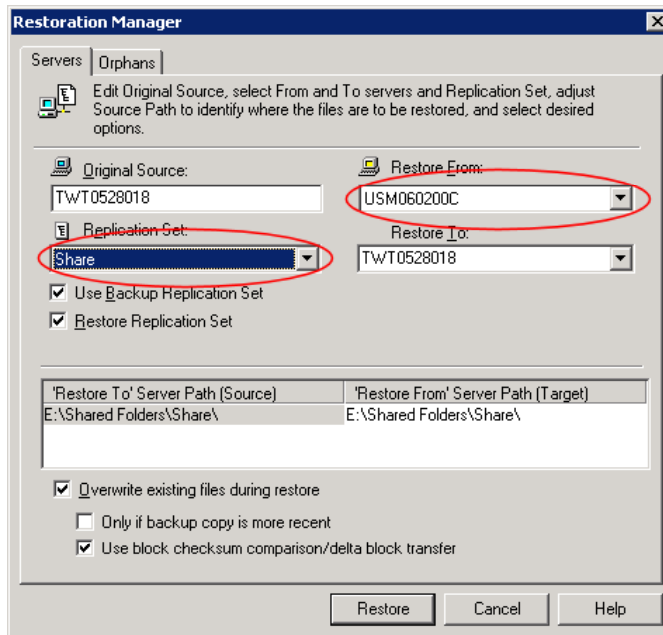
This causes any additional replication to cease while restore operations are occurring.

Restore the replication set corresponding to the folders data

You may now restore the replication set associated with the folder being restored from the replication target All-in-One Storage System back to the replication source All-in-One Storage System.

1. On the replication target All-in-One Storage System, select **Start > Programs > HP StorageWorks Storage Mirroring > Management Console** to open the StorageWorks Storage Mirroring console.
2. Select the replication source All-in-One Storage System.
3. Select **Tools > Restoration Manager** to start the restoration manager.
4. Select the **Restore From** host to be the replication target All-in-One Storage System.

5. Select the replication set containing the data for the folder to restore as shown.



6. Select **Restore** to restore the data set back to the replication source All-in-One Storage System.

Restart replication

After restoration is complete, the replication from the replication source All-in-One Storage System to the replication target All-in-One Storage System should be restarted.

On the replication target All-in-One Storage System:

1. Select **Start > Programs > HP StorageWorks Storage Mirroring > Management Console** to open the StorageWorks Storage Mirroring console.
2. Right-click the replication set to restart and then select **Connection Manager**.
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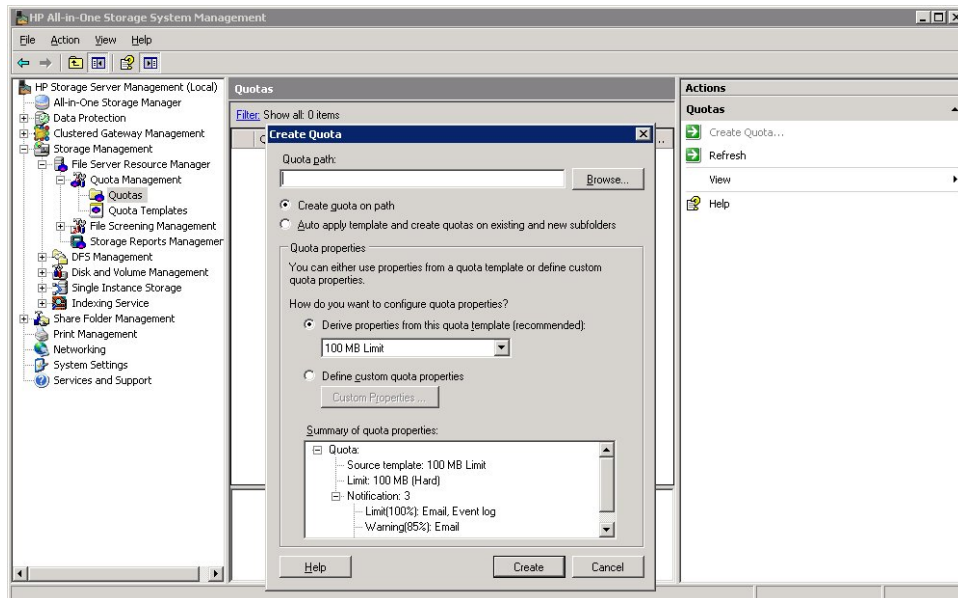
Perform these steps for each replication set to restart.

Recovering an entire All-in-One Storage System by replacement

In the event that the replication source All-in-One Storage System fails, the entire server can be physically swapped out and replaced by the replication target All-in-One Storage System. This approach offers the quickest recovery time but requires the replication target All-in-One Storage System to be equipped with similar or better hardware capabilities to avoid performance degradations.

Note:

After this replacement process is complete, the iSCSI based application areas no longer appear in the All-in-One Storage Manager interface on the replacement system. This is a limitation in the current All-in-One Storage Manager software. Directory quotas and warning thresholds are also no longer set, but they can be recreated manually using the "Create Quota" action in the Quota Management interface as shown in the following figure.



After the replication target All-in-One Storage System is set up at the replication source location, ensure that the network identities are configured to reflect that of the original replication source All-in-One Storage System. Also, delete all of the active replication sets in StorageWorks Storage Mirroring.

After doing this, re-create each iSCSI Target Disk:

1. Select **Start > Programs > Administrative Tools > Microsoft iSCSI Software Target** to open the iSCSI Target console.
2. Right-click the **Devices** node in the left-hand pane and select **Import Virtual Disk**.
3. In the Import Virtual Disk Wizard, select **Next** and then **Browse** to select the virtual disk file to recover.
4. Select **Next** and then **Finish** to complete the Import wizard.
5. Double-click the iSCSI Target Disk in the right-hand pane that has been imported.

The iSCSI Target Disk Properties dialog opens.

6. Select the **Target Access** tab and **Add** access to the iSCSI Target Disk from the application host. Click **OK** when finished.
7. If the iSCSI Target Disk was locally mounted prior to the restoration it needs to be restored back to the original state.
 - a. Right-click the iSCSI Target Disk and select **Disk Access > Mount Read/Write**.
 - b. When the confirmation dialog appears, click **Yes** and then **OK**.

Repeat the above steps for all other iSCSI Target Disks that need to be recovered.

You need to re-share each Shared Folder. Each directory being shared was replicated, but it must now be shared. Use the directory's **Properties > Sharing** tab to re-share the folder. Perform this for each shared folder.

The old replication source All-in-One Storage System can now be delegated as the new replication target All-in-One Storage System.

Summary

The availability and reliability of data is critical for SMBs because they are less able to absorb the high costs and lost productivity that the loss of critical business data represents. Losing even a single day's worth of orders, or e-mail communications with customers, can seriously harm a small business.

The HP StorageWorks All-in-One Storage System's iSCSI target capability and the HP StorageWorks Storage Mirroring (SWSM) data replication solution allow businesses of every size to easily and cost-effectively implement high-availability data storage and protection solutions.

For more information

For more information about HP StorageWorks All-in-One Storage Systems, see <http://www.hp.com/go/AiOStorage>.

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4AA2-0555ENW, October 2008

