

HP OpenView

Storage Mirroring application notes

Guidelines for using VMware GSX Server with Storage Mirroring

Legal and notice information

© Copyright 2005–2006 Hewlett-Packard Development Company, L.P.

Hewlett-Packard Company makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

This document contains proprietary information, which is protected by copyright. No part of this document may be photocopied, reproduced, or translated into another language without the prior written consent of Hewlett-Packard. The information is provided "as is" without warranty of any kind and is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

Microsoft, Windows, Windows NT, and Windows XP are U.S. registered trademarks of Microsoft Corporation.

Storage Mirroring Guidelines for using VMware GSX Server with Storage Mirroring application notes

Document overview

This document is a Storage Mirroring application note. An application note provides guidelines on the use of Storage Mirroring in a specific environment.

This document contains:

- **Document overview**—Explains what an application note contains, how it should be used, what you need to know before trying to use the application note, and where you can go for more information.
- **Implementation guidelines**—Describes all of the considerations that you must weigh when implementing your Storage Mirroring solution. Includes both basics, such as system requirements, as well as configuration and environment-specific topics, such as interactions with specific clients or special considerations for WAN (Wide Area Network) environments. Pay special attention to those topics that are directly related to your environment.

Audience

This document is written for network and application administrators who have a working understanding of the applications and environments where the Storage Mirroring solution is to be deployed. You may need to expand on the documented information in order to customize the solution to fit your environment.

Before you use this application note, you should have an understanding of basic Storage Mirroring operation.

Expectations

Application notes are intended to provide a framework for configuring a Storage Mirroring solution in a specific environment and to draw attention to decisions you will need to make when configuring your solution.

Because there are an infinite number of possible configuration, network, and environment scenarios, application notes contain general configuration guidelines as well as an example configuration procedure that has been tested for a specific environment.

This document assumes that you are comfortable working with your operating system, Storage Mirroring, and your application(s).

Related documentation

Before you begin to configure your solution, make sure that you have complete documentation for your operating system, application, and Storage Mirroring. This application note does not provide step-by-step instructions for using standard operating system, application, and Storage Mirroring functionality.

The following documents contain additional information that you may need while setting up this solution:

- *HP OpenView Storage Mirroring user's guide* or online documentation

Getting help

For help using Storage Mirroring, refer to the Storage Mirroring online manual or online help.

Implementation guidelines

VMware GSX Server is virtual machine software for business-critical environments. It is ideal for server and application consolidation. Storage Mirroring provides real-time enterprise data protection and replication. Storage Mirroring can be used to provide high availability for your VMware server.

This document describes the steps necessary to configure Storage Mirroring to provide high availability for Windows servers running VMware GSX Server. To complete these instructions, you will install VMware GSX Server and Storage Mirroring, and configure Storage Mirroring for real-time replication and failover. Due to the complexities of these applications, this document is intended for network administrators with experience installing, configuring, and maintaining network applications, including Storage Mirroring and VMware.

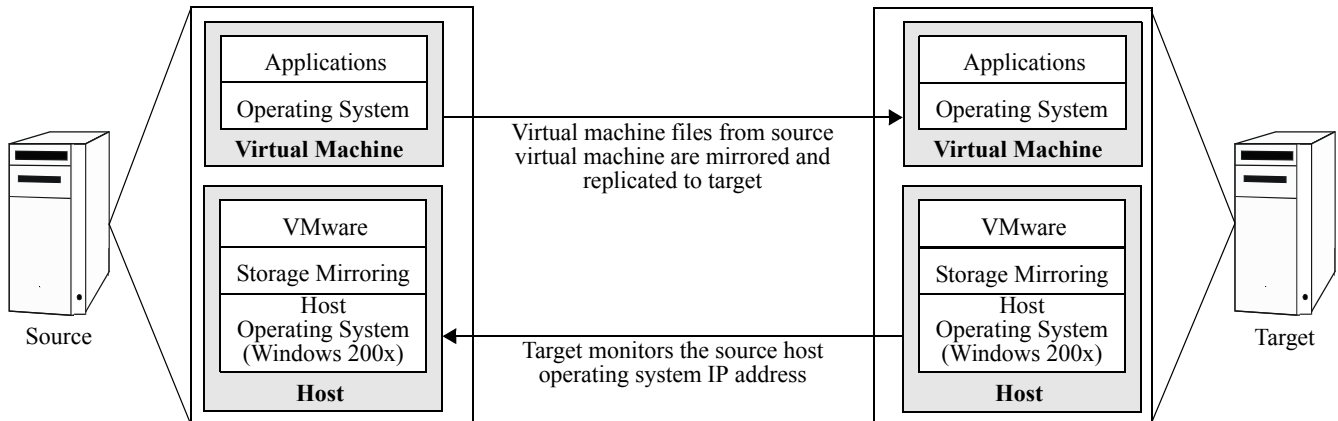
Requirements

- Two licensed copies of Microsoft Windows 200x

- Two licensed copies of VMware GSX Server 2.5.1
- Licensed copies of the operating system(s) and application(s) to be installed on the virtual machines
- Two licensed copies of Storage Mirroring

Configuration

This solution allows you to install Storage Mirroring on the host operating system on both the source and target. It provides you the ability to maintain an up-to-date backup of the virtual hard disk image(s) from the virtual machine(s) on the source. The target will monitor the IP address of the host operating system on the source, and if it fails, the target can stand in for the failed source and the target virtual machine will be started.



Alternate configuration for disaster recovery

If you are only interested in disaster recovery and do not need high availability, you may want to consider the following configuration.

CAUTION: This configuration has not gone through extensive testing and is only provided as a guideline for identifying another solution which may be possible using Storage Mirroring and VMware.

If you only want to install VMware on the source, you can still protect the virtual hard disk image(s) from the virtual machine(s). In this configuration, Storage Mirroring is installed on the source host operating system. The replication set from the source virtual machine is backed up on the target. The target does not contain any virtual machines. Because VMware is not installed on the target, this configuration does not support high availability, but in the event of a failure on the source, all of your data will be protected on the target.

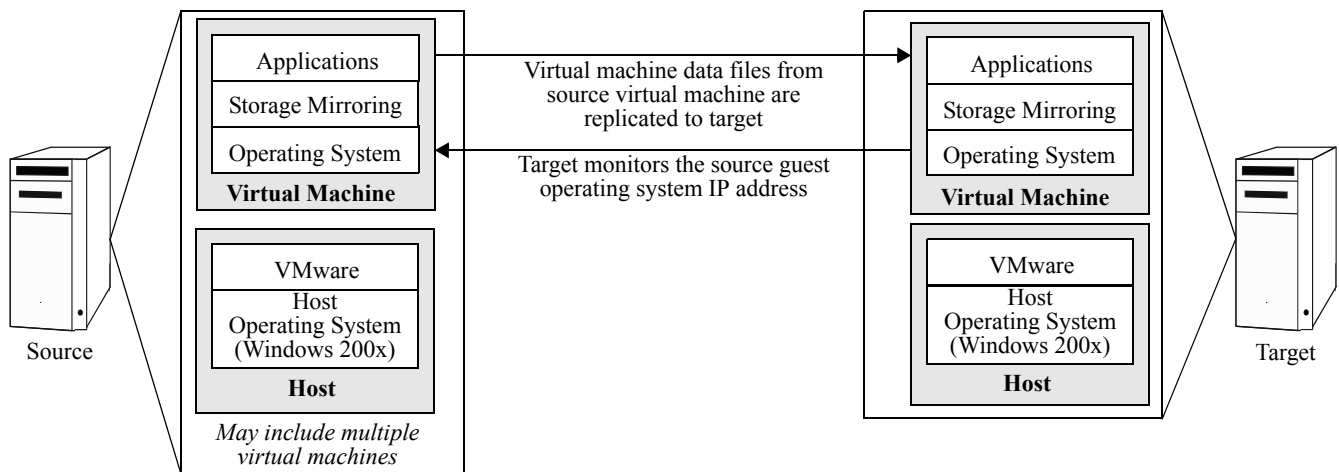


Alternate configuration for high availability

If you want to protect only your virtual machine data files, you may want to consider this alternate high-availability configuration.

CAUTION: This configuration has not gone through extensive testing and is only provided as a guideline for identifying another solution which may be possible using Storage Mirroring and VMware.

By installing Storage Mirroring on the virtual machines on the source and target, you can provide high availability for the virtual machine data files. This configuration would require a licensed copy of Storage Mirroring for each virtual machine. With this configuration, Storage Mirroring provides a backup copy of user-selected data from the virtual hard disk image(s) from the virtual machine(s) on the source. The target monitors the IP address of the virtual machine on the source, and if it fails, the target can stand in for the failed virtual machine.



Sample implementation

This section describes an example of how to configure Storage Mirroring and VMware GSX Server. Use these procedures as a guideline for creating your own implementation.

Because no two environments or configurations are exactly the same, you will probably need to implement additional or different steps than what is documented here in order to make the solution work in your environment.

Installing and configuring software on the source

1. Install Storage Mirroring on the source using the installation defaults. See the *HP OpenView Storage Mirroring getting started guide* for details.
2. Make sure that you reboot the source after the installation is complete.
3. Install VMware on the source and reboot when prompted, if VMware is not already installed.

NOTE: Because most servers have limited space available on the boot drive, you may want to select a location on another volume to install the software and to create the virtual machine.

4. Create a virtual machine. For assistance, see your VMware reference guide.
5. Record the location of the virtual machine's folder.

Virtual Machine Folder _____



NOTE: If your virtual machine is already installed, look at the properties to determine the location of the virtual machine folders. By default, virtual machine folders are stored at %systemroot%\Documents and Settings\\my documents\my virtual machines\

6. Create a virtual disk. For assistance, see your VMware reference guide.
7. In VMware, register the virtual machine. For assistance, see your VMware reference guide.
8. Install the operating system and applications on the virtual machine on the source. For assistance, see your VMware reference guide.
9. Install the VMware tools on the virtual machine. For assistance, see your VMware reference guide.

Installing software on the target

1. Install Storage Mirroring on the target using the installation defaults. See the *HP OpenView Storage Mirroring getting started guide* for details.
2. Make sure that you reboot the target after the installation is complete.
3. Install VMware on the target and reboot when prompted.

NOTE: Because most servers have limited space available on the boot drive, you may want to select a location on another volume to install the software and to create the virtual machine.



After Storage Mirroring has mirrored and replicated all of the data, you will need to configure the target.

Configuring mirroring and replication

1. Select **Start, Programs, Storage Mirroring, Management Console**.
2. Double-click your source to log on.
3. Right-click the source and select **Properties**.
4. On the Source tab, enable **Block Checksum All Files on a Difference Mirror** and click **OK**.
5. Right-click your source and select **New, Replication Set** and enter the desired name for the replication set.
6. Select the data to protect. This includes the virtual machine folder recorded in step 5 in “Installing and configuring software on the source” on page 6.
7. Right-click the replication set name and select **Save** to save the replication set.
8. Drag and drop the replication set onto the target. The Connection Manager dialog box opens.
9. The **Source Server, Target Server, Replication Set,** and **Route** fields will automatically be populated. If you have multiple IP addresses on your target, verify the **Route** field is set to the correct network path. (For detailed information on connecting a source and target, see the *HP OpenView Storage Mirroring user's guide*.)
10. Select **One to One** to map the replication set data from the source to an identical volume/directory structure on the target. Make sure you select the correct mapping; if the paths do not match exactly, the virtual server on the target will not function correctly.
11. Click **Connect** to start the mirror and replication processes.



NOTE: If you start the replicated virtual server on the target, or if the associated data on the target is otherwise modified, the data on the source and target will no longer match. If the updated data on the target is not needed, perform a full or difference with block checksum mirror from the source to the target. If the updated data on the target is needed, restore the data from the target to the source.

Wait until mirroring is complete and the Mirror Status has changed to **Idle** before continuing with the next section, “Configuring VMware on the target” on page 7.

Configuring VMware on the target

After the mirror has completed, register the virtual machine on the target using the virtual machine folder and virtual disk that were replicated to the target in the previous steps.



NOTE: If you want to start this virtual machine to make sure that it works, you must first isolate it from the network.

Configure failover and begin failure monitoring

1. Select **Start, Programs, Storage Mirroring, Failover Control Center**.
2. Select the target from the list of available machines and click **Login**. If the target you need is not displayed, click **Add Target**, enter the machine name, and click **OK**.
3. To add a monitor for the selected target, click **Add Monitor**. Type the name of the source host server and click **OK**. The Monitor Settings window will open.
4. In the Monitor Settings window, mark the IP address that is going to failover. This is the physical address of the source host operating system.

NOTE: Monitoring is configured for the physical source, not the virtual machine. There is no direct monitoring of the virtual machine. When the physical source fails to respond, failover will occur.

5. Make sure all of the following settings are disabled:
 - Items to Failover—IP Address(es), Server Name, Share(s)

- Use .SHR Share Mapping File
 - Active Directory—Failover Hostname
6. Verify that the VMware GSX console window is not started on the target host server. If it is started and the target virtual machine is highlighted, the pre-failover script will not start the virtual machine. See the VMware documentation for more information.
 7. If a failure occurs, you will want to have the virtual machine start on the target automatically. To do this, create a batch file called `postover.bat` using the sample batch file below. Save the batch file to the same directory on the target where your Storage Mirroring files are installed.

SAMPLE_POSTOVER.BAT

```
REM Sample post-failover script for VMware
REM You may need to modify the path to the VMware-cmd file to fit your environment.
REM You will need to modify the path and name of the virtual machine.
REM The following command should appear as one line in your script file. It is on two
REM lines here so that you can see the entire command.
"C:\Program Files\VMware\VMware VMperl Scripting API vmware-cmd" "c:\Documents and
Settings\user_name\My Documents\my virtual machines\machine_type_dir\machine_type.vmx" start
```

8. After a failure is resolved, you will be ready to bring your source back online. At this time, you will want to stop the virtual machine on the target automatically. To do this, create a batch file called `preback.bat` using the sample batch file below. Save the batch file to the same directory on your target where your Storage Mirroring files are installed.

SAMPLE_PREBACK.BAT

```
rem ***SAMPLE*** pre-failback script for VMware failover

rem This sample batch file is provided as an example only. Because no two environments or
rem configurations are exactly the same, you MUST modify this script in order to make the
rem solution work in your environment.

REM You may need to modify the path to the VMware-cmd file to fit your environment.
REM You will need to modify the path and name of the virtual machine
REM The following command should appear as one line in your script file. It is on two
REM lines here so that you can see the entire command.
"C:\Program Files\VMware\VMware VMperl Scripting API vmware-cmd" "c:\Documents and Settings\
user_name\My Documents\my virtual machines\machine_type_dir\machine_type.vmx" stop trysoft
```



NOTE: VMware Tools (included with VMware) must be installed on the virtual machine for the `trysoft` option used in the pre-failback script to work correctly. VMware tools can be installed from the **Settings** menu within the virtual machine. If VMware tools are not installed, the `soft` or `hard` commands can be substituted. However, they are not preferred because the `trysoft` option will first try to shut down the virtual machine gracefully and only if it fails will it perform a hard shutdown.

9. Back on the Failover Control Center Monitor Settings dialog box, click **Scripts** and specify the scripts that were previously created, using `postover.bat` for the target post-failover scrip and `preback.bat` for the target pre-failback.

NOTE: The scripts are processed using the same account running the Storage Mirroring services.

10. Click **OK** to go back to the Monitor Settings dialog box.
11. Click **OK** to begin monitoring the source machine.

In the event of a source failure, your target is now ready to stand in for the source. For information on monitoring failover, see the *HP OpenView Storage Mirroring user's guide*.

Restoring back to the original source

If your source experiences a failure, such as a power, network, or disk failure, the virtual machine on the target will stand in for the source while you resolve the source machine issues.

1. Verify that your source machine is not connected to the network. If it is, disconnect it.

2. Resolve the source machine problem that caused the failure.



NOTE: If you must rebuild your hard drive, reinstall Windows and complete the instructions in [“Installing and configuring software on the source”](#) on page 6 using the same settings as originally used.

3. Select **Start, Programs, Storage Mirroring, Failover Control Center**.
4. Select the target machine that is currently standing in for the failed source.
5. Verify that the target virtual machine is not running in Local Management mode. If it is, change it to Remote Management mode.
6. Select the failed source and click **Failback**. The pre-failback script created during the failover configuration will be executed and the virtual machine on the target will be stopped.
7. You will be prompted to determine if you want to continue monitoring the source server. Do not choose **Continue** or **Stop** at this time.
8. Connect the source machine to the network.
9. After the source is back online, select whether or not you want to continue monitoring this source machine (**Continue** or **Stop**).



NOTE: Verify that the Storage Mirroring connection on the source has been disconnected (right-click the connection in the Storage Mirroring Management Console and select **Disconnect**).

10. To begin the restoration process, open the Storage Mirroring Management Console and select **Tools, Restoration Manager**.
11. Complete the appropriate fields as described below.
 - **Original Source**—The name of the source machine where the data originally resided.
 - **Restore From**—The name of the target machine that contains the replicated data.
 - **Replication Set**—The name of the replication set to be restored.
 - **Restore To**—The name of the machine where the data will be restored. This may or may not be the same as the original source machine.
12. Identify the correct drive mappings for the data and any other restoration options necessary. For detailed information on the restoration options, see the *HP OpenView Storage Mirroring user's guide*.
13. Verify that the selections you have made are correct and click **Restore**. The restoration procedure time will vary depending on the amount of data that you have to restore.
14. After the restoration is complete, re-establish the replication set connection. For more information, see [“Configuring mirroring and replication”](#) on page 7.

At this time, your data is restored back to your source machine and if you selected to continue failover monitoring, the target is available to stand in for the source in the event of a failure.