Double-Take for Windows®

Guidelines for using Double-Take® with Windows® Single Instance Storage

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Double-Take® Support for Application Failover

The Double-Take® file system replication process is application independent and replicates any file system changes (including permissions and attributes) written to NTFS, FAT or FAT32 file systems by any application or process, subject to specific exceptions called out in the *User's Guide* or readme file. Maintaining point-in-time consistent file system replicas and providing server monitoring and automatic or manual failover of the server name and IP address are the primary functions of Double-Take, and Double-Take Software offers support to qualified customers should these functions fail to operate in accordance with our published documentation, regardless of what application or process is manipulating the data.

Double-Take Software may provide application notes and other documents that provide implementation guidelines on how to use Double-Take functions and replicas to manually or automatically failover or recover many popular third-party applications and a general process to accomplish failover or recovery of many other third-party applications. While these steps are believed to be accurate for the specific configuration, Double-Take version, and application versions originally tested, due to the number of possible configurations and variables, Double-Take Software can only test selected combinations and may provide only limited support for the operation and configuration of third-party applications or the behavior of those applications before, during, or after failover, in its discretion. In cases where Double-Take Software has no direct access to or experience with a particular application or configuration, Double-Take Software support may also be limited to only the actual replication of the file system data and failover (name and IP address) of the server.

For assistance in validating, implementing or troubleshooting these or other possible configurations with third-party applications, Double-Take Software and its partners may offer professional services on a fee basis to apply best practices for assisting with third-party applications to recover automatically or manually using replicated data. This, and any other, application note is provided solely for the convenience of our customers and is not intended to bind Double-Take Software to any obligation. Although we try to provide quality information, Double-Take Software makes no claims, promises or guarantees about the accuracy, completeness, or adequacy of the information contained in this document.

Table of Contents

Document Overview

This document is a Double-Take® application note. An application note provides guidelines on the use of Double-Take 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.
- **Solution Overview**—Explains how the application works with Double-Take and describes the considerations that you must weigh when implementing your Double-Take solution. Review this section to make sure that you understand the theory involved with using Double-Take and your application. 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.
- **Sample Implementation**—Describes a specific example of how to use Double-Take for this solution. Use these procedures as a guideline for creating your own implementation.

NOTE: 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.

Audience

This document is written for network and application administrators who have a working understanding of the applications and environments where the Double-Take 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:

- Double-Take Server Recovery Option
- The Single Instance Storage (SIS) feature of Microsoft® Windows® Storage Server

Expectations

Application notes are intended to provide a framework for configuring a Double-Take 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, Double-Take, and Single Instance Storage.

Related documentation

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

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

- Double-Take *User's Guide* or online documentation
- Double-Take *Server Recovery Option Guide*
- Reference guides or documentation for the Windows Single Instance Storage feature

Getting help

Double-Take Software has application notes that describe how to configure Double-Take with a variety of popular third-party applications. These application notes are available on the Application Notes page of the Double-Take Software support web site (http://support.doubletake.com).

Double-Take Software offers professional services on a fee basis to assist you in identifying the best practices for implementing a solution in your environment. Visit http://www.doubletake.com/what-we-offer/services/ for more information.

Solution Overview

The Single Instance Storage (SIS) feature of Microsoft Windows Storage Server reduces duplicate files by calculating a unique signature for each file and replacing each duplicate file's physical data with a pointer to a single instance of the file. If an individual file is changed, then its reparse point is modified to point to the new data instead of the original duplicate file. This works very well for reducing the total storage footprint of the target server and still allowing access to the entire data set.

The Double-Take Server Recovery Option is a Double-Take add-on that protects an entire server. It is based on core Double-Take technology, but it also replicates a server's system state.

The Double-Take Server Recovery Option can be used to store images of multiple source servers onto a single target image server (many-to-one). Because the available disk space constrains how many source servers can be protected to a single image server, data de-duplication technologies are useful to reduce storage of system files that are duplicates from multiple protected servers.

This document explains the benefits of data de-duplication on the target, as well as describes the steps necessary to enable SIS on a target server to minimize disk space use.

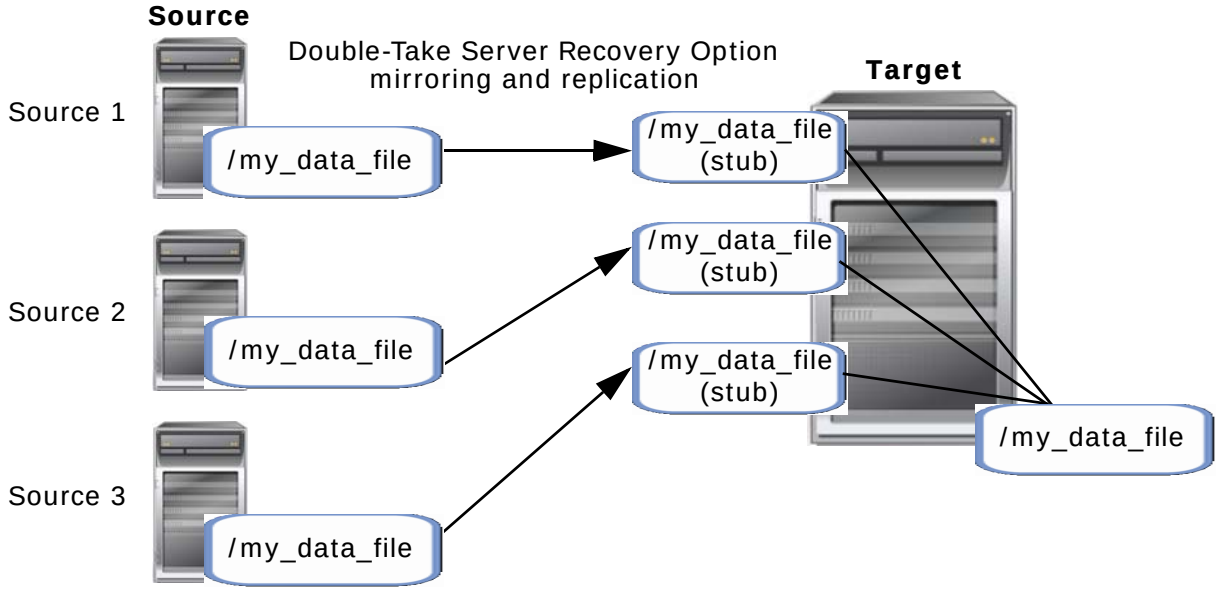
To complete these instructions, you will install Single Instance Storage and Double-Take, and configure Double-Take Server Recovery Option to protect one or more source servers.

NOTE: Due to the complexities of these applications, this document is intended for network administrators with experience installing, configuring, and maintaining network applications including Double-Take and Single Instance Storage.

Configuration

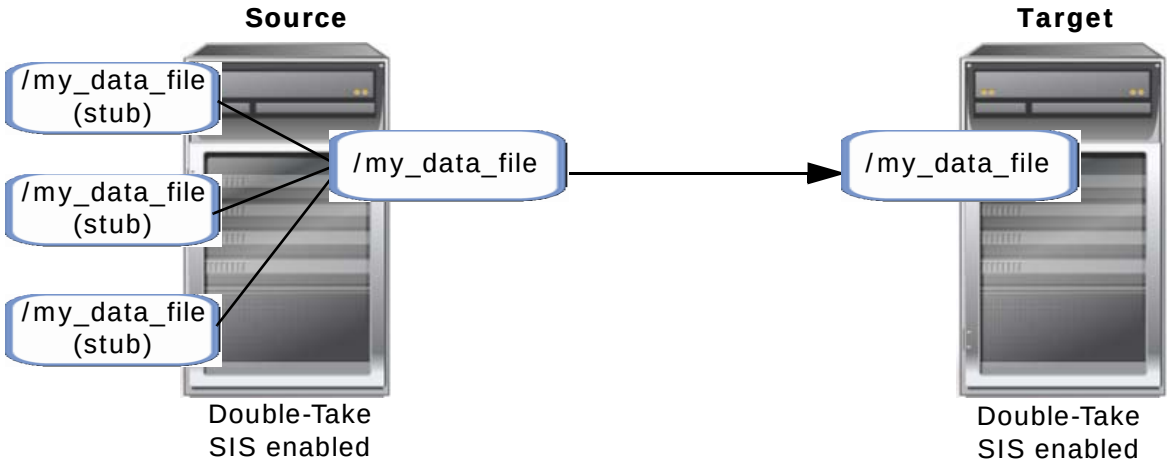
Scenario 1

The most common scenario for using SIS is on a target image server to minimize disk space use while protecting multiple sources. Similar to SRO, any many-to-one consolidated back-up configuration could have SIS enabled on the target. In this scenario, multiple source servers use Double-Take Server Recovery Option to save their images on a single Double-Take target image server. The files that are common on one or more source servers will be de-duplicated so that the copy of the file for each source server is stubbed and only one full image exists on the target in an SIS archive.



Scenario 2

It is also possible to enable SIS on a source storage server that is failover protected to another storage server, where SIS may or may not be enabled. Double-Take will correctly mirror the full files (rather than the stubs) on an SIS source for files that have been de-duplicated. No additional configuration is necessary for Double-Take to run on source servers where SIS is enabled.



Enabling compression

By enabling compression, you can reduce the amount of bandwidth needed to transmit Double-Take data. When compression is enabled, the data is compressed before it is transmitted from the source. When the target receives the compressed data, it uncompresses it and then writes it to disk. On a default Double-Take connection, compression is disabled.

Because the files that should be included in a replication set can generate a significant amount of data, you should enable compression for the connection. For more information about enabling compression, see the Double-Take *User's Guide*. However, keep in mind that the process of compressing data impacts processor useage. If you notice an impact on performance while compression is enabled in your environment, either adjust to a lower level of compression, or leave compression disabled.

Configuring memory usage

Double-Take uses memory to queue operations and data on both the source and target. Since the source server is typically running a production application, it is important that the amount of memory Double-Take and the other applications use does not exceed the amount of RAM in the system. If the applications require more memory than there is RAM, the system will begin to swap pages of memory to disk and the system performance will degrade.

Using SQL Server® as an example, for instance, SQL Server will use all of the available system memory when needed by default, and it may use almost all of the system memory during high-load operations. These high-load operations are precisely what cause Double-Take to need memory to queue the data being changed by SQL Server. On a server with 1 GB of RAM running SQL Server and Double-Take, you might configure SQL Server to use only 512 MB and Double-Take to use 256 MB, leaving 256 MB for the operating system and other applications on the system. Many other server applications will use almost all system memory by default, so it is important to check and configure applications appropriately, particularly on high-capacity servers.

Sample Implementation

This section describes an example of how to configure Double-Take and Single Instance Storage. 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.

Requirements

For this scenario, your system must meet the following requirements:

- Microsoft® Windows® Server®, Storage Server edition
- Licensed copies of Double-Take 5.0, Server Recovery Option, with the latest service pack

Install software on the source

The Double-Take Server Recovery Option can be used to store images of multiple source servers onto a single image server.

1. Install Windows on the source, if it is not already installed.
2. Install Double-Take on the source machine using the installation defaults. Storage Recovery Option is installed with Double-Take and is activated with an add-on Double-Take activation code. See the Double-Take *Server Recovery Option* Guide for details.
3. Install Windows and Double-Take on each additional source server.

Install and configure software on the target

1. Install Windows and enable Single Instance Storage on the target, if it is not already installed.
2. Create a volume on the target server.
3. Right-click on the volume, then select **Properties**.
4. On the **Advanced** tab, select **Enable SIS on this volume**. Click **OK**.
5. Open a command window, then type `sisadmin /i <volume>`.

   This command will install the SIS and reboot the server.
6. After the reboot is complete, open the command window and type `sisadmin /e`.

   This command will enable SIS and start the SIS Groveler Service.
7. Set the Groveler service to foreground mode or background mode by typing `sisadmin /f <volume>` or `sisadmin /b <volume>`.
8. Install Double-Take on the target server using the installation defaults. See the Double-Take *Getting Started* guide for details.

Establishing server protection

1. Open the Double-Take Management Console.
2. Select **Tools**, **Connection Wizard**.
3. The Connection Wizard opens to the Welcome screen. Click **Next** to continue.
4. Select the source server. This is the server that you want to protect. Click **Next** to continue.

NOTE:	Double-Take will automatically attempt to log on to the selected source using the identification of the user logged on to the local machine.

5. Select the Double-Take target. This is your image server that will hold the image of the source. Click **Next** to continue.

NOTE:	Double-Take will automatically attempt to log on to the selected target using the identification of the user logged on to the local machine.

6. Select **Protect system state and data using Server Recovery Option** and click **Next** to continue.

7. By default, all volumes are automatically selected for protection. You can deselect those volumes that you do not want to protect by clearing the checkbox, although if those volumes contain application data, the integrity of your installed applications will not be maintained. You cannot clear the checkbox for the boot volume because that is where the system state information is stored. A replication set will automatically be created using the volumes you select. Click **Next** to continue.

8. The system state and data from the source will be stored on the target image server and used in the event the source fails. Select a location on the target image server to store the image of the source. In order to distinguish this image from images of other servers, the source name and replication set name will automatically be appended to the path you select and will be displayed on-screen. Click **Next** to continue.

9. Review your selections on the summary screen, then click **Finish**. The Connection Wizard will close, the connection will be established, and mirroring and replication will begin.

10. Repeat these steps for each additional source server.

Monitor your connection through the Management Console. For detailed information on monitoring a connection, see the Double-Take *User's Guide*.

Recovering a failed source

In the event your source has failed, you can recover it to another server through the Recovery Manager client. The recovery server should be similar, but it does not need to have Double-Take installed on it.

1. Prepare your recovery server as described in the *Double-Take Server Recovery Option Guide*.
2. From the Management Console, select **Tools**, **Recovery Manager**.
3. Select the target image server. After you have selected the target image server, the list of available images will automatically be populated.
4. From the **Available Images**, select the image that corresponds with the source server. If the image you want is not listed, click **Add** and specify the name and location of the image.
5. If desired, select the snapshot that you want to use from **Available Snapshots**.
6. Specify the **Recovery Server**, which is the replacement server that will replace the original source.
7. If desired, you can view and/or modify the optional recovery settings by clicking **Configure Recovery**. A complete description of each setting can be found in the *Server Recovery Option Guide.*
8. Before starting the recovery, you must validate the configuration of the recovery server to make sure it is suitable for the image of the original source. Click **Validate Configuration**. The validation results will be displayed in the Validation tab at the bottom of the window.

   You must resolve any errors before you can begin the recovery process. For details on the different validation checks, see the *Server Recovery Option Guide*.
9. Double-click on any of the validation items to see details. You must correct any errors before you can recover. Depending on the error, you may be able to click **Fix** or **Fix All** and let Server Recovery Option correct the problem for you. For those errors that Server Recovery Option cannot correct automatically, you will need to modify the recovery server to correct the error, or you can select a different server. You must revalidate the selected server until the validation check passes without errors.
10. When the validation is complete and the recovery server configuration is suitable, click **Recover** to being the recovery process.
11. Specify what you want to happen when recovery is initiated.
    - **Shutdown source server if running**—If the original source is still running, the Recovery Manager can stop it. Although, if the Recovery Manager cannot communicate with the original source, the shutdown command will fail. This option prevents network conflicts in those cases where the original source is still online.

- **Disable source protection during recovery**—This option allows you to disconnect the connection between the original source and target image server during recovery. The connection will be disconnected after the recovery to the recovery server is complete. If your recovery server is your original source, this connection will always be enabled.
- **Display prompt before completing recovery**—If desired, you can be prompted before the recovery process is complete. The prompt will be displayed before the last step of the recovery process, which is the reboot step. The recovery server will not become the original source until after it is rebooted. If you do not select this option, no prompt will be displayed, and the reboot will occur automatically.

12. During the recovery process, status information will be displayed in the Recovery tab at the bottom of the window. If configured, the recovery server will automatically reboot when the recovery process is complete. Otherwise, you need to respond to the prompt to reboot the server. If you choose not to reboot the server when prompted, you must reboot it manually so that the recovery server can become the original source.

NOTE: Because the Windows product activation is dependent on hardware, you may need to reactivate your Windows registration after recovery. Follow the on-screen prompts to complete the reactivation.

You may experience application issues following a recovery if an application is hardware or volume specific. If an application is not functioning following a recovery, perform a repair installation if the application offers that functionality. If a repair installation is not available, you may need to reinstall the application.

If you have recovered to a different subnet, the image server may not be able to contact the network address on the recovered server. The Recovery Manage will hang for a short period of time and then log a timeout message in the status window. Recovery is complete at this point.