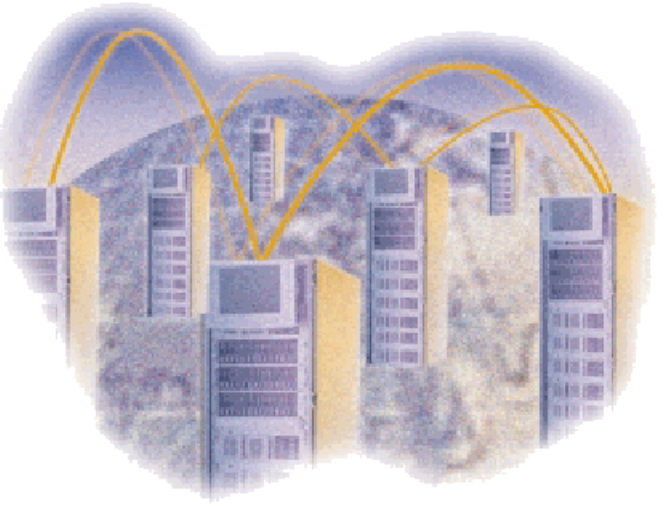
High Availability for Lotus Notes



High Availability for Lotus Notes published November 2002

Double-Take Support for Application Failover

Double-Take's 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.txt 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 the Double-Take software and we offer 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.

NSI 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, NSI 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 NSI Software has no direct access to or experience with a particular application or configuration, NSI 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, NSI 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 NSI Software to any obligation.

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Introduction

Lotus Notes is an integrated e-mail, calendaring, group scheduling, contact and task management, Web browsing, and knowledge management tool. It is an integrated messaging and Web application software platform. Together these products deliver secure, interactive Web applications and a solid infrastructure for messaging and collaboration.

NSI Software's Double-Take provides real-time enterprise data protection and replication. Double-Take can be used to provide high availability for your Lotus Notes servers.

This document describes the steps necessary to configure Double-Take to provide high availability for Windows 2000/NT servers running Lotus Notes server. These procedures allow a secondary server to assume the identity and role of the failed primary Notes server while maintaining the availability of the Notes services with minimal disruption or data loss.

To complete these instructions, you will install Lotus Notes and Double-Take. You will also configure Double-Take for 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 Double-Take and Lotus Notes.

Requirements

- Two servers that meet one of the following operating system requirements:
  - Microsoft Windows NT 4.0 with Service Pack 4 or higher
  - Microsoft Windows 2000

NOTE:	The two servers should both be running the same operating system. Although cross-platform mirroring and replication are available, NSI Software recommends that the two servers be the same platform for effective failover and failback.

- Two licensed copies of Lotus Notes
- Two licensed copies of Double-Take 4.x
- Both servers must be connected to the same physical network

Protecting Your Notes Data

Install software on the source

1. Install Notes on the source, if it is not already installed.
2. Install Double-Take 4.x on the source machine using the installation defaults.

NOTE:	Verify that the **transactional applications** option is selected on the Double-Take Optimizations screen if you are using Notes R5 which is a transactional database application. (Previous versions of Notes do not support transactional logging.) See the Double-Take *Getting Started* guide for further details.

Install and configure software on the target

1. Install Notes on the target using the same options used when installing Notes on the source machine.
2. Install Double-Take 4.x on the target using the installation defaults.

NOTE:	Verify that the **transactional applications** option is selected on the Double-Take Optimizations screen if you are using Notes R5 which is a transactional database application. (Previous versions of Notes do not support transactional logging.) See the Double-Take *Getting Started* guide for further details.

3. Configure the Double-Take service to interact with the desktop. Use the instructions under step a if you are using Windows 2000 or under step b if you are using Windows NT.
   a. For Windows 2000, follow these steps:
      1. In **Control Panel**, **Administrative Tools**, **Services**, double-click the Double-Take service.
      2. Click the **Log On** tab.
      3. Mark the check box **Allow service to interact with desktop** and click **OK**.

b. For Windows NT, follow these steps:

1. In **Control Panel**, **Services**, double-click the Double-Take service.
2. Mark the check box **Allow service to interact with desktop** and click **OK**.

Configure and begin mirroring and replication

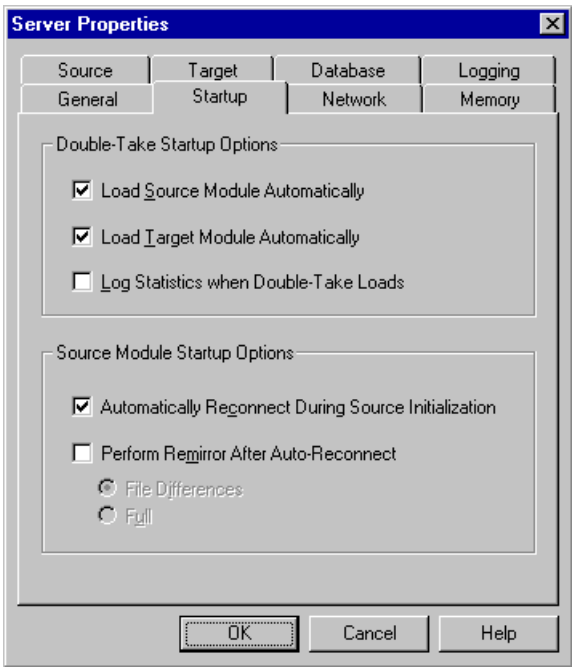
If you replicating to the same target directory, `c:\notes` to `c:\notes`, continue with the instructions below. If you are replicating to a different target directory, `c:\notes` to `d:\notes`, skip to the instructions ***Replicating to a different target directory*** on page 7.

Replicating to the same target directory

This section of the application note assumes that your source and target machines have the same drive and directory structure. For example, you may be replicating `c:\notes` to `c:\notes`. If you need to replicate to a different directory on the target, `c:\notes` on the source is replicated to `d:\notes` on the target, see ***Replicating to a different target directory*** on page 7.

1. Select **Start**, **Programs**, **Double-Take**, **Management Console**.
2. Double-click your source machine to log on.
3. If you are using Double-Take version 4.1 or earlier, you will need to disable auto-remirror on auto-reconnect so that the source does not remirror files after failback. In version 4.2 and later, the source automatically recognizes that a restore is required and will not remirror. If you are using 4.1 or earlier, complete steps a-c below. If you are using 4.2, you can continue with the next numbered step.
   a. Right-click the source machine and select **Properties**.

b. Select the Startup tab.

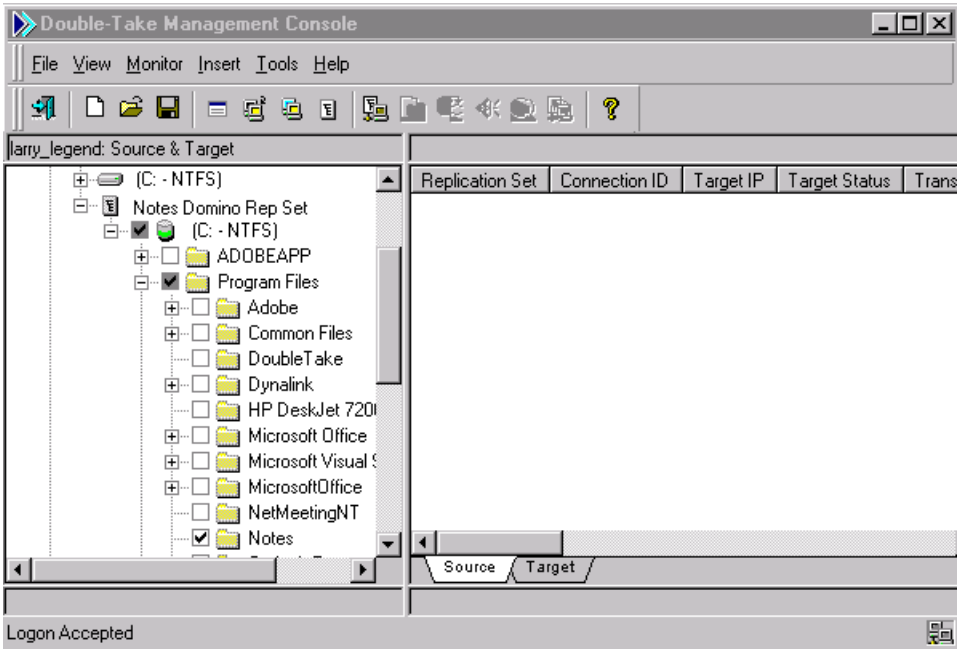


c. By default, **Perform Remirror After Auto-Reconnect** will be selected. Disable this option so that the source does not remirror files after failback. Click **OK** to continue.

NOTE:	If you disable this option and a auto-disconnect occurs, you will need to remirror manually after the connection is reestablished.

4. Right-click your source machine and select **New**, **Replication Set** and enter the desired name for the replication set.

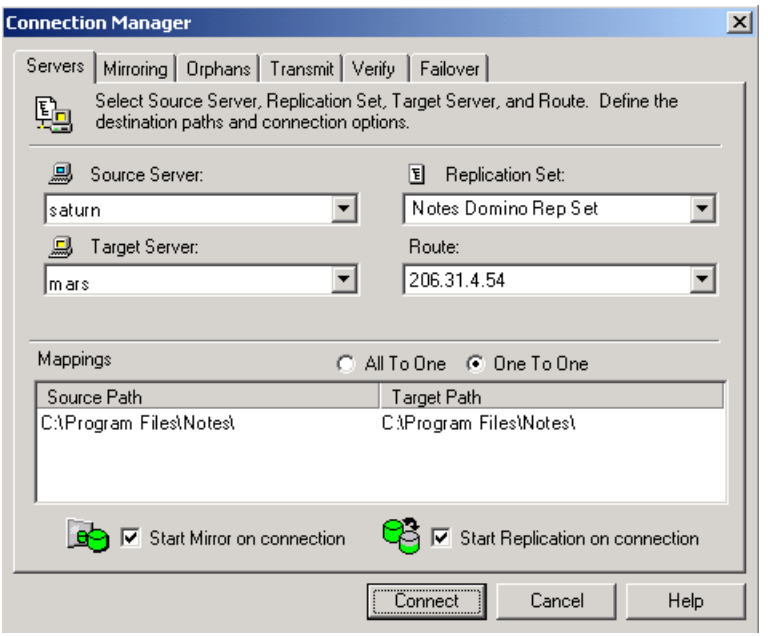
5. Select the Notes data that you wish to protect. The default installation for a single Notes server places the application and data files in the same directory, `\notes`. Mark the `\notes` directory to select it and all of its subdirectories.



6. By default, two configuration files, `notes.ini` and `lotus.ini`, are placed in the `\winnt` directory. Locate and mark the `.ini` files for replication.

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, reference Double-Take's *User's Guide*.)

10. Select the **One To One** mapping so that the replication set data is transmitted to the same directory structure on the target.

11. Click **Connect** to start the mirror and replication processes.

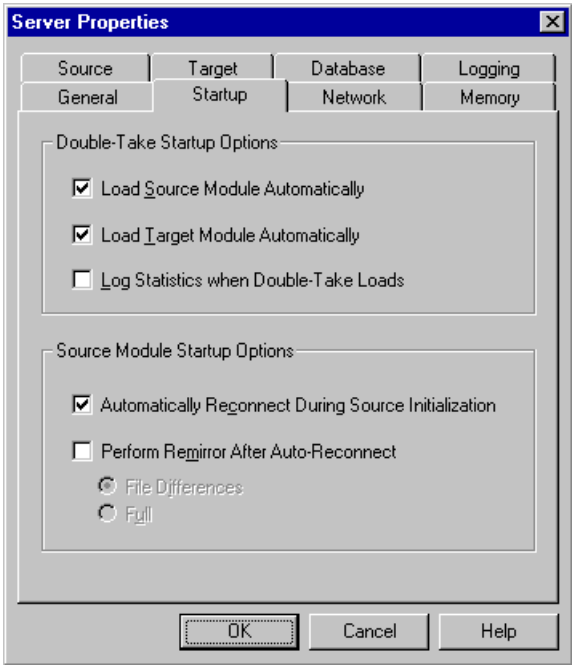
NOTE:	Each time you start or stop a Notes server, files are modified. If, in a test environment, you failover to your target, you will need to remirror or restore to synchronize the files between the two machines.

Mirroring and replication have now been established. Continue with ***Configuring failover when replicating to the same target directory*** on page 10 to complete your setup steps.

Replicating to a different target directory

This section of the application note assumes that your source and target machines have different drive and directory structures. For example, you may be replicating `c:\notes` to `d:\notes`. If you need to replicate to the same directory on the target, `c:\notes` on the source is replicated to `c:\notes` on the target, see ***Replicating to the same target directory*** on page 3.

1. Select **Start**, **Programs**, **Double-Take**, **Management Console**.
2. Double-click your source machine to log on.
3. If you are using Double-Take version 4.1 or earlier, you will need to disable auto-remirror on auto-reconnect so that the source does not remirror files after failback. In version 4.2 and later, the source automatically recognizes that a restore is required and will not remirror. If you are using 4.1 or earlier, complete steps a-c below. If you are using 4.2, you can continue with the next numbered step.
   a. Right-click the source machine and select **Properties**.
   b. Select the Startup tab.

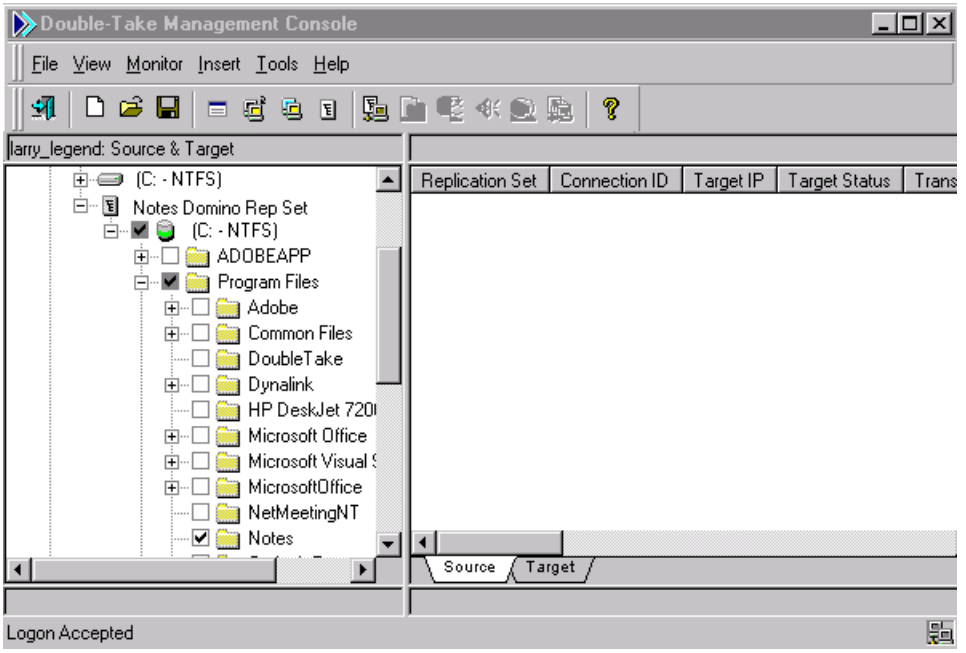


   c. By default, **Perform Remirror After Auto-Reconnect** will be selected. Disable this option so that the source does not remirror files after failback. Click **OK** to continue.

NOTE:	If you disable this option and a auto-disconnect occurs, you will need to remirror manually after the connection is reestablished.

4. Right-click your source machine and select **New**, **Replication Set** and enter the desired name for the replication set.

5. Select the Notes data that you wish to protect. The default installation for a single Notes server places the application and data files in the same directory, `\notes`. Mark the `\notes` directory to select it and all of its subdirectories.

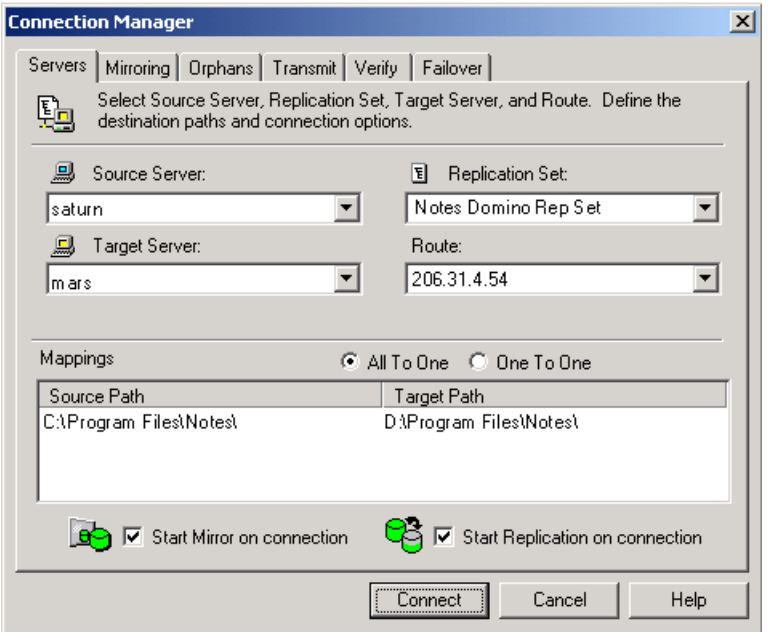


By default, two configuration files, `notes.ini` and `lotus.ini`, are placed in the `\winnt` directory. You will want to replicate these files to your target for disaster recovery in the event of a total machine failure. But since you are replicating to a different directory structure, if you experience a high availability interruption, such as a NIC failure, you will not want to use the replicated `.ini` files on the target because they may point to incorrect or non-existent data. You will be replicating your `.ini` files, but later in this document, you will be configuring failover to automatically use the specific `.ini` files that you need.

6. Locate and mark the `.ini` files for replication.

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, reference Double-Take's *User's Guide*.)

10. By default, the **All To One** mapping will be selected. Click the **Target Path** field and make the necessary changes to direct the files to the desired location on your target machine.

11. Click **Connect** to start the mirror and replication processes.

NOTE:	Each time you start or stop a Notes server, files are modified. If, in a test environment, you failover to your target, you will need to remirror or restore to synchronize the files between the two machines.

Mirroring and replication have now been established. Continue with ***Configuring failover when replicating to a different target directory*** on page 12 to complete your setup steps.

Configure Failover and Begin Failure Monitoring

If you replicating to the same target directory, `c:\notes` to `c:\notes`, continue with the instructions below. If you are replicating to a different target directory, `c:\notes` to `d:\notes`, skip to the instructions ***Configuring failover when replicating to a different target directory*** on page 12.

Configuring failover when replicating to the same target directory

This section of the application note assumes that your source and target machines have the same drive and directory structure. For example, you may be replicating `c:\notes` to `c:\notes`. If you are replicating to a different directory on the target, `c:\notes` on the source is replicated to `d:\notes` on the target, see ***Configuring failover when replicating to a different target directory*** on page 12.

1. If a failure occurs, you will want to have Notes start on the target machine 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 where your Double-Take files are installed. Note that you will have to select the appropriate line to run depending on how you are running Notes.

POSTOVER.BAT

```
rem  This file starts the Notes service on the target. If you are starting
rem  Notes as an application, uncomment the last command in this file by
rem  removing the remark characters rem and comment out the first command in this
rem  file by adding the remark characters rem before the command.

net start “Lotus Notes Server”

rem c:\notes\nserver.exe
```

2. After a failure is resolved, you will be ready to bring your source back online. At this time, you will want to stop Notes 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 where your Double-Take files are installed. Note that you will have to select the appropriate line to run depending on how you are running Notes.

PREBACK.BAT

```
rem  This file stops the Notes service on the target. If you are running
rem  Notes as an application, uncomment the last command in this file by
rem  removing the remark characters rem and comment out the first command in this
rem  file by adding the remark characters rem before the command.

net stop “Lotus Notes Server”

rem c:\notes\nserver.exe -q
```

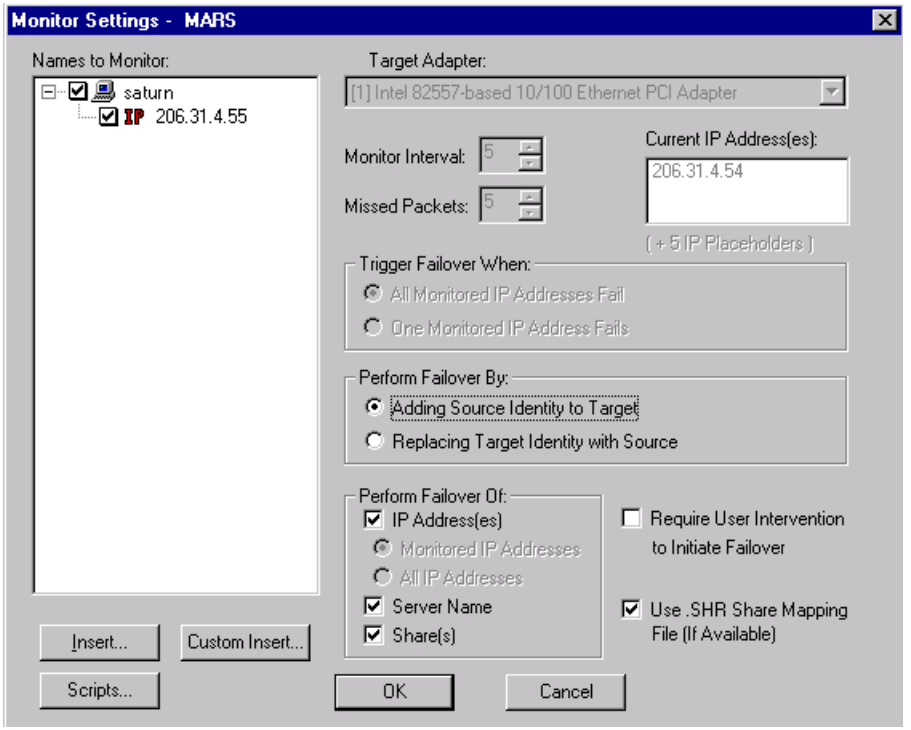
NOTE: These sample batch files are available on the NSI Software web site at `www.nsisoftware.com/download/lotusnotescrp.exe`.

3. Select **Start**, **Programs**, **Double-Take**, **Failover Control Center**.

4. Select the target machine from the list of available machines. If the target you need is not displayed, click **Add Target**, enter the machine name, and click **OK**.

5. To add a monitor for the selected target, click **Add Monitor**. Type the name of the source machine and click **OK**. The Monitor Settings window will open.

6. In the Monitor Settings window, mark the IP address that is going to failover and verify that the **Perform Failover By** option **Adding Source Identity to Target** is selected.



7. Click **Scripts** and specify the location and file names of the scripts that were created above.

8. Click **OK** to go back to the Monitor Settings dialog box.

9. Click **OK** to begin monitoring the source machine.

In the event of a source machine failure, your target machine is now ready to stand in for your source.

Configuring failover when replicating to a different target directory

This section of the application note assumes that your source and target machines have different drive and directory structures. For example, you may be replicating `c:\notes` to `d:\notes`. If you are replicating to the same directory on the target, `c:\notes` on the source is replicated to `c:\notes` on the target, see ***Configuring failover when replicating to the same target directory*** on page 10.

1. Create the following directories on the target machine:
   - `<drive>:\failfile\source`
   - `<drive>:\failfile\target`
2. Copy the configuration files (`notes.ini`, and `lotus.ini`) from the source machine to both of the directories you just created.
3. Using a text editor, edit the configuration files located in the `<drive>:\failfile\target` directory. Search and replace the source path with the target path that will be used after failover. For example, `c:\notes\data` becomes `d:\notes\data` and `c:\notes\data\w32` becomes `d:\notes\data\w32`.
4. If a failure occurs, you will want to replace the source's `.ini` files with the edited files in `<drive>:\failfile\target\`, and then have Notes start on the target machine automatically. To do this, create a batch file called `postodif.bat` using the sample batch file below. Save the batch file to the same directory where your Double-Take files are installed. Note that you will have to select the appropriate line to run depending on how you are running Notes.

POSTODIF.BAT

```
rem  The first part of this file copies the source's .ini files into the target's
rem  system directory.  The second part of this file starts Notes on the
rem  target.

copy d:\failfile\target\notes.ini c:\winnt\notes.ini
copy d:\failfile\target\lotus.ini c:\winnt\lotus.ini

rem  If you starting Notes as an application, uncomment the last command
rem  in this file by removing the remark characters rem and comment out the first
rem  command in this file by adding the remark characters rem before the command.

net start "Lotus Notes Server"

rem c:\notes\nserver.exe
```

5. After a failure is resolved, you will be ready to bring your source back online. At this time, you will want to stop Notes on the target automatically and then restore the target's original `.ini` files to the target's system directory. To do this, create a batch file called `prebdif.bat` using the sample batch file below. Save the batch file to the same directory where your Double-Take files are installed. Note that you will have to select the appropriate line to run depending on how you are running Notes.

PREBDIF.BAT

```
rem  The first part of this file stops Notes on the target. The second part
rem  of the file copies the target's original .ini files into the target's
rem  system directory.

rem  If you are running Notes as an application, uncomment the nserver line
rem  below by removing the remark characters rem and comment out the net stop
rem  command by adding the remark characters rem before the command.

net stop "Lotus Notes Server"

rem c:\notes\nserver.exe -q


copy d:\failfile\target\notes.ini c:\winnt\notes.ini
copy d:\failfile\target\lotus.ini c:\winnt\lotus.ini
```

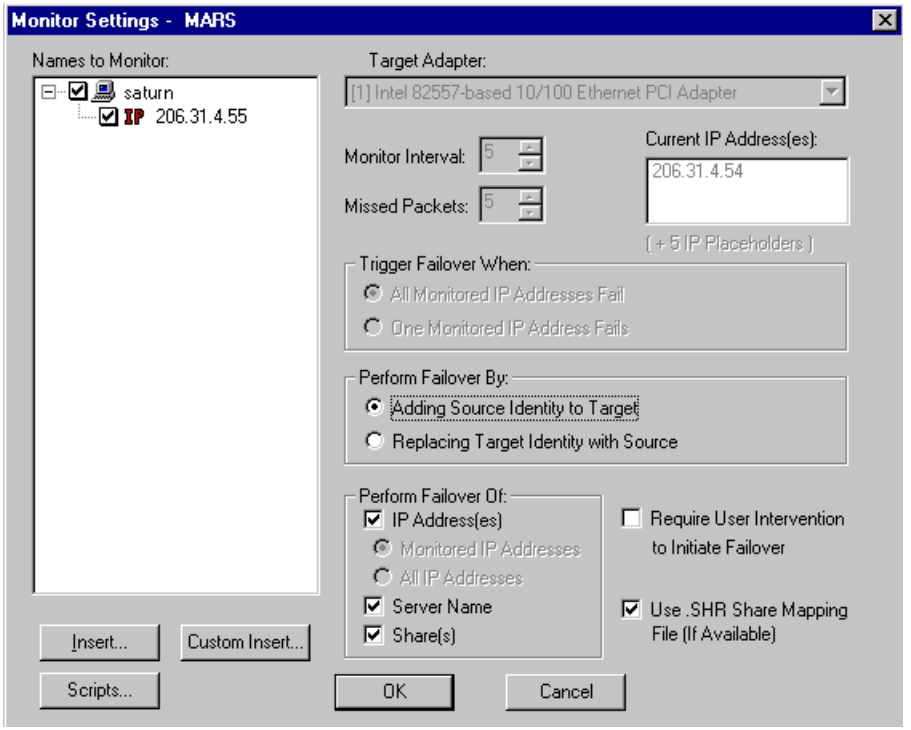
NOTE: These sample batch files are available on the NSI Software web site at `www.nsisoftware.com/download/notescrp.exe`.

6. Select **Start**, **Programs**, **Double-Take**, **Failover Control Center**.

7. Select the target machine from the list of available machines. If the target you need is not displayed, click **Add Target**, enter the machine name, and click **OK**.

8. To add a monitor for the selected target, click **Add Monitor**. Type the name of the source machine and click **OK**. The Monitor Settings window will open.

9. In the Monitor Settings window, mark the IP address that is going to failover and verify that the **Perform Failover By** option **Adding Source Identity to Target** is selected.



10. Click **Scripts** and specify the location and file names of the scripts that were created above.

11. Click **OK** to go back to the Monitor Settings dialog box.

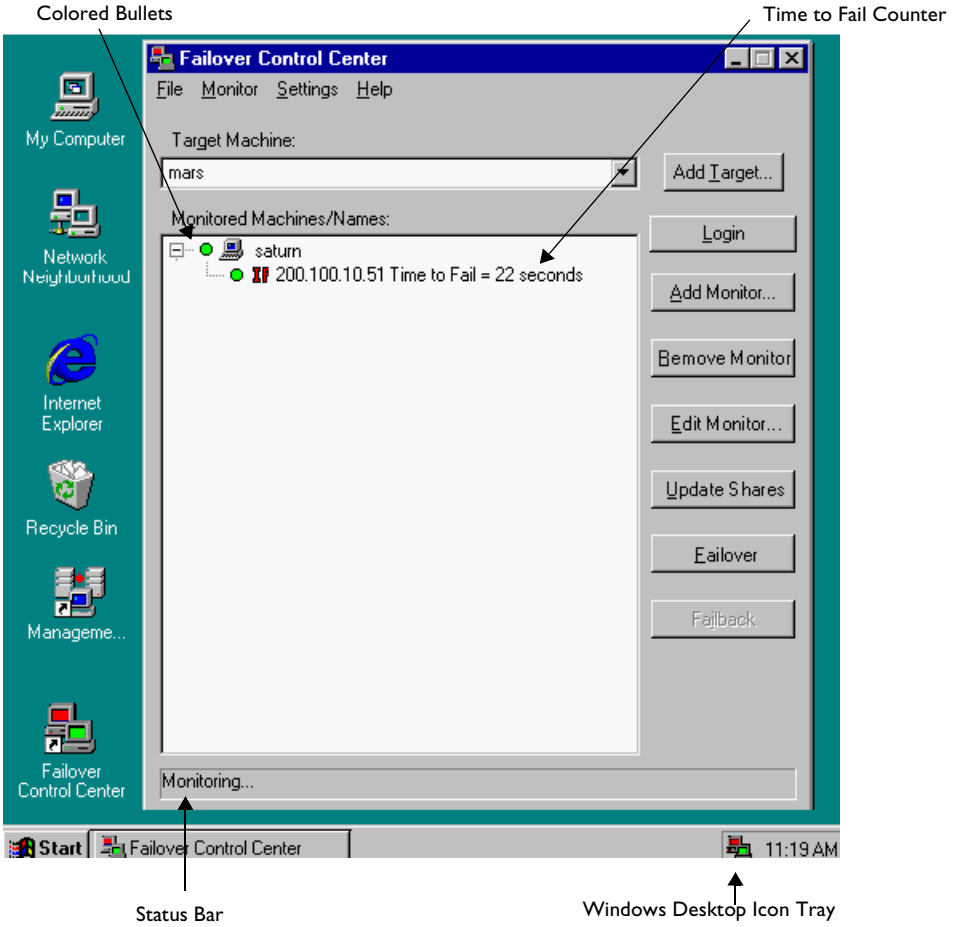
12. Click **OK** to begin monitoring the source machine.

In the event of a source machine failure, your target machine is now ready to stand in for your source.

Monitoring Failover

Now that replication and failover monitoring are configured and started, you will need to know if and when there is a problem. Since it can be essential to quickly know the status of your machines, Double-Take offers various methods for monitoring the status of failover. When the Failover Control Center is running, you will see four visual indicators:

- The Failover Control Center Time to Fail counter
- The Failover Control Center status bar located at the bottom of the window
- The Failover Control Center colored bullets to the left of each IP address and source machine
- The Windows desktop icon tray containing a failover icon



NOTE: You can minimize the Failover Control Center and, although it will not appear in your Windows taskbar, it will still be active and the failover icon will still appear in the desktop icon tray.

The Failover Control Center does not have to be running for failover to occur.

The following table identifies how the visual indicators change as the status of failover changes.

	Time to Fail Countdown	Status Bar	Colored Bullets	Desktop Icon Tray
Source is Online	The Time to Fail counter is counting down and resetting each time a heartbeat is received from the source machine.	The status bar indicates that the target machine is monitoring the source machine.	The bullets are green. [a]	The Windows desktop icon tray contains a failover icon with red and green computers.
Source Fails and Failover is Initiated	The Time to Fail countdown value is 0.	The status bar displays the source machine and IP address currently being assumed by the target.	The bullets are red.	The Windows desktop icon tray contains a failover icon with red and green computers.
Failover is Complete	The Time to Fail counter is replaced with the **`"Failed Over"`** message.	The status bar indicates that monitoring has continued.	The bullets are red.	The Windows desktop icon tray contains a failover icon with a red computer.

a. When the **Time to Fail** value has decreased by 25% of the entire timeout period, the bullet changes from green to yellow, indicating that the target has not received a response from the source. The yellow bullet is a caution signal. If a response from the source is received, the countdown resets and the bullets change back to green. If the countown reaches zero without the target receiving a response from the source, failover begins.

Once failover is complete, any clients logging into the server will be automatically directed to the target.

NOTE: For additional detailed information on failover and other monitoring tools, see Double-Take's *User's Guide*.

Restoring Your Notes Data

If your source experiences a failure, such as a power, network, or disk failure, your target machine will stand in for the source(s) while you resolve the source machine issues. During the source machine downtime, data is updated on the target machine. When your source machine is ready to come back online, the data is no longer current and must be updated with the new data on the target machine.

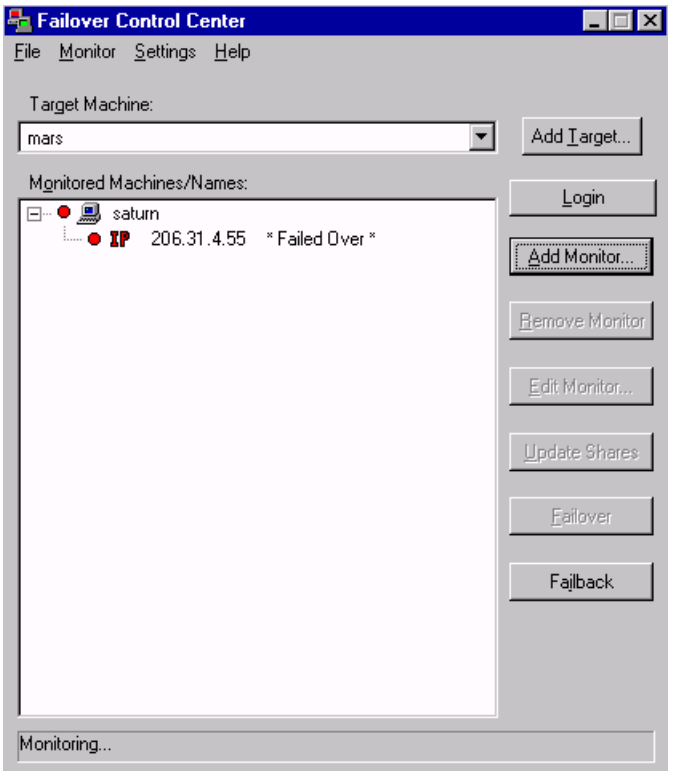
NOTE:	If the source server is rebooted while connected to the network before failback is performed, you may receive errors due to duplicate IP addresses.

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, continue with step 3. If you do not need to rebuild your hard drive, continue with step 6.

3. Install Windows 2000 or Windows NT. Since your source machine is not connected to the network, go ahead and use the source's original name and IP address.
4. Install Double-Take using the installation defaults.
5. Install Notes using the same settings as the original installation.
6. **Verify that Notes is not running on the source.** Depending on the type of failure or the options you selected during the installation, Notes could be running.
7. On the target machine, select **Start**, **Programs**, **Double-Take**, **Failover Control Center**.
8. Select the target machine that is currently standing in for the failed source.

9. Select the failed source and click **Failback**.



The pre-failback script entered during the failover configuration stops Notes on the target so that no additional changes can be made to the data during failback.

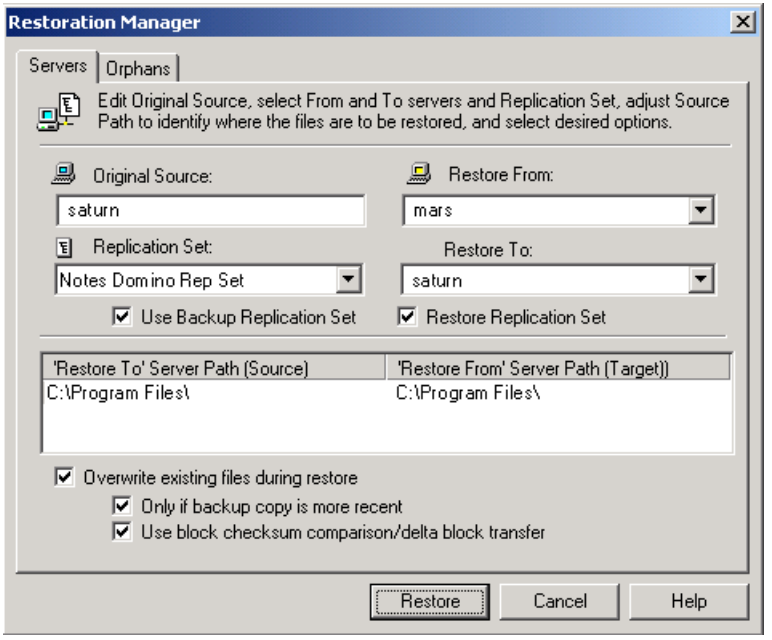
10. You will prompted to determine if you want to continue monitoring the source server. Do no choose **Continue** or **Stop** at this time.

11. Reconnect the source machine to the network.

12. After the source is back online, select whether or not you want to continue monitoring this source machine (**Continue** or **Stop**).

13. To begin the restoration process, open the Double-Take Management Console and select **Tools**, **Restoration Manager**.

NOTE:	You can also run the Double-Take DTCL automated restoration script, which can be found in the Double-Take *User's Guide*, to complete the remaining steps in this section.



14. Complete the appropriate fields as described below.
    - **Original Source**—The name of the source machine where the data original 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 you the data will be restored. This may or may not be the same as the original source machine.

15. Identify the correct drive mappings for the data and any other restoration options necessary.

NOTE:	For detailed information on the restoration options, see the Double-Take *User's Guide*.

16. Verify that the selections you have made are correct and click **Restore**.

NOTE:	The restoration procedure time will vary depending on the amount of data that you have to restore. You can monitor the progress of the restoration by viewing the connection from the target to the source in the Management Console.

17. After the restoration is complete, start Notes on the source machine.

18. Reestablish the Double-Take Notes replication set connection.

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