



An IBM Proof of Technology

Discovering the Value of Tivoli Storage Manager v5.5

FilesX Installation and Use Lab

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Introduction

This lab will have the student install, configure and explore FilesX.

Lab Requirements

These labs are written using IBM® Tivoli Storage Manager v5.5 and FilesX on a Microsoft® Windows® 2003 operating system. The only requirement is the virtual machine used to perform the labs, VMWare Workstation v5 or later (or VMWare Player or VMware Server v1 in some circumstances) and sufficient resources on your host machine to run the virtual machine (2 GB RAM is recommended). All software needed for the labs is included within the VMWare image itself. The location of all necessary files will be indicated in the lab as required.

This lab uses the *TSM Demo II* VMWare Image.

Lab Objectives

Upon completion of this lab you will be able to:

- Install the FilesX component
- Understand how the components work together
- Configure FilesX for normal operations
- Take snapshot and CDP backups of file data
- Restore file data in numerous scenarios
- Create a DR backup of the primary snapshot repository.

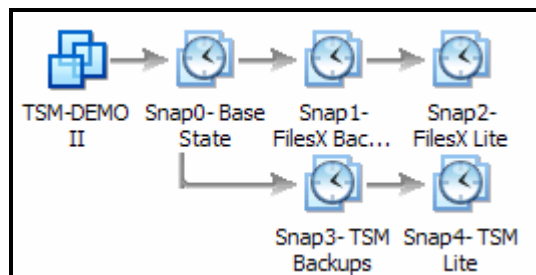
Preparing for the Lab

Start the Windows 2003 Virtual Machine

1. If the VMWare image is not already running, start it then click the **Manage Snapshots for Virtual Machine** icon at the top of the page.



2. Select the Snapshot named **Snap0- Base State** (see picture) and click the **Go To** button at the bottom of the panel. If you get a message to confirm you want to restore this snapshot, click **Yes**.



- ___ 3. On the left side of the screen click on **Start this virtual machine**. This will open a virtual Windows 2003 Server. If you are prompted to install drivers, click **OK**.
- ___ 4. When the **Welcome to Windows** screen appears, left-click somewhere in the *middle* of the virtual screen. Use **CTRL+ALT+Insert** to get a sign-on screen for the virtual machine.
- ___ 5. Log on to the virtual machine. The default ID is **Administrator**, and the password is **smartway**.
- ___ 6. While your cursor is within the virtual machine's window, use the **CTRL+ALT+Enter** key combination to put the host in full screen mode.

Exercise 1 – Installing and Configuring FilesX Server

Introduction

In this exercise you will install and configure FilesX Server.

Install FilesX Server

- __ 1. Start Windows Explorer from the System bar. Navigate to **S:\IBM Software\FilesX\Xpress Restore**. Double-click on **Setup.exe**.
- __ 2. Click **Next** at the Welcome screen.
- __ 3. Review the Introduction screen and click **Next**.
- __ 4. Accept the license agreement by clicking **Yes**.
- __ 5. Click **Next** to accept the default installation directory.
- __ 6. Click **Next** to accept the default Program Folder.
- __ 7. Choose **Backup Server** for the installation type, click **Next**.
- __ 8. During the install, you will see a popup asking for authorization to install a new driver. Click **Yes** to authorize the installation of the FilesX Virtual Volume driver.
- __ 9. When asked, validate *Yes, I want to restart my computer now* is selected and click **Finish**.

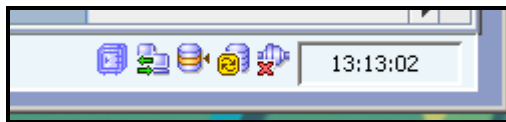
Add Repository Space to the FilesX Server

- __ 1. After the system restarts, Log In again using a **CTRL-ALT-INSERT** key combination and the account **Administrator** with the password **smartway**.
- __ 2. You will notice the system bar is not visible. You can make it so by using your cursor to **stretch it upwards**.
- __ 3. Start the FilesX Xpress Restore manager using the **Start** button → **All Programs** → **XpressRestore** → **Xpress Manager** menu path. If you receive any errors stating the interface was unable to initiate, simply wait 2-3 minutes and try again.
- __ 4. Once the login screen starts, you will see the message *Loading configuration...* After it changes to *Loading completed* you can log in with the user name **admin** and the password **admin123**.
- __ 5. Click **Cancel** at the welcome screen which asked if you wish to add storage to a repository.
- __ 6. On the left side of the interface you will see a navigation tree. *Expand* that tree next to **General Configuration**.
- __ 7. *Click* on the node **Storage Pool**.

- ___ 8. In the bottom of the right-hand section of the GUI, you will a list of all volumes on the system and the partitions that reside upon them. **Scroll down** until you see the *Local Repository* partition.
- ___ 9. Right-Click on the volume (not the existing partition) and select **Add to repository** (see Picture).



- ___ 10. You will be warned that the data will be lost. Click **Yes** to continue.
- ___ 11. You will be asked again if you are certain you wish to add this volume (*BasicDisk-10006*). Click **Yes** again.
- ___ 12. Click **Apply** at the next window which will add all of the volume's space to the repository.
- ___ 13. You will be told the space will be added to Xpress Restore, will warn you not to use it for anything else and also that you should configure your Anti-Virus software to not scan this data area. Click **OK**.
- ___ 14. While the volume is formatted and added to the repository, you will lose connectivity to the Xpress Restore Server. You can validate this by looking at the **right-most status** icon on the GUI (see Pic).



- ___ 15. When the server restarts and reconnects, you will see the icon change.



- ___ 16. When the manager and server reconnect, **click** on *Storage Pool* again. You will see that you can now **expand** the tree next to Storage Pool. Do so.
- ___ 17. You will see a *Repository Pool* node. **Click** on it. You will see that the volume we selected earlier is now part of the Xpress Restore snapshot repository. You will also see that it created a new partition on that volume and formatted it with an NTFS file system.
- ___ 18. Start **Windows Explorer**, expand **My Computers** and click on the **H:** drive (REP_H). You will see first that this repository is shared to other users on the network. You will also see various control files within the repository.

Configure FilesX Server

- ___ 1. Return to Xpress Manager and click on the **General Configuration** node in the navigation tree.
- ___ 2. You will see a settings workbook on the right side of the GUI, started at the *General* tab. **Review** this tab (note that the system date/time of the virtual machine is different than your physical host, this is intentional).
- ___ 3. Click on the **Applications** tab. FilesX has the option of quiescing MS SQL and MS Exchange. It can do this using VSS (on 2003 and current application versions) or using a custom Application Quiescing module for earlier software. Check the boxes for **VSS Flush** and **Purge Exchange logs after completed snapshot**. Click the **Apply** button *in that section of the page*. You can also see some timeout parameters can be specified on this page.
- ___ 4. Click the **Maintenance** tab. FilesX will do free-space maintenance on its snapshot repository by consolidating snapshot data once that data is no longer required. For now, just review but do not change these settings.
- ___ 5. Click on the **Retries** tab. You can see that we can customize how many attempts FilesX will make when taking a snapshot.
- ___ 6. Click the **Licenses** tab. You will see this software will expire after 13 days if we do not add a license. Click on the **File** main menu item and select **Upload License File**.
- ___ 7. Navigate to **S:\IBM software\FilesX\license** and select **nosupport.dat**.
- ___ 8. Click **License Upload** and **Yes** to allow the Xpress Restore server to be reset.
- ___ 9. Monitor the bottom-right icon and watch the Xpress Restore server stop and restart. When the connection is restarted, you will need to click on **General Configuration** again to get to the properties workbook.
- ___ 10. Click the **Network Configuration** tab. You will see that an IP address is dedicated for the Xpress Restore server. You have the option to assign another NIC to file-level recovery. We will not need to do this in this lab.
- ___ 11. Click on the **Xpress Mount Access** tab. This will allow you to limit who can access the FilesX repository to do recoveries.
- ___ 12. Click on the **Remote Repository Access** tab. You can add remote disk to the repository (such as may be served up by a NAS box). We will not do this in this lab.
- ___ 13. Click on the **FXP Configuration** tab. This will allow us to configure Disaster Recovery replication of the snapshot repository, but that will be done later in the lab.
- ___ 14. Click the **Alerts** tab. This tab allows us to configure Xpress Restore to use a SMTP server to send alerts via e-mail. We do not do this in our lab.
- ___ 15. Expand the **Users and Groups** node on the main navigation tree.
- ___ 16. Expand **Users**. You will see we have just one internal user configured to FilesX. *Right click* on **Users** and select **New User**. You will see that we can define a new user into a SuperUser group or a read-only group (LimitedGroup). Click **Cancel**.


- __ 17. Expand the **Groups** node. You will see the two pre-defined groups to which we can add an internal user. Right-click on **Groups** and select **New Group**.
- __ 18. Click on the **Yellow Arrowhead** next to *Show Permissions*. You will see that you can make custom user groups with specific capabilities. Click **Cancel**.
- __ 19. Right-click on **AD Groups** and select **New AD Group**.
- __ 20. Type in **FX Restore Master** and click **Apply**. FilesX allows existing Active Directory groups to be granted Super User authority. The *FX Restore Master* Active Directory group had previously been defined and the *Administrator* user added to the group.
- __ 21. Close **Xpress Manager** to allow the next exercise to begin.

Exercise 2 – Installing FilesX Client software

Introduction

In this exercise you will install FilesX Client software.

Install FilesX Client software

- __ 1. Start Windows Explorer from the System bar. Navigate to **S:\IBM Software\FilesX\Xpress Restore**. Double-click on **Setup.exe**.
- __ 2. Since we had previously installed the Backup Server components using this setup program, the first screen will ask us if we wish to uninstall or modify the current installation. Make certain **Modify** is checked and click **Next**.
- __ 3. You will be presented a list of modules, most of which are already checked since we installed them already. Check **Xpress Client** and click **Next**. *Do not* uncheck any that are already checked.
- __ 4. The client installer will ask you for name of the restore server. Leave *TSM-DEMO* and click **Next**.
- __ 5. During the install, you will receive a message to manually register the VSS module. Click **OK**. This error is an uncommon problem caused by the complex set of software that we have installed within this Virtual Machine in order to support a very wide variety of demonstrations. You will be asked if you wish to restart the machine. For now, *do not respond*.
- __ 6. Open a **Windows Command Prompt** using the  icon on the system bar.
- __ 7. Issue the command:
`cd \Program Files\FilesX\XpressRestore\Xpress Client\`
- __ 8. Issue the command:
`register_app.vbs -register XR_VSS XpressRestoreVSS.dll XR_VSS`

- __ 9. Return to the Xpress Restore setup screen, make certain that *Yes, I want to restart my computer now* is checked and click **Finish**.

Exercise 3 – Performing a Snapshot Backup

Introduction

In this exercise you will define what you want to protect, when it will be protected and how its backups will be managed. You will then watch those policies in action.

Define a Snapshot Backup

- __ 1. After the system restarts, log in again using the **CTRL-ALT-INSERT** key combination and the user **administrator** with the password of **smartway**.
- __ 2. You will need to **resize the system bar** again to make it visible.
- __ 3. Start the FilesX Xpress Restore manager using the **Start** button → **All Programs** → **XpressRestore** → **Xpress Manager** menu path. If the interface fails to initiate, just try again in 2 minutes or so. The Xpress Manager interface attempts to gather Active Directory information, which takes a few minutes to become available.
- __ 4. Log into Xpress Manager using the account **administrator** with the password **smartway** from the domain **DemoDomain**.
- __ 5. Expand the **General Configuration** node in the main navigation tree.
- __ 6. Expand the **Storage Pool** node in the main navigation tree. You will see that the client *tsm-demo* is now listed.
- __ 7. Right-click on the **Client Group** node in the main navigation tree. Select **New Client Group**.
- __ 8. In the *Client Group Name* field, enter **File Data CG**.
- __ 9. Expand the volume selection tree by **tsm-demo**.
- __ 10. Check the **G:** drive (this volume only contains file data).
- __ 11. Click **Apply**.
- __ 12. Right-click on **Job Schedules** in the main navigation tree and select **New Job Schedule**.
- __ 13. Enter **File Data BU Schedule** for the *Job Name*.
- __ 14. Check the **Run once a day at:** button and enter a time **2 hours from now**.
- __ 15. Check the **Application Aware** button. You will see the global application aware settings we chose earlier are already specified. Click **Cancel**.
- __ 16. Click the **Advanced** button. You will see we can specify when the snapshot starts, if it is to run within a small window only or run only a specified number of times. The Content aware snapshot box should be checked, which tells FilesX to not backup empty blocks. Click **Cancel**.

- __ 17. Click **Apply** to save the job schedule.
- __ 18. Right-click on the **Policies** node on the main navigation tree and select **New Policy**.
- __ 19. In the *Add/Define a Client Group* page, click the **Use an Existing Client Group** tab.
- __ 20. Select **File Data CG** and add it to the list of client groups with the **Add->** button. Click **Next**.
- __ 21. In the *Add/Define a Job Schedule* page, click the **Use an Existing Job Schedule** tab.
- __ 22. Select the **File Data BU Schedule** and the **Catalog** schedule and click **Add->** them both, one at a time.
- __ 23. Click **Next**.
- __ 24. In the Policy Name field enter **File Data BU Policy**.
- __ 25. Note that *Enable DR* is checked. Leave it that way. In this screen you can also modify the job schedules and client groups selections from the earlier pages.
- __ 26. Click on the **Pre/Post Processes** tab. Here you can specify scripts that can be run at key points during the snapshot process.
- __ 27. Click on the **Policy Cleanup** tab. Here you can specify a custom cleanup policy for this policy's data.
- __ 28. Click **Finish**.
- __ 29. Click the **Pending Jobs** node of the main navigation tree. You should show a pending backup for the G: volume starting today and running each day forever.

Note: In this exercise, we defined *what* will be protected, *when* it will be protected and *how* its backups will be managed. As you have seen multiple client groups and schedules can be tied together with a policy for any combination of data protection you might wish.

Run and Test the Snapshot Backup

- __ 1. Expand the **Policies** node in the main navigation tree.
- __ 2. Right-click on **File Data BU Policy** and select **Run Full Snapshot**.
- __ 3. Click on the **Snapshots Monitor** tab *above* the main navigation tree. You will see a snapshot run and complete in short amount of time. The filled-in green checkmark means the backup ran successfully and was cataloged.
- __ 4. Open **Windows Explorer** using the icon on the system bar.
- __ 5. Expand **My Computer** and **File Volume (G:)**.
- __ 6. You will see a directory named **Example Data**. Click on that directory.
- __ 7. There is a file named **ChangeMe.txt** in this directory. Double-click on it.
- __ 8. **Add a line** indicating it is the first change and the current system time. **Save and close the file**.
- __ 9. Delete the two files named **DeleteMe.txt** and **DeleteMeToo.txt**.

- __ 10. Close Windows Explorer.
- __ 11. Return to **Xpress Manager**. Right-click on the **Full snapshot** we just ran and select **Restore** → **Snapshot Volume Restore**.
- __ 12. To restore to the original location, expand next to **TSM-Demo** and select **G:**. Click **Apply**.
- __ 13. You will be asked if you really want to restore *G:* into *G:*. Click **Yes**.
- __ 14. You will be asked again to confirm. Click **Yes**.
- __ 15. The software will recommend that you bypass anti-virus scanning of this volume during its restore. Click **OK**. You will see the restore run and complete. *If you receive any message about open handles on the volume, make certain to close Windows Explorer then retry.*
- __ 16. Return to **G:\Example Data** using Windows Explorer. You will see DeleteMe.txt and DeleteMeToo.txt were restored.
- __ 17. Open **ChangeMe.txt**. You will see that the first change you made was undone. Add another change with a timestamp.

Use Xpress Mount to Recover Individual Files

- __ 1. Launch **Express Mount** by double-clicking its icon on the system tray (see picture). The window may start in the background.



- __ 2. Xpress Mount must locate the Xpress Restore repositories from which to read the snapshots. Click the **Refresh** button. Restore **Xpress Mount** using its icon. The repository on TSM-DEMO@DemoDomain will be displayed. You can also select the policy, host, volume and date of the snapshot you wish to mount. Since we have only taken one snapshot, this is the only viable selection.
- __ 3. Click the **Mount** button.
- __ 4. You will be asked where to mount the snapshot. Just leave **I:** selected and click **OK**. A message will be showing indicating the mount has taken place.
- __ 5. Restart or restore **Windows Explorer**. Navigate to the **I:** drive. Review the contents of **Example Data**.
- __ 6. Copy **ChangeMe.txt** to the desktop using Drag-n-Drop.
- __ 7. Open **ChangeMe.txt** to view the original contents of the file.
- __ 8. Close **Windows Explorer**.
- __ 9. Return to **Xpress Mount** and click **Dismount All**.

Note: Take a moment and think about what we just did. We accessed a snapshot *while it was still in the Xpress Restore Server's repository*. Without having done a recovery of the snapshot, we can

still review its contents, copy files wherever we wish, etc. Keep in mind that Xpress Mount can run on any Windows machine on the network by accessing the repository via its share. We can also access the data while it is being restored using the Instant Restore feature of Xpress Mount. Since this volume has very little data it is difficult to demonstrate this feature at this time so we will defer that exercise until later.

Exercise 4 – Performing a Continuous Data Protection Backup

Introduction

In this exercise you will modify the previous snapshot backup to include Continuous Data Protection (CDP).

Define a CDP Backup

- __ 1. Return to **Xpress Manager** and the **Configuration** tab.
- __ 2. Expand **Job Schedules** and click on **File Data BU Schedule**.
- __ 3. In the job definition page, check the **Enable CDP** box. You will be warned that CDP is not supported on Dynamic Disks. Click **OK**.
- __ 4. In the *Run once a data at:* field enter the **current system time plus 2 minutes**.
- __ 5. Click **Apply**.
- __ 6. Click on **Pending Jobs** in the main navigation tree. You should see a job scheduled to run today within 2 minutes (keep in mind the system date will not be the current date).
- __ 7. Click on the **Snapshot Monitor** tab. You will see a snapshot backup run and complete. Notice that the checkmark next to the job State will have a *C* to indicate that this snapshot invokes CDP when it completes.
- __ 8. Open up **Windows Explorer** and return to **G:\Example Data**.
- __ 9. Open **ChangeMe.txt**. Enter a line indicating it is **change #1** and the **current system time**. Go to **File** menu item and click on **Save**. **Keep note of the time** you made the first change. _____
- __ 10. **Wait** 2 minutes.
- __ 11. Add another line, indicating it is **change #2** and include the **current system time**. **Save** the contents using the File menu again. **Take note of the time**. _____
- __ 12. **Wait** another 2 minutes.
- __ 13. Add a third line, indicating it is **change #3** and include the **system time**. **Close** the editor and save the file contents. **Take note of the time**. _____
- __ 14. Close **Windows Explorer**.

- __ 15. Return to the **Snapshot Monitor** tab of Xpress Manager. Right-click on the **snapshot you just ran** and select **Restore -> CDP Volume Restore**.
- __ 16. In the Destination page, expand **TSM-Demo** and select **G:**. Click **Next Step**.
- __ 17. You will be shown a slider bar that allows you to choose the point-in-time to recover. Move the slider to a time **1 minute after your second change**. For example, if you made change #2 at 14:15, move the slider to 14:16.
- __ 18. Click **Restore**. **Respond** to the confirmations and warnings.
- __ 19. You will be returned to the Snapshot Monitor page. **Wait** until the restore completes.
- __ 20. Open **Windows Explorer** and navigate to **G:\Example Data** again. Open **ChangeMe.txt**. You should see change #2, but not #3.

Note: Continuous Data Protection offers a great deal of flexibility in data recovery, but the differences between the consistency of snapshot backups and CDP need to be understood, particularly in the context of the specific applications you are protecting. For example, using our editing application, if we had not saved our changes each time we made them, this exercise would not have worked.

Exercise 5 – Disaster Recovery Replication

Introduction

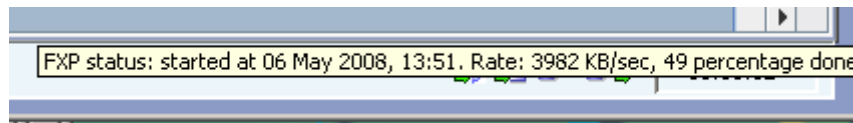
In this exercise you will set up DR replication to a remote site.

Configure the FTP server and the DR Hub service

- __ 1. Close **Xpress Manager**.
- __ 2. Using Windows Explorer from the System bar. Navigate to **S:\IBM Software\Files\Xpress Restore**. Double-click on **Setup.exe**.
- __ 3. Since we had previously installed the Backup Server and Backup Client components using this setup program, the first screen will ask us if we wish to uninstall or modify the current installation. Make certain **Modify** is checked and click **Next**.
- __ 4. You will be presented a list of modules, most of which are already checked since we installed them already. Check **Central Control Station** and **Xpress DR Hub Server** and click **Next**. *Do not* uncheck any that are already checked.
- __ 5. When the install is complete, click **Finish**.
- __ 6. Open a **Windows Command Prompt** using the icon on the system bar.
- __ 7. Issue the command: **FTP tsm-demo**
- __ 8. When prompted enter **administrator** for the account and **smartway** for the password.
- __ 9. Issue the command: **put install.xml**
- __ 10. Issue the command: **quit**

- __ 11. Move to the **R:\Drrepository** directory by issuing the command: **cd /d r:\DRRepository**
- __ 12. List the contents of this directory by issuing the command: **dir** You will see that the file we transferred a moment ago is in this directory. We have a FTP server set up on this virtual machine and R:\DRRepository is its root directory.
- __ 13. Issue the following commands to create directories to store Xpress DR data:
 - mkdir Logs**
 - mkdir LogEvents**
 - mkdir REP_tsm-demo**
- __ 14. Change to the Xpress DR Hub server program directory by issuing the command: **cd /d c:\program files\filesx\xpressrestore\xpress dr hub server**
- __ 15. Edit the DR Hub Server configuration file by issuing the command: **Write XpressDRServer.ini**
- __ 16. Locate the line with the parameter **ListenPath1**. Uncomment the line by **deleting the ;** character at its beginning. Change *c:\ListenPath1* to **R:\DRRepository**.
- __ 17. Locate the line with the parameter **FTPRootPath**. **Uncomment** this line as well and modify its value to **R:\DRRepository**.
- __ 18. **Close** and **save** the file.
- __ 19. Stop and start the Xpress DR Hub service by issuing these commands:
 - net stop "xpress dr hub server"**
 - net start "xpress dr hub server"**
- __ 20. **Restart** Xpress Manager and log in.
- __ 21. Click on **General Configuration**.
- __ 22. Go to the **FXP Configuration** tab.
- __ 23. Enter the following parameters on this page:
 - Server: **tsm-demo**
 - Username: **administrator**
 - Password: **smartway**
 - Confirm Password: **smartway**
 - Branch Name: **tsm-demo**
 - Compression: **Check**
 - Encryption: **Unchecked**
- __ 24. Click **Apply**.
- __ 25. Click **Test configuration**. Click **Yes** when told the test will only use the applied values.
- __ 26. You should receive a message that the test was successful. Click **OK**.

- ___ 27. Start an ad hoc DR replication by clicking the **Run now** button (this will start a background task with no message).
- ___ 28. After 2-3 minutes, you will see the first monitoring icon at the bottom of Xpress Manager *change* to show that DR replication is active. You can **hover** over that icon to see status and statistical information (see pictures).



- ___ 29. Click on the **DR Scheduler** button in the properties workbook. You can see that DR replication can be scheduled at any time of the day, be set to run specific days, etc. Click **Cancel** to close this page.
- ___ 30. Using **Windows Explorer**, look at the contents of **R:\DRRepository\REP_tsm-demo**. You will see that the data within the onsite snapshot repository is being replicated to the offsite location. Since we configured the DR Hub Server, it is monitoring the location of the transferred data and uncompressing it to the original format.
- ___ 31. Start the Central Control Station using the **Start** button → **All Programs** → **Xpress Restore** → **Central Control Station** menu pathway.
- ___ 32. When Central Control starts, it will ask you to either connect to a Vault or to a Share. Click on the **Connect to Share** tab.
- ___ 33. Under *Share Snapshots Path* enter **d:\drrepository\logs**. Click **OK**.
- ___ 34. In the main navigation tree, you will see tsm-demo listed under the Xpress Restore Servers. **Click on it**. You will see information propagate into the Replication Status and Snapshots table. Central Control Station allows you to monitor a large number of Xpress Restore servers using the information stored in the DR repository and log directories.
- ___ 35. Close **Central Control Station**.

Note: Since Xpress DR replicates its data to a central site but does not change the nature of the repository itself, you can begin doing restores immediately from that repository in a Disaster (or DR Test).

Exercise 6 – Performing an Instant Restore (Optional)

Introduction

In this exercise you will restore one of your snapshot backups using the FilesX Instant Restore capability. Since the volume used in this lab contained very little data, this Instant Restore exercise is not very compelling. If you are going to do the FilesX labs for MS SQL Server or MS Exchange, we suggest you skip this exercise and perform the instant restore exercise(s) from one or both of those labs.

Perform an Instant Restore

- ___ 1. Bring up the Windows Service control applet using the **Start** button → **Administrative Tools** → **Services** menu pathway.
- ___ 2. Within the Services control applet, scroll down until you find the **XpressClient** services. Stop that service.
- ___ 3. Start **Windows Explorer** and expand **My Computer** so all drives are listed. *Do not* select any specific drive at this point.
- ___ 4. Invoke the **Xpress Mount** client using its icon on the system tray. If necessary, click **Refresh** to allow the local repository to be displayed (If you had to Refresh, you will need to **click on the icon again**).
- ___ 5. **Position** Xpress Mount so that the list of drives in Windows Explorer is visible.
- ___ 6. When you have the Xpress Mount client started and pointed to a repository, it will automatically list the Policy you created earlier, the local Xpress Restore server, the volume we previously backed up and the most recent snapshot date. If you explore the snapshots in the Date menu, you will see you can select any snapshot previously taken as well as just specifying the Last Snapshot. **Choose any snapshot you wish to restore.**
- ___ 7. At the bottom of the Xpress Mount GUI, you can start an Instant Restore by clicking the **Restore** button.
- ___ 8. Select **G:** to act as the destination of the Instant Restore. Click **OK**.
- ___ 9. When warned the volume will be overwritten, click **Yes** to continue.
- ___ 10. **Monitor** the messages in the Instant Restore box. You will notice that the G: drive is dismounted and the snapshot from within the repository is mounted for access while it is being restored. You will also see the G: drive disappear and then reappear in Windows Explorer as the original was dismounted then the snapshot was mounted.
- ___ 11. While the restore is still taking place, use Windows Explorer to navigate to **G:\Example Data**. Open, modify and save **ChangeMe.txt**.

Note: Since this Instant Restore happened so quickly, let's review what occurred. You were able to perform a volume restore but access the data while the restore was taking place. You had full read/write access to the volume the entire time. Consider this capability in the context of large file systems. You now have near-instant recovery of very large amounts of data without having to use hardware-based snapshot recovery capabilities.

Exercise 7 – TSM Integration (Optional)

Introduction

In this exercise you will run through the process of integrating FilesX with TSM.

Manual Example

- __ 1. Bring up the Windows Service control applet using the **Start** button → **Administrative Tools** → **Services** menu pathway.
- __ 2. Start the **Xpress Client** service.
- __ 3. Using Xpress Mount, mount the last snapshot of the G: volume as I:.
- __ 4. Start the TSM GUI Client using the **Start** button → **All Programs** → **Tivoli Storage Manager** → **Backup/Archive GUI** menu pathway.
- __ 5. Click on the **Backup** button.
- __ 6. Expand the **Local** node on the navigation tree.
- __ 7. Check the gray box next to **\\tsm-demo\\$(I:File Volume)**.
- __ 8. Click the **Backup** button.
- __ 9. After the backup is complete, click the **OK** button and close the **Detailed Status Report**.
- __ 10. Click the **Restore** button.
- __ 11. Expand the **File Level** node. You will see the *I:* volume we just backed up.
- __ 12. **Explore** the contents of the I: drive and you will see the same contents as on the snapshot of the G: drive we just backed up.

Note: In this example, we saw that we can backup data to TSM without any problems or loss of data. However, there are 2 problems with this example. First, it was manual instead of automatic. Second, we have to know that the I: drive on this host represents the G: drive (possibly from another host).

Automatic Example with SnapshotRoot Correlation

- __ 1. Close the **TSM B/A GUI**.
- __ 2. Return to **Express Mount** and Dismount the *I:* drive by **selecting that line** and clicking **Dismount**.
- __ 3. Start **Windows Explorer** and navigate to **C:\Program Files\FilesX\XpressRestore\TSM Integration Example**.
- __ 4. You will see 3 scripts. Right-click on **mount_g.cmd** and select **Edit**.
- __ 5. **Review** the contents and find the comment “*Example of Mounting a snapshot using Xpress Shell*”. The following line contains a command that will mount the last snapshot of the G: volume to a directory called U:\mounted_g. **Close** the editor.
- __ 6. Right-click on **mount_g.cmd** again and select **Open** to run the script.
- __ 7. Use **Windows Explorer** and navigate to **U:\mounted_g**. You will see the contents of the G: volume’s last snapshot.
- __ 8. In **Windows Explorer**, return to **C:\Program Files\FilesX\XpressRestore\TSM Integration Example**.
- __ 9. Right-click on **Backup_G_to_TSM.cmd** and select **Edit**.

- ___ 10. **Look at the second to last line** in the script. This script will run a simple Incremental backup to TSM. What is somewhat unusual is the use of the *SnapshotRoot* parameter. This tells TSM to backup the G: drive, but use a snapshot of that volume mounted at U:\Mounted_G. This parameter allows us to use the snapshot backup as the source, but to understand which volume this snapshot belongs to.
- ___ 11. **Close the editor, right-click** and select **Open** to run the backup.
- ___ 12. Review the contents of the **dismount_g.cmd** script as well and execute it when you are satisfied.
- ___ 13. Restart the TSM GUI Client using the **Start** button → **All Programs** → **Tivoli Storage Manager** → **Backup/Archive GUI** menu pathway.
- ___ 13. Click the **Restore** button.
- ___ 14. Expand the **File Level** node. You will see the G: drive we just backed up using its snapshot as the source of the data. If desired, explore the backup data.
- ___ 15. Close the **TSM B/A GUI Client**.

Note: Since we only use a single virtual machine in this exercise, we cannot demonstrate using a second host to backup the snapshots. However, in a real world scenario you can use any host of the same OS to backup any other hosts snapshot backups and still maintain the ownership of the backup (using the TSM *AsNode* parameter) and the original source (using the *SnapshotRoot* parameter).

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