

8	On Primary host, create a differential clone session. This creates a Clone session between the Clone Source and Clone Target. Creating a Clone session makes the Clone Target "Not-Ready" and also puts a "hold" on that device so that the Target cannot participate in other copy activities like TimeFinder, Snap or Clone. <pre># symclone -g stddg<SGN> create <SrcLogicalDevName> sym ld <TgtLogicalDevName> -differential -precopy</pre> What is the purpose of the -precopy option? What is the difference between the Clone create command with and without the "-differential" option? Verify the status of the clone session. <pre># symclone -g stddg<SGN> query</pre> What is the "State" of this Clone session? List the number of Protected Tracks on the Source Volume. <pre># symld -g stddg<SGN> -held list -v</pre> The command lists the devices in the device group that have a "hold" on them. What is the Device Status of the Clone Target device? Why is the Target device placed in a "Not-ready" state after the creation of a Clone Session?
---	--

9	On the Primary host, activate the Clone Session. <pre># symclone -g stddg<SGN> activate <SrcLogicalDevName> sym Id <TgtLogicalDevName> -consistent # symclone -g stddg<SGN> query</pre> What is the state of the Clone Session? _____ List the number of Protected Tracks on the Source Volume. _____ <pre># symId -g stddg<SGN> -held list</pre> What is the Device Status of the Clone Target device? _____ Did the Device Status change from the previous step? _____ What is the purpose of –consistent option? _____
10	Create additional testfiles on the Source Volume Filesystem on the Primary host. <pre># /students/scripts/CreateFiles.sh /students/<SGN>/clonefs 500 -nop &</pre> Perform a listing of the files on the file system to confirm that you have created the desired files. <pre># ls -l /students/<SGN>/clonefs wc -l</pre> How many files are in the directory? _____
11	Accessing the data on the Clone Target volume from the Secondary host On the secondary host, update the AIX configuration database (ODM) and import the volume group. <pre># cfgmgr # importvg -y clonevg<SGN> hdiskpower#</pre>

12	Mount the file systems Clone Target Device and verify that the data is accessible. On the secondary host: <pre># mkdir /students/<SGN>/clonefs</pre> Remember that the Source file system was mounted at the time the Clone Session was activated. Thus a mount of the file system on the Clone device may fail and a "fsck" on the Target volume might be necessary. We will perform an fsck just to be sure. <pre># fsck -p /dev/rc1onelv<SGN></pre> <pre># mount -v jfs /dev/rc1onelv<SGN>/students/<SGN>/clonefs</pre> <pre># ls -l /students/<SGN>/clonefs</pre> Do you see any of the new test files from Step 10 on the secondary host? Why or Why not?
13	Recreate and activate the clone session to incrementally copy all subsequent changes made to the source device (made after the point-in-time copy initiated) to the target device. On the secondary host, unmount the file system. Then deactivate and export the volume group. <pre># umount /students/<SGN>/clonefs</pre> <pre># varyofvg clonevg<SGN></pre> <pre># exportvg clonevg<SGN></pre> On the primary host, recreate and activate the clone session. <pre># symclone -g stddg<SGN> recreate <SrcLogicalDevName></pre> <pre>sym_id <TgtLogicalDevName></pre> <pre># symclone -g stddg<SGN> activate <SrcLogicalDevName></pre> <pre>sym_id <TgtLogicalDevName></pre>

14	On the secondary host, accessing the data on the Clone Target volume <pre># importvg -y clonevg<SGN> hdiskpower#</pre> Mount the file systems Clone Target Device and verify that the data is accessible. <pre># mkdir /students/<SGN>/clonefs</pre> Remember that the Source file system was mounted at the time the Clone Session was activated. Thus a mount of the file system on the Clone device may fail and a "fsck" on the Target volume might be necessary. <pre># fsck -p /dev/rcclone1v<SGN></pre> <pre># mount -v jfs /dev/rcclone1v<SGN> /students/<SGN>/clonefs</pre> <pre># ls -l /students/<SGN>/clonefs</pre> How many files are in the directory?
----	--

15 **Prepare the hosts and restore the data on clone to source volume.**
Note: The session must have been created with –differential for incremental restore

On the secondary host:

Add 200 files to the file system on the clone.

```
# /students/scripts/createFiles.sh
/students/<SGN>/clonefs 200 -nop
```

Wait until all 200 files have been created.

Unmount the file system.

```
# umount /students/<SGN>/clonefs
```

Deactivate and export the volume group.

```
# varyofvg clonavg<SGN>
# exportvg clonavg<SGN>
```

On the primary host:

Unmount the filesystem

```
# umount /students/<SGN>/clonefs
```

Deactivate and export the volume group.

```
# varyofvg clonavg<SGN>
```

```
# exportvg clonavg<SGN>
```

Start a restore of the clone session

```
# syncclone -g stdag<SGN> restore <SrcLogicalDevName>
sym Id <TgtLogicalDevName> -nop
```

Import the volume group.

```
# importvg -Y clonavg<SGN> hdiskpower#
```

Mount the file system .

```
# mount /dev/clonelv<SGN> /students/<SGN>/clonefs
```

How many files are in the /students/<SGN>/clonefs directory?

16	Terminate the Clone Session. We will terminate the Clone session while the file system on the Target is still mounted. <pre># symclone -g stddg<SGN> terminate <SrcLogicalDevName> sym id <TgtLogicalDevName> # symclone -g stddg<SGN> query # symld -g stddg<SGN> -held list</pre> Is there a "hold" on the Clone Target device?	
17	Lab Cleanup: We will now clean up the server for the next lab group. On the primary host: <pre># cd /students # umount /students/<SGN>/clonefs # symdg delete stddg<SGN> -force # varyoffvg clonevg<SGN> # exportvg clonevg<SGN></pre> On the secondary host: <pre># cd /students # umount /students/<SGN>/clonefs # symdg delete stddg<SGN> -force # varyoffvg stddg<SGN> # exportvg stddg<SGN> # rm -r /students/<SGN>/clonefs</pre>	This concludes the TimeFinder Lab 3 – Clone (AIX).

Lab Exercise 4: TimeFinder Snap (AIX)

Purpose:	This exercise is designed to lead the student through the setup and operations of the EMC TimeFinder Snap facility. Students will identify devices for use as the Source and Snap Targets.
-----------------	--

Objectives:	At the completion of this exercise, using the IBM/AIX Volume Manager and SYMCLI command set the students will be able to: ▪ Use the AIX Volume Manager to create a Volume Group, Logical Volume and File System on a source volume. ▪ Create a SYMCLI Device group and add a Source, and Snap Target Volumes. ▪ Create and use multiple save device pools ▪ Monitor save devices ▪ Create and activate a Snap session between the Source and Snap Target. ▪ Check the status of the Snap session. ▪ Perform Business Continuity Operations by accessing the data on the Snap volumes. ▪ Terminate the active Snap session.
--------------------	--

References:	EMC Solutions Enabler Symmetrix Timefinder CLI - Version 6.0 PRODUCT GUIDE P/N - 300-000-876 - REV A0 PowerPath Product Guidel - Version 4.4 P/N - 300-002-308 - REV A01 SCC Training / Advanced Unix Logical Volume Manager Rev – D / Apr-2004
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Lab 4 Part 1: TimeFinder Snap - Configuring Additional Save Pools.

STEP	ACTION
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1	Contact the instructor for the save pool devices to be used. New Save Pool Name _____ Symmetrix Device ID (Save Devices) _____
2	List the current save pools on the Symmetrix <pre># symsnap -pools list</pre> How Many save pools are there ? _____
3	List the save devices in the "DEFAULT_POOL" – save pool <pre># symsnap -sid <your symmetrix ID> show pool DEFAULT_POOL</pre> Are any of the save devices in an active state ? _____
4	In this step, the save device in the DEFAULT_POOL assigned to you will be disabled . Create a text file, disable<SGN>.txt, containing the following line: <pre>disable dev <Your Save Device1>:<Your Save Device2> in pool DEFAULT_POOL, type = SAVEDEV;</pre> Use the text file with symconfigure command. <pre># symconfigure -sid <Your Symmetrix ID> -f disable<SGN>.txt commit -nop -v</pre> Did the symconfigure command completed successfully? _____

5	Create a new save pool Create a text file, <code>create_pool<SGN>.txt</code>, containing the following line: <pre>create pool pool<SGN>, type = SAVEDDEV;</pre> Use the text file with <code>symconfigure</code> command <pre># symconfigure -sid <Your Symmetrix ID> -f create_pool<SGN>.txt commit -nop</pre> Verify that a new save pool was created. <pre># symsnap -sid <Your Symmetrix ID> -pools list</pre> What is the state of the pool? _____
6	Add the disabled save device to the new save pool and enable it Create a text file, <code>adddev<SGN>.txt</code>, containing the following line: <pre>add dev <Your Save Device1>:<Your Save Device2>to pool pool<SGN>, type = SAVEDDEV, member_state = ENABLE;</pre> Use the <code>adddev<SGN>.txt</code> file with the <code>symconfigure</code> command <pre># symconfigure -sid <Your Symmetrix ID> -f adddev<SGN>.txt commit -nop</pre> Verify that the device was added to the new pool and enabled. <pre># symsnap -sid <Your Symmetrix ID> show pool pool<SGN></pre> What is the state of the pool? _____ What is the state of the device? _____

Lab 4 Part 2: TimeFinder Snap Functionality

STEP	ACTION -
------	----------

1	Create a AIX volume group, Volume and filesystem on the Source Volume (Symmetrix Standard Device). Identify the Symmetrix Logical Volumes available to the primary host. <pre># syming more</pre> Find the Standard Volume assigned as your Source and complete the table. <pre># sympl list</pre> <pre># # lsdev -Cc disk > my_disk.txt</pre>
---	--

Note: Standard Volumes are Symmetrix Logical Volumes which do not have any description under the "Type" column in the output of the syming command.

Standard Volumes (Source)	PdevName (hdiskpower#)	SymDevName (eg. 031)
Device 1		

2	Create an AIX Volume Group with the standard device. The following command creates an AIX Volume Group with a standard device. <pre># mkvg -y snapvg<SGN> hdiskpower#</pre> <pre># lsvg snapvg<SGN></pre> Create a Logical Volume. The following command creates a 400 MB Logical Volume named snaprcvol<SGN> <pre># mklv -y snaprcvol<SGN> snapvg<SGN> 100</pre>
---	---

3	<pre># mkdir /students/<SGN>/AIXLab4</pre> Create a mount point directory <pre># crfs -v jfs -d snaprcvol<SGN> -m /students/<SGN>/AIXLab4</pre> Create a file system on the snaprcvol<SGN> Volume <pre># mount /students/<SGN>/AIXLab4</pre> Mount the file system Create 50 test files. <pre># /students/scripts/CreateFiles.sh /students/<SGN>/AIXLab4 50 -nop &</pre>	4	On the Secondary host, identify the Device assigned as your Snap device. Record the information about your assigned Virtual device in the table below. <pre># symdev list -vdev more</pre>	<table><tr><th>Device Type</th><th>PdevName (hdiskpower#)</th><th>SymDevName (eg. 031)</th><th>Virtual device#1</th></tr><tr><td></td><td></td><td></td><td></td></tr></table>	Device Type	PdevName (hdiskpower#)	SymDevName (eg. 031)	Virtual device#1				
Device Type	PdevName (hdiskpower#)	SymDevName (eg. 031)	Virtual device#1									

5	Create a SYMCLI Device Group and add the Source and Virtual Device as members of the Device Group. Create the device group and add source, and Virtual devices <pre># symdg -type REGULAR create stdg<SGN> # symld -g stdg<SGN> add dev <SourceSymDevName> # symld -g stdg<SGN> add dev <VirtualDevSymDevName></pre> The Source, and VirtualDev SymDevNames are three digit numbers that were recorded earlier in this lab.
6	List the save pools. Snap session can then be assigned to a specific pool based on the usage pattern. This can improve performance of snap sessions. <pre># symsnap list -pools</pre> How many save device pools are there?
7	Create a snap session and assign it to a pool <pre># symsnap -g stdg<SGN> create -svp pool<SGN> <LogicalSourceSymDevName> sym DEV <VirtualDevSymDevName> -nop</pre> What is the status of the SRC⇔TGT column? What the name of the save device pool used by this snap session?
8	Activate the snap session. <pre># symsnap -g stdg<SGN> activate <LogicalSourceSymDevName> sym DEV <VirtualDevSymDevName> -nop</pre> <pre># symsnap -g stdg<SGN> query</pre> What is the status of the SRC⇔TGT column?

9	On the primary host, monitor the usage of save device pool. Create a text file, /students/<SGN>/monitor.sh, action script containing the following lines: <pre>#/bin/sh echo "echo reached 10 percent">/students/<SGN>/monitor.out</pre> Make the file executable <pre># chmod +x /students/<SGN>/monitor.sh</pre> Execute the monitoring command. <pre># symsnap -sid <SYM> monitor -percent 10 -i 5 -action "/students/<SGN>/monitor.sh" -svp pool<SGN> -norepeat &</pre>
---	--

10	On the secondary host : Update the AIX Configuration Database (ODM) <pre># cfigmgr</pre> Import the volume group <pre># importvg -Y snapvg<SGN> hdiskpower#</pre> Make a directory <pre># mkdir /students/<SGN>/aixlab4_snap</pre> Fsck and mount the file systems on the snap volume <pre># fsck -p /dev/rsnapsrcvol<SGN></pre> <pre># mount -v jfs /dev/snapsrcvol<SGN></pre> <pre>/students/<SGN>/aixlab4_snap</pre> Verify that the data is accessible <pre># ls -l /students/<SGN>/aixlab4_snap</pre> On the primary host: <pre># ls -l /students/<SGN>/aixlab4</pre> Are the contents of the two directories identical ?
11	On the primary host, add 500 datafiles on the Source Filesystem. <pre># /students/scripts/CreateFiles.sh</pre> <pre>/students/<SGN>/AIXLab4 500 -nop &</pre> Perform a listing of the files on the file system to confirm that you have created the desired files. <pre># ls -l /students/<SGN>/AIXLab4 wc -l</pre> How many files are in the directory?

12	Investigate the Save devices <pre># symsnap list -savedevs -svp pool<SGN></pre> What is the total used tracks on all save devices? _____ What is % Full of all save devices? _____ If the % Full is 10 percent or higher, check if the /students/<SGN>/monitor.out file was created by the symsnap monitor command. Was the file created? _____
13	On the secondary host, add 700 test files on the snap volume and verify the tracks used on save devices. <pre># /students/scripts/CreateFiles.sh /students/<SGN>/aixlab4_snap 700 -nop &</pre> <pre># symsnap list -savedevs -svp pool<SGN></pre> What is the total used tracks on all save devices? _____ How many files are in the /students/<SGN>/hplab4_snap directory? _____

14	Restore the virtual device to the standard device On the Secondary host: Unmount the file system <pre># umount /students/<SGN>/aixlab4_snap</pre> Deactivate and export the volume group <pre># varyoflv snapvg<SGN></pre> <pre># exportvg snapvg<SGN></pre> On the primary host: Unmount the file system <pre># umount /students/<SGN>/AIXLab4</pre> Deactivate and export the volume group <pre># varyoflv snapvg<SGN></pre> <pre># exportvg snapvg<SGN></pre> Start a restore of the snap session <pre># symsnap -g stdag<SGN> restore -nop</pre> Verify the status of snap sessions <pre># symsnap -g stdag<SGN> query -multi</pre> Note: the original snap session remains and the restore creates an additional snap session. The restore leaves the VDEV in a NOT READY state. What are the status of the 2 snap sessions?
----	---

15	Verify the contents of both source and target are identical. On the primary host: Import the volume group, mount the file system, and list the contents <pre># importvg -y snapvg<SGN> hdiskpower# # mount /dev/snapvg<SGN>/snapsrcvol<SGN> /students/<SGN>/AIXlab4 # ls -la /students/<SGN>/AIXlab4 wc -l</pre> How many files are in the students/<SGN>/hplab4 directory? _____ Is the number of files equal to that in Step 13? _____
16	Terminate the Snap Session. On the primary host: <pre># symsnap -g stdbg<SGN> terminate <LogicalSourceSymDevName> sym Id <LogicalVirtualDevSymDevName> -restored # symsnap -g stdbg<SGN> terminate <LogicalSourceSymDevName> sym Id <LogicalVirtualDevSymDevName> -restored</pre> Note: The restore session must first be terminated using the -restored flag.

17	Lab Cleanup: We will now clean up the server for the next lab group. On the primary host: <pre># umount /students/<SGN>/AIXLab4 # rm -r /students/<SGN>/AIXLab4 # varyoffvg snapvg<SGN> # exportvg snapvg<SGN> # symdg delete stdg<SGN> -force</pre> On the secondary host: <pre># rm -r /students/<SGN>/aixlab4_snap</pre>
	This concludes the TimeFinder – Snap (AIX) Lab.

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Symmetrix Business Continuity - TimeFinder Solutions

Lab Guide – TimeFinder – Window 2000



Global Education and Productivity

**26-Jul-2005
Ver-2.1a**

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1.0a	BCL LG Win V10a.Doc	02-May-05	
1.1a	BCL LG Win V11a.Doc	15-Jun-05	
		08-Jul-05	Added Create
			Save Pool
2.1a	BCL LG Win V21a.Doc	26-Jul-05	Name Change

Table of Contents: - Symmetrix Business Continuity - TimeFinder Solutions, W2K Labs

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SGN is the abbreviation for **Student Group Number**. This is the number that will be assigned to you by the instructor before starting the lab exercise.

Lab Exercise 1: TimeFinder Mirror Lab (Windows 2000 – Basic Disks)

Purpose: Students will explore features of TimeFinder Mirror in this lab in a Windows 2000 Basic Disk environment. A file system will be created on a Standard hyper volume which is then will be associated and established with its BCV volume. The file system will be mounted to another host; During which process, the students will learn to manipulate the disk signature using `symtctl` command. Concurrent BCV feature will also be explored in the lab.

Objectives:

After completion of this exercise, participants will be able to:

1. Display and identify the configured BCVs.
2. Create a SYMCLI device group of type REGULAR.
3. Associate BCVs with a SYMCLI device group.
4. Save the disk signature using the `symtctl` tool.
5. Synchronize the BCVs with the Standard Volumes belonging to the SYMCLI Device Group.
6. Monitor the status and synchronization of the BCVs
7. Split the BCVs from the Standard Volumes to obtain point-in-time copy of the data.

References: EMC Solutions Enabler Symmetrix Timefinder CLI - Version 6.0 PRODUCT GUIDE P/N - 300-000-876 - REV A06

Lab 1 Part 1: Configuration TimeFinder Mirror – Set up Lab

STEP	ACTION
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1	Use the following command on both the Primary and Secondary hosts to obtain the information to fill in table in Step 2. C:\> symcfg discover C:\> sympd list																															
2	<table><tr><td>Volumes</td><td>PdevName (PHYSICALDRIVE#)</td><td>SymDevName (eg. 03a)</td><td>DriveLetter (If applicable)</td></tr><tr><td>Standard device 1</td><td></td><td></td><td></td></tr><tr><td>(On Primary host)</td><td></td><td></td><td></td></tr><tr><td>BCV Device 1</td><td></td><td></td><td></td></tr><tr><td>(On Secondary host)</td><td></td><td></td><td></td></tr><tr><td>BCV Device 2</td><td></td><td></td><td></td></tr><tr><td>(On Secondary host)</td><td></td><td></td><td></td></tr></table>				Volumes	PdevName (PHYSICALDRIVE#)	SymDevName (eg. 03a)	DriveLetter (If applicable)	Standard device 1				(On Primary host)				BCV Device 1				(On Secondary host)				BCV Device 2				(On Secondary host)			
Volumes	PdevName (PHYSICALDRIVE#)	SymDevName (eg. 03a)	DriveLetter (If applicable)																													
Standard device 1																																
(On Primary host)																																
BCV Device 1																																
(On Secondary host)																																
BCV Device 2																																
(On Secondary host)																																
3	Save the signature of all the Standard device using symmctl command. Windows OS uses disk signatures to identify the uniqueness of the drives. There are other applications such as Microsoft Cluster Service that also rely on disk signature. Record the current disk signatures C:\> symmctl list -pd Disk#																															
4	<table><tr><td>Device</td><td>PdevName/DISK# (PHYSICALDRIVE#/DISK#)</td><td>Signature</td></tr><tr><td>Standard Volume 1</td><td></td><td></td></tr></table>			Device	PdevName/DISK# (PHYSICALDRIVE#/DISK#)	Signature	Standard Volume 1																									
Device	PdevName/DISK# (PHYSICALDRIVE#/DISK#)	Signature																														
Standard Volume 1																																

5	Save the disk signatures	C:\> symmctl signature -pd Disk# -save
6	Create a NTFS file system on the Standard volume and assign a drive letter that has been given to you by the instructor to it.	a. Invoke Windows Disk Management C:\diskmgmt.msc b. Make sure that you can access the new drive letter. Then, use Windows Explorer to copy c:\program files\EMC directory to the new drive letter. How many files are in the new drive letter?
7	Create a SYMCLI Device Group, add the Standard Volumes to it and associate the BCVs with the Device Group, define the Gatekeeper device. The device group must be of the type "REGULAR".	a. Create a regular device group. C:\> symdg -type REGULAR create stdg<SGN> b. Add the Standard volume to the device group C:\> symld -g stdg<SGN> add pd <PdevName> c. Associate the BCV's with the device group. C:\> symbcv -g stdg<SGN> associate dev <SymDevName> of the first BCV C:\> symbcv -g stdg<SGN> associate dev <SymDevName> of the second BCV2 d. Verify the Device Group and the BCV association C:\> symdg list C:\> symdg show stdg<SGN>

8	Establish the Standard to the BCV's for the first time BCV001 C:\> symm1r -g stddg<SGN> establish -full DEV001 bcv 1d BCV002 C:\> symm1r -g stddg<SGN> establish -full DEV001 bcv 1d Note: You can also use -concurrent instead of specifying the BCV device to establish. if the standard is already synchronized with one BCV, the Symmetrix array will synchronize one other BCV with it. If the standard device is not yet synchronized with a BCV, the Symmetrix array will still only synchronize one BCV with it.
9	Query the status of the Standard-BCV C:\> symm1r -g stddg<SGN> query -multt1 -i 5 -c 3 Synchronization rate: _____ Estimated time to completion: _____ BCV Device Status: _____
10	Verify that the BCV's are synchronized with the Standard C:\> symm1r -g stddg<SGN> verify -concurrent

11 After the synchronization completed, split the BCV's. Both BCV volumes will be split at once. The BCV volumes normally will be in Ready (RW).

The BCV's have identical disk signature to the Standard volumes. This fact could cause Windows to crash in some certain situation. Thus the BCV's should be put in Not Ready (NR) after the split. New disk signatures should be assigned to the first BCV volume before the second BCV can be made Ready to the host.

c. Flush the file system data of the drive letter

```
C:\symmctl flush -drive <DriveLetter>:
```

d. Split the mirrors

```
C:\> symmir -g stddg<SGN> split -consistent -not_ready
```

e. Verify that the background split has also completed

```
C:\> symmir -g stddg<SGN> query -multl -bg
```

What is the state of both BCV volumes?

f. Change the status of the first BCV device from NR (Not Ready) to RW (Ready)

```
C:\> symld -g stddg<SGN> ready BCV001 -bcv
```

g. Write the new signature to the first BCV volume.

```
C:\> symmctl signature -pd disk# -sig 11111111
```

h. Change the status of the second BCV device from NR (Not Ready) to RW (Ready)

```
C:\> symld -g stddg<SGN> ready BCV002 -bcv
```

i. Verify the signatures of the BCV devices

```
C:\> symmctl list -pd disk#
```

Signature of BCV 1
Signature of BCV 2

j. Reboot the Secondary host

12	When the Secondary host comes back online, make sure that the BCV volumes are accessible by using Disk Management. The BCV volumes may have drive letters assigned to them. On the Secondary host, use Disk Management to assign the drive letters that were assigned to you by the instructor. Are the BCV volumes accessible by the host at this point? _____ If so, are their contents identical to those on the Standard volume? _____
13	On the Secondary host, list the disk signature of BCV volumes <pre>C:\> symmctl list -physical -pd Disk# (disk number of the BCV)</pre> Signature of BCV 1 _____ Signature of BCV 2 _____
14	Now, we will simulate a disaster by deleting file on the Standard volume and later restore them from one of the BCV volumes. a. On the Primary host, use Windows Explorer to delete all files of the drive letter that is on the <u>Standard volume</u>. b. On the Primary host, unmount the Standard drive using symmctl command <pre>C:\> symmctl umount -drive <DriveLetter:></pre> c. On the Secondary host, unmount the drive on the first BCV. This will be the source of the restore. <pre>C:\> symmctl umount -drive <DriveLetter:></pre>

15	The Standard volume is in the RW state and will inherit the disk signature of the BCV after the restore completes. This situation again requires disk signature manipulation. We will set the Standard volume to Not Ready state during/after the restore. a. On the Primary host, start the restore from the first BCV to the Standard volume <pre>C:\> symm1r -g stdbg<SGN> restore DEV001 bcv 1d BCV001 -full</pre> b. Monitor the status of the restore <pre>C:\> symm1r -g stdbg<SGN> query -l 5 -c 5</pre> c. List the signature of the Standard volume. <pre>C:\> symmctl list -pd disk#</pre> Is the disk signature of the Standard volume now identical to that of the first BCV? d. Restore the original disk signature of the Standard volume. <pre>C:\> symmctl signature -pd disk# -restore</pre> What is the disk signature of DEV001? e. Reboot the Primary host
16	When the Primary host comes online, ensure that the contents of the Standard volume are back. Are all files restored to the Standard volume?
17	On the Primary host, check the mirror status of the device group <pre>C:\> symm1r -g stdbg<SGN> query -multl</pre> What is the state of the mirror pairs?

18	Clean up for the next lab
	On both Primary and Secondary hosts, un-assign all drive letters involved in this lab with Windows Disk Management On the Primary host, split the BCV and delete the device group <pre>C:\> symmir -g stdbg<SGN> split DEV001 sym 1d BCV001 C:\> symdg delete stdbg<SGN> -force</pre>
	This concludes – The TimeFinder Mirror - Win-2000 - Lab 1

Lab Exercise 2: TimeFinder Lab – Clone (Windows 2000 – Dynamic Disks)

Purpose: This exercise is designed to lead the student through the setup and operations of the EMC TimeFinder Clone facility. Students will identify devices for use as the Clone Source and Targets. A Partition with an NTFS file system will be created on the Clone Source device. Data will be written to the file system on the Clone Source, a Clone session with a Clone Target will be created and activated. The data on the Clone Target will then be accessed by a secondary host .

Objectives:

At the completion of this exercise, using the Windows 2000 Logical Disk Manager Service, Symmetrix Integration Utilities and the SYMCLI command set students will be able to:

1. Use the Windows 2000 Logical Disk Manager service to create a Partition and an NTFS file system on a Dynamic Disk which will serve as the Clone Source
2. Create a SYMCLI Device group and add a Clone Source and Clone Target Volumes to the same.
3. Create and activate a Clone session between the Clone Source and Clone Target.
4. Check the status of the Clone session.
5. Perform Business Continuity Operations by accessing the data on the Clone Target volumes.
6. Terminate the active Clone session

References:

EMC Solutions Enabler Symmetrix Timefinder CLI - Version 6.0 PRODUCT GUIDE P/N - 300-000-876 - REV A06

Lab 2 Part 1: Configuration TimeFinder Clone – Set up Lab

STEP	ACTION
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1	Identify the devices assigned as the Clone Source. Using Logical Disk Manager create a partition, NTFS file system on the Source volume and assign a drive letter. a) On the Primary host, find the Standard Volume assigned as your Clone Source and complete the table. <pre>C:\> sympd list more</pre>						
2	<table><tr><td>Standard Volumes (Clone Source)</td><td>PdevName (physicaldrive#)</td><td>SymDevName (eg. 031)</td></tr><tr><td>Device 1</td><td></td><td></td></tr></table>	Standard Volumes (Clone Source)	PdevName (physicaldrive#)	SymDevName (eg. 031)	Device 1		
Standard Volumes (Clone Source)	PdevName (physicaldrive#)	SymDevName (eg. 031)					
Device 1							

3	On the Primary host, create a Partition, NTFS File System on the Source Volume and assign a Drive letter a) Right Click on the "My Computer" icon and choose "Manage" b) Click on the "Disk Management" Folder under "Storage" in the tree panel c) Scroll down and click on the Source device assigned to you. Make sure it is a Basic Disk, Online and is completely unallocated. You may have to write the disk signature for all disks. If so, right click on the disk and select "Write Signatures". d) Convert the disk to Dynamic disk e) Right Click anywhere on the unallocated space on the disk and choose "Create Volume ...". This will launch the Create Volume Wizard. f) Follow the Wizard to create a 447 MB volume and a NTFS file system on it. g) Assign a drive letter to this volume. h) Exit the Logical Disk Manager	4	On the Primary host, add data to the drive letter created in Step 3 by copying the C:\Program Files\EMC folder to it.	5	On the Secondary host, identify the Device assigned as your Clone Target. Record the information about your assigned Clone Target in the table below. Note that in this example the Clone Target is a Standard Device, BCV's and SRDF devices can also be used as Clone Targets. Use the Logical Device Manager to ensure that the target device is a Basic Disk, online and is unallocated.	C:\> symcmd list more <table><tr><td>Clone Target</td><td>PdevName (physicaldrive#)</td><td>SymDevName (eg. 031)</td></tr><tr><td>Device 1</td><td></td><td></td></tr></table>	Clone Target	PdevName (physicaldrive#)	SymDevName (eg. 031)	Device 1		
Clone Target	PdevName (physicaldrive#)	SymDevName (eg. 031)										
Device 1												

6	Create a SYMCLI Device Group and add your Clone Source and Target STD Volumes as members of the Device Group.. Again note that we are using STD volumes for both the Clone source and target in this example. <pre>C:\> symdg -type REGULAR create stdg<SGN></pre> <pre>C:\> symld -g stdg<SGN> add dev <CloneSourceSymDevName></pre> <pre>C:\> symld -g stdg<SGN> add dev <CloneTargetSymDevName></pre> The Clone Source and Target SymDevNames are three digit numbers that were recorded earlier in this lab.										
7	Identify the Logical Device Names of the Clone Source and Target Volumes. A default logical name (ld) is assigned to each Symmetrix device when it is added or associated with a Device Group. This logical name can be changed if desired. Identify the Logical Device Names assigned to your Clone source and target volumes.										
	<pre>C:\> symdg show stdg<SGN></pre> <table><tr><td>Device</td><td>Logical Name (eg DEV001)</td><td>SymDevName (eg. 031)</td></tr><tr><td>Clone Source</td><td></td><td></td></tr><tr><td>Clone Target</td><td></td><td></td></tr></table>	Device	Logical Name (eg DEV001)	SymDevName (eg. 031)	Clone Source			Clone Target			
Device	Logical Name (eg DEV001)	SymDevName (eg. 031)									
Clone Source											
Clone Target											

8	On the Primary host, create a Clone Session. This creates a Clone session between the Clone Source and Clone Target. Creating a Clone session makes the Clone Target "Not-Ready" and also puts a "hold" on that device so that the Target cannot participate in other copy activities like TimeFinder, Snap or Clone. <pre>C:> symclone -g stdag<SGN> create <CloneSourceLogicalDevName> sym ld <CloneTargetLogicalDevName></pre> Note that in the example above the Logical Device names of the Source and Target devices are DEV001 and DEV002 respectively. What is the difference between the Clone create command with the "-copy" option and without any options? _____ In the example above no option has been used. What would the state of the Clone session be upon activation? _____ What is the difference between a clone session created with the "-copy" and one with "-precopy" option? _____ Query the state of the clone session <pre>C:\> symclone -g stdag<SGN> query</pre> What is the "State" of this Clone session? _____ List the number of Protected Tracks on the Source Volume. _____ Verify the device held by the clone session <pre>C:\> symld -g stdag<SGN> -held list</pre> Is the clone source or the target being held? _____ Why is the device held?
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9	On the Primary host, activate the Clone Session. <pre>C:> symclone -g stdag<SGN> activate <CloneSourceLogicalDevName> sym Id <CloneTargetLogicalDevName> C:\> symclone -g stdag<SGN> query</pre> What is the state of the Clone Session? _____ List the number of Protected Tracks on the Source Volume. _____
10	Reboot the Secondary host. The clone target is now in a RW state. However, the disk will appear in "Foreign" state to the Secondary host.
11	Prepare the secondary host to access data on clone target. On the Secondary host: Start Logical Disk Manager C:\> diskmgmt.msc Right click on the disk and select "Import..". Right click on the disk and select "Reactivate Disk". Assign a drive letter to it.
12	On the Secondary host, open up Windows explorer and you should see a new drive letter. Verify the availability of data on the clone target. Is there an EMC directory on the clone target? _____

13 On the Primary host , terminate the Clone Session. We will terminate the Clone session while the file system on the Target is still mounted. <pre>C:\> symclone -g stdbg<SGN> terminate <CloneSourceLogicalDevName> sym ld <CloneTargetLogicalDevName> C:\> symclone -g stdbg<SGN> query C:\> symld -g stdbg<SGN> -held list</pre> Is there a "hold" on the Clone Target device?	14 On the Secondary host, accessing data on the Clone Target after the Clone Session is terminated: We created a "CopyOnAccess" clone session is this exercise. The clone session was terminated while the filesystem on the target volume was still mounted. Is the Data on the Target volume after the termination of a "CopyOnAccess" Clone session a viable point-in-time copy of the data on the Source Volume? Perform a simple test by opening files of the same name from both the Source and Target file systems and compare their contents. Where there any differences in the data in the files from the two file systems? Explain why? Would you recommend the use of the data on the "CopyOnAccess" Clones as a viable Point-in-time copy of the source data after the termination of the Clone session?
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15	On the Primary host, create a new clone session with the -differential option. <pre>C:> symclone -g stdbg<SGN> create <CloneSourceLogicalDevName> sym Id <CloneTargetLogicalDevName> -differential -precopy C:\> symclone -g stdbg<SGN> query</pre> What is the "State" of this Clone session? _____ List the number of Protected Tracks on the Source Volume. _____	16	On the Primary host, activate the clone session. <pre>C:> symclone activate DEV001 sym Id DEV002 C:\> symclone query</pre> What is the state of the Clone Session? _____	17	On the Primary host, use Windows Explorer to copy c:\Acrobat to the Clone source drive. This new data will not be copied to the clone target because we have activated the session.	18	On the Primary host, perform an incremental clone establish to refresh the data on the clone target volume. Changes from Step 17 will be copied to the clone target. <pre>C:> symclone establish DEV001 sym Id DEV002 C:\> symclone query</pre> What is the state of the Clone Session? _____	19	Reboot the Secondary host	20	Once the computer comes online, you may have to repeat Step 11 to be able to access the data on the clone target Check if the new files from Step 17 are present on the Target drive. Is there an Acrobat directory on the clone target drive? _____
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21	On the Primary host: Remove all file from the Source drive, to simulate a data loss. Unmount the clone source drive C:> symctl unmount -drive <DriveLetter:> Perform an incremental clone restore C:> symclone -g stdg<SGN> restore <CloneSourceLogicalDevName> sym ld <CloneTargetLogicalDevName>	22	After the restore completes, reboot the Primary computer.
23	Accessing data on the Primary host after a restore from the clone target On the Primary host: Start Logical Disk Manager C:\> diskmgmt.msc Right click on the disk and select "Import..". Right click on the disk and select "Reactivate Disk". Right click on the volume on disk and select "Reactivate Volume". Assign a drive letter to it. Are there EMC and Acrobat directories on the clone target drive?		

23	Lab Cleanup: We will now clean up the server for the next lab group. On the Primary host: Terminate the clone session <pre>C:> symclone -g stdbg<SGN> terminate <CloneSourceLogicalDevName> sym ld <CloneTargetLogicalDevName></pre> Delete the Device Group <pre>C:> symdg delete stdbg<SGN> -force</pre>
	This concludes – The TimeFinder Clone - Win-2000 - Lab 2

Lab Exercise 3: TimeFinder Lab – Snap (Win 2000- Basic Disk)

Purpose:	This exercise is designed to lead the student through the setup and operations of the EMC TimeFinder Snap. Students will identify devices for use as the Source and Snap Targets.
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Objectives:	At the completion of this exercise, using the SYMCLI command set students will be able to: 1. Create a SYMCLI Device group and add a Source, and Snap Target Volumes. 2. Create and use multiple save device pools 3. Monitor save devices 4. Create and activate a Snap session between the Source and Snap Target. 5. Check the status of the Snap session. 6. Monitor the save pools 7. Perform Business Continuity Operations by accessing the data on the Snap volumes. 8. Terminate the active Snap session.
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References:	EMC Solutions Enabler Symmetrix Timefinder CLI - Version 6.0 PRODUCT GUIDE P/N - 300-000-876 - REV A0
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Lab 3 Part 1: TimeFinder Snap - Configuring Additional Save Pools.

STEP	ACTION
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1	Contact the instructor for the save pool devices to be used. New Save Pool Name _____ Symmetrix Device ID (Save Devices) _____
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2	List the current save pools on the Symmetrix <pre>c:\> symsnap -pools list</pre> How Many save pools are there ? _____
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3	List the save devices in the "DEFAULT_POOL" – save pool <pre>c:\> symsnap -sid <your symmetrix ID> show pool DEFAULT_POOL</pre> Are any of the save devices in an active state ? _____
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4	In this step, the save device in the DEFAULT_POOL assigned to you will be disabled . Create a text file, disable<SGN>.txt, containing the following line: disable dev <Your Save Device1>:<Your Save Device2> in pool DEFAULT_POOL, type = SAVEDEV; Use the text file with symconfigure command. <pre>c:\> symconfigure -sid <Your Symmetrix ID> -f disable<SGN>.txt commit -nop -v</pre> Did the symconfigure command completed successfully? _____
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5	Create a new save pool Create a text file, <code>create_pool<SGN>.txt</code>, containing the following line: <pre>create pool pool<SGN>, type = SAVEDEV;</pre> Use the text file with <code>symconfigure</code> command <pre>c:\> symconfigure -sid <Your Symmetrix ID> -f create_pool<SGN>.txt commit -nop</pre> Verify that a new save pool was created. <pre>c:\> symsnap -sid <Your Symmetrix ID> -pools list</pre> What is the state of the pool? What is the state of the device?
6	Add the disabled save device to the new save pool and enable it Create a text file, <code>adddev<SGN>.txt</code>, containing the following line: <pre>add dev <Your Save Device2>: <Your Save Device2> to pool pool<SGN>, type = SAVEDEV, member_state = ENABLE;</pre> Use the <code>adddev<SGN>.txt</code> file with the <code>symconfigure</code> command <pre>c:\> symconfigure -sid <Your Symmetrix ID> -f adddev<SGN>.txt commit -nop</pre> Verify that the device was added to the new pool and enabled. <pre>c:\> symsnap -sid <Your Symmetrix ID> show pool pool<SGN></pre> What is the state of the pool? What is the state of the device?

Lab 3 Part 2: Configuration TimeFinder Snap – Set up Lab

STEP	ACTION
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1	Create a NTFS filesystem on the Source Volume (Symmetrix Standard Device). a) Identify the Symmetrix Logical Volumes available to the Primary host. C:\> syminq more b) Find the Standard Volume assigned as your Source and complete the table. C:\> sympd list	Note: Standard Volumes are Symmetrix Logical Volumes which do not have any description under the "Type" column in the output of the syminq command.								
	<table><tr><td>Standard Volumes (Source)</td><td>PdevName (PHYSICALDRIVE©)</td><td>SymDevName (eg. 031)</td><td>Driveletter</td></tr><tr><td>Device 1</td><td></td><td></td><td></td></tr></table>	Standard Volumes (Source)	PdevName (PHYSICALDRIVE©)	SymDevName (eg. 031)	Driveletter	Device 1				
Standard Volumes (Source)	PdevName (PHYSICALDRIVE©)	SymDevName (eg. 031)	Driveletter							
Device 1										

	On the Primary host , create a Partition, NTFS File System on the Source Volume and assign a Drive letter i) Right Click on the "My Computer" icon and choose "Manage" j) Click on the 'Disk Management' Folder under "Storage" in the tree panel. k) Scroll down and click on the Source device assigned to you. Make sure it is Basic Disk, Online and is completely unallocated. You may have to write the disk signature for all disks. If so, right click on the disk and select "Write Signatures". l) Convert the disk to Dynamic disk m) Right Click anywhere on the unallocated space on the disk and choose "Create Volume ...". This will launch the Create Volume Wizard. n) Follow the Wizard to create a 447 MB volume and a NTFS file system on it. o) Assign a drive letter to this volume. Exit the Logical Disk Manager							
2	On the secondary host, identify the device assigned as your Snap device. Record the information about your assigned Virtual device in the table below. C:\> symdev list -vdev <table><tr><td>Device Type</td><td>PdevName (PHYSICALDRIVE#)</td><td>Virtual device#1</td></tr><tr><td>SymDevName (eg. 031)</td><td></td><td></td></tr></table>	Device Type	PdevName (PHYSICALDRIVE#)	Virtual device#1	SymDevName (eg. 031)			
Device Type	PdevName (PHYSICALDRIVE#)	Virtual device#1						
SymDevName (eg. 031)								

3	Create a SYMCLI Device Group and add the Source, BCV, and Virtual Device as members of the Device Group. Then, establish the BCV mirror. b) Create the device group and add source, and Virtual devices <pre> C:\> symdg -type REGULAR create stdg<SGN> C:\> set SYMCLI_DG=stdg<SGN> C:\> symld -g stdg<SGN> add dev <SourceSymDevName> C:\> symld add dev <VirtualDevSymDevName> </pre> The Source, and VirtualDev SymDevName are three digit numbers that were recorded earlier in this lab.
4	List the save pools. Snap session can then be assigned to a specific pool based on the usage pattern. This improves performance of snap volumes. <pre> C:\> symsnap list -pools </pre> How many save device pools are there? _____
5	Create a snap session using the save pool you have created. <pre> C:\> symsnap create <LogicalSourceSymDevName> sym ld <VirtualDevSymDevName> -snp pool<SGN> -nop C:\> symsnap -pools query </pre> What is the status of the SRC⇌TGT column? _____ What the name of the save device pool used by this snap session? _____
6	On the Primary host Activate the snap session. <pre> C:\> symsnap activate -ppath SRCDEVS -nop C:\> symsnap query </pre> What is the purpose of -ppath? _____ What is the status of the SRC⇌TGT column? _____

7	On the Primary host, monitor the usage of save device pool Create a text file, /students/monitor<SGN>.bat, action script containing the following line: echo "echo reached 10 percent">c:\tmp\monitor<SGN>.out Execute the monitoring command. C:\> symsnap -sid <SYM> monitor -percent 10 -i 5 -action c:\tmp\monitor<SGN>.bat -svp pool<SGN> -norepeat &	8	On the Primary host, use Windows Explorer to copy c:\Program Files\EMC to on the Source drive letter.	9	On the Primary host, investigate the Save devices C:\> symsnap list -savedevs -svp pool<SGN> What is the total used tracks on all save devices? _____ What is % Full of all save devices? _____ If the % Full is 10 percent or higher, check if the C:\tmp\monitor<SGN>.out file was created by the symsnap monitor command. Was the file created? _____	10	Reboot the Secondary host.	11	Prepare the secondary host to access data on virtual device. On the Secondary host: Start Logical Disk Manager C:\> diskmgmt.msc Right click on the disk and select "Import..". Right click on the disk and select "Reactivate Disk". Assign a drive letter to it.
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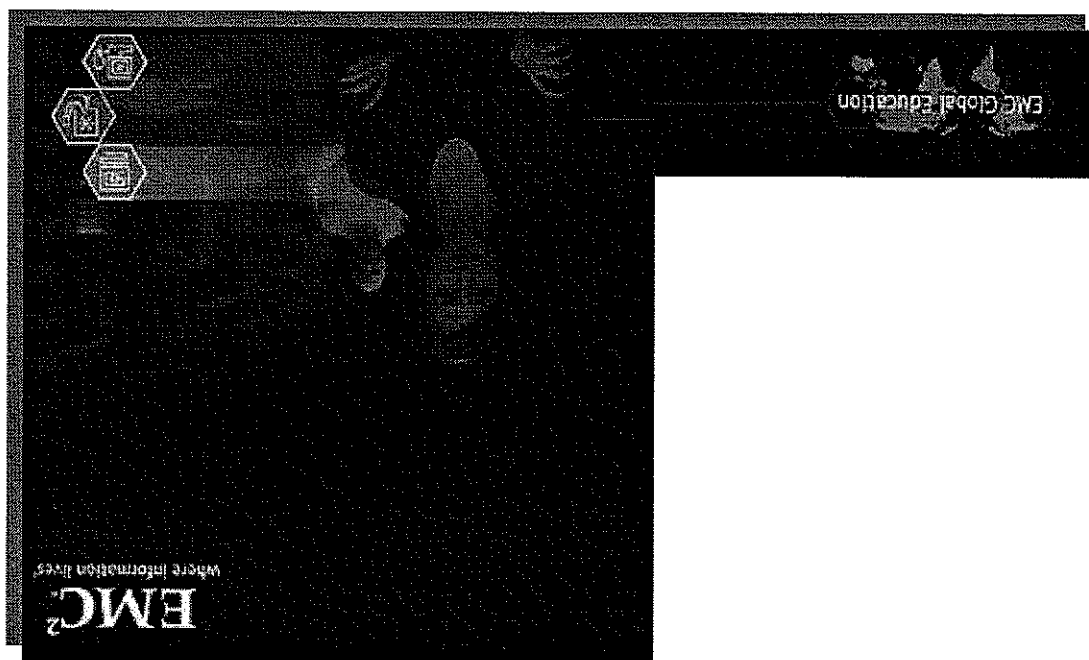
12	On the Primary host, remove all file from the Source drive, to simulate a data loss.	
13	On the Primary host, mount the drive and restore the virtual device to the standard device <pre>C:\> symmctl mount -drive <Source DriveLetter></pre> <pre>C:\> symsnap restore <LogicalSourceSymDevName> sym ld <VirtualDevLogicalDevName> -nop</pre> <pre>C:\> symsnap query -multi</pre> Note: the original snap session remains and the restore creates an additional snap session. The restore leaves the VDEV in a NOT READY state. What are the status of the 2 snap sessions?	
14	Reboot the Primary host	
16	When the computer comes online, verify that files were successfully restored from the virtual device Accessing data on the Primary host after a restore from a virtual device On the Primary host: Start Logical Disk Manager <pre>C:\> diskmgmt.msc</pre> Right click on the disk and select "Import..". Right click on the disk and select "Reactivate Disk". Right click on the volume on disk and select "Reactivate Volume". Assign a drive letter to it. Is the EMC directory restored?	

15	Terminate the Snap Session. The restore session must first be terminated using the -restore flag. <pre>C:\> symsnap terminate <LogicalSourceSymDevName> sym Id <LogicalVirtualDevSymDevName> -restore</pre> <pre>C:\> symsnap terminate LogicalSourceSymDevName sym Id <VirtualDevLogicalDevName></pre> Note: The restore session must first be terminated using the -restore flag.	17	Lab Cleanup: We will now clean up the server. <pre>C:\> symdg delete stddg<SGN> -force</pre>	This concludes – The TimeFinder Snap - Win-2000 - Lab 3
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