BrightStor ARCserve Backup
Disaster Recovery From
Physical Machines to Virtual
Machines

Best Practices Guide

BrightStor ARCserve Backup r11.5
Version 1.0

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<January 2007>
Chapter 1: Disaster Recovery From Physical Machines to Virtual Machines

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Chapter 1: Disaster Recovery From Physical Machines to Virtual Machines

Overview

The BrightStor® ARCserve® Backup Disaster Recovery Option is based on the concept of collecting and saving machine-specific information before a disaster strikes. When you submit a full backup job, the option automatically generates and saves emergency data information for each protected machine locally on the backup server, on backup media, and, optionally on a remote computer. In the event of a disaster, the option can recover its protected computers to their most recent backup state.

The option provides a flexible, easy-to-use, enterprise-wide solution to protect your data on Windows NT 4.0, Windows 2000, Windows 2003, and Windows XP based computers. It provides you with the following benefits:

- It protects your local BrightStor ARCserve Backup server and remote client computers using the BrightStor® ARCserve® Backup Client Agent installed.
- It lets you quickly put an unusable system back online, saving you substantial time when recovering from a disaster.
- It requires minimal user input, provided the recommended measures were performed before the disaster occurred.

Although the option was designed to recover a physical server to the same physical server or another one with similar hardware configuration, Disaster Recovery Option has been updated to provide methods to allow you to recover a physical server to a virtual machine that is depot in some virtual infrastructures like VMware ESX Server.
The scope of this document is to provide you with the information on how to perform Disaster Recovery from physical machines to virtual machines (P2V) using the BrightStor ARCserve Backup Disaster Recovery Option.

**Prerequisites**

This document assumes that you have knowledge on BrightStor ARCserve Backup Disaster Recovery Option. Also, you should have basic knowledge about Microsoft ASR, network configuration utility `netsh`, the usage of VMware ESX Server.

**Software requirements**

- BrightStor ARCserve Backup Base r11.5 with SP3 or later versions
- BrightStor ARCserve Backup Disaster Recovery Option
- BrightStor ARCserve Backup Client Agent (for remote recovery)

**Operating Systems**

This feature is supported on the following operating systems:

- Microsoft Windows 2000 Service Pack 4
- Microsoft Windows 2003
- Microsoft Windows XP Professional
Virtual Infrastructures

This feature is supported on VMware ESX Server 2.5 and higher virtual infrastructures from VMWare.

Best Practices

The backup images could be local or remote backup images and you can perform local restore or remote restore of these images. The following sections will provide best practices for these scenarios:

**Note:** BrightStor ARCserve Backup is designed to restore the backup image to the machine with the similar hardware configuration, ensure that you configure the virtual machine same as the physical machine while performing P2V restore.

Method 1: Local backup and local restore

You must ensure to perform full backup of your physical machine to the local tape and create a machine specific recovery disk (MSD).

Use the bootable CD or the installation CD, and the floppy disk to restore the backup data from the backup tape to the virtual machine using the similar method you use to restore to the physical machine.

There exists a known issue in this recovery method for which the solution is provided as below:

**Problem:**

The Network Interface Card (NIC) does not function properly when the restored system is started.

**Solutions:**

You can use one of the following solutions to solve this problem:

- Install the VMware Tools on the virtual machine for the NIC to work properly.
- Uninstall the network driver and reinstall it as shown below:
  
  a. Log into the recovered system on the virtual machine and open Control Panel, Administrative tools, Computer Management and Device Manager.
  
  b. Right-click on the network driver and click uninstall as shown in the figure below:
Uninstalls the driver for the selected device.
c. After the un-installation, right-click on the host name and select Scan for hardware changes to scan the hardware changes. The network adapters are automatically reinstalled.

![Computer Management](image)

After the network adapter are installed properly, configure the IP address of the host machine if it is not DHCP configured.

**Method 2: Remote backup and remote restore**

The solutions of the known issues that exist in this method are given below:

**Problem 1**

The connection to the tape engine is not established when the Disaster Recovery restore begins. This issue is mostly encountered with a VMware ESX recovery.

**Solution:**

1. Open a Command prompt from the Restore Manager. To do this, double-click the left icon on the Restore window holding the Ctrl and Shift keys pressed.

2. Execute the following command:

   `ipconfig`
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If there has no IP address or the IP address is 169.254.159.XXX, you must configure a new IP address. This is because if the NIC’s Mac address has changed, BrightStor ARCserve Backup cannot get the original IP address of the new NIC.

3. Execute the windows command netsh to add an address to the NIC as shown below:

```
C:\DRBOOT.TMP\system32\CMD.EXE - netsh
netsh interface
interface>ip
interface ip> add address "Local Area Connection" 192.168.1.226 255.255.255.0
```

4. Modify the following files by adding Server IP address and the Server name:

- **Microsoft Windows XP/ 2003**
  
  C:\WINDO\system32\drivers\etc\hosts

- **Microsoft Windows 2000**
  
  C:\DRBOOT.TMP\system32\drivers\etc\hosts

5. Go to the following directories of the respective platforms and execute drw command to start the usual restore process:

- **Microsoft Windows XP/ 2003**
  
  C:\WINDO\system32\DR

- **Microsoft Windows 2000**
  
  C:\DRBOOT.TMP\system32

**Problem 2**

The Network Interface Card (NIC) does function when the restored system is started.

**Solution:**

See the Problem and the Solution in the section Local backup and local restore.
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Method 3: Local backup and remote restore

Scenario 1

In this scenario, assume that the server has been locally backed up, the Server name is TEST-SERVER, and the IP address is 192.168.1.224.

To recover this server to a virtual machine, rename the new server as TEST-SERVER-REP, and assign 192.168.1.226 IP address to it. This new name and IP address avoid IP conflict with the physical machine during the restore process. After you restore the local backup to the remote virtual machines, you can change the host name and IP address to the same as physical machine. To avoid IP address conflict, you must ensure to disconnect the physical machine when you reboot the virtual machine after completion of the restore job.

Perform the following procedure to modify the MSD (Machine specific recovery Disk) floppy:

1. Modify the following two files using registry edit tools:
   - **TEST-SERVER.DRF**
     Modify the record DRLOCALCOMPUTERNAME from TEST-SERVER to TEST-SERVER-REP
     **Note:** Ensure that the name does not exceed 15 characters.
   - **w2ktcpip_drf**
     Modify the record IP address from 192.168.1.224 to 192.168.1.226.
     For more information on how to modify these files, see Appendix A.

2. Rename the following files:
   - TEST-SERVER_CA to TEST-SERVER-REP_CA
   - TEST-SERVER.DRF to TEST-SERVER-REP.DRF
   - TEST-SERVER_DLST to TEST-SERVER-REP_DLST
   - TEST-SERVER_DTBL to TEST-SERVER-REP_DTBL
   - TEST-SERVER_PRDS to TEST-SERVER-REP_PRDS

3. Add an empty file BABDRE115.

4. Add a file w2karmt.dmp. To do this:
   - Copy the following file in the BrightStor ARCserve Backup installation CD to the BrightStor ARCserve Backup home directory on your machine
     \Utilities\IntelNT\DRO\ENU\makermt.exe
Exchange data collection best practice

- Open the command prompt and go to the BrightStor ARCserve Backup home directory and execute the following command:

  ```
  makermt –BAB11_5 –alter –file w2karmt.dmp
  ```

- You are prompted to input the server name, domain name, user name and the password. For this scenario, enter TEST-SERVER for both server name and domain name. The w2karmt.dmp file is generated in the current directory.

- Copy this file to the MSD floppy. Use this floppy and the bootable CD to restore the local backup data to the remote virtual machine.

**Scenario 2**

In this scenario, assume that the server has been locally backed up, the Server name is TEST-SERVER, and the IP address is 192.168.1.224.

To recover this server to a virtual machine from another server named as DR-SERVER, perform the following procedure to modify the MSD floppy:

1. Modify the following file using registry edit tools:

   ```
   TEST-SERVER.DRF
   ```

   Modify the record DRCOMPUTERNAME from TEST-SERVER to DR-SERVER

   For more information on how to modify these files, see Appendix A.

2. Add an empty file BABDRE115.

3. Add a file w2karmt.dmp. To do this:

   - Copy the following file in the BrightStor ARCserve Backup installation CD to the BrightStor ARCserve Backup home directory on your machine

     ```
     \Utilities\IntelNT\DRO\ENU\makermt.exe
     ```

   - Open the command prompt and go to the BrightStor ARCserve Backup home directory and execute the following command:

     ```
     makermt –BAB11_5 –alter –file w2karmt.dmp
     ```

   - You are prompted to input the server name, domain name, user name and the password. For this scenario, enter DR-SERVER for both server name and domain name. The w2karmt.dmp file is generated in the current directory.

   - Copy this file to the MSD floppy. Use this floppy and the bootable CD to restore the local backup data to the remote virtual machine.

The following manual operations are critical when you perform Windows 2000 P2V, else your system may fail to boot after DR.

**Note**: You are recommended to take a VMWare snapshot before you perform the step 2 described below. If your machine fails to boot, revert to the snapshot and try again.

1. When the restore job is finished successfully, the following screen is displayed. **Do not** click on the Finish button on this screen.

2. Hold Shift+Ctrl keys and select the Open Command Line Window option as shown in the screen below:
3. From the command line console, go to the restored system directory. Usually it is C:\WINNT\System32\config.

4. Prepare a blank floppy disk and attach it to the virtual machine.

5. From the command line console, run the following Windows utility command to compress the files on your machine:

   `makecab system a:\system`

   **Note:** The file size of the system may exceed the capacity of floppy disk, even if it is compressed using the Windows utility `makecab`. In this case, copy the file to a different location on the network.

6. From the command line console, run the `regedt32` command to open the Registry Editor.

7. Select the HKEY_LOCAL_MACHINE on Local Machine child window and maximize it.

8. Select the SYSTEM sub key under HKEY_LOCAL_MACHINE.

9. From the Registry menu select Save Key... .

   The Save Key dialog appears.

10. Input the file name as system.p2v as shown below and click on Save:

11. From the command line console, run the following command:

    `makecab system.p2v a:\system.p2v`
12. Copy the system._ and system.p2_ files to a machine which has Windows 2000 running, and expand the compressed files using the following command:

   expand -r C:\temp\*

13. Perform the following procedure on the Windows 2000 machine:

   a. Open the Registry Editor from the command line console, select the HKEY_LOCAL_MACHINE child window, and Select the root key HKEY_LOCAL_MACHINE.

   b. From the Registry menu, select Load hive.

      The Load Hive dialog appears.

   c. Select the system.p2v file, and input the Key Name as $system in the Load Hive dialog for the key to be loaded.
d. Close the current Registry Editor window, and open a new Registry Editor window to browse the subkey $system\ControlSet001\Enum.

e. From the Registry menu, select Export Registry File... option.
   The Registry File dialog appears.

f. Input the file name as enum.reg. Repeat the steps f to i to export $system\ControlSet001\Services key and name it as services.reg.

g. Close the regedit window and launch a new Registry Editor using regedt32. Select the $system subkey and unload it from the Registry menu.

h. Load the system hive file into the registry and name the key as $system.

i. Browse and select the $system\ControlSet001\Enum subkey. From the Security menu, select Permissions.... Select the Allow option for Full Control for Everyone. Click OK.
j. Open the Windows Explorer and browse to locate enum.reg and services.reg.

k. Right click on enum.reg and select Merge. Repeat the same for services.reg.

A warning message may appear stating some data is not written into registry successfully. Click OK.

l. From regedt32, browse and locate $system\ControlSet001\Enum subkey and remove the Allow of Full Control permissions.

m. Select the $system key, and from the Registry menu select the UnLoad Hive option.

n. Compress the system file using the makecab command.

o. Copy it to a blank floppy and rename the file C:\WINNT\Sytem32\config\system to system.org. Copy the modified system._ file to C:\WINNT\System32\config and expand it to system.

p. Click Finish on the DR Wizard and reboot machine.

**Note:** Follow the same procedure on Windows XP/2003 systems. You must use regedt32 for all the operations instead of regedit.
Other known issues

Failed to find SCSI disk when installed

Valid on Microsoft Windows XP

When you restore Windows XP machines to virtual machines on ESX, use F6 to add additional SCSI drivers and set the SCSI to use LSIlogic mode. Now you can use LSI Logical SCSI driver which you can download from the VMware web site.

Multi SCSI adapter and multiple hard disks

You must consider the following:

- The number of disks on the virtual machines has to be same as the number of disks on the physical machines.
- The size of the disk on the virtual machine must be equal or greater than the size of the disk on the physical machine.
- When configuring virtual hard disks, you must make sure that the virtual disks are in the same sequence as the disk numbers displayed in disk manager on the physical machine.
- The boot disk should be same as the original one. You may need to configure the boot sequence of hard disks in BIOS setup of virtual machine.

An illustration is given in the following diagram, also note the capacity of each disk:
**Windows 2000 Machine Failed to boot up after Recovery with the STOP error**

The error message "***STOP 0x0000007B (parameter1, parameter2, parameter3, parameter4) INACCESSIBLE_BOOT_DEVICE" appears when the physical machine is running Microsoft Windows2000 operating system.

To avoid this, use the Windows PE (Preinstall Environment) CD to boot the machine or attach the system virtual disk to another living Windows virtual machine.

For more information to update the registry hive system file, see the section Additional Manual Operations for Windows 2000 P2V.
Appendix

How to modify a registry file

1. Run the registry editor and select KEY_LOCAL_MACHINE.
2. Select file, Load Hive from the menu, and select the file you want to edit.
3. Assign a temporary name to the key, for example, tmpKey as shown in the screen below:
4. You can see the values in this key in the right panel of the registry editor as shown below:
5. Double-click the row you want to modify and then edit it.

6. To verify the modified registry values, select tmpKey in the left panel of the registry editor, and go to the File menu, Unload Hive. The changes are applied to the file you just modified.

References

- BrightStor ARCserve Backup for Windows Disaster Recovery Option Guide
- VMWare ESX user manual
- MSDN