This document is a side-by-side comparison of these two tech notes:

This is for **Windows 2000/2003** (with a brief mention of 2008)
http://www.symantec.com/business/support/index?page=content&id=TECH56473
Full system restore/recovery of a Windows server from file-level backups (no BMR).

This is for **Windows 2008** (with no mention of 2000/2003):
http://www.symantec.com/business/support/index?page=content&id=TECH87810
HOWTO: Use NetBackup to perform a restore for a total and complete recovery of Windows 2008 client(s) that includes C: (and other system) drive(s), Shadow Copy Component, and System_State from a reliable full Windows-NT backup without IDR or BMR in the event of a Disaster (or need to fall back to a known working state).

For **Windows 2000/2003** – also read:
http://www.symantec.com/business/support/index?page=content&id=TECH22365
During a System_State restore, not all of the registry keys are recovered, causing the system to go into a reboot cycle.

For **Windows 2008** – also read:
http://www.symantec.com/docs/TECH125275
Full system restore of Windows Standard 2008 fails to boot after restore completes.

http://www.symantec.com/docs/TECH150156
A file system restore using Symantec Netbackup or Backup Exec to perform a DR of a Windows based system to another server with dissimilar hardware may result in a non-bootable Operating system.

For **Windows 2012** – also read:
http://www.symantec.com/docs/TECH209585
BUG REPORT: Disaster recovery of Windows 2012 client fails with error "(0xE000FEEE:The Recovery Partition volume could not be found"

OLD TECH NOTE	NEW TECH NOTE
This TN appears to be for Windows 2000 and 2003	This TN appears to be for Windows 2008
TECH56473	TECH87810
http://www.symantec.com/business/support/index?page=content&id=TECH56473	http://www.symantec.com/business/support/index?page=content&id=TECH87810
	TN said "Updated: 2011-01-24"
	This TN no longer exists?
Title: This document outlines how to perform a full system restore/recovery of a Windows server in case of a disaster-recovery scenario.	Title: HOWTO: Use NetBackup to perform a restore for a total and complete recovery of Windows 2008 client(s) that includes C: (and other system) drive(s), Shadow Copy Component, and System_State from a reliable full Windows-NT backup without IDR or BMR in the event of a Disaster (or need to fall back to a known working state).
Content: **SCOPE:** This document outlines how to perform a full system restore/recovery of a Windows server in case of a disaster-recovery scenario. This has been taken from: http://www.symantec.com/business/support/index?page=content&id=TECH56473 **SUMMARY:** This guide is provided as a general/generic template that would be applicable for most restores, and may require trial-and-error and multiple attempts. Most of the time using the following steps the way it is, will result in good bootable system. It is intended for Disaster Recovery of a client back to original hardware, or a near identical new hardware should the original no longer be available **Pre-Requisites** • This is for a client system restore only. • This procedure will restore your computer's system files and data files to a pre-disaster state except those protected by one of the NetBackup database agents, such as the Exchange agent or SQL agent. If any of your data is protected by NetBackup agents, refer to the section on restoring the data protected by the agent before beginning disaster recovery. • This procedure does NOT utilize NetBackup Bare Metal Restore (BMR) or NetBackup Intelligent Disaster Recovery (IDR) but instead makes use of standard Windows-NT backups	Content: **Problem** HOWTO: Use NetBackup to perform a restore for a total and complete recovery of Windows 2008 client(s) that includes C: (and other system) drive(s), Shadow Copy Component, and System_State from a reliable full Windows-NT backup without IDR or BMR in the event of a Disaster (or need to fall back to a known working state). **How to use this guide**: This guide is provided as a general/generic template that would be applicable for most restores, and may require trial-and-error and multiple attempts. Most of the time using the following steps the way it is, will result in good bootable system. The guide is intended for restore back to the original machine. If the machine is damaged and replaced with another machine (regardless of being 99.999% identical make/model) this is no longer considered the original machine. If target is not the original, the larger the difference from the original machine, the lower the success rate of a bootable system. This guide is NOT intended for system cloning. It is intended for Disaster Recovery of a client back to original hardware, or a near identical new hardware should the original no longer be available. **Pre-Requisites** • This is for a client system restore only. • This procedure will restore your computer's system files and data files to a pre-disaster state except those protected by one of the NetBackup database agents, such as the Exchange agent or SQL agent. If any of your data is protected by NetBackup agents, refer to the section on restoring the data protected by the agent before beginning disaster recovery. • This procedure does NOT utilize NetBackup Bare Metal Restore (BMR) or NetBackup Intelligent Disaster Recovery (IDR) but instead makes use of standard Windows-NT backups

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of all local drives including System_State (Windows 2000 and earlier AND NetBackup 4.5 and earlier) **or** Shadow Copy Components (Windows 2003 and later AND NetBackup 5.1 and later). • Any Windows 2003 (or later) client backed up previously by NetBackup client 4.5X would not support Shadow Copy Components restore. You must select only System_State. This is true trying to restore from an OLDER version 4.5X backup even if the client has been upgraded to 5.X or later. • The success of a full restore will depend on a "reliable" full system backup. So if System State or Shadow Copy Components backups complete with a Status 1, then it is not reliable for a Disaster Recovery Scenario. • This procedure requires third party **Windows 2000 or 2003** Setup media from Microsoft in order to perform reinstallation of the operating system. The same version/suite must be used. For example, if the original version is Windows Enterprise Server 2003 with Service Pack 1, that same version must be installed for disaster recovery. All related hardware drivers that are required to reinstall Windows and configure networking must be available and ready. Network functionality after windows is booted up is a requirement. **NOTE: For a higher success rate, install the same drivers (and applications which install drivers) the system had when the backup was made. Failure to do so can result in a post-restore reboot loop.** **WARNING:** You cannot recover using a different Windows OS than was previously installed. For example, Windows 2003 Small Business could not be used to recover a Windows 2003 Enterprise server. **NOTE:** You may have to [re]install drivers even after a successful restore and reboot. **NOTE:** When using an imaging software to rebuild the box, please verify it is supported by Microsoft. **Other options to consider:** NetBackup Bare Metal Restore (BMR) protects client systems by backing them up with a policy configured for BMR protection. For a complete description of BMR backup and recovery procedures, see the Bare Metal Restore System Administrator's Guide. If you installed and configured NetBackup Intelligent Disaster Recovery (IDR) on the client system, refer to the NetBackup Administrator's Guide, Volume II, for recovery procedures instead of the instructions below.	of all local drives including System_State **and** Shadow Copy Components. • The success of a full restore will depend on a "reliable" full system backup. So if System State or Shadow Copy Components backups complete with a Status 1, then it is not reliable for a Disaster Recovery Scenario. • This procedure requires third party **Windows 2008** Setup media from Microsoft in order to perform reinstallation of the operating system. The same version/suite must be used. For example, if the original version is Windows Enterprise Server 2008 with Service Pack 1, that same version must be installed for disaster recovery. All related hardware drivers that are required to reinstall Windows and configure networking must be available and ready. Network functionality after windows is booted up is a requirement. **For a higher success rate, install and use all the same drivers the system had when the backup was made.** **WARNING:** You cannot recover using a different Windows OS than was previously installed. For example, Windows 2008 Small Business could not be used to recover a Windows 2008 Enterprise server. **NOTE:** You may have to [re]install drivers even after a successful restore and reboot. **NOTE:** When using an imaging software to rebuild the box, please verify it is supported by Microsoft. **Other options to consider:** NetBackup Bare Metal Restore (BMR) protects client systems by backing them up with a policy configured for BMR protection. For a complete description of BMR backup and recovery procedures, see the Bare Metal Restore System Administrator's Guide.

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Solution:	**Solution:**
1. Setup and Install Windows. Install the original version of Windows. This basic Windows installation is necessary to provide NetBackup with a target to which it can restore the system. The computer name, Windows directory, and the file system type (such as NTFS) must be the same as it was on the previous Windows installation. This installation will be overwritten by the recovered version, which will restore your original system configuration, application settings, and security settings. After setup, Install the necessary service packs to bring Windows to the same level as was previously installed.	**1. Setup and Install Windows.** Install the original version of Windows. This basic Windows installation is necessary to provide NetBackup with a target to which it can restore the system. The computer name, Windows directory, and the file system type (such as NTFS) must be the same as it was on the previous Windows installation. This installation will be overwritten by the recovered version, which will restore your original system configuration, application settings, and security settings. After setup, Install the necessary service packs and drivers to bring Windows to the same level as was previously installed.
NOTE ABOUT HARDDRIVE PARTITIONS: If you are recovering from an entire hard disk failure, use Windows Setup to partition and format the new disk during installation. Use the same partition layout as was on the previous drive. You may re-adjust to larger sizes, but drive letters must be the same. Format the partitions with the same file system type as before the failure. During setup: • If the system was in a specific domain or workgroup, do not join the domain or workgroup at this time. • If you are recovering a domain controller, do not perform the domain controller installation process at this time.	**NOTE ABOUT HARDDRIVE PARTITIONS:** If you are recovering from an entire hard disk failure, use Windows Setup to partition and format the new disk during installation. Use the same partition layout as was on the previous drive. You may re-adjust to larger sizes, but drive letters must be the same. Format the partitions with the same file system type as before the failure. During setup: • If the system was in a specific domain or workgroup, do not join the domain or workgroup at this time. • If you are recovering a domain controller, do not perform the domain controller installation process at this time.
2. Configure Network. Reinstall Network Interface Card (NIC) drivers (same version) if Windows does not have built-in support for the NIC. The same IP and hostname must be used. **NOTE:** Consult your Windows administrator, network administrator, NIC hardware/installation manual and/or NIC vendor support channel for additional information regarding driver support and configuration under Windows.	**2. Configure Network.** Reinstall Network Interface Card (NIC) drivers (same version) if Windows does not have built-in support for the NIC. The same IP and hostname must be used. **NOTE:** Consult your Windows administrator, network administrator, NIC hardware/installation manual and/or NIC vendor support channel for additional information regarding driver support and configuration under Windows.
3. Install NetBackup Client. If you change client name during install, please use workaround for the restore as mentioned in: http://www.symantec.com/business/support/index?page=content&id=TECH87218 Install the same version of the NetBackup Client for Windows as it was during the backup, including any necessary patches. Do not install a newer (higher) version than the master server. If the client version is not known, the version file	**3. Install NetBackup Client.** Install the same version of the NetBackup Client for Windows as it was during the backup, including any necessary patches. Do not install a newer (higher) version than the master server. If the client version is not known, the version file

OLD TECH NOTE	NEW TECH NOTE
(**<install_path>\VERITAS\NetBackup\version.txt**) can be restored from the backup image of the client to an alternate location on the master or a media server and examined.	(**<install_path>\VERITAS\NetBackup\version.txt**) can be restored from the backup image of the client to an alternate location on the master or a media server and examined.
RECOMMENDATION: Perform a custom installation where NetBackup is not installed to the same drive as Windows. If you have to reformat and perform a Windows installation again, you will not lose access to NetBackup client logs.	**RECOMMENDATION:** Perform a custom installation where NetBackup is not installed to the same drive as Windows. If you have to reformat and perform a Windows installation again, you will not lose access to NetBackup client logs.
4. Enable NetBackup client logs: A. Navigate via Windows Explorer to your <Program Files>\Veritas\ folder. This represents the custom drive letter and folder name you used during the custom installation of the NetBackup client. Example: D:\Program Files\Veritas\. B. Navigate into the *NetBackup* folder, and then into the *logs* subfolder. If this subfolder does not exist, create it. C. In the *logs* folder, create these three subfolders: bpinetd, bpcd, and tar. D. Open the Backup, Archive and Restore (BAR) GUI console from the client: Start > All Programs > Veritas NetBackup > Backup, Archive and Restore E. Select File > NetBackup Client Properties > Troubleshooting (tab). F. Under Debug Levels, set General to a value of 2 and Verbose to a value of 5. G. Stop/Restart the NetBackup client service via the Windows Services console. (Start > Run > type services.msc) Find NetBackup Client Service, highlight, and Stop. After it has stopped, restart it with Start.	**4. Enable NetBackup client logs:** A. Navigate via Windows Explorer to your <Program Files>\Veritas\ folder. This represents the custom drive letter and folder name you used during the custom installation of the NetBackup client. Example: D:\Program Files\Veritas\. B. Navigate into the *NetBackup* folder, and then into the *logs* subfolder. If this subfolder does not exist, create it. C. In the *logs* folder, create these three subfolders: bpinetd, bpcd, and tar. D. Open the Backup, Archive and Restore (BAR) GUI console from the client: Start > All Programs > Veritas NetBackup > Backup, Archive and Restore E. Select File > NetBackup Client Properties > Troubleshooting (tab). F. Under Debug Levels, set General to a value of 2 and Verbose to a value of 5. G. Stop/Restart the NetBackup client service via the Windows Services console. (Start > Run > type services.msc) Find NetBackup Client Service, highlight, and Stop. After it has stopped, restart it with Start.
5. Start the restore process. **NOTE:** For this procedure to work, the restore must to initiated from the client and not the master server or remote media server. A. Launch the **VERITAS NetBackup BAR** (Backup, Archive & Restore) GUI application from the client. B. First, select the images that contain the Full and Incremental (if applicable) backups of the system drive first(s). Enable the overwrite option. **Do not elect to restore the System State/Shadow Copy Components at the same time.** **NOTE:** "System drive(s)" in modern day may no longer be just "C:" drive; as it is becoming more and more common to custom build and tune Windows to place system components into different drive for scalability and performance benefits. When considering restoring a client that was customize in this way, it is important to restore not only the C: drive, but all other drives and folders where system components are needed by Windows to operate. For example, this may include part or all of "Program Files" if some system dependent application is installed on elsewhere, for example security services or anti-virus. During boot	**5. Start the restore process.** **NOTE:** For this procedure to work, **the restore must to initiated from the client** and not the master server or remote media server. A. Launch the **VERITAS NetBackup BAR** (Backup, Archive & Restore) GUI application from the client. B. First, select the images that contain the Full and Incremental (if applicable) backups of the system drive first(s). Enable the overwrite option. **Do not elect to restore the System State/Shadow Copy Components at the same time.** **NOTE:** "System drive(s)" in modern day may no longer be just "C:" drive; as it is becoming more and more common to custom build and tune Windows to place system components into different drive for scalability and performance benefits. When considering restoring a client that was customize in this way, it is important to restore not only the C: drive, but all other drives and folders where system components are needed by Windows to operate. For example, this may include part or all of "Program Files" if some system dependent application is installed on elsewhere, for example security services or anti-virus. During boot

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time, Windows may have been configured to load critical libraries that could be located in custom install paths outside of C:	time, Windows may have been configured to load critical libraries that could be located in custom install paths outside of C:
WARNING: DO NOT REBOOT after the system drive(s) restore is completed.	**WARNING: DO NOT REBOOT** after the system drive(s) restore is completed.
C. When the restore is complete, check the client's tar log (found in <Program Files>\Veritas\NetBackup\logs\tar) for confirmation of a successful restore.	C. When the restore is complete, check the client's tar log (found in <Program Files>\Veritas\NetBackup\logs\tar) for confirmation of a successful restore. There should be messages stating:"WRN - System needs to be rebooted for file to take effect", but no errors.
If the restore had errors, this log will provide more detail and any issues found should be resolved before continuing.	If the restore had errors, this log will provide more detail and any issues found should be resolved before continuing.
D. System_State/Shadow Copy Components.	D. System_State/Shadow Copy Components.
CAUTION: This is the most critical part of the restore that could result in a bootable system or non-bootable system.	**CAUTION:** This is the most critical part of the restore that could result in a bootable system or non-bootable system.
Select the images that contain the Full and Incrementals (if applicable) backups and start a restore of the System State/Shadow Copy Components with the overwrite option enabled.	Select the images that contain the Full and Incrementals (if applicable) backups and start a restore of the System State/Shadow Copy Components with the overwrite option enabled.
NOTE: By default, the System State/Shadow Copy Components assumes the restore is to different hardware (and NOT the original machine) and does not restore the registry hive: HKLM:\System\CurrentControlSet\Control\BackupAndRestore\KeysNotToRestore. This will result in the loss of certain hardware driver and configuration information noted by Microsoft here:**http://technet.microsoft.com/en-us/library/cc737538.aspx** (this means you may have to [re]install drivers if restore/reboot is successful). If the restore being attempted is to the ORIGINAL hardware and you wish to restore this information, use the W2koption.exe utility supplied with the NetBackup Windows Client. **THIS SHOULD NOT BE USED IF RESTORE IS NOT TO ORIGINAL HARDWARE**. Running W2koption.exe:	
NOTE: below is an updated procedure used and referenced from: http://seer.entsupport.symantec.com/docs/251163.htm	
1. If this is not the original system, skip this step, otherwise, before the restore of System_State or Shadow Copy Components component starts, run the w2koption with the following command syntax**: (No need to run below command for Win 2008 Clients)** <install_path>\VERITAS\NetBackup\bin\w2koption -restore -same_hardware 1 2. Then, restore the System_State or Shadow Copy Components. **DO NOT REBOOT THE SERVER YET**. 3. Repeat the w2koption command as done earlier: (**(No need to run below command for Win 2008 Clients)**	

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<install_path>\VERITAS\NetBackup\bin\w2koption -restore -same_hardware 1 **NOTE:** For Windows 2003, if shadow copy was successfully restored and still NOT able to boot, on next try, instead of restoring the entire or Shadow Copy Components, simply expand and just select System_State portion; and skip w2koption. **NOTE2**: If you want to restore Shadow Copy Components or System_State again to the original hardware and recover device driver information, you use repeat the w2koptions steps before and after again. E. Upon completion of the restore, check the tar log again for any problems. Once again, **DO NOT REBOOT**. **6. Transfer logs from restore.** Transfer the client's NetBackup logs to an area where you can access them if the reboot results in a blue screen and safe mode is not possible. **7. Double-check.** Double-check to see if there are any System data on other drives that need to be restored. At this time, if there are any, restore them. **8. [Optional] Restore other data.** Perform restores of other drive letters (non-system Drives) before rebooting. (Alternatively, you could perform this step after the reboot.) **9. Stop services named "NetBackup Client Service" and "NetBackup Legacy Client Service" and Reboot.** NOTE: After the Restore job completes, the NetBackup process named **bpinetd.exe** has pending registry-merge responsibilities post-restore. It will perform the queued registry-merge tasks upon graceful shutdown of the process. Killing the process (bpinetd.exe) using Task Manager or other tools will prevent the registry merge from happening. To verify the post-restore registry manipulation is completed there are 3 options: **9.1. Simply shutdown/reboot the OS like normal. When the OS shuts down running Services, bpinetd.exe should shutdown gracefully and perform the registry merge operation.** **NOTE:** Step 9.1 above works in the majority of situations. However, in rare circumstances when the OS brings down services (upon reboot), the bpinetd.exe process can not complete the post restore registry actions before the process is terminated during the reboot sequence. When this happens, a reboot-loop will be observed. Frequently, the reboot will	E. Upon completion of the restore, check the tar log again for any problems. Once again, **DO NOT REBOOT**. **6. Transfer logs from restore.** Transfer the client's NetBackup logs to an area where you can access them if the reboot results in a blue screen and safe mode is not possible. **7. Double-check.** Double-check to see if there are any System data on other drives that need to be restored. At this time, if there are any, restore them. **8. [Optional] Restore other data.** Perform restores of other drive letters (non-system Drives) before rebooting. (Alternatively, you could perform this step after the reboot.) **9. Stop NetBackup Client Service (bpinetd) and Reboot.** To verify the registry information is pushed Stop the NetBackup Client Service and verify bpinetd is no longer running, then at this time, it should be okay to reboot the system. The following command can be ran to stop the NetBackup Client Service: net stop "NetBackup Client Service"

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not be associated with a BSOD, but will simply POST in the middle of the boot process. If this behavior is observed, manually stopping the services (as described in steps 9.2 and 9.3) prior to reboot will allow the bpinetd.exe the needed time to perform the registry merge operation before reboot. **9.2. NBU 7.0 and older:** Manually Stop the *NetBackup Client Service*. **This will cause bpinetd.exe to perform the merge operation and terminate gracefully. When bpinetd is no longer running,** it should be okay to reboot the system. The following command can be run to stop the NetBackup Client Service: net stop "NetBackup Client Service" **9.3. NBU 7.1 and newer:** Manually Stop the *NetBackup Legacy Client Service*. **This will cause bpinetd.exe to perform the merge operation and terminate gracefully. When bpinetd is no longer running,** it should be okay to reboot the system. The following command can be run to stop the NetBackup Legacy Client Service: net stop "NetBackup Legacy Client Service" **[10.] Post Reboot Action.** After the reboot, if a blue screen occurs while the client is starting Windows, attempt to boot using Safe Mode (or Safe Mode with Networking). If a Safe Mode Boot succeeds, take a look at the Windows event logs, and export them. Transfer them to another partition (or network location if Networking is enabled and working under Safe Mode). If there is no alternate method to access and transfer data, reinstall the operating system again and set up Networking so evidence can be sent to the Technical Support of various vendors, including Symantec for NetBackup support. **NOTE:** If you took a chance and restored to a non-original machine with w2koption, retry this procedure again (reinstall/rebuilding Windows also) and skip over w2koption. If it still fails to boot and this is Windows 2003, retry again without w2koption AND only restore System_State from Shadow Copy Components. **NOTE:** The first boot after doing a full OS restore of Windows 2008 or Windows 2008 R2 may take 5-10 minutes or longer. It may show a blank screen during this time. The machine is not hung. Do not reboot forcefully during this time, as it may corrupt the OS causing it not to boot up. The slow boot is due to a bulk file-rename for files which were restored with temporary file names because their production counterparts were active and locked at the time of the restore. This also happens with Windows 2003, but the file-set is much smaller and the boot-lag is therefore much shorter in duration.	**[10.] Post Reboot Action.** After the reboot, if a blue screen occurs while the client is starting Windows, attempt to boot using Safe Mode (or Safe Mode with Networking). If a Safe Mode Boot succeeds, take a look at the Windows event logs, and export them. Transfer them to another partition (or network location if Networking is enabled and working under Safe Mode). If there is no alternate method to access and transfer data, reinstall the operating system again and set up Networking so evidence can be sent to the Technical Support of various vendors, including Symantec for NetBackup support.