BrightStor® ARCserve® Backup for Windows

Microsoft Volume Shadow Copy Service Guide

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Introducing VSS Support

BrightStor® ARCserve® Backup is a comprehensive storage solution for applications, databases, distributed servers, and file systems. It provides backup and restore capabilities for databases, business-critical applications, and network clients.

Using the Volume Shadow Copy Service (VSS) feature provided with Microsoft Windows Server 2003, BrightStor ARCserve Backup enables you to take advantage of the point-in-time backup feature of VSS that allows open files to be backed up. Applications and large databases that are VSS-aware can also be backed up, ensuring transactional consistency during the backup process.

This chapter provides an introduction to the VSS technology and concepts and introduces the solutions available for VSS support in BrightStor ARCserve Backup. For complete information about VSS, see the Microsoft web site.

VSS Support in BrightStor ARCserve Backup

BrightStor ARCserve Backup provides VSS backup and restore support through the following solutions:

■ **BrightStor® ARCserve® Backup Client for VSS Software Snap-Shot**—Works with VSS-aware applications to provide point-in-time backup and restore of Windows 2003 files and data sets. As changes are made to the original information, intermediate shadow copies are created to back up only the changes. The BrightStor ARCserve Backup Client for VSS Software Snap-Shot (the client) creates software-based shadow copies as well as hardware-based shadow copies on devices that support this functionality; however, these hardware-based shadow copies are not transportable.

■ **BrightStor® ARCserve® Backup Enterprise Option for VSS Hardware Snap-Shot**—Works with the client and VSS interfaces supplied by specific vendors of disk array equipment to create transportable hardware-based shadow copies. Transportable shadow copies allow greater flexibility for the backup and restore of your mission critical applications and files by enabling the shadow copy to be imported onto other servers within the same system.

You can then use the transported shadow copy volumes for additional tape backups, or for other uses such as data mining and software development testing. The BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot (the option) is available with the BrightStor ARCserve Backup for Windows Enterprise Option and currently supports Microsoft Exchange Server 2003 and Microsoft SQL 2000.

When used in a remote backup and restore configuration, both of these solutions use the BrightStor® ARCserve® Backup Client Agent for Windows to provide communication between a workstation and the BrightStor ARCserve Backup server.

What Is Volume Shadow Copy Service?

Volume Shadow Copy Service (VSS) is built into the Microsoft Windows XP Professional and Windows Server 2003 operating systems. VSS works with BrightStor ARCserve Backup, the BrightStor ARCserve Backup Client for VSS Software Snap-Shot, the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot, and VSS-aware applications and services to create shadow copies of single volumes or multiple volumes.

Note: BrightStor ARCserve Backup does not support Writers under Windows XP. This is because some of the necessary Writer support in Windows Server 2003 is not included in the Windows XP operating system.

A *shadow copy* is a read-only, frozen view of a volume's file system as it exists when the copy is taken, and may reside on a volume separate from the one that was copied. The shadow copy volume can exist on the same server as the original data but in a different share or mount point, or on another network-attached volume.

The shadow copy of the volume is created at a single point in time and is synchronized across the whole volume set. To avoid inconsistencies, shadow copies cannot be taken of individual files.

Regardless of where the shadow copy volume is created, BrightStor ARCserve Backup uses the shadow copy as the source for the backup. The shadow copy volumes can also be backed up (migrated) to another disk or tape device.

Using the shadow copy method to perform backups has two distinct advantages over other traditional backup methods:

■ **Open files are backed up**—A shadow copy is a static snap-shot of a volume's data. Therefore, files that are open when a shadow copy is created appear closed on the shadow volume. When the shadow copy data is backed up, the open files are included.

■ **Workflow is not interrupted**—Since the data that is backed up by BrightStor ARCserve Backup exists on the shadow volume, work can continue on the original volume without affecting the integrity of the backup data.

In traditional backups, open files are skipped and do not appear in the backup. To get a better quality backup, administrators often implemented backup windows when the applications being backed up are unavailable to users. Unavailable applications prevented work from continuing, forcing users to wait until after the backup completed to finish their tasks.

If applications that are included in a VSS backup are not enabled for VSS, all the application's data (including open files) is written to the shadow copy. However, because the application cannot prepare its files before the backup begins, the data may not be consistent and any transactions may be incomplete.

A shadow copy of a volume, even in a crash-consistent state, still contains all files. A backup set created without a shadow copy would not contain the files that were open at the time of the backup. These open files are excluded from the backup.

Volume Shadow Copy Architecture

For a VSS backup to be successful, the following entities must work together and with VSS to prepare and perform the backup:

■ Requestors

■ Providers

■ Writers

■ Components

Writers, Components, and the other entities involved in a VSS backup are explained in greater detail in the following sections.

Requestors

The Requestor is a piece of software (usually a backup application) that is responsible for the following tasks:

- Initiating the request for a VSS backup

- Processing the backup instructions from the Writers, including which files are selected for backup and the methods that should be used to back up and restore those files

- Backing up the shadow copy data to media

- Signaling the completion of the backup by deleting the shadow copy data

BrightStor ARCserve Backup is designed to function as the Requestor in VSS backups.

Providers

The Provider is responsible for managing the volumes involved in the shadow copy backup, as well as for creating the shadow copy. The Provider interfaces with the shadow copy creation capabilities that are either part of the operating system (software-based) or on the disk array (hardware-based).

The Windows Server 2003 operating system has a built-in (system) Provider that uses a copy-on-write scheme to create the shadow copies. It can create shadow copies of any NTFS, FAT32, or RAW volume on the Windows Server 2003 system. The system provider only creates shadow copies on NTFS. Third-party Providers are also available.

Hardware disk array vendors can supply their own Providers that interface with the VSS framework, and direct where and how to create the shadow copies.

The BrightStor ARCserve Backup Client for VSS Software Snap-Shot works with the Windows Server 2003 system provider, but if a hardware-based provider is available it is used instead. When the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot is installed, hardware-based providers work with VSS to create a transportable shadow copy.

There are two types of Providers: software-based and hardware-based.

- Software-based Providers are typically implemented as a DLL and a filter to manage storage. The shadow copies are created in software. Shadow copies created with this type of Provider include a point-in-time view of the original volume as it existed before the shadow copy, and the subsequent snapshots of only the changed data.

■ Hardware-based Providers are implemented at the hardware level and work with a hardware controller or storage adapter. The shadow copies are created by a storage appliance, host adapter, or RAID device outside the operating system. Shadow copies created with a hardware-based Provider are of an entire volume (a full copy), and are typically mirrored views of the original volume. Additionally, if a transportable shadow copy is created, it can be imported onto other servers within the same system.

Writers and Components

The key to shadow copy technology is the Writers and their Components. A *Writer* is part of an application or service that works with VSS to prepare the application's data into a consistent state at the time of the shadow copy backup request. A *Component* is a group of files, selected for backup, that are controlled by the application or service under the Writer's control.

While an application or service is frozen, the Writer suspends writes on the original volume, so that the files selected for backup (the Components) remain in a consistent state during the creation of the shadow copy. Although writes are suspended during this time, the process is transparent to the user working on the selected files.

Writers

A Writer is part of an application or a service that is VSS-aware and that participates in a VSS backup in the following ways:

■ Works with VSS to prepare the application or service's data to be frozen

■ Suspends writes to the original volume while the shadow copy is created

■ Supplies a list of Components to include in the backup (and the restore) to VSS and the Requestor

To ensure that the data used to create the shadow copy is internally consistent, VSS informs the applications or services that control the files included in the backup to freeze. When an application or service is frozen, the state of the files under its control is consistent. It is the responsibility of the Writer to let VSS know when an application or service's files are in a consistent state.

To ensure that this state does not change during the creation of a shadow copy, the Writers suspend the ability of the application or service to make changes to the volume serving as the source of the shadow copy. The application (or its Writer) ensures the consistency of its data at the time of the shadow copy. Work can continue as if nothing was happening on the original volume, but no changes are actually made to the data until after the shadow copy has been created.

A Writer is also responsible for supplying a list of Components to VSS and to the Requestor in the form of a writer metadata document. A *writer metadata document* is an XML file produced by a Writer that contains instructions for the Requestor, such as which Components are to be backed up, the backup and restore methods to be used, and a list of any files that should be excluded from the backup.

Note: BrightStor ARCserve Backup does not support Writers under Windows XP. This is because some of the necessary Writer support in Windows Server 2003 is not included in the Windows XP operating system.

Components   A Component is a group of files treated as a single unit by the Writers and VSS. The files that make up a Component are grouped together because they are mutually dependent on one another. For example, consider the files that make up a database. Each file serves an important function in the context of the database as a whole, but on its own, a single file from a database has no use. By grouping all of these essential files into a Component, you ensure that all the data needed to successfully back up an application and its related files is backed up and can be restored later.

Each VSS backup must consist of at least one Writer, and each Writer must consist of at least one Component. An individual file cannot be backed up on its own. A file can only be backed up if it is part of a Component. Furthermore, if any of the files that comprise a Component are inaccessible when the shadow copy is being created, the backup of the Component will fail.

Shadow Copy Creation Methods

There are two methods to create shadow copies: making a full copy (or clone) of all data on the volume or making a copy of only the data and files that changed (known as copy-on-write). The method used to create the shadow copy and where the shadow copy is created are specified by the Provider associated with a volume.

- Hardware-based Providers are supplied by a disk array hardware vendor or storage virtualization provider (for example, XIOtech, HDS, EMC, and HP), and will only work with their own arrays.

- Software-based Providers that use the copy-on-write method have been developed by a variety of vendors to instantly create a shadow copy of file systems. In some cases, applications like Microsoft Exchange Server 2003 use this method for high-performance, low-impact backup or duplication.

The BrightStor ARCserve Backup Client for VSS Software Snap-Shot works using the system Provider included with Windows Server 2003. This Provider uses a copy-on-write scheme to create the shadow copies. If a hardware provider is installed, the BrightStor ARCserve Backup Client for VSS Software Snap-Shot uses it to create a full shadow copy of the entire volume. When the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot and a hardware provider are installed, the full shadow copy that is created is also transportable.

Full Copy Method

Hardware-based Providers use the full copy method to create a complete, point-in-time shadow copy of the data set to another disk array (or another section of the same disk array). This shadow copy can then be used as the backup copy for restores, or it can be transported to another disk or tape device for longer-term retention or archival use. Because the shadow copy is an exact full copy of the original data set, the required disk space for the first shadow copy is double, and so on.

Copy-on-Write Method

A copy-on-write shadow copy is a mapping of all the data blocks at a designated point in time. As the original data set changes, the pointers to data that has changed then replicate the original data, enabling the point-in-time restore. Because of the way it works, copy-on-write shadow copies typically only take up a small percentage of the disk space of the original data set.

VSS coordinates with the application Writers, the BrightStor ARCserve Backup Client for VSS Software Snap-Shot, and BrightStor ARCserve Backup to create shadow copies of applications and their files and the file system.

Note: One limitation of copy-on-write shadow copies is that the shadow copy data block map is created on (and must stay within), a particular server.

How the Client Works

The BrightStor ARCserve Backup Client for VSS Software Snap-Shot works with VSS to back up Writers, Components and file systems. The BrightStor ARCserve Backup Client for VSS Software Snap-Shot uses the system Provider included with Windows Server 2003 that uses a copy-on-write scheme to create the shadow copies. If a hardware provider is installed, the client uses it to create a full shadow copy of the entire volume.

Using the Backup Manager and the Restore Manager in BrightStor ARCserve Backup, you can select Writers on local or remote computers. The BrightStor ARCserve Backup Client Agent for Windows must also be installed if you plan to perform backups and restores on remote computers.

The BrightStor ARCserve Backup Client for VSS Software Snap-Shot can be used to back up Writers and Components on local or remote computers. In local VSS backups, the production server contains the original data to be backed up, and is also used as the location where the shadow copy data is created. In remote VSS backups, the BrightStor ARCserve Backup Client Agent for Windows reads the data from the shadow copy instead of from the original volume.

The following illustrations show the supported BrightStor ARCserve Backup Client for VSS Software Snap-Shot configurations:

Local Configuration
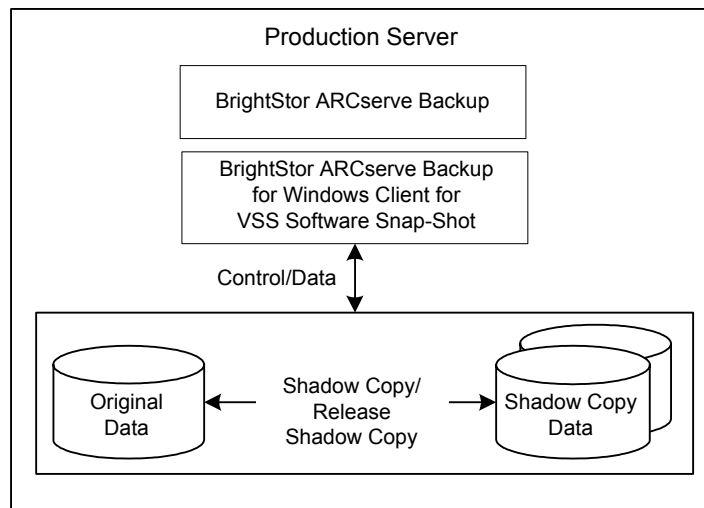
Remote Configuration
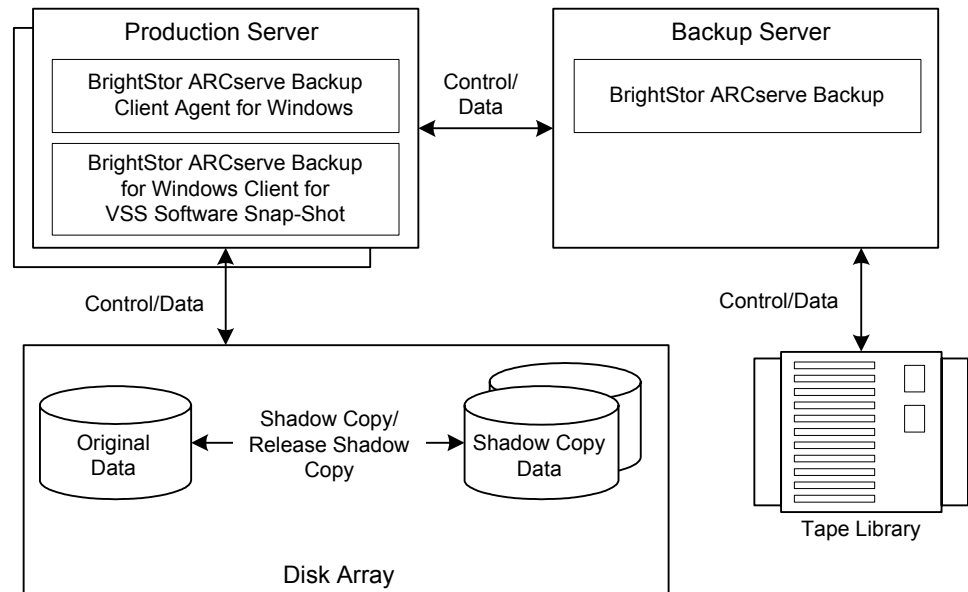
How the Option Works

Intended for use with extremely large data sets on various disk array enterprise environments, the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot works with the BrightStor ARCserve Backup Client for VSS Software Snap-Shot and hardware-based providers to create a transportable shadow copy of entire volumes. This shadow copy is a mirror of an entire LUN; however, the data can be restored for specific volumes of the LUN.

The transportable shadow copy can be imported to a different server where it can be backed up to tape. This leaves the production system running while the data is backed up on the secondary (or backup) server. Data on the shadow copy volume can also be mounted on another server for a number of uses:

■ Used as the basis for restores in the event of system failure

■ Used by developers to test applications

■ Transported to another location for archive or longer term storage

Note: The BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot does not support disaster recovery because the hardware-based Provider is not functional in disaster recovery.

There are two servers involved in a creating a transportable VSS backup: a production server and a backup server:

■ The production server contains the database and connects to the original volumes in the disk array.

Note: The BrightStor ARCserve Backup Client Agent for Windows must also be installed.

■ The backup server connects to the shadow copy volumes in the disk array and to the tape library. BrightStor ARCserve Backup is installed on the server.

Transportable Shadow Copy Creation Process Typically, a production server uses some level of disk storage fault tolerance to protect critical data. Fault tolerance can be provided through disk mirroring or a level of RAID striping. Using transportable shadow copies does not affect the level of fault tolerance. The production data remains on the configured LUNs with full fault tolerance, while the shadow copy is cloned to another transportable LUN. For example, in the following figure, the dashed line represents the logical connection between a Microsoft Exchange 2003 Server and the cloned data on the transportable shadow copy volume.
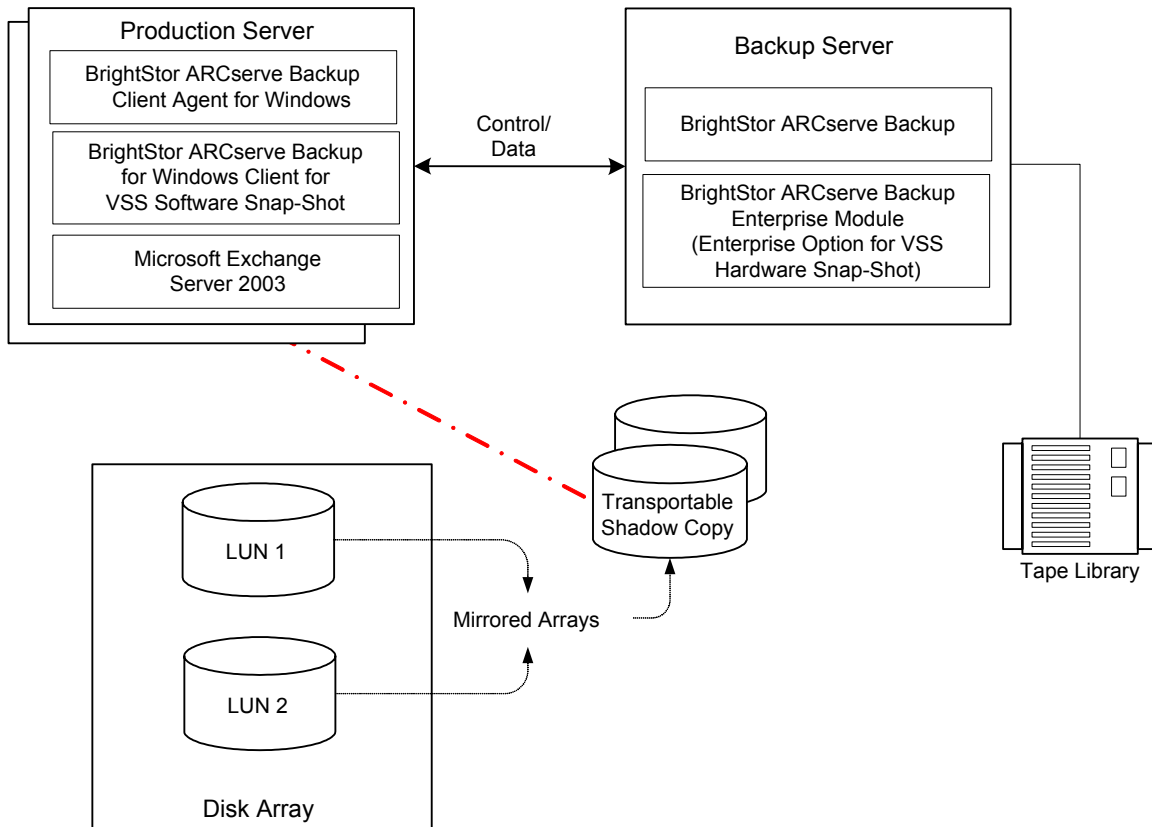
During backup operations, BrightStor ARCserve Backup (the Requestor) contacts VSS on the production server and informs it to begin the transportable shadow copy process. VSS tells the Writer to prepare the data for the shadow copy.

After the Writer finishes preparing the data, VSS instructs the Provider to split the volume that contains the transportable shadow copy away from the production server and to present this volume on the backup server. Continuing with the earlier example, the following figure shows the dashed line that now represents the logical attachment between the BrightStor ARCserve Backup server and the cloned data on the transportable shadow copy volume.
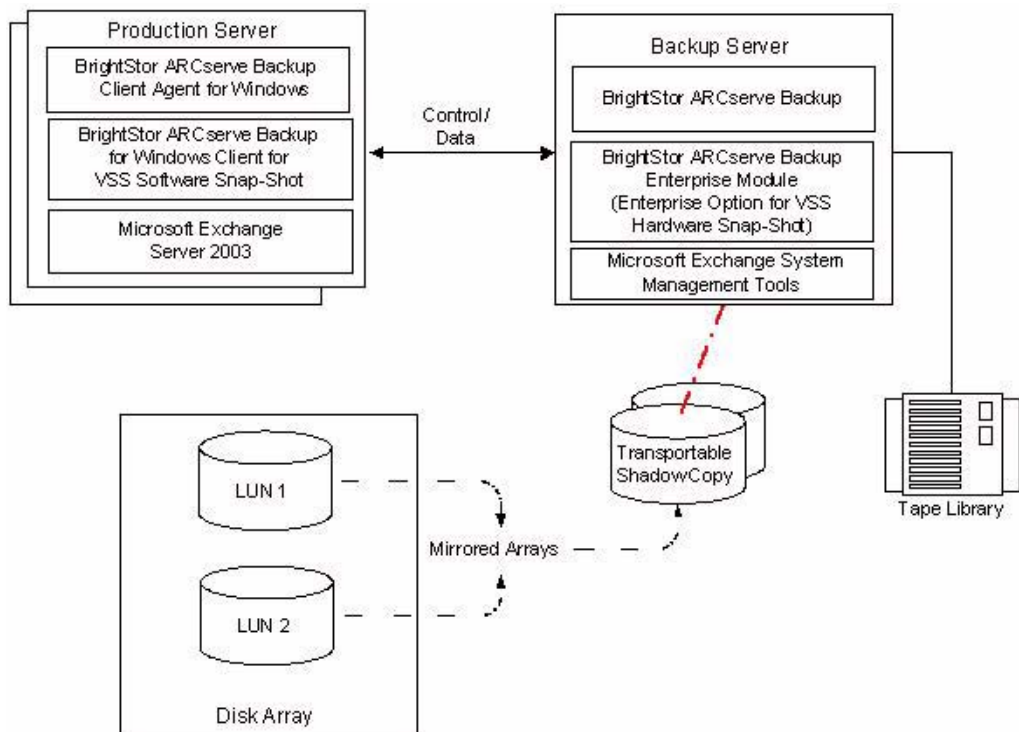
BrightStor ARCserve Backup can then perform a backup of the shadow copy without impacting the production server.

After the backup is complete, the Provider disconnects the transportable volume from the backup server and resynchronizes the volume back with the production server in preparation for the next backup.

Chapter 2

Installing the Client and the Option

The BrightStor ARCserve Backup Client for VSS Software Snap-Shot and the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot can be installed locally or remotely on a BrightStor ARCserve Backup client machine. This chapter includes the information that you need to install and configure the client and option. The information in this chapter assumes you are familiar with the characteristics and requirements of Windows Server 2003 in general, and with the administrator responsibilities in particular.

After the client and the option are installed, you can begin your first VSS backup. No configuration of either solution is necessary.

System Requirements

See the readme file on the installation CD-ROM for hardware and software requirements for installing and running the client and the option. Check the Computer Associates web site at ca.com for any updates to the requirements, as well as a list of the currently supported hardware-based Providers and disk array devices used by the option.

When used in a remote backup and restore configuration, both of these solutions require the BrightStor® ARCserve® Backup Client Agent for Windows to provide communication between a workstation and the BrightStor ARCserve Backup server.

Installation Checklist

Use the following checklist to ensure that you have met all the requirements and have all the information you need to complete the installation of the client.

✓	**Prerequisites for the BrightStor ARCserve Backup Client for VSS Software Snap-Shot**
	Have you installed BrightStor ARCserve Backup? If not, you can install it at the same time that you install the BrightStor ARCserve Backup Client for VSS Software Snap-Shot.
	Have you verified that your system meets the software requirements needed to install the BrightStor ARCserve Backup Client for VSS Software Snap-Shot? For a list of requirements, see the readme file.
	Have you configured the hardware based on your hardware environment?
	Are you changing the default installation path? If you are, enter your installation path here: _____
	Do you know the name and password of the computer that you are installing the BrightStor ARCserve Backup Client for VSS Software Snap-Shot on?
	Do you have administrator privileges or the proper authority to install software on the computer where you are installing the BrightStor ARCserve Backup Client for VSS Software Snap-Shot?

Use the following checklist to ensure that you have met all the requirements and have all the information you need to complete the installation of the option.

✓	**Prerequisites for the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot**
	Have you verified that your system meets the software requirements needed to install the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot? For a list of requirements, see the readme file.
	Are you changing the default installation path? If you are, enter your installation path here: _____
	Do you have a separate license for each computer on which you are installing the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot?

✓	**Prerequisites for the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot**
	Do you know the name and password of the computer that you are installing the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot on?
	Do you have administrator privileges or the proper authority to install software on the computer where you are installing the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot?

Installation Procedure

The BrightStor ARCserve Backup Client for VSS Software Snap-Shot follows the standard installation procedure for the system components, agents, and options of BrightStor ARCserve Backup. For the detailed steps in this procedure, see the *BrightStor ARCserve Backup Getting Started*.

There is no separate installation for the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot. The BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot is one of the options included in the BrightStor ARCserve Backup Enterprise Module, and requires a separate license for each computer on which the option is installed. After both the BrightStor ARCserve Backup Client for VSS Software Snap-Shot and the Enterprise Module is installed, the transportable VSS functionality is available.

After you complete the installation procedure, be sure to restart your computer when prompted.

Post-Installation Procedure

If you currently use the BrightStor® ARCserve® Backup Agent for Open Files **only** for its VSS support, the VSS functionality is now provided by the BrightStor ARCserve Backup Client for VSS Software Snap-Shot. After installing the BrightStor ARCserve Backup Client for VSS Software Snap-Shot, you can manually uninstall the Backup Agent for Open Files. However, although VSS does allow open files to be backed up, it does not provide all of the functionality available through the BrightStor ARCserve Backup Agent for Open Files. Some users may require both solutions.

Preparing for VSS Shadow Copies

The amount of disk space that you need to allow for shadow copies depends on how often an application writes files changes, and how much information is written. For example, if an application rewrites the entire file when the file is modified, changes to the application will need much more shadow copy disk space than if the application wrote only the data that changed.

Determine how much space is needed for the shadow copies, and then verify that the space is available.

Uninstalling the Client and the Option

To uninstall the BrightStor ARCserve Backup Client for VSS Software Snap-Shot, use the Add or Remove Programs feature in the Windows Control Panel.

There is no separate uninstallation process for the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot. However, uninstalling the BrightStor ARCserve Backup Client for VSS Software Snap-Shot removes the transportable VSS functionality. Because the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot is one of the options included in the BrightStor ARCserve Backup Enterprise Module, uninstalling the Enterprise Module also removes the transportable VSS functionality as well as all the other features provided by the other options.

To uninstall the BrightStor ARCserve Backup Client for VSS Software Snap-Shot, follow these steps:

1. Open the Windows Control Panel.

2. Double-click the Add or Remove Programs icon.

3. To uninstall the agent, select **CA BrightStor ARCserve Backup Client for VSS Software Snap-Shot**.

4. Click the Remove button. The Add or Remove Programs dialog opens asking whether you want to remove the selected product.

5. Click Yes.

Performing Backups

This chapter includes information about the procedures and options BrightStor ARCserve Backup offers to let you safely and efficiently backup your data using VSS. The instructions in this chapter explain how to create non-transportable and transportable VSS backups of file systems, Writers, and Components.

You can perform VSS backups from BrightStor ARCserve Backup by using either the Backup Wizard or the Backup Manager. The VSS backup procedures in this chapter use the Backup Manager interface of BrightStor ARCserve Backup. For complete information about the Backup Manager and all of its features, see the *BrightStor ARCserve Backup Administrator Guide*.

The Backup Wizard

The Backup Wizard enables you to select the computer and files you want to back up and quickly and easily takes you through the remaining steps to allow you to back up data in your network. Using this wizard, you can submit a backup job to the BrightStor ARCserve Backup job queue without using the Backup Manager. Use the Backup Manager to perform more customized backups using filters, options, and scheduling.

The wizard enables you to select what files to back up, choose a backup destination, select the backup method and other options, and specify a schedule.

Note: You cannot use the Backup Wizard to create transportable VSS backups.

For more information about how to submit VSS backup jobs using the Backup Wizard, see the *BrightStor ARCserve Backup Getting Started.*

The VSS Backup Process

The following diagram shows the series of steps involved in using BrightStor ARCserve Backup to perform a VSS backup. To read this diagram, start at the top with the icon of the BrightStor ARCserve Backup server (the Requestor). Then, follow the steps clockwise, remembering that VSS often performs two actions in a row.
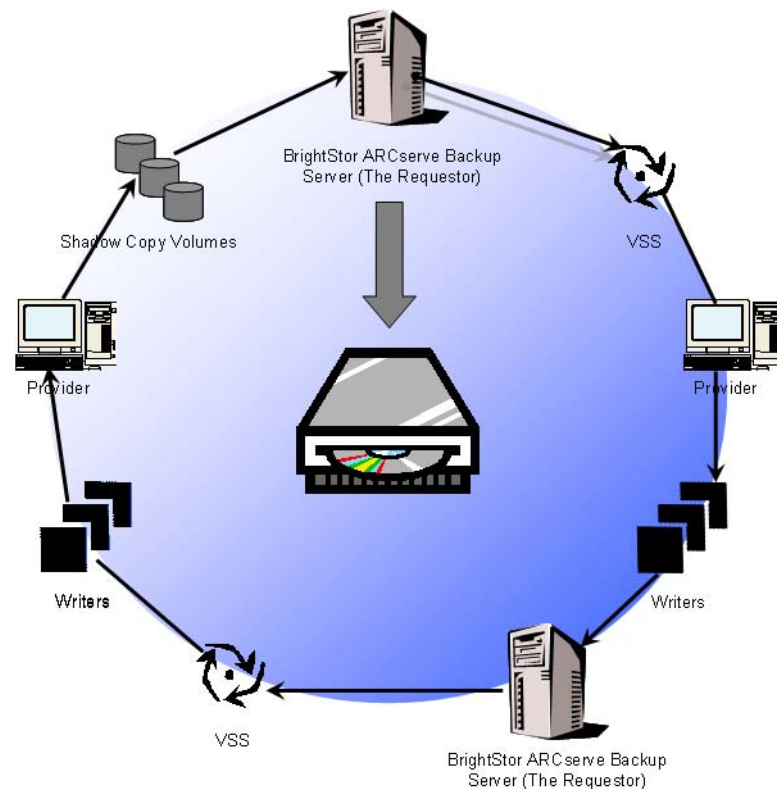
The following list explains each step in the diagram.

1. The Requestor (BrightStor ARCserve Backup) asks VSS to tell the Writers involved in the backup to gather their writer metadata documents (XML files that contain instructions for the backup) and send them to the Requestor.

   BrightStor ARCserve Backup (the Requestor) communicates directly with VSS in a local configuration. In remote configurations, the actual communication between VSS and BrightStor ARCserve Backup is handled by the BrightStor ARCserve Backup Client Agent for Windows, which must be installed on the target computer.

2. VSS contacts the Provider responsible for managing the volumes involved in creating the shadow copy. In the simplest case, one Provider is responsible for all of the volumes involved in creating the shadow copy, but in some situations, multiple Providers may be involved.

3. VSS contacts the Writers that are part of the backup and asks them to gather their writer metadata documents and send them to the Requestor. The Writers also begin preparing for the freeze by ensuring that the files to be backed up are in a consistent state.

4. The Writers send their writer metadata documents to the Requestor. You do not edit these files directly. Instead, you use the Backup Manager in BrightStor ARCserve Backup to indicate the files that you want backed up, and the backup and restore methods to use.

5. After collecting all the writer metadata documents from the Writers, the Requestor issues another command to VSS, asking that it begin the creation of the shadow copy.

6. VSS freezes the Writer's applications, ensuring that the data to be used for the creation of the shadow copy remains consistent and has internal integrity. While an application is frozen, the Writers suspend any changes that are made to the files on the original volume, allowing the application and its files to remain available while the shadow copy is created. However, because a VSS backup is a point-in-time backup, any changes made to files after the freeze are not reflected in the shadow copy and will not be backed up.

7. VSS issues a command to the Provider, telling it to create a shadow copy of the current disk state.

8. The Provider creates the shadow copy on the shadow copy volume.

9. VSS thaws the frozen Writers, returning them to their normal state. Any changes that were queued by the Writer while the shadow copy was being created are written to the original volume at this time. The thaw occurs after the shadow copy has been created and before the data is backed up. This allows the applications to start using the original volumes while the backup is made using the shadow copy volume.

10. The backup data is sent to the Requestor (BrightStor ARCserve Backup). This is handled by the BrightStor ARCserve Backup Client Agent for Windows.

11. The Requestor backs up the data to media. The Writer metadata is stored with the shadow copy data so that recovery information is available when the data is restored.

VSS and the Backup Manager

When used to manage VSS backups, the Backup Manager lets you browse Writers and Components on the local computer or remote computers. The Writers appear at the same level as volumes, system state, and other agents. Expanding a Writer reveals its associated Components.

Any Writer displayed in the Backup Manager can be selected for backup, but Components can only be selected if they can be backed up separately. The Writer is always part of the backup when any of its Components are selected.

Backup Options

Writer and global options are available from the Backup Manager. With VSS support, local Writer options enable to you customize backup settings for specific Writers for drives, directories, and files that you want to back up. Global VSS options affect all Writers and their drives, directories, and files.

Setting Writer Options

Options set at the Writer level affect only the selected Writer and override any global options set for VSS backups. For information about setting global VSS options, see Setting Global Options.
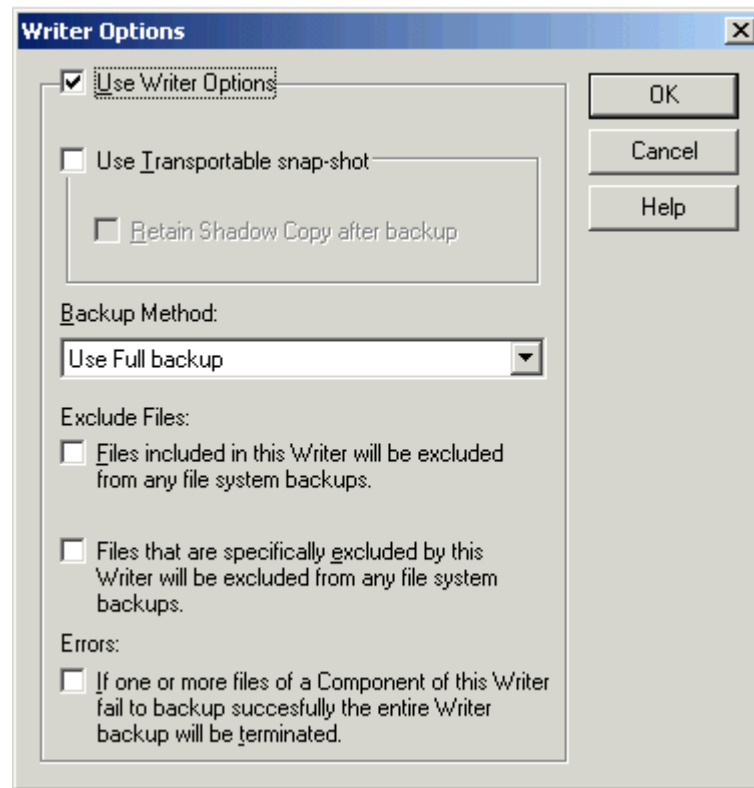
To set options for a specific Writer, follow these steps:

1. Open the Backup Manager.

2. On the Source tab, right-click the Writer in the Source tree, and then select Writer Options from the pop-up menu. For example, here is the IIS Metabase Writer being selected:

The Writer Options dialog for VSS opens and looks like this:

Writer Options Dialog The following options are available on the Writer Options dialog:

- **Use Writer Options**—Selecting this check box specifies that the VSS backup process uses the options provided by the selected Writer, and enables the other options available on this dialog.

  If this check box is not selected, the options set in the Volume Shadow Copy Service tab of the Global Options dialog are used. For an explanation of the global options, see Setting Global Options.

- **Use Transportable snap-shot**—Creates a transportable VSS backup. When this check box is selected, the only available Backup Method is Full Backup.

  This check box is available only when the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot is installed as part of the BrightStor ARCserve Backup Enterprise Module.

- **Retain Shadow Copy after backup**—Available when Use Transportable snap-shot is selected. When you select the Retain Shadow Copy after backup option, BrightStor ARCserve Backup does not delete the shadow copy volume after the backup. Because the shadow copy volume is transportable, retaining it after the backup enables the volume to be imported onto another system for other uses.

- **Backup Method**—Indicates the backup method to use for the backup of the selected Writer. Select one of the following methods:

  - **Use Method Selected for Job**—The backup job uses the backup method indicated in the Schedule tab of the Backup Manager.

  - **Use Full Backup**—Backs up all the files associated with the selected Writer, regardless of when the data last changed. When the Use Transportable snap-shot check box is selected, Use Full Backup is the only option available.

  - **Use Log Backup**—Backs up only the log files associated with the selected Writer.

  - **Use Copy Backup**—Backs up all the files included by the Writer, but BrightStor ARCserve Backup does not mark the files as having been backed up. Use a copy backup if you want to make a full backup of your data but do not want to disrupt any existing incremental or differential backups.

    Note: Not all Writers support all types of backups. Depending on the Backup Method selected, the BrightStor ARCserve Backup behavior is different. For example, if Incremental or Differential is selected at the job level and the Global Options dialog for VSS has the Use Method Selected for Job option set at the Writer level, then a full backup is performed. However, if the Global Options dialog for VSS has the Use Log Backup option set at the Writer level and the Writer does not support Log backup, then the backup fails.

- **Files Included in this Writer Will be Excluded from Any File System Backups**—Prevents files that belong to a Writer component from being backed up by a traditional file system backup. This option offers the following advantages:

  - Avoids backing up files that have already been backed up by VSS.

  - By excluding files from traditional backups, fewer files are processed and traditional backups take less time to complete.

  - Helps achieve successful backups by eliminating certain problems associated with files that must be processed as a group; for example, files associated with a database application. In a traditional backup, there is no mechanism to ensure that the files are processed together.

  This option is not available if the Use Transportable snap-shot option is selected.

- **Files that are Specifically Excluded by this Writer Will be Excluded from Any File System Backups**—There may be files associated with an application that should never be backed up (the Windows page file, for example). Each Writer is aware of whether its associated application maintains any such files. Selecting this option enables BrightStor ARCserve Backup to use this information when performing traditional backups.

  This option is not available if the Use Transportable snap-shot option is selected.

- **If One or More Files of a Component of this Writer Fail to Backup Successfully, the Entire Writer Backup Will be Terminated**—Cancels the backup of the selected Writer if the backup of any of its Components fails. The backup of a Component will fail if one or more of the files that are part of the Component cannot be backed up successfully.

  Selecting this option ensures that all of the files associated with a Writer get backed up before the backup is considered successful, regardless of how many Components are associated with the Writer.

 This option is not available if the Use Transportable snap-shot option is selected.

Setting Global Options

Options set at the global level affect all Writers for VSS backups. You can override global options for a selected Writer by setting the Writer level options. For information on setting options for selected Writers, see Setting Writer Options.

Global options do not apply to transportable VSS backups.

To set global options for non-transportable VSS backups, follow these steps:

1. Open the Backup Manager.

2. Click Options to open the Global Options dialog. Then click the Volume Shadow Copy Service tab. A sample tab is shown next.
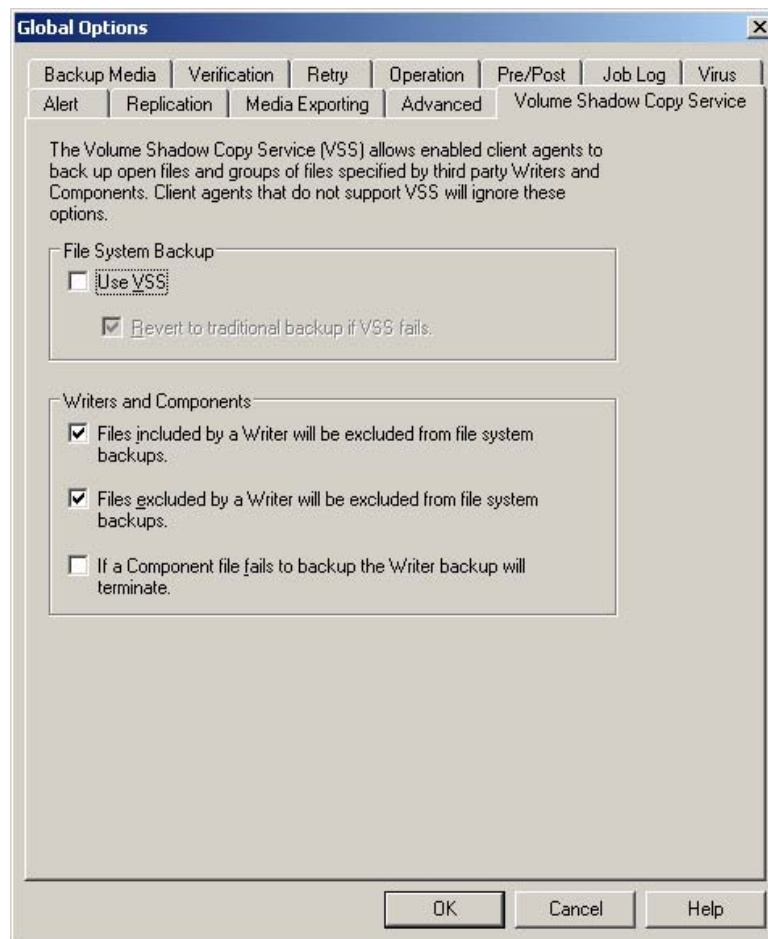
File System Backup Group Box

The File System Backup group box lets you specify how you want BrightStor ARCserve Backup to handle open files during file system backups. These option do not affect Writers and Components.

- **Use VSS**—Directs BrightStor ARCserve Backup to use VSS to handle the backup of open files.

  If this check box is not selected, VSS support is not used and the BrightStor ARCserve Backup Agent for Open Files (if available) is used to handle open files. If the BrightStor ARCserve Backup Agent for Open Files is not available and Use VSS is not selected, a traditional backup is performed. However, the backup will be incomplete if there are any open files that cannot be backed up.

- **Revert to traditional backup if VSS fails**—Directs BrightStor ARCserve Backup to execute a traditional backup if an attempt to create a VSS backup fails. If the BrightStor ARCserve Backup Agent for Open Files is available, it is used to handle open files if this option is selected and the VSS backup fails.

  If this check box is not selected and the VSS backup fails, the backup job fails.

Writers and Components Group Box

The Writers and Components group box lets you specify how you want BrightStor ARCserve Backup to treat Writers and Components. These global options affect all Writers, except for those with Writer-specific options in place. For information about setting Writer-specific options, see Setting Writer Options.

- **Files included by a Writer will be excluded from file system backups**—Prevents files that belong to a Component from being backed up by a traditional file system backup. This option offers the following advantages:
  - Avoids backing up files that have already been backed up by VSS.
  - By excluding files from traditional backups, fewer files are processed and traditional backups take less time to complete.
  - Helps achieve successful backups by eliminating certain problems associated with files that must be processed as a group; for example, files associated with a Writer or database application. In a traditional backup, there is no mechanism to ensure that the files are processed together.

- **Files excluded by a Writer will be excluded from file system backups**—Prevents files that have been excluded from being backed up by a Component from being backed up by a traditional file system backup.

  There may be files associated with an application that should never be backed up (for example, the Windows page file). Each Writer is aware of whether its associated application maintains any such files. Selecting this option allows BrightStor ARCserve Backup to use this information when performing traditional backups.

- **If a Component file fails to backup the Writer backup will terminate** — Cancels the backup of a Writer if the backup of any of the Components fails. The backup of a Component fails if one or more of its files cannot be successfully backed up.

  Selecting this option ensures that the backup is consistent and that all of the files associated with a Writer are backed up before the backup is considered successful, regardless of how many Components are associated with the Writer.

Performing Writer Backups

VSS is able to safely back up open files by using application-specific Writers and their Components. A Writer is a process of an application or a service that works with VSS to freeze the application or service in preparation for a VSS backup. A Component is a group of files, selected for backup, that are controlled by the application or service that is under the control of the Writer. An application-specific Writer understands how the application works, and what files and structures the application needs.

While an application is frozen, the Writer suspends writing activities on the original volume, so that the files selected for backup (the Components) remain in a consistent state during the creation of the shadow copy. Although write activities are suspended during this time, the process is completely transparent to a user working on the selected application.

Note: For additional information about certain Writers and VSS backups and restores, see Appendix A, "Application-Specific Guidelines."

To perform a non-transportable VSS backup of a VSS-aware application Writer and its Components, follow these steps:

1. From the Source tab of the Backup Manager, expand the node of the computer where the Writer is located.

   If the computer does not appear in the Source tree, you need to add it. To add the computer, follow these steps:

   a. Right-click the Windows NT/2000/XP/2003 Systems item in the Source tree.

   b. Select Add Machine/Object from the pop-up menu.

   c. Enter the required information in the Add Agent dialog. For help with the Add Agent dialog, click the Help button.

2. Select the Writer that you want to back up by clicking the green marker next to its name. For example, here is the IIS Metabase Writer being selected:
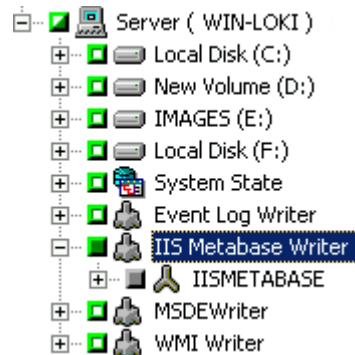
    Optionally, you can expand the Writer node to view its Components. If a Writer has only one component, the marker next to its name will be gray, meaning that it cannot be removed from the backup. If a Writer has multiple components, you may be able to choose which ones that you want to back up. The Writer decides whether the backup of a component is optional. Some Writers may require that all the components be backed up.

3. Specify local options for the selected Writer or use the global options:

    ■ To specify local Writer options, right-click the Writer in the Source tree and select Writer Options from the pop-up menu. The Writer Options dialog appears. Select Use Writer Options, and then choose other options as explained in Setting Writer Options.

    ■ To use the global options, right-click the Writer in the Source tree and select Writer Options from the pop-up menu. The Writer Options dialog appears. Clear the Use Writer Options check box. The backup uses the options as specified on the Volume Shadow Copy Service tab of the Global Options dialog, as explained in Setting Global Options.

4. From the Destination tab of the Backup Manager, choose the options that are appropriate for your backup.

5. From the Schedule tab of the Backup Manager, choose the options that are appropriate for scheduling your backup.

6. When you are ready to begin the backup, click the Start button on the Backup Manager. A Security dialog opens.

7. In the Security dialog, enter the authentication information for the production server, and then click OK. The Submit Job dialog opens.

8. In the Submit Job dialog, you can either select Run Now, or select Run On and enter a specific date and time. Click OK, and the backup job is added to the job queue. Use the Job Status Manager to monitor the progress of the backup job.

Note: You can also use the Backup Wizard to prepare your non-transportable backup.

When Writers are Excluded During Backups

If you select the whole computer during a backup and there is a BrightStor ARCserve Backup application-specific agent installed, the corresponding Writer is excluded from the backup. Excluding the Writer from the backup avoids backing up the Writer data twice. Currently this applies to two Writers: the Microsoft Exchange Writer and the Microsoft SQL Server Desktop Engine Writer (MSDE Writer).

- If the BrightStor ARCserve Backup Agent for Microsoft Exchange is installed, the Microsoft Exchange Writer is excluded.

- If the BrightStor ARCserve Backup Agent for Microsoft SQL Server is installed, the MSDE Writer is excluded.

The Writers are only excluded from a whole machine backup. You can still select individual Writers for backup if required.

Performing File System Backups

You can use VSS without Writers to back up open files on the file system; for example, this option is useful when backing up file servers where all the files are independent. However, this method of backing up files is not as reliable as a Writer backup.

Important! When you use VSS to back up the file system, the Writers are not involved in the process. Unless the data on the selected volumes is relatively static, using VSS to back up the file system could result in a corrupt backup.

To perform a non-transportable VSS backup of the file system, follow these steps:

1. From the Backup Manager, click the Options button to open the Global Options dialog.

2. Select the Volume Shadow Copy Service tab.

3. On the Volume Shadow Copy Service tab, select the Use VSS option, and then click OK.

    For more information about the options available on this tab, see Setting Global Options.

4. From the Source tree of the Backup Manager, select the volumes that you want to back up.

5. From the Destination tab of the Backup Manager, choose the options that are appropriate for your backup.

6. From the Schedule tab of the Backup Manager, choose the options that are appropriate for scheduling your backup.

7. When you are ready to begin the backup, click the Start button on the Backup Manager. A Security dialog opens.

8. In the Security dialog, enter the authentication information for the production server, and then click OK. The Submit Job dialog opens.

9. In the Submit Job dialog, you can either select Run Now, or select Run On and specify a specific date and time. Click OK, and the backup job is added to the job queue. Use the Job Status Manager to monitor the progress of the backup job.

Note: You can also use the Backup Wizard to prepare your non-transportable backup.

Creating a Transportable VSS Backup

Note: At this time, BrightStor ARCserve Backup only supports transportable backup and restore of the Microsoft Exchange Writer and the MSDE Writer. That process is described in the following section.

For transportable backups, VSS coordinates with the Writer, the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot, BrightStor ARCserve Backup, and the disk array Provider to create a shadow copy of the LUN. When a request is initiated from BrightStor ARCserve Backup (the Requestor) to back up the Writer, the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot communicates with VSS to contact the Writer. VSS freezes all processing in the Writer's application and contacts the disk-array Provider to create the shadow copy on its volumes. After the shadow copy is created, VSS thaws the application, thus allowing database writes to resume.

You must use the Backup Manager to submit transportable VSS backup jobs. The Backup Wizard does not support transportable VSS backups.

Follow these steps to create a transportable VSS backup that can then be migrated to another device or location. This procedure uses the Microsoft Exchange Writer as an example.

1. From the Source tab of the Backup Manager, expand the node of the computer where the Microsoft Exchange Writer is located.

   If the computer does not appear in the Source tree, you need to add it. To add the computer, follow these steps:

   a. Right-click the Windows NT/2000/XP/2003 Systems item in the Source tree.

   b. Select Add Machine/Object from the pop-up menu.

    c.   Enter the required information in the Add Agent dialog. For help with the Add Agent dialog, click the Help button.

2.   You can back up the entire Writer or select individual storage groups:

- To back up the Writer, click the green marker next to its name.

- To back up individual storage groups, expand the Writer node to view its storage groups and components. Click the green marker next to the name of each storage group that you want to include in the backup.

This example shows an individual storage group that is selected.
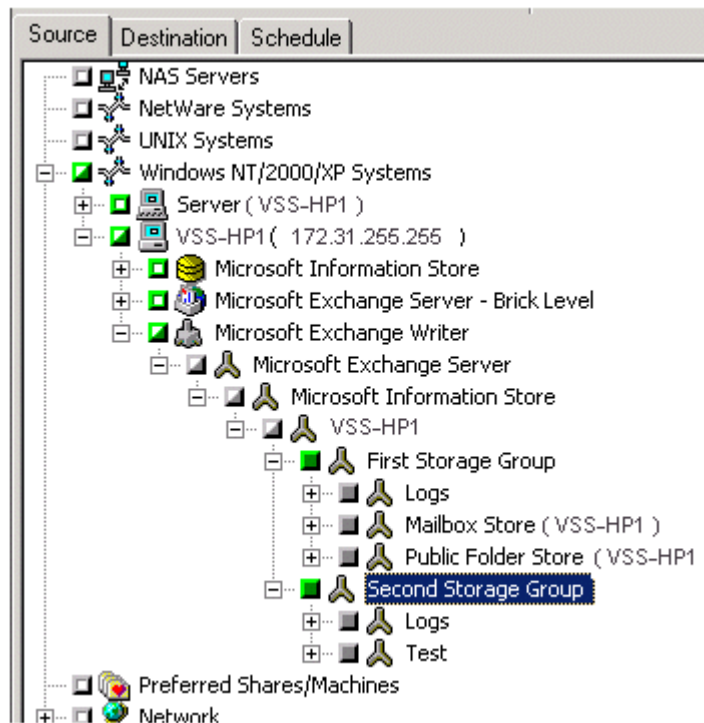
3.   Specify the Writer options:

    a.   Right-click the Microsoft Exchange Writer in the Source tree and select Writer Options from the pop-up menu. The Writer Options dialog opens.

    b.   Select Use Writer Options, and then select Use Transportable snap-shot.

    c.   By default, the shadow copy is deleted after the backup completes. To retain the shadow copy after the backup, select the Retain Shadow Copy after Backup option.

        For a complete explanation of these options, see <u>Setting Writer Options</u>.

    d.   Click OK.

4. From the Destination tab of the Backup Manager, select Multi Stream. Then set any other destination options for the backup.

    Note: Multiplexing is not supported for transportable VSS backups.

    For information about multistreaming jobs, see the chapter "Backing Up Your Data" in the *BrightStor ARCserve Backup Administrator Guide*.

5. From the Schedule tab of the Backup Manager, choose the options that are appropriate for scheduling your backup.

6. When you are ready to begin the backup, click the Start button on the Backup Manager. A Security dialog opens.

    Important! Ensure that all storage groups are online before the backup job starts.

7. In the Security dialog, enter the authentication information for the production server, and then click OK. The Submit Job dialog opens.

8. In the Submit Job dialog, you can either select Run Now, or select Run On and specify a specific date and time. Click OK, and the backup job is added to the job queue. Use the Job Status Manager to monitor the progress of the backup job.

How the Backup Job is Submitted

You must submit transportable VSS backup jobs as multistreaming jobs. When you start the backup job, the Backup Manager packages it as a master job. The master job creates child jobs for each storage group selected; one child job represents one storage group. Also the master job saves the exported metadata it received from the production server for child jobs.

Use the Job Status Manager to view the progress of the master and each child job. This example shows one master jobs with its two child jobs:

Chapter

4

Performing Restores

This chapter includes information on the various options BrightStor ARCserve Backup offers to let you safely and efficiently restore your data from VSS backups. The instructions in this chapter provide the general steps of using the Restore Manager. For additional information about how to complete the restore process, consult the documentation supplied by each Writer application.

The Restore Wizard

The Restore Wizard guides you through the process of restoring your data. Using this wizard, you can submit a restore job to the BrightStor ARCserve Backup job queue without using the Restore Manager. Use the Restore Manager to perform more customized restores using filters, options, and scheduling.

The wizard offers two restore methods:

- Restore by Session (the default method)
- Restore by Query

For more information about how to use the Restore Wizard, see the online help or the *BrightStor ARCserve Backup Getting Started*.

VSS and the Restore Manager

BrightStor ARCserve Backup allows you to restore data to most computers attached to your Windows network. When used to manage Writer restores, the Restore Manager lets you browse Writers and Components available on local and remote computers. The Writers appear at the same level as volumes, system state, and other agents. Expanding a Writer reveals its associated Components.

Any Writer displayed in the Restore Manager can be selected for restore, but Components can only be selected if they can be restored separately. The valid restore methods for the Writer are specified in the writer metadata document that was created at the time of the restore.

Each restore job requires a source and destination. The files selected as your source must originate from media that is controlled by BrightStor ARCserve Backup, and the destination must be a hard drive.

The Restore Manager dialog provides three tabs to customize your restore job:

- Source

- Destination

- Schedule

For procedural information on how to submit a basic restore job, see the online help.

Restoring File Systems

A non-Writer file backed up using VSS is no different than a file backed up by a traditional backup. This means that files in a VSS backup can be restored using any of the methods available for any file. For information about the different methods, see Restore Methods.

Restoring Writers

The process for restoring common Writer VSS backups, transportable or non-transportable, is essentially the same. However, you should have a working knowledge of the application whose files and components are to be restored. While in many cases the VSS Writer specifies the backup and restore methods for its application files and components, there may be some additional manual steps and procedures required for the restore process. For example, Microsoft Exchange Server 2003 requires that its stores be dismounted before the restore begins. If a specific store has been selected at the Component level, you may need to run the Exchange eseutil program to complete the restore. For more guidelines for specific applications and VSS, see Appendix A, "Application-Specific Guidelines."

See the documentation for the application associated with the VSS Writer or contact the application's vendor for additional information about restoring from the Writer.

Writers that allow custom restores may need extra processing to complete the restore process. These steps are application specific and not part of BrightStor ARCserve Backup functionality. To restore these Writers the data should be restored to an alternate location, and the necessary files and extra processing should be carried out according to the application's specification. Restoring Writers that declare themselves to be custom restores are not supported to the original location at present within BrightStor ARCserve Backup. For more information about alternate locations, see Determining a Restore Location.

Determining a Restore Location

There may be times when you need to restore a Writer to an alternate location (for example when the Writer is not available on the original location or if the Components and files to be restored already exist in the original location).

The restore location you choose determines whether the Writer is involved in the restore process:

■   When restoring to the original location, the Writer is always involved.

■   When restoring to an alternate location, the Writer is never involved.

When you use the Restore by Tree, Restore by Session, or Restore by Backup Media methods to restore a Writer, and you restore the files to their original location, the Writer is always involved in the restore. If you restore the files to an alternate location, the Writer is not involved.

When you use the Restore by Query method to restore a Writer's files, the Writer is not involved in the restore. Additionally, the files are restored as if they had been backed up as part of the file system, and BrightStor ARCserve Backup uses the restore options set in the Destination tab of the Global Options dialog when restoring the files.

Because the Writer can also determine how to restore its files, keeping the Writer out of the restore process enables you to:

■   Access an individual file from a Writer backup

■   Restore the files associated with a Writer to a computer on which the Writer is not available

Restore Methods

You can use the Restore Manager to restore files backed up using a VSS Writer using any of the following methods:

- **Restore by Tree**—Writer backups are visible in the tree of the Restore Manager at the same level as volume and system state backups. Click the marker next to the Writer's name to restore all of its Components. To restore an individual Component, expand the Writer in the tree and click the marker next to the Component's name.

  Note: Not all Components can be restored individually. The Writer decides whether a Component can be restored individually

  Use this method when you do not know which media contains the data you need, but you know which computer it came from.

- **Restore by Session**—Writer backups are listed as separate sessions. Click the marker next to the session's name to restore all of the Components included in the session. To restore an individual Component, expand the session and click the marker next to the Component's name.

  Note: Not all Components can be restored individually. The Writer decides whether a Component can be restored individually.

  Use this method when you know the media name, but are not certain about the session that you want to restore.

- **Restore by Backup Media**—Writer backups are listed as separate sessions. You must restore the entire session. Components cannot be restored individually using this method even though they may be selectable.

  Use this method when media was created by a different version of BrightStor ARCserve Backup or if the database does not recognize it.

- **Restore by Query**—Files that were backed up as part of a Writer can be restored individually using this method.

  Use this method when you know the name of the file or directory that you want to restore, but do not know the machine it was backed up from or the media it was backed up to.

  Important! While this option does allow a single file to be restored, the Writer is not notified of the restore and cannot properly prepare the application. By restoring a single file, you could create inconsistencies in your data. You should only use the Restore by Query method if you have in-depth knowledge about the files you are restoring.

- **Restore Wizard**—You can use the Restore Wizard to restore Writer backups by session or by query. For more information about how to use the Restore Wizard, see the online help or the *BrightStor ARCserve Backup Getting Started*.

Restoring VSS Writer Backups

Before beginning a restore, you should consult the documentation for the specific application whose files and components you are restoring. This is because BrightStor ARCserve Backup only restores the files to disk, and there may be some additional steps or procedures necessary to completely recover the application.

The instructions for restoring common Writer VSS backups (non-transportable) and restoring transportable VSS backups using BrightStor ARCserve Backup is essentially the same. For more guidelines for specific applications and VSS, see Appendix A, "Application-Specific Guidelines."

To restore a VSS Writer, use the following general steps:

1. From the Source tab of the Restore Manager, choose the restoration type. For a description of each type, see Restore Methods. The example shows the Restore by Tree option selected.
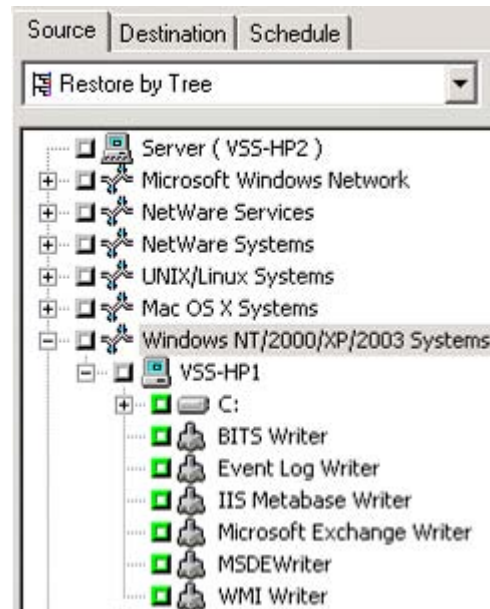
2. Select the Writer you want to restore by clicking on the green marker next to its name. To restore individual components, expand the Writer node and click to select the Components you want to restore.

3. From the Destination tab of the Restore Manager, choose the restore location. There are two methods for selecting the destination you want to restore the data to:

   ■ Restore files to their original location

   ■ Restore to user-shared directories and drives (alternate location)

The default method is to restore files to their original location. If you deselect this check box, you are presented with a list of computers, directories, and files. You can select your specific destination from this list. For more information about restore locations, see [Determining a Restore Location](#).

4. From the Schedule tab of the Restore Manager, choose the options that are appropriate for your restore.

5. When you are ready to begin the restore, click the Start button on the Restore Manager. A Security dialog opens.

6. Enter the authentication information for the production server, and then click OK. The Submit Job dialog opens.

7. You can either select Run Now, or select Run On and enter a specific date and time. Click OK, and the restore job is added to the job queue. Use the Job Status Manager to monitor the progress of the restore job.

Best Practices

Open files can cause significant problems when backing up data. BrightStor ARCserve Backup provides the following solutions for backing up files that are in use by other applications or users:

- BrightStor ARCserve Backup Client for VSS Software Snap-Shot

- BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot

- BrightStor ARCserve Backup Agent for Open Files

This chapter describes when it is most appropriate to use each solution.

Choosing the Best Solution for Backing Up Open Files

Consider the following points when determining your backup strategy:

- Amount of data to back up

- Files that are not supported by a Writer

Consider Amount of Data to Back Up

Both the BrightStor ARCserve Backup Client for VSS Software Snap-Shot and the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot operate on a per-volume basis (VSS must prepare the entire volume for the backup before the backup can begin). The BrightStor ARCserve Backup Agent for Open Files operates on a per-file basis (each open file is processed as it is encountered). For example, consider a backup consisting of 10 GB of critical database files that reside on a full 120 GB hard disk:

- Using the VSS solutions, a shadow copy of the entire 120 GB volume must be taken, and each Writer with data on that volume must prepare its files (both open and closed) before the backup can begin. While the initial shadow copy may take some time, subsequent shadow copies are almost instantaneous.

- Using the BrightStor ARCserve Backup Agent for Open Files, if the files to be backed up are closed when the request for the backup is made, the backup can begin immediately. If there are any open files, the agent synchronizes them and allows BrightStor ARCserve Backup to back them up.

For these reasons, when you are backing up a small amount of data (relative to the size of the volume on which it resides), using the BrightStor ARCserve Backup Agent for Open Files to handle open files results in a much faster backup. When the amount of data to backup is large, you should use either the BrightStor ARCserve Backup Client for VSS Software Snap-Shot or the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot.

Files that are Not Supported by a Writer

When backing up open files, VSS relies on VSS-aware applications and their Writers to prepare their associated files for backup (for example, the Microsoft Exchange Writer is responsible for preparing Microsoft Exchange files and the MSDE Writer is responsible for preparing Microsoft SQL files). If there is no Writer available for a certain application, any open files of that type cannot be reliably backed up.

Use the BrightStor ARCserve Backup Client for VSS Software Snap-Shot or the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot when the files you are backing up are associated with a Writer. Because of the way in which Writers communicate with their applications and the application's files, VSS is able to obtain an in-depth knowledge of the transactional behavior of a Writer's files. In a situation where file activity is very high, the BrightStor ARCserve Backup Agent for Open Files may take much longer than VSS to find a transactionally safe period in which to back up the open files.

Use the BrightStor ARCserve Backup Agent for Open Files to guarantee that all open files that are not associated with a Writer are reliably backed up. If open files that are not associated with a Writer are backed up using VSS, there is no guarantee of transactional integrity, and you run the risk of invalidating the entire backup.

The BrightStor ARCserve Backup Agent for Open Files operates independently of other applications. An application does not need to know about the agent to back up open files, and an application can write to its files during a backup without having to communicate with the agent at all. Everything is handled by the agent.

Application-Specific Guidelines

The information in this appendix presents some guidelines and other information that you should keep in mind when backing up and restoring files and components controlled by applications that support a VSS Writer.

Microsoft Exchange Writer

This section details some considerations to be aware of when using VSS to back up and restore Microsoft Exchange Server 2003. For complete restore and recovery information, see the Microsoft Exchange Server 2003 documentation or contact Microsoft directly.

General Guidelines

- Microsoft Exchange databases that were backed up using VSS must be restored using VSS and the Microsoft Exchange Writer.

- Ensure that all storage groups are online before a backup job starts.

- Ensure that all storage groups are offline before a restore job starts. This is true even if you are restoring a single database in the storage group. After the data has been restored, the storage groups can be brought back online.

- BrightStor ARCserve Backup works with VSS to restore only the backed up data. To completely recover the databases to a consistent state you will need to perform some Exchange-specific procedures to recover the logs.

Non-Transportable VSS Backup and Restore

- A non-transportable Microsoft Exchange Writer session can be restored in the same way as any other Writer session. See Restore Methods for a description of the types of restore available in the Restore Manager.

- For a non-transportable Microsoft Exchange Writer backup, the whole Writer can be selected for restore if the whole Writer was selected during the backup. This is because all of the data is in a single session.

- Using the BrightStor ARCserve Backup Client for VSS Software Snap-Shot, when you select the Microsoft Exchange Writer for backup, all of the data is written to a single session on the backup media. To restore the whole Microsoft Exchange Writer, you select only that one session to restore all the data. If there is more than one storage group, all data for the storage groups is in one session.

Transportable VSS Backup and Restore

- Transportable VSS backups of the Microsoft Exchange Writer can only be restored by tree or by session. See Restore Methods for a description of the types of restore available in the Restore Manager.

- To restore the entire Microsoft Exchange Writer, you must individually restore each storage group session.This is because transportable VSS backups are run as multistreaming jobs, and in the case of the Microsoft Exchange Writer each storage group has been backed up to a different session. Each session is one storage group.

Sample Restore   Follow these steps to restore a transportable VSS backup of the Microsoft Exchange Writer:

1. On the Source tab of the Restore Manager, choose the restoration type:

   - **Restore by Tree** — Microsoft Exchange backups are visible in the tree at the same level as volume and system state backups. Click the marker next to the storage group's name to restore all of its Components.

Notice that only one storage group is appears in the tree; this is the storage that finished last in the multistreaming backup job. The following example shows the First Storage Group.
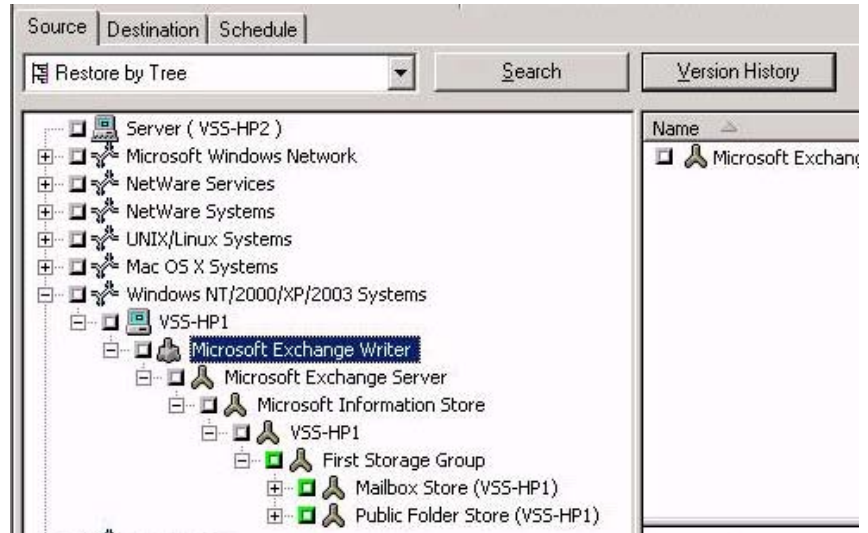
To see the other storage groups, click the Version History button. From the Version History window, click a version that represents the stream of the storage group that you want to restore, and then click Select.

The Restore Manager display is updated to show the new storage group, as shown in the following example:
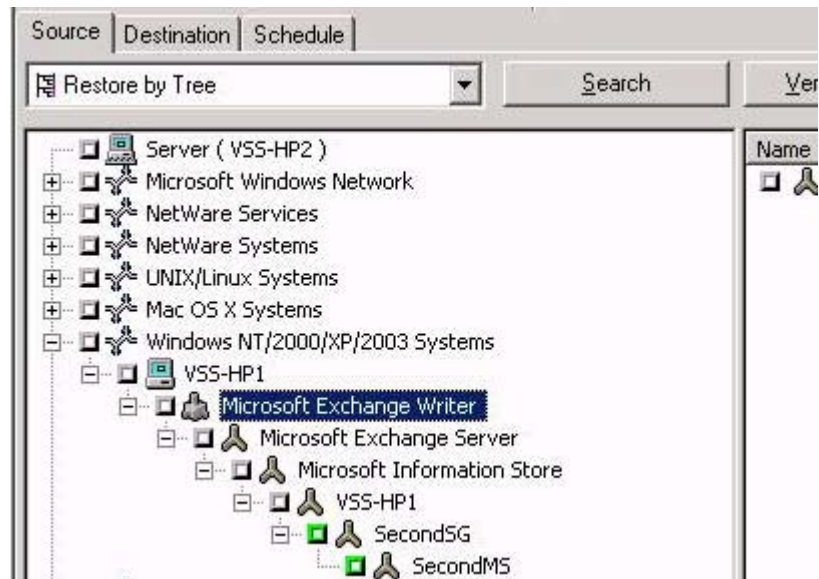
■ **Restore by Session**—Microsoft Exchange backups are listed as separate sessions. Click the marker next to the session's name to restore all of the Components included in the session. To restore an individual Component, expand the session and click the marker next to the Component's name. Not all Components can be restored individually. This example shows the individual sessions:

2. On the Destination tab of the Restore Manager, choose where to restore.There are two methods for selecting the destination that you want to restore the data to:

   ■ Restore files to their original location

   ■ Restore to user-shared directories and drives (alternate location)

   The default method is to restore files to their original location. If you clear this check box, you are presented with a list of computers, directories, and files. You can select your specific destination from this list. For more information about restore locations, see <u>Determining a Restore Location</u>.

3. On the Schedule tab of the Restore Manager, choose the options that are appropriate for your scheduling the restore.

4. When you are ready to begin the restore, click the Start button on the Restore Manager. A Security dialog opens.

   Important! Ensure that all storage groups are offline before the restore job starts.

5. In the Security dialog, enter the authentication information for the production server, and then click OK. The Submit Job dialog appears.

6. In the Submit Job dialog, you can either select Run Now, or select Run On and specify a specific date and time. Click OK, and the restore job is added to the job queue. Use the Job Status Manager to monitor the progress of the restore job.

MSDE Writer

This section details some considerations to be aware of when using VSS to back up and restore Microsoft SQL 2000. For complete restore and recovery information, see the Microsoft SQL 2000 documentation or contact Microsoft directly.

General Guidelines

- Microsoft SQL databases that were backed up using VSS must be restored using VSS and the MSDE Writer.

- Ensure that all databases are offline or detached before a restore job starts.

Non-Transportable VSS Backup and Restore

- A non-transportable MSDE Writer session can be restored in the same way as any other Writer session. See Restore Methods for a description of the types of restore available in the Restore Manager.

- For a non-transportable MSDE Writer backup, the whole Writer can be selected for restore if the whole Writer was selected during the backup. This is because all of the data is in a single session.

- Using the BrightStor ARCserve Backup Client for VSS Software Snap-Shot, when you select the MSDE Writer for backup, all of the data is written to a single session on the backup media. To restore the whole MSDE Writer, you select only that one session to restore all the data. If there is more than one database, all data for the databases is in one session.

Transportable VSS Backup and Restore

- Transportable VSS backups of the MSDE Writer can only be restored by tree or by session. See Restore Methods for a description of the types of restore available in the Restore Manager.

- To restore the entire MSDE Writer, you must individually restore each database session.This is because transportable VSS backups are run as multistreaming jobs, and in the case of the MSDE Writer each database has been backed up to a different session. Each session is one database.

Sample Restore

Follow these steps to restore a transportable VSS backup of the MSDE Writer:

1. On the Source tab of the Restore Manager, choose the restoration type:

   ■ **Restore by Tree**—Microsoft SQL backups are visible in the tree at the same level as volume and system state backups. Click the marker next to the database.

   Notice that only one database is appears in the tree; this is the database that finished last in the multistreaming backup job. The following example shows the First Database.
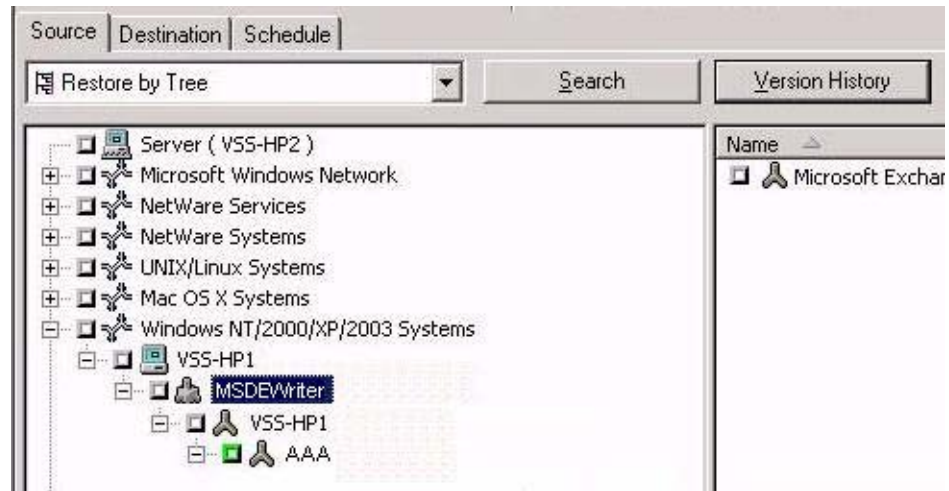
   To see the other databases, click the Version History button. From the Version History window, click a version that represents the stream of the database that you want to restore, and then click Select.

The Restore Manager display is updated to show the new database, as shown in the following example:

- **Restore by Session**—Microsoft SQL backups are listed as separate sessions. Click the marker next to the session's name to restore all of the Components included in the session. To restore an individual Component, expand the session and click the marker next to the Component's name. Not all Components can be restored individually.

2. On the Destination tab of the Restore Manager, choose where to restore. There are two methods for selecting the destination that you want to restore the data to:

   - Restore files to their original location

   - Restore to user-shared directories and drives (alternate location)

   The default method is to restore files to their original location. If you clear this check box, you are presented with a list of computers, directories, and files. You can select your specific destination from this list. For more information about restore locations, see Determining a Restore Location.

3. On the Schedule tab of the Restore Manager, choose the options that are appropriate for your scheduling the restore.

4. When you are ready to begin the restore, click the Start button on the Restore Manager. A Security dialog opens.

   Important! Ensure that all databases are offline or detached before the restore job starts.

5. In the Security dialog, enter the authentication information for the production server, and then click OK. The Submit Job dialog appears.

6. In the Submit Job dialog, you can either select Run Now, or select Run On and specify a specific date and time. Click OK, and the restore job is added to the job queue. Use the Job Status Manager to monitor the progress of the restore job.

Troubleshooting

This appendix provides troubleshooting information to help you identify and resolve problems that you may encounter when using the BrightStor ARCserve Backup Client for VSS Software Snap-Shot and BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot. To help you quickly find the information you need, this appendix includes error messages and possible reasons and solution for these messages.

The Activity Log

Many of the suggested actions to resolve error conditions tell you to check the BrightStor ARCserve Backup Activity log. The Activity log contains comprehensive information about the operations performed by BrightStor ARCserve Backup. It provides an audit trail of all BrightStor ARCserve Backup activity for every job that is run. You can scan this log whenever necessary to see if any errors have occurred. The log is available from the Job Status Manager. For more information about using the Activity log, see the *BrightStor ARCserve Backup Administrator Guide*.

Error Messages

This section explains the most common error messages for the BrightStor ARCserve Backup Client for VSS Software Snap-Shot and the BrightStor ARCserve Backup Enterprise Option for VSS Hardware Snap-Shot.

E3240 Transportable Snap-Shot failed.

Reason:

The transportable snap-shot operation failed.

Action:

Check the Activity log and the Windows Event log for additional information.

E3241 Failed to export Transportable Snap-Shot.

Reason:

The export transportable snap-shot operation failed.

Action:

Check the Activity log and the Windows Event log for additional information.

E3242 Failed to import Transportable Snap-Shot.

Reason:

The import transportable snap-shot operation failed.

Action:

Check the Activity log and the Windows Event log for additional information.

E3243 Failed to communicate with client agent.

Reason:

The connection with the client agent was broken.

Action:

Restart the BrightStor Universal Agent service and retry the operation.

12502 The volume shadow service provider has reported a bad state for the operation.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12503 An attempt was made to register an ID for a volume shadow service provider that is already registered.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12504 An attempt was made to use a provider id that does not correspond to a registered volume shadow service provider.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12505 The volume shadow service provider vetoed an operation. The provider logged the error in the event log.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12506 The volume shadow service provider is in use, please try again later.

Reason:

:Another process is using the Volume Shadow Service Provider.

Action:

Retry the operation.

12507 The volume shadow service provider is unable to find an object that has been selected. This could be a volume, writer, component, etc.

Reason:

The selected Volume, Writer or Component is not available to the Volume Shadow Service Provider.

Action:

Check the Activity log and the Windows Event log for additional information.

12508 A volume shadow service provider can not be found to support one of the volumes selected directly or indirectly through a writer.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error. A volume has been selected that cannot be incorporated into a shadow copy.

Action:

Check the Activity log and the Windows Event log for additional information.

12509 The object is a duplicate. An attempt was made to add a component with the same logical path and component name or private metadata has already been written.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12510 The volume shadow service provider being used does not support one of the volumes selected directly or indirectly through a writer.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12511 The volume shadow service provider had an unexpected error. The error code is logged in the error log.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12512 The volume shadow service provider reports that one of the XML documents is invalid or has become corrupted. Please refer to the event log for details.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12513 The volume shadow service provider is unable to load the XML document passed in the bstrXML argument or it is not valid, that is, either it is not a correctly formed XML string or it does not match the schema.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12514 The maximum number of volumes has been added for the shadow copy set. At least one of the specified volumes could not be added to the shadow copy set.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12515 The volume shadow service provider reported a flush writes timeout.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12516 The volume shadow service provider reported a hold writes timeout.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12517 The volume shadow service provider reported an unexpected writer error.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12518 The volume shadow service provider was unable to complete the operation as a shadow copy was in progress. Please try again later.

Reason:

Another process is creating or using a shadow copy.

Action:

Retry the operation when the other process has completed.

12519 The volume shadow service provider was unable to complete the operation as the maximum number of snapshots has been reached.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Delete one or more snapshots and retry the operation.

12520 The volume shadow service infrastructure is not operating properly. Check that the Event Service and VSS have been started, and check for errors associated with those services in the event log.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Verify that the Activity log and the Windows Event log for additional information. Check the Event Service and VSS have been started, and then retry the operation.

12521 A selected volume shadow service writer is not responding.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12522 The writer has already been subscribed with the volume shadow service.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12523 The volume shadow service provider reported an unsupported context.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12524 The volume shadow service provider was unable to complete the operation as the volume is in use.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12525 The volume shadow service provider was unable to complete the operation as the maximum number of difference area associations has been reached.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12526 The volume shadow service provider was unable to complete the operation as it has insufficient storage space. Please check the volume shadow service use limit.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error. The service probably has insufficient space in which to store the shadow copy.

Action:

Increase the available disk space on a local NTFS drive and retry the operation.

12527 The volume shadow service provider reported that no volume shadow copies were imported.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12528 The volume shadow service provider reported that only some volume shadow copies were imported.

Reason:

This is an internal Microsoft Volume Shadow Copy Service error.

Action:

Check the Activity log and the Windows Event log for additional information.

12565 An unexpected error has occurred. Error Code (code).

Reason:

The Volume Shadow Copy Service has generated an unexpected error.

Action:

Check the Activity log and the Windows Event log for additional information. If this does not resolve the situation, contact Computer Associates Technical Support.

12567 The addition of the components failed in the restore.

Reason:

One or more of the components specified to be restored have caused a failure.

Action:

Check the Activity log and the Windows Event log for additional information. log entries may identify the component and the reason for the failure.

12568 Unable to find the user selected options.

Reason:

One or more of the components selected to be restored do not exist on the destination computer.

Action:

Ensure that all of the Writers required for the restore are running on the destination computer. To verify, browse through the Backup Manager to view all the Writers, or run the VSSADMIN LIST command from a command window to list all installed Writers.

Note: For more information about the VSSADMIN command, see the Windows Server 2003 documentation.

12569 Unable to write data to the files list.

Reason:

A write request to the file list has failed.

Action:

Ensure that there is sufficient disk space available, and then retry the operation.

12570 Failed to back up file (filename).

Reason:

The specified file could not be backed up.

Action:

Retry the operation.

12571 Writer (writer) does not exist on the system.

Reason:

The backup job includes the specified Writer but the Writer is not currently running on the source computer.

Action:

Either modify the job to remove the Writer or ensure the Writer is running on the source computer.

12572 The writer's constructed file path exceeds MAX_PATH.

Reason:

The internal representation of the Writer name has exceeded the maximum allowed length.

Action:

You cannot backup this Writer.

12573 An attempt was made to construct a path name with an empty root path.

Reason:

An internal error has occurred.

Action:

If this error persists, contact Computer Associates Technical Support.

12574 The path "%1" has a bad format.

Reason:

An internal error has occurred.

Action:

If this error persists, contact Computer Associates Technical Support.

12575 Unable to restore writer (writer).

Reason:

It has not been possible to restore the specified Writer.

Action:

Check the Activity log and the Windows Event log for additional information.

12576 Unable to restore Writer, File (file).

Reason:

The restore process is not able to restore the specified file.

Action:

It may be necessary to perform application-specific procedures before it is possible to restore the specified file. Contact the supplier of the Writer for assistance.

12577 Component (component) is not selectable.

Reason:

The specified Component cannot be independently selected for restore.

Action:

Select to restore the whole Writer or another Component that includes this one.

12578 Unable to find the component set for component (component).

Reason:

The parent Component cannot be found for the specified Component. The Component selected for restore was not specifically selected at the time of backup and no parental relationship to the selected Component can be found.

Action:

Restore the whole Writer or restore the Component to an alternative location.

12581 This writer has a custom restore. Please contact the writer provider.

Reason:

It is not possible to directly restore a Writer that specifies a custom restore method. User intervention is required to restore this writer.

Action:

Contact the supplier of the Writer for the procedure necessary to restore the data.

12582 This writer (writer) has reported an unknown state.

Reason:

An error has occurred in the Writer.

Action:

Check the Windows Event log for errors related to the Writer. Try restarting the Writer and retry the operation.

12583 This VSS writer has reported a failure on an identification event.

Reason:

The Writer vetoed the shadow copy creation process at the Writer Identification state.

Action:

Check the Windows Event log for errors related to the Writer.

12584 This VSS writer (writer) has reported a failure on a prepare for backup event.

Reason:

The specified Writer vetoed the shadow copy creation process during the Backup Preparation state. This error may be due to inconsistencies in the backup method selected on the Writer Options dialog for a particular Writer and the backup methods that are actually supported by the Writer.

Action:

Check the Windows Event log for errors related to the Writer.

12585 This VSS writer (writer) has reported a failure on a prepare for snapshot event.

Reason:

The specified Writer vetoed the shadow copy creation process during the Prepare For Snapshot state.

Action:

Check the Windows Event log for errors related to the Writer.

12586 This VSS writer (writer) has reported a failure on a freeze event.

Reason:

The specified Writer vetoed the shadow copy creation process during the Freeze state.

Action:

Check the Windows Event log for errors related to the Writer.

12587 This VSS writer (writer) has reported a failure on a thaw event.

Reason:

The specified Writer vetoed the shadow copy creation process during the Thaw state.

Action:

Check the Windows Event log for errors related to the Writer.

12588 This VSS writer (writer) has reported a failure on a post snapshot event.

Reason:

The specified Writer vetoed the shadow copy creation process during the PostSnapshot state.

Action:

Check the Windows Event log for errors related to the Writer.

12589 This VSS writer (writer) has reported a failure on a backup complete event.

Reason:

The shadow copy has been created and the specified Writer failed during the BackupComplete state. A Writer should save information about this failure to the error log.

Action:

Check the Windows Event log for errors related to the Writer.

12590 This VSS writer (writer) has reported a failure on a pre restore event.

Reason:

The specified Writer failed during the PreRestore state.

Action:

Check the Windows Event log for errors related to the Writer.

12591 This VSS writer (writer) has reported a failure on a post restore event.

Reason:

The specified Writer failed during the PostRestore state.

Action:

Check the Windows Event log for errors related to the Writer.

12592 This VSS writer (writer) has reported a failure on a backup shutdown event.

Reason:

The specified Writer failed during the shutdown of the backup application.

Action:

Check the Windows Event log for errors related to the Writer.

12593 The shadow copy contains only a subset of the volumes needed by the writer to correctly back up the application component.

Reason:

The shadow copy does not include all the required volumes for the associated Writer.

Action:

Check the Activity log and Windows Event log for errors related to the Writer.

12594 The writer ran out of memory or other system resources.

Reason:

This is an internal error generated by the Writer.

Action:

Check the Activity log and Windows Event log for errors related to the Writer. Restarting the Writer or rebooting the system may resolve the problem.

12595 The writer operation failed because of a time-out between the Freeze and Thaw events.

Reason:

This is an internal error generated by the Volume Shadow Copy Service and indicates that the Writer was unable to comply in time.

Action:

Check the Activity log and Windows Event log for errors related to the Writer.

12596 The writer failed due to an error that would likely not occur if the entire backup, restore, or shadow copy creation process was restarted.

Reason:

This is an internal error generated by the Writer.

Action:

Check the Activity log and Windows Event log for errors related to the Writer. Retry the operation.

12597 The writer operation failed because of an error that might recur if another shadow copy is created.

Reason:

This is an internal error generated by the Writer.

Action:

Check the Activity log and Windows Event log for errors related to the Writer. Retry the operation.

12598 The writer is not responding.

Reason:

The Writer is not responding to requests.

Action:

Check the Activity log and Windows Event log for errors related to the Writer. Ensure the Writer is running and retry the operation.

12599 An Error has occurred trying to create the browse manager.

Reason:

An internal error is preventing the creation of the browse manager.

Action:

Restart the BrightStor services on the machine being browsed. If the error persists, contact Computer Associates Technical Support.

12601 Unable to find a file which meets the file descriptor (file).

Reason:

The Writer has included the specified file in the list of files to be backed up but the file does not exist.

Action:

The Writer may not be able to be restored correctly without the specified file. This error may indicate that the application data is in a bad state.

12602 Unable to backup writer (writer).

Reason:

An error has occurred that indicates that the specified Writer cannot be backed up.

Action:

Check the Activity log and Windows Event log for errors related to the Writer.

12603 The shadow copy does not exist.

Reason:

An internal error has occurred that prevented the creation of a shadow copy.

Action:

Check the Activity log and the Windows Event log for additional information.

12604 Unable to get the writer from the VSS interface.

Reason:

An internal error has occurred that prevented the Writer from being backed up.

Action:

Check the Activity log and the Windows Event log for additional information.

12605 The selected item is not a writer.

Reason:

An internal error has indicated that the specified item is not a Writer.

Action:

Check the Activity log and the Windows Event log for additional information.

12606 Unable to get the selected writer options.

Reason:

An internal error has prevented the selected Writers from being backed up.

Action:

Check the Activity log and the Windows Event log for additional information.

12607 The selected index is invalid.

Reason:

An internal error has prevented the selected item from being backed up.

Action:

Check the Activity log and the Windows Event log for additional information.

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