BrightStor® ARCServe® Backup for Windows

Agent for Microsoft SQL Server Guide

r11.1

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Introducing the Agent

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

Among the agents BrightStor ARCserve Backup offers is the BrightStor® ARCserve® Backup Agent for Microsoft SQL Server. This agent enables you to perform the following actions:

- Back up your Microsoft SQL Server databases using BrightStor ARCserve Backup without taking your database offline or preventing users from adding new data to it

- Manage backups of Microsoft SQL Server databases remotely

- Schedule backups

- Back up to a wide array of media storage devices

- Restore Microsoft SQL Server databases using BrightStor ARCserve Backup

The agent handles all communications between BrightStor ARCserve Backup and Microsoft SQL Server during backup and restore jobs, including preparing, retrieving, and processing the data packets that are sent back and forth between Microsoft SQL Server and BrightStor ARCserve Backup.

Architectural Overview

BrightStor ARCserve Backup can be installed on the same host as the BrightStor ARCserve Agent for Microsoft SQL Server for local operation or they can be installed on separate systems. A single installation of BrightStor ARCserve Backup can work with agents on many systems, allowing multiple machines to be backed up by a single backup server. BrightStor ARCserve Backup and the agent work together to back up and restore SQL database objects.

The agent provides services that allow BrightStor ARCserve Backup to back up and restore a SQL database associated with the agent. The agent may reside on the same server as Microsoft SQL Server or the agent may reside on each local drive of all nodes in a SQL cluster environment. The agent and Microsoft SQL Server are managed by BrightStor ARCserve Backup.

Architecturally, the agent is positioned between the BrightStor ARCserve Backup and Microsoft SQL Server, as shown in the following illustration:
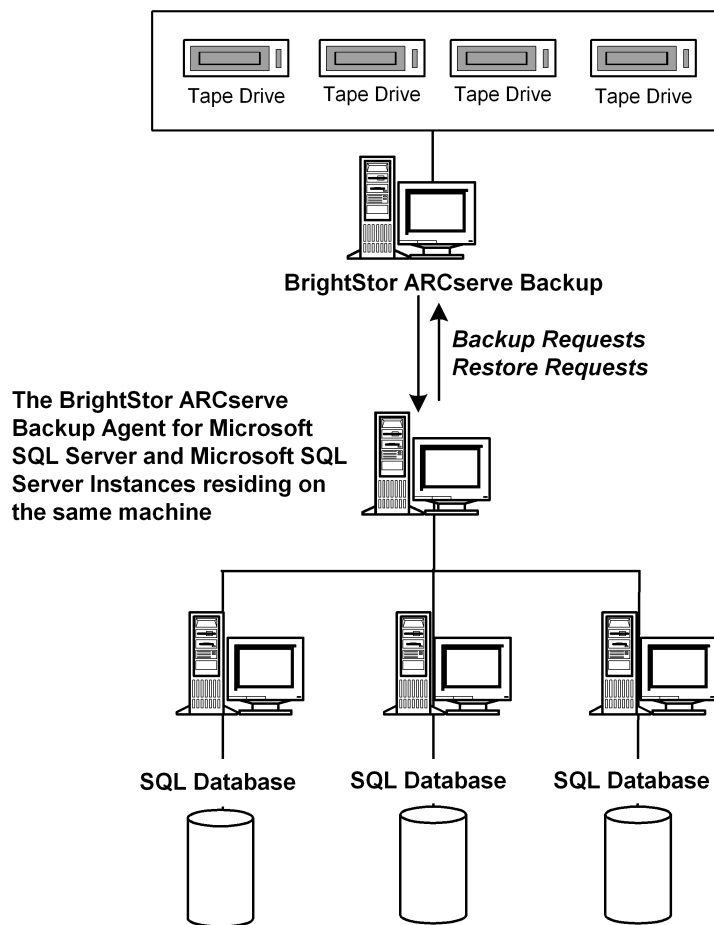
For a Backup Request

In a backup, the following actions occur:

1. A user issues a backup command from BrightStor ARCserve Backup.

2. BrightStor ARCserve Backup sends the request to the agent for a database.

3. The agent retrieves a particular database or log from SQL Server, which sends multiple data chunks to the agent.

4. The agent retrieves the data chunks and transfers then to BrightStor ARCserve Backup, which backs up the data to a storage medium selected by the user.

For a Restore Request

In a restore, the following actions occur:

1. The user issues a restore command from BrightStor ARCserve Backup.

2. BrightStor ARCserve Backup informs the agent of the restore.

3. The agent informs the SQL Server to prepare to receive the data.

4. BrightStor ARCserve Backup accesses a storage medium and begins restoring data.

5. BrightStor ARCserve Backup transfers data to the agent.

6. The agent transfers data to SQL.

How the Agent Works

BrightStor ARCserve Backup and the agent work together to back up or restore SQL Server databases. When BrightStor ARCserve Backup starts to back up a database, it sends a request to the agent. The agent retrieves the database from Microsoft SQL Server and sends it to BrightStor ARCserve Backup, where the complete database is backed up to media. During a restore, the agent functions in a similar fashion and helps transfer the backed up database from BrightStor ARCserve Backup to Microsoft SQL Server.

The agent takes advantage of the Microsoft SQL Server dump database and transaction log backup method (commonly called the *dump*). A dump backs up the database or transaction log in a single step. The agent ensures that a complete database is backed up.

For each database submitted for backup, the agent initiates a dump in Microsoft SQL Server. Microsoft SQL Server sends the database to the agent in multiple data chunks. The agent receives the data, one chunk at a time, and passes it directly to BrightStor ARCserve Backup, where it is recorded to backup media.

The Data Flow During Backup

The following steps describe the data flow when BrightStor ARCserve Backup uses the BrightStor ARCserve Backup Agent for Microsoft SQL Server to back up a Microsoft SQL Server:

1. BrightStor ARCserve Backup sends a request to the agent for a database.

2. The agent instructs Microsoft SQL Server to perform a backup of a particular database or log.

3. Microsoft SQL Server returns the data from the database in multiple chunks to the agent, one chunk at a time.

4. The agent receives the data chunks from Microsoft SQL Server and transfers them to BrightStor ARCserve Backup.

5. BrightStor ARCserve Backup writes the data chunks to media.

6. Steps 2 through 5 are repeated until there is no more data to be backed up.

The agent and the Microsoft SQL Server backup function guarantee the consistency and accuracy of the data being backed up.

The Backup Agent RPC Server Service and Backup Agent Remote Service

The BrightStor ARCserve Backup Agent for Microsoft SQL Server consists of the following services:

- **The Backup Agent RPC (Remote Procedure Call) Server Service** — The Backup Agent RPC Server Service operates as a Windows service. This service starts automatically after the installation of the BrightStor ARCserve Backup Agent for Microsoft SQL server is completed. This service allows the BrightStor ARCserve Backup Agent for Microsoft SQL Server to browse, backup, and restore over named pipes.

- **The Backup Agent Remote Service** — The Backup Agent Remote Service starts automatically after the installation of the BrightStor ARCserve Backup Agent for Microsoft SQL Server is completed. This service backs up Microsoft SQL Server databases remotely using the TCP/IP protocol.

Requirements When Accessing Windows Database Servers

When it submits a job that includes remote Windows database servers, BrightStor ARCserve Backup prompts the user for a default user name and password for the system on which the database resides. BrightStor ARCserve Backup accesses the remote servers using this user name and password.

A remote Microsoft SQL Server user ID and password are also required to access the remote database server. When prompted by the system, enter the Microsoft SQL Server user ID and the password of the system administrator (sa), or enter a user ID and password with equivalent privileges. This user may be a Windows user, depending on security settings.

Checking the Agent Activity Log for Job Status

The BrightStor ARCserve Backup Agent for Microsoft SQL Server generates an activity log with information about backup or restore jobs and their status. The Activity log is named dbasql.log and is located in the directory in which the agent has been installed. If errors appear in the BrightStor ARCserve Backup job logs, check the Activity log for more information about why the errors occurred.

Additional Features Available

When you use the BrightStor ARCserve Backup Agent for Microsoft SQL Server with Microsoft SQL Server 2000, you can use multiple instance support to perform backups and restores of databases on named SQL Server instances. For more information, see Multiple Instance Support, Backup Options, and Restore Options in this chapter.

With the BrightStor ARCserve Backup Agent for Microsoft SQL Server in addition to the BrightStor ARCserve Backup Enterprise Module, and Microsoft SQL Server 7.0 or Microsoft SQL Server 2000, you can also use the Multi-Striping feature. For information about Multi-Striping, see Multi-Striping Support in this chapter.

Multi-Striping Support

When the agent is used with the multistreaming feature of the BrightStor ARCserve Backup Enterprise Module, you can use multiple processes and multiple backup devices to accelerate your backup beyond the speed of a single tape drive. With very large databases, this can make the difference between a backup that takes you a few hours instead of an entire day.

Multiple Instance Support

This feature provides backup and restore support on multiple instances of Microsoft SQL Server running concurrently on the same computer, with each instance having its own set of system and user databases that are not shared between instances. An application can connect to each Microsoft SQL Server instance on a local computer in the same way that it connects to Microsoft SQL Server running on a remote computer.

The BrightStor ARCserve Backup Agent for Microsoft SQL Server offers backup and restore support for multiple Microsoft SQL Server instances. The BrightStor ARCserve Backup Manager in BrightStor ARCserve Backup displays instances for the local computer and for the remote computer. The default instance is simply called Microsoft SQL Server, while named instances will append their instance names.

Backup Options

These features enable you to do the following:

- Back up differential files or filegroups of a database

- Back up transaction logs

- Leave the database in a restoring state

- Check the physical consistency of databases

For more information about backup options, see the chapter, Backing Up Microsoft SQL Server Databases.

Restore Options

These features enable you to do the following:

- Restore data and stop at a specific mark

- Restore data and stop before a specific mark

- Restore with replication settings

- Restore with restricted user access

- Restore partially

- Move log files

- Check the physical consistency of databases

- Automatically determine a sequence of backups to restore in order to produce a live, consistent database from a single restore job

For more information about restore options, see the chapter, Restoring Microsoft SQL Server Databases.

Backing Up SAP R/3 Online with Microsoft SQL Server 7.0 or 2000

When you use Microsoft SQL Server 7.0 or Microsoft SQL Server 2000 as the database server for SAP R/3, you can perform an online backup of SAP R/3 databases using the BrightStor ARCserve Backup Agent for Microsoft SQL Server. A separate backup agent for SAP R/3 is not required. The online backup procedure is the same as it is with any other database in the Microsoft SQL Server.

Note: You cannot perform offline backups of SAP R/3 databases in Microsoft SQL Server 7.0 or Microsoft SQL Server 2000 using the BrightStor ARCserve Backup Agent for Microsoft SQL Server.

Chapter 2

Installing the Agent

BrightStor ARCserve Backup Agent for Microsoft SQL Server is a client program you can install in two types of configurations:

■ On the server machine with Microsoft SQL Server

■ On the local drives of all nodes in a Microsoft SQL cluster environment

This chapter explains how to install the BrightStor ARCserve Backup Agent for Microsoft SQL Server in both types of configurations.

Installation Prerequisites

This section provides prerequisite information that you must complete before installing the BrightStor ARCserve Backup Agent for Microsoft SQL Server in a standard Microsoft SQL environment, Microsoft SQL Server 7.0 cluster environment, and a Microsoft SQL Server 2000 cluster environment.

Basic Prerequisites

Before you install the BrightStor ARCserve Backup Agent for Microsoft SQL Server in a standard Microsoft SQL environment, verify the following:

■ You have administrator privileges or the proper authority to install software on the computers where you will be installing the product or its components.

Note: Contact your BrightStor ARCserve Backup administrator to obtain the proper rights if you do not have them.

- You have used SQL or NT authentication for each Microsoft SQL Server instance. For each Microsoft SQL Server instance that has SQL authentication, you must provide a user name and password of an SQL user with system administrator privileges.

- You have access to license keys for BrightStor ARCserve Backup Agent for Microsoft SQL Server.

- You have registration information for BrightStor ARCserve Backup Agent for Microsoft SQL Server.

Microsoft SQL Server 7.0 Cluster Environment Prerequisites

Before you install the BrightStor ARCserve Backup Agent for Microsoft SQL Server in a Microsoft SQL Server 7.0 cluster environment, verify the following:

- Ensure that your Microsoft SQL Server 7.0 virtual server has Mixed Mode authentication selected. For specific instructions on checking and changing this setting, see Checking and Changing the Microsoft SQL Server Authentication Method in the appendix "Configuring Microsoft SQL Server Security Settings."

- If you change the setting, you must stop and restart Microsoft SQL Server services from the Microsoft Cluster Administrator before this change takes effect.

- Use SQL authentication, rather than NT authentication.

- Install Microsoft SQL Server Client Connectivity to all secondary nodes of the cluster. This enables a backup to occur if Microsoft SQL Server Quorum and the Windows Quorum are on separate nodes of the cluster.

Installation Checklist

The following checklists serve as an aid to ensure that you have all the information necessary to complete your installation successfully.

Basic Checklist

Use the following checklist to ensure that you have met all of the prerequisites and have all of the information that you need to complete a basic installation.

✓	Prerequisites
	Have you verified that your system meets the minimum requirements needed to install the BrightStor ARCserve Backup Agent for Microsoft SQL Server? For a list of requirements, see the readme file.
	Are you installing the BrightStor ARCserve Backup Agent for Microsoft SQL Server in a standard Microsoft SQL Server environment, in a Microsoft SQL Server 7.0 cluster environment, or in a Microsoft SQL Server 2000 cluster environment?
	Have you installed BrightStor ARCserve Backup? See *BrightStor ARCserve Backup Getting Started*.
	Do you plan to use Multi-Striping? If so, have you installed the BrightStor ARCserve Backup Enterprise Module? See *BrightStor ARCserve Backup Getting Started*.
	Have you selected your type of installation (for example, local, remote, create a response file)?
	Are you changing the default installation path? If you are, remember to write down the installation path for easy reference._____
	Do you know the computer name and the valid user name and password for the computers on which you are installing the BrightStor ARCserve Backup Agent for Microsoft SQL Server?
	Do you have the license key information that is required for installing the BrightStor ARCserve Backup Agent for Microsoft SQL Server or is this a valid trial?
	Do you have administrator privileges or the proper authority to install software on the computers on which you are installing the BrightStor ARCserve Backup Agent for Microsoft SQL Server?

Microsoft SQL Server 7.0 Cluster Environment Checklist

Use the following checklist to ensure that you have met all of the prerequisites and have all of the information that you need to complete a Microsoft SQL Server 7.0 installation in a cluster environment.

✓	Prerequisites
	Have you completed the prerequisites outlined in the Basic Checklist?
	Have you selected Mixed Mode authentication for the Microsoft SQL Server 7.0 instance?
	If you changed to Mixed Mode authentication, have you restarted Microsoft SQL Server services from the Microsoft Cluster Administrator?
	Do you know the Microsoft SQL Server virtual server name and the user name and password of an MSCS domain user with administrator privileges?
	Do you know the user name and password of an Microsoft SQL Server user with system administrator privileges?
	Have you installed the agent on the local drives of all nodes in the Microsoft Clustering Server (MSCS) cluster as part of the initial agent installation?
	If you are installing on a node of an SQL cluster environment, have you selected local as your installation type?
	(Optional) Have you installed the Microsoft SQL Server 7.0 Client Connectivity on every node of the cluster?

Microsoft SQL Server 2000 Cluster Environment Checklist

Use the following checklist to ensure that you have met all of the prerequisites and have all of the information that you need to complete a Microsoft SQL Server 2000 installation.

✓	Prerequisites
	Have you completed the prerequisites outlined in the Basic Checklist?
	Do you know the user name and password of an MSCS domain user with system administrator privileges?
	Have you selected NT authentication for the Microsoft SQL Server 2000 instance?

✓	Prerequisites
	Do you know the SQL 2000 virtual server name, cluster server user name, and cluster server password?
	Have you installed the BrightStor ARCserve Backup Agent for Microsoft SQL Server on the local drives of all nodes in the MSCS cluster as part of the initial agent installation?
	If you are installing on a node of an SQL cluster environment, have you selected local as your installation type?

Installing the Agent

Make sure that you have confirmed the installation prerequisites and performed the required pre-installation tasks. When you have completed these tasks and gathered the required information, you are ready to start the installation process.

Installing the Agent in a Standard Microsoft SQL Server Environment

To install the BrightStor ARCserve Backup Agent for Microsoft SQL Server in a standard Microsoft SQL Server environment, follow 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*.

During the installation procedure, the following Account Configuration dialog is displayed after you select the BrightStor ARCserve Backup Agent for Microsoft SQL Server for installation:
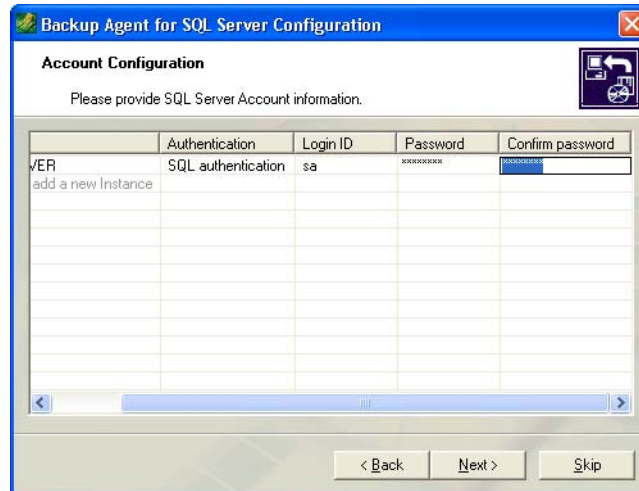
On this dialog, enter the appropriate information for each instance of your standard Microsoft Server:

■ Enter either SQL or NT Authentication.

■ For each SQL Server instance for which you have specified SQL authentication, enter the user name and password of a SQL user with system administrator privileges.

Installing the Agent in a Microsoft Server 7.0 Cluster Environment

To install the BrightStor ARCserve Backup Agent for Microsoft SQL Server in a Microsoft SQL Server 7.0 cluster environment, follow 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*.

During the installation procedure, the following Account Configuration dialog is displayed after you select the Backup Agent for Microsoft SQL Server for installation:
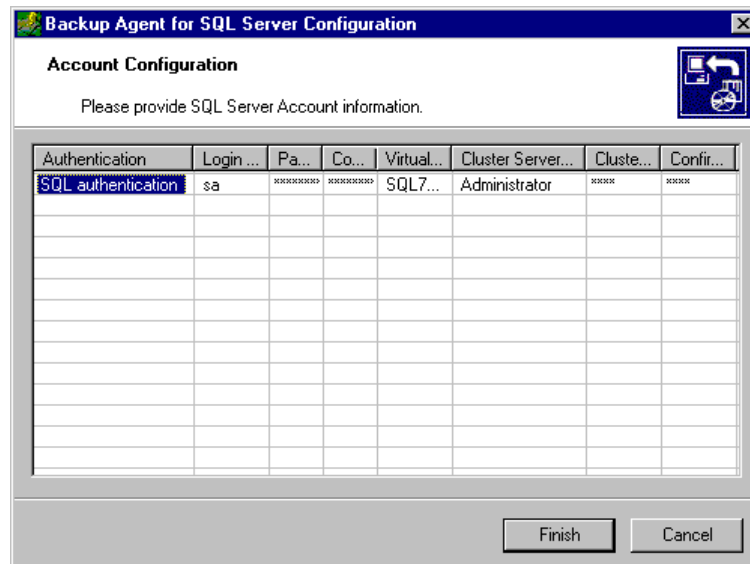
On this dialog, enter the appropriate cluster information for your Microsoft SQL Server 7.0 virtual server that you must specify for each node on the cluster:

■ Enter SQL Authentication for a Microsoft SQL Server 7.0 virtual server.

■ Enter the user name and password for the system administrator (sa) or an equivalent account on the Microsoft SQL virtual server.

■ Enter the Microsoft SQL virtual server name, and the user name and password of an MSCS domain user with system administrator privileges.

Installing the Agent in a Microsoft Server 2000 Cluster Environment

To install the BrightStor ARCserve Backup Agent for Microsoft SQL Server in a Microsoft SQL Server 2000 cluster environment, follow 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*.

During the installation procedure, the following Account Configuration dialog (consisting of the following left and right panes) is displayed after you select the Backup Agent for Microsoft SQL Server for installation
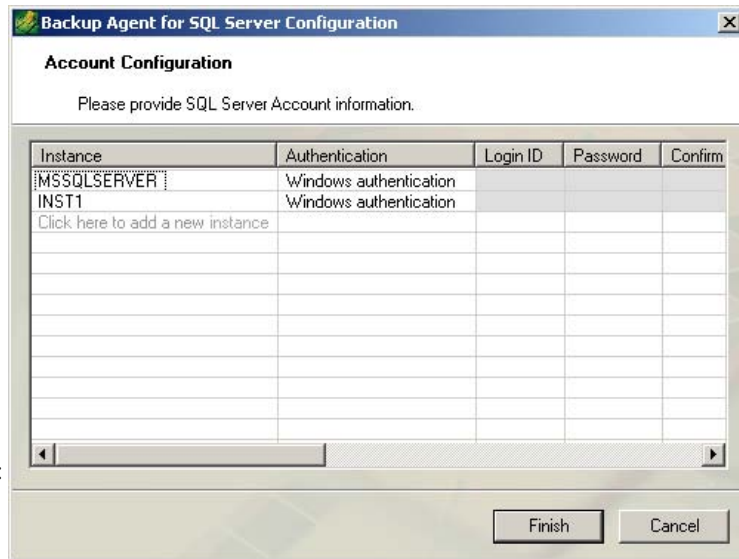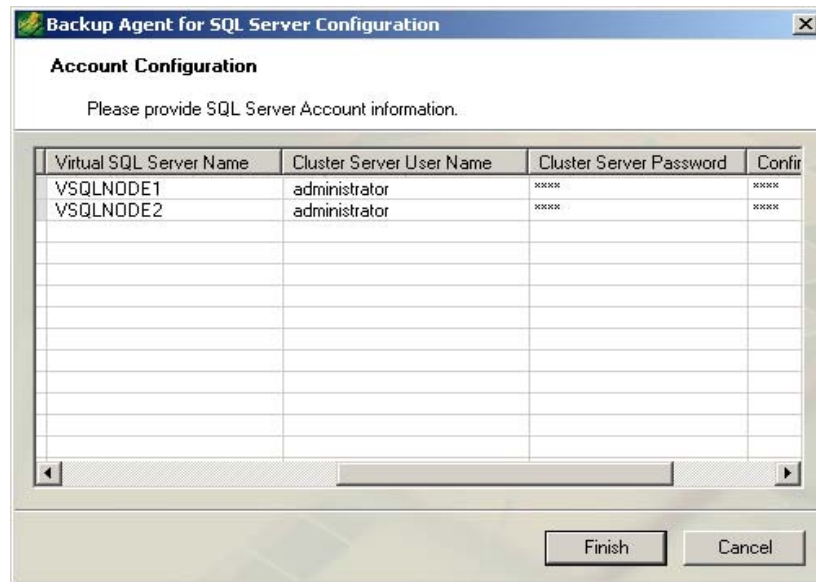
On this dialog, enter the appropriate cluster information for each instance of your Microsoft SQL Server 2000 virtual server:

■ Enter SQL Authentication.

■ To add Microsoft SQL virtual server instances that are not displayed in the configuration window, click the cell containing the instruction in the Instance column.

■ In the Authentication column, specify either NT or SQL authentication. If you specify SQL authentication, enter the user name and password of a SQL Server user with system administrator (sa) rights for that instance.

■ Enter the name of the SQL 2000 virtual server associated with this instance.

■ Enter the login ID of an MSCS domain user with system administrator privileges and the password for that user. Confirm the password.

Post-Installation Procedures

After you have installed the agent, you may need to perform one or more of the following post-installation tasks:

■ Configure the agent backup and restore parameters for Microsoft SQL Server 7.0 and Microsoft SQL Server 2000 cluster environments

■ Configure the TCP port address

■ Configure parameters to use Multi-Striping

Configuring the Agent Backup and Restore Parameters

The Microsoft SQL Agent Configuration utility enables you to configure the BrightStor ARCserve Backup Agent for Microsoft SQL Server backup and restore parameters for Microsoft SQL Server 7.0 and Microsoft SQL Server 2000. The parameters include settings for the Microsoft Virtual Device Interface (VDI) object, remote communication, and virtual server (cluster) account information. Start the utility from the BrightStor ARCserve Backup Program group in the Start menu.

The Microsoft SQL Agent Configuration utility opens the Microsoft SQL Server DBAgent Configuration dialog. The following illustration is an example of the Microsoft SQL Server DBAgent Configuration dialog:
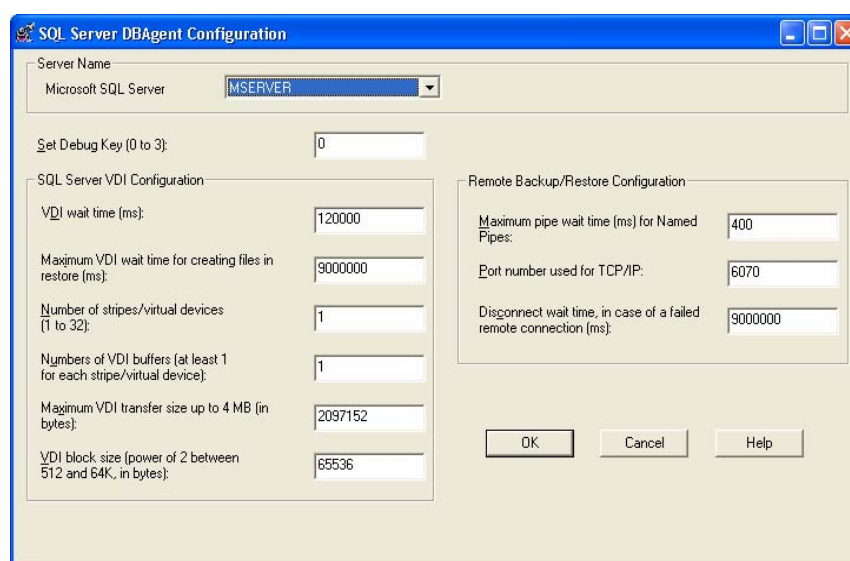
The dialog contains the following sections and configuration parameters:

- **Server Name**—Use this parameter to select the default server (MSSQLSERVER) or instance name (Microsoft SQL Server 2000 only) for which the BrightStor ARCserve Backup Agent for Microsoft SQL Server configuration is to be changed.

- **Set Debug Key (0 to 3)**—Use this parameter to create a detailed debug log. Change this parameter to 3 only when asked to by Computer Associates Technical Support.

■ **SQL Server VDI Configuration**—Use the parameters in this section of the dialog to configure the BrightStor ARCserve Backup Agent for Microsoft SQL Server for backups or restores that use the VDI. The SQL Server VDI Configuration section contains the following parameters:

– **VDI wait time (ms)**—The time that a VDI object waits. The time is set in milliseconds.

– **Maximum VDI wait time for creating files in restore (ms)**—The time that a VDI object waits before timing out when creating data files during a restore. Increase this time if the database to be restored contains very large data files. The time is set in milliseconds.

– **Number of stripes/virtual devices (1 to 32)**—The number of threads used for retrieving data from Microsoft SQL Server. This parameter determines the number of CPUs that are used to perform backups. Setting this value to match the number of CPUs in the database server will generally result in the fastest backup performance.

– **Number of VDI buffers (at least 1 for each stripe/virtual device)**—The total number of buffers (of maximum transfer size) that are used to back up and restore.

– **Maximum VDI transfer size up to 4 MB (in bytes)**—The maximum input or output request issued by Microsoft SQL Server to the device. This is the data portion of the buffer. This parameter value must be a multiple of 64 KB. The range is from 64 KB to 4 MB.

– **VDI block size (power of 2 between 512 and 64 KB bytes)**—All data transfers are in integral multiples of this value. Values must be a power of 2 between 512 bytes and 64 KB inclusive.

■ **Remote Backup/Restore Configuration**—Use the parameters in this section to configure the BrightStor ARCserve Backup Agent for Microsoft SQL Server for remote backups and restores. The Remote Backup/Restore Configuration section contains the following parameters:

– **Maximum pipe wait time (ms) for Named Pipes**—The time the BrightStor ARCserve Backup Agent for Microsoft SQL Server waits to close a named pipe if a remote connection fails. The time is set in milliseconds.

– **Port Number used for TCP/IP**—The port number for remote backup and restore using TCP/IP. For more information about port number, see Configuring the TCP Port Address in this chapter.

– **Disconnect wait time, in case of a failed remote connection (ms)**—The time the BrightStor ARCserve Backup Agent for Microsoft SQL Server waits to close a TCP/IP session if a remote connection fails. The time is set in milliseconds.

Configuring the TCP Port Address

The BrightStor ARCserve Backup Agent for Microsoft SQL Server consists of the following two services:

■ BrightStor ARCserve Backup Agent RPC Server service — Used to browse, back up, and restore over named pipes. It communicates over named pipes and over TCP/IP using port 6071 for TCP/IP.

Important! *You should not change this port number unless specifically instructed to do so by a Computer Associates Technical Support representative.*

■ BrightStor ARCserve Backup Agent Remote service — Used for TCP/IP backup and restore. It uses port 6070 by default. You can change this port number with the BrightStor ARCserve Backup Agent for Microsoft SQL Configuration utility.

To change the port number for the BrightStor ARCserve Backup Agent Remote service, follow these steps:

1. On the server where the BrightStor ARCserve Backup Agent for Microsoft SQL Server is installed, open the Start menu.

2. Select the Microsoft SQL Agent Configuration utility. The SQL Server DBAgent Configuration dialog opens.

3. Specify or change the value in the Port Number Used for TCP/IP field in the Remote Backup/Restore Configuration area, as shown in the following example:
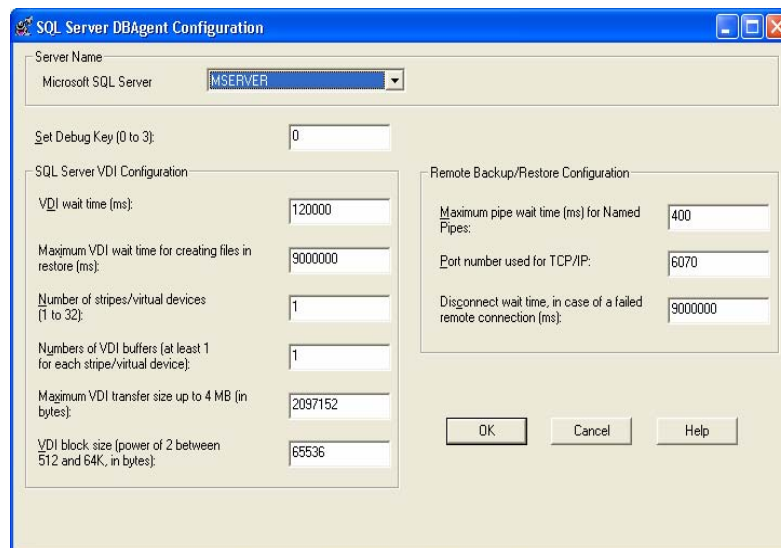
Note: If you have more than one instance of Microsoft SQL Server installed, you must have the same port number for every instance.

4. Stop and restart the BrightStor ARCserve Backup Agent Remote service and BrightStor ARCserve Backup Agent RPC Server service.

5. You must update settings on the backup server with the revised port number for this agent. For information on configuring the settings, see the *BrightStor ARCserve Backup Administrator Guide*.

Configuring the Parameters for Multi-Striping

You can fine-tune the performance and operations of your backup jobs to run on multiple devices. You can tune these settings directly after installing the BrightStor Backup Agent for Microsoft SQL Server, or at another time, depending on your specific database needs. To do this, follow these steps:

1. From the Start menu, open the BrightStor ARCserve Backup Agent for Microsoft SQL Configuration utility.

Tip: From the Start menu, choose Programs, Computer Associates, BrightStor, ARCserve Backup Agents. From ARCserve Backup Agents, open Microsoft SQL Agent Configuration.

The following SQL Server DBAgent Configuration dialog is displayed:

2. On the Microsoft SQL Server DBAgent Configuration dialog, consider making the following changes:

■ Increase the VDI wait time from 2 minutes (120000 ms) to 20 minutes (1200000) if you have very large databases or slow tape changers. If a backup must span from one tape to another, the default time may be insufficient for some changers to replace a full tape with a blank tape.

■ Increase the number of VDI buffers to be double the number of tape devices you have attached to the system running BrightStor ARCserve Backup and the BrightStor ARCserve Backup Agent for Microsoft SQL Server. The number of VDI buffers used for a Multi-Striping backup or restore is the number of VDI buffers set here unless the number of devices used for the backup or restore is higher.

■ Increase the maximum VDI wait time if your databases have very large data files. The default value of 9000000 ms (2½ hours) will be adequate for most databases. However, if data files exceed 200 GB, additional time may be required depending on CPU and disk speed, or restore operations may fail due to timeouts while waiting for the Microsoft SQL Server to create data files.

Uninstalling the Agent

To uninstall the BrightStor ARCserver Backup Agent for Microsoft SQL Server, use the following steps:

1. Open the Windows Control Panel.

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

3. Select CA BrightStor ARCserver Backup Agent for SQL Server.

4. Click the Remove button. The Add or Remove Programs dialog opens asking whether you want to remove CA BrightStor ARCserver Backup Agent for SQL Server.

5. Click Yes.

Backing Up Microsoft SQL Server Databases

This chapter contains information about backing up databases and Transaction logs using BrightStor ARCserve Backup, the BrightStor ARCserve Backup Agent for Microsoft SQL Server, and Microsoft SQL Server 7.0 or Microsoft SQL Server 2000.

Backup Overview

To *back up* is to create a copy of a database, Transaction log, database differential, or collection of files or file groups on another device (usually a media drive). You use BrightStor ARCserve Backup and the BrightStor ARCserve Backup Agent for Microsoft SQL Server to perform backups using the SQL Server Backup statement.

Backing up a database creates a copy of its tables, data, and user-defined objects. In case of media failure, you can recover your databases if you have been making regular backups of your databases and their Transaction logs

*Important! Transaction logs are not backed up or truncated during full or differential database backups. To back up and truncate Transaction logs, you must perform a separate Transaction log backup. **When you perform the Transaction log backup, select the Remove inactive entries from Transaction log option to truncate the log files**. For more information about Transaction log backups see <u>What Are Transaction Log Backups</u> in this chapter.*

When a Microsoft SQL database backup is started in BrightStor ARCserve Backup, the BrightStor ARCserve Backup Agent for Microsoft SQL Server initiates a dynamic backup of the database. This backup can take place while the database is active. The backup captures the state of the data at the moment the statement is executed. No partial transactions are captured. Any data changes made after the backup begins are not captured in the backed up database.

Types of Backups

The BrightStor ARCserve Backup Agent for Microsoft SQL Server supports the following types of backups:

- **Database Complete**—Backs up the entire database.

- **Database Differential**—Backs up data that has changed since the last complete backup. For example, if you ran a complete backup of your database on Sunday night, you can run a differential backup on Monday night to back up only the data that changed on Monday.

- **Transaction Log**—Backs up the Transaction log. You have the following options when you back up a Transaction log:

  - **Remove inactive entries from transaction log**—Truncates the log files. This is the default option.

  - **Do not remove inactive entries from transaction log**—Retains inactive log entries after backup. These entries will be included in the next Transaction log backup.

  - **Back up only the log tail and leave the database in unrecovered mode**—Backs up the log and leaves the database in a restoring state. This option is available for Microsoft SQL Server 2000 only. Use this option to capture activity since the last backup and take the database offline to restore it.

- **Files and File groups**—Backs up selected files within a database. Use this option to back up a file or file group when the database size and performance requirements make it impractical to perform a full database backup.

- **Files and File groups; Differential**—Backs up data changed in selected files since the last File and File Group backup. Differential file backups reduce recovery time by reducing the number of transactions from the Transaction log that must be restored. This option is available for Microsoft SQL Server 2000 only.

Backup Strategy Recommendations

To establish a good backup strategy, follow these recommendations:

Database Activity	Back Up How Often
Low to medium activity	Full—once per week Differential—once per day Transaction Log—every 2-4 hours
High activity (small to medium size)	Full—twice per week Differential—twice per day Transaction Log—every 60 minutes
High activity (large size-Full or Bulk-Logged Recovery model)	Full—once per week Differential—once per day Transaction Log—every 20 minutes
High activity (large size, Simple Recovery model)	Full—once per week Differential—twice per day

When a Full Backup Is Required

After you perform certain database management actions, your next backup **must** be a full database backup. If you perform one of these actions and then perform a differential, Transaction log, or files and file groups backup, you may be unable to use that backup with your last full database backup to restore the database successfully.

To prevent this problem, always perform a full database backup immediately after you have performed any one of the following actions:

- Created a new database

- Changed the recovery model of the database

- Changed the number of files or file groups in the database

- Changed the arrangement of files among the file groups

- Canceled a full backup job while it is running

- Modified the structure of the database, including adding or removing a table or a column in a table

- Added or removed an index

- Restored the database from backups

What Are Differential Backups

A differential backup records only the data that has changed since the last full database backup. On average, these backups are smaller than full database backups and usually take less time to complete, though they are typically larger and take more time than a Transaction log backup. However, if you need to restore the database, a differential backup requires only the last full backup, and does not need any of the other differential or Transaction log backups performed since the last backup. A differential backup is also faster to restore than a Transaction log backup because transactions do not need to be reprocessed.

Note: If a database is very active or a long time has passed since the last full backup, then a differential backup could take as long as a full backup.

When to Perform a Differential Backup

Perform differential backups as a supplement to full backups. Because they are usually faster and smaller, you can perform them more often than full database backups. They are also typically more efficient because they require less space on media and have a briefer impact on database performance than frequent, full database backups. Additionally, you can use them to minimize the number of Transaction logs you need to recover during a restore, because you would only need to restore those Transaction log backups performed since the differential backup.

Differential backups are most beneficial when:

- Only a relatively small portion of the data in the database has changed since the last database backup. Differential database backups are most efficient if the same data is modified frequently.

- You are using the Simple Recovery model, which does not permit Transaction log backups, and you want to perform backups more frequently than is practical for full database backups.

- You are using the Full or Bulk-Logged Recovery model and want to minimize the time it takes to roll forward Transaction log backups when restoring a database.

Note: After you have modified the structure or configuration of the database (for example, by adding more data or log files or changing the recovery model), you must perform a full database backup before performing a differential or Transaction log backup.

What Are Transaction Log Backups

Transaction logs contain the record of Microsoft SQL Server database activity; back them up frequently. To back them up, run self-contained Transaction log backups separately from database backups. Transaction log backups offer these advantages:

- They are generally faster than differential backups.

- They are always faster and smaller than full database backups.

- They have the least impact on database performance while running.

- They can be restored to a specific point in time, rather than just the time when the backup was made.

*Important! Transaction logs are not backed up during full or differential database backups. You **must** back them up by running separate Transaction log backups.*

After you have modified the structure or configuration of the database (for example, by adding more data or log files, or changing the recovery model), you must perform a full database backup before performing a differential or Transaction log backup.

Restoring a Transaction Log Backup

To restore a Transaction log backup, you must first restore the following:

- The last full database backup performed

- The last differential backup performed since that full database backup, if any

- Any other Transaction log backups performed since the last full database or differential backup

It takes longer to recover a database when you restore the database and several Transaction logs than it does when you restore only the database. Finding the correct strategy depends on your environment. You must consider the time required to perform backups in relation to the time required to restore.

Important! Do not perform a Transaction log backup until you have performed at least one full database backup.

Truncating a Transaction Log

You can truncate Transaction logs when you back them up. To truncate a Transaction log, select the Remove inactive entries from transaction log option when you configure the backup. If the Transaction log is not truncated, it may eventually grow large.

What Are File and File Group Backups

You can choose to back up one or more file groups or individual files when the database size and performance requirements make it impractical to perform a full database backup.

If you choose to back up an individual file instead of the full database, put procedures in place to ensure that all files in the database are backed up regularly. Also, you must perform separate Transaction log backups for the files or file groups you back up individually. After restoring a file backup, you must apply the Transaction log to roll the contents of the file forward to make it consistent with the rest of the database. For further information, see the Microsoft SQL Server documentation.

The Impact of the Create Index Statement on File and File Group Backups

The Backup statement requires that you back up entire file groups affected by a Create Index statement. This requirement exists in the following situations:

- If you create an index on a file group, you must back up that entire file group in a single backup operation. Microsoft SQL Server does not allow backups of individual files that are part of the affected file group.

- If you create an index on a file group separate from the file group in which the table resides, then you must backup both file groups (the file group containing the table and the file group containing the newly created index) together.

- If you create more than one index on a file group separate from the file group in which the table resides, you must back up all the file groups immediately to accommodate these different file groups.

The Backup statement detects all of these file group situations and communicates the minimum number of file groups that you must backup. Microsoft SQL Server reports this information to the user when the backup job is run.

Checking the Consistency of a Database

When your database activity is low, you should run a database consistency check (DBCC), particularly with a large database. Although it takes some time, it is important to determine that your SQL database is functioning well.

A DBCC tests the physical and logical consistency of a database. When you enable the Database Consistency Check option for a backup, it performs the following tests:

- **DBCC CHECKDB** — Checks the allocation and structural integrity of all objects in the specified database. By default, the CHECKDB performs a check for indexes that can increase the overall execution time.

  Note: The system table indexes are checked regardless of whether you select this option.

- **DBCC CHECKCATALOG** — Checks for consistency in and between system tables in the specified database.

Database Consistency Check (DBCC) Options

A DBCC tests the physical and logical consistency of a database. DBCC provides the following options:

- **Before Backup** — Checks consistency before the backup of the database.

- **After Backup** — Checks consistency after the backup of the database.

- **Continue with backup, if DBCC fails** — Performs a database backup even if the consistency check fails.

- **After restore** — Performs DBCC after the restore of the database.

- **Do not check indexes** — Checks the database for consistency without checking indexes for user-defined tables.

- **Check only the physical consistency of the database** — Detects torn pages and common hardware failures. In addition, it checks the integrity of the physical structure of the page and record headers, and the consistency between the page's object ID and index ID. This feature is available for Microsoft SQL Server 2000 only.

All error messages that are generated during the DBCC are displayed in the BrightStor ARCserve Backup Agent for Microsoft SQL Server log file called dbasql.log. The log is located in the Backup Agent directory.

Scheduling Backups

You should back up a database immediately after you create it. Thereafter, continue to back it up on a regular schedule to ensure smooth recovery from a database or media failure. Maintain regular backups of all databases, including:

■ The master, msdb, and model databases

■ All user databases

■ The distribution database (if the server is configured as a replication distributor)

Using Rotation Schemes and Global Options

BrightStor ARCserve Backup applies the incremental and differential global backup methods to backups of Microsoft SQL Server. This allows you to use a rotation scheme to perform differential and Transaction log backups of Microsoft SQL Server databases, dynamically adjusting for the limitations of each individual database. The various backup methods applied are as follows:

■ **Full Backup Method**—If you specified backup options for the target database, these options are applied. Otherwise, a full database backup is performed by default.

■ **Differential Backup Method**

– If you are backing up a system database (for example, master, model, or msdb), a full database backup is always performed.

– If the Microsoft SQL Server has no record of a prior full database backup of the target database, a full database backup is performed.

– If the backup options selected for the target database include a selection of specific database files and file groups, a File-and-FileGroup differential backup is performed for Microsoft SQL 2000 databases, and a File-and-FileGroup full backup is performed for Microsoft SQL 7.0 databases.

– In all other circumstances, a differential database backup is performed.

■ **Incremental Backup Method**

– If you are backing up a system database (for example, master, model, or msdb), a full database backup is always performed.

– If the Microsoft SQL Server has no record of a prior full database backup of the target database, a full database backup is performed.

– If the database uses the Simple Recovery Model, a differential database backup is performed.

– In all other circumstances, a Transaction log backup with truncation is performed.

Note: For more information about rotation schemes and automatic backups, see the *BrightStor ARCserve Backup Administrator Guide.*

Tip: Performing a backup can slow the system down. Run backups when the database is not being heavily updated.

Dynamic and Explicit Job Packaging

BrightStor ARCserve Backup provides two ways to package (set up) your backup jobs:

■ Dynamic job packaging

■ Explicit job packaging

Marking an Instance for Dynamic Job Packaging

If you mark a database instance for dynamic job packaging when defining a backup job, BrightStor ARCserve Backup automatically selects, at the time the backup job runs, all the components of the object (its child volumes, files, and so on) for backup.

For example, suppose you choose to back up an entire server and mark the server for dynamic job packaging. Later, you change the volumes on the server. When you run the next backup job, the volumes that exist on the server at the time of the backup job are the volumes that are backed up. Any change that you make on the server you marked for dynamic job packaging is included in the next backup.

Important! When you mark a parent object for dynamic job packaging, all of its associated (or child) objects are also marked for dynamic job packaging and are selected for backup. Child objects of an object marked for dynamic packaging lose any separate options you have assigned them when the job is submitted.

To mark an object for dynamic job packaging, follow these steps:

1. On the Source tab in the Backup Manager, expand the directory tree until the object you want to mark for dynamic job packaging is displayed.

2. Click the square next to the object. The square next to the object, and the squares next to all the children of the object, become completely green, as shown in the following example:
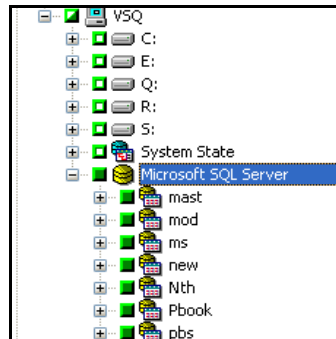
In the example, Microsoft SQL Server has been marked for dynamic job packaging. All of its children are also marked for dynamic job packaging.

Marking an Object for Explicit Job Packaging

If you mark a database object for explicit job packaging when defining your backup job, you mark some or all of its child objects for dynamic job packaging, but do not mark the parent.

For example, if you select only the C and E drives to back up on a server, then the server, which is the parent, is packaged explicitly. If you add another drive to the server between the time you scheduled the job and the time it runs, the new drive is not included in the job. However, because you dynamically packaged the C and E drives, any change in the contents of those two drives between the time you scheduled the job and the time you run it, will be included in the backup job.

Explicit job packaging gives you the ability to customize local backup options. For example, if you run a backup job for which you dynamically packaged the C and E drives on your server (which is explicitly packaged), you can select one set of options for drive C and another set of options for drive E.

Note: To customize volume or database options, you must package the volume or database parent items explicitly.

To mark an object for explicit job packaging, follow these steps:

1. On the Source tab in the BrightStor ARCserve Backup Manager, expand the directory tree until the object you want to mark for explicit job packaging is displayed.

2. Click the squares next to the children of the object. The squares next to the child objects become completely green and the square next to the parent object becomes half green and half white, as shown in the following example:
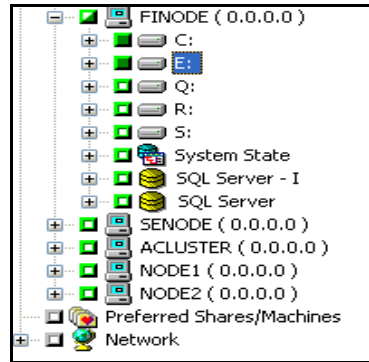
In the example, the C and E drives have been marked for dynamic job packaging. The computer on which they exist, FiNode, has been marked for explicit job packaging.

Backing Up a Database

This section provides the basic steps required to back up a database. To perform a basic backup, follow these steps:

1. Ensure that Microsoft SQL Server is running on your server. The Microsoft SQL Server service must be started.

2. Start the Backup Agent RPC Server service and Backup Agent Remote Service if they are not already running.

   Note: These services are started automatically when the agent is installed and set to start automatically if the machine is restarted.

3. Open the Backup Manager. In the Backup Manager, locate the Microsoft SQL Server instance. It is listed under the name of the computer on which it is installed.

4. Expand the Microsoft SQL Server instance to display a list of databases, as shown in the following example:
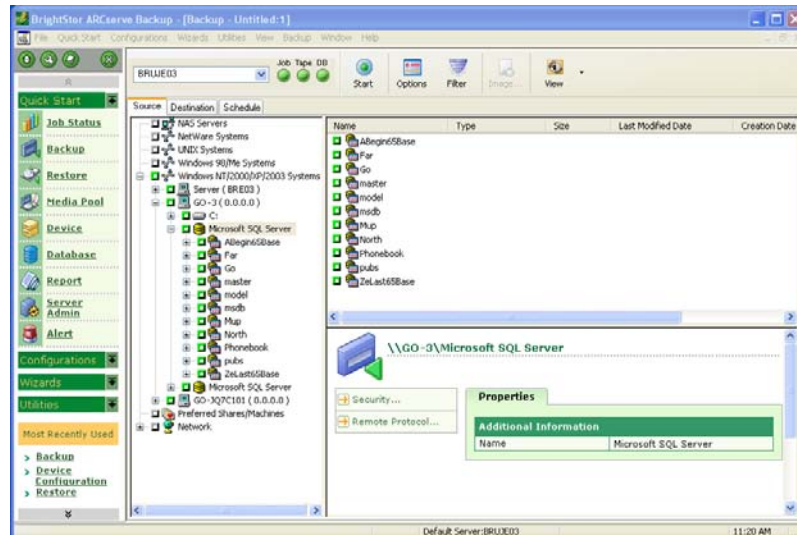
5. If you **are not** backing up from a remote Microsoft SQL Server database, go to Step 7. If you are backing up from a remote Microsoft SQL Server database, right-click the Microsoft SQL Server instance and select the Remote Protocol option from the pop-up menu. The Remote Protocol dialog opens, as shown in the following example:
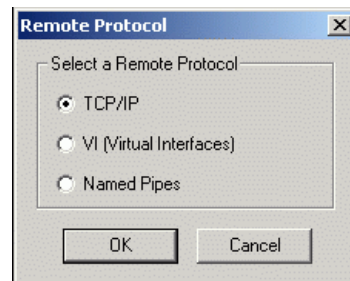
6. Select a protocol and click OK. TCP/IP is the default.

   Note: Select Named Pipes only if you have backup operator rights, but do not have system administrator rights or if you cannot use TCP/IP. The system automatically tries to use named pipes if it cannot connect to the BrightStor ARCserve Backup Agent for Microsoft SQL Server using TCP/IP.

7. Choose a database instance under Microsoft SQL Server. Information about the selected database is displayed on the right side of the Backup Manager.

   Note: For information about how to select a database to apply options properly for backup, see Dynamic and Explicit Job Packaging in this chapter.

8. Right-click the database object. A pop-up menu opens.

9. Select Backup Agent Options. The Backup Agent Options dialog for Microsoft SQL Server 7.0 or Microsoft SQL Server 2000 opens, depending on which version of Microsoft SQL Server you are using.

The following example shows the Agent Backup Options dialog for Microsoft SQL Server 7.0:
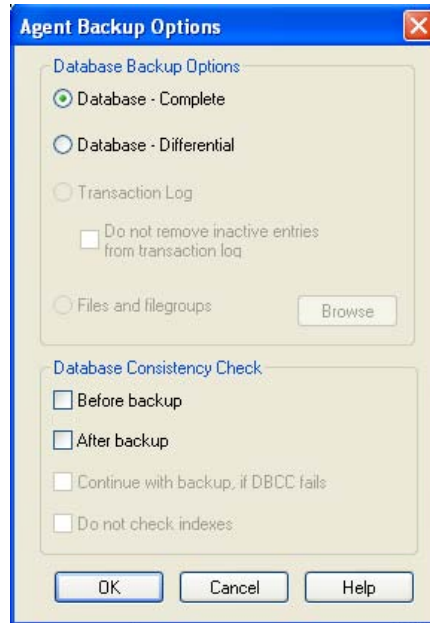
The following example shows the Agent Backup Options dialog for Microsoft SQL Server 2000:
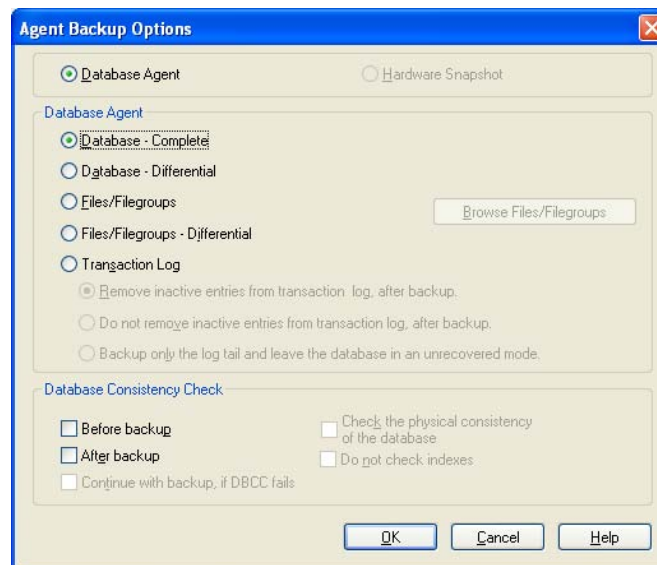
10. Select the type of backup you want to perform. For more information about backup types, see <u>Types of Backups</u> in this chapter.

11. If you **did not** choose Files/Filegroups or Files/Filegroups - Differential, go to Step 13. If you did choose Files/Filegroups or Files/Filegroups - Differential, click the Browse or Browse Files/Filegroups button. The Specify Filegroups and Files dialog opens, as shown in the following example:
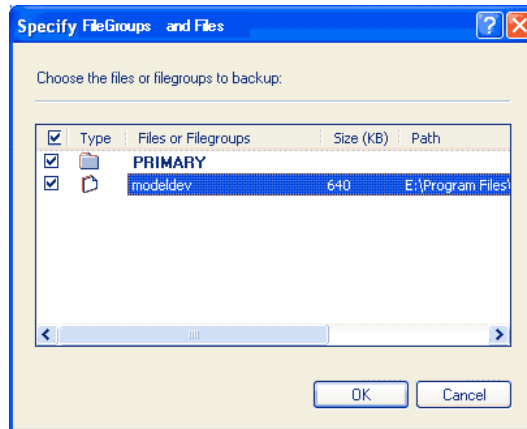
12. Select the specific files and file groups you want to back up. Click OK when you are finished.

13. (Optional) Enable a Database Consistency Check and select the Database Consistency Check options. For more information about Database Consistency Checks, see <u>Checking the Consistency of a Database</u> in this chapter and your Microsoft SQL documentation.

14. Click OK.

15. Repeat Steps 7 through 14 for each database you are backing up in this job.

16. Click the Destination tab in the Backup Manager and select a backup destination, as shown in the following example:
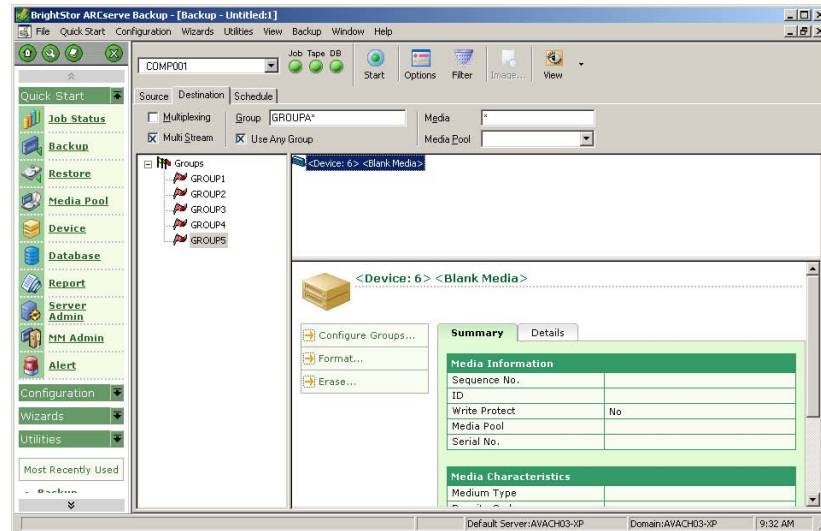
Note: You can use the * symbol in the Group or Media fields to create partial wildcards when you select a backup destination. For example, if you are backing up to two sets of groups, one with all members beginning GroupA and the other with all members beginning GroupB, you can select all the GroupA members by typing GroupA* in the Group field. For more information about selecting devices and media, see the *BrightStor ARCserve Backup Administrator Guide*.

17. Click the Schedule tab and select the scheduling options for this backup. For information about scheduling backups, see the *BrightStor ARCserve Backup Administrator Guide*.

18. Click Start. The Security and Agent Information dialog opens, as shown in the following example:

Note: In this dialog, the column and button labeled Agent refer to the client agent, not the BrightStor ARCserve Backup Agent for Microsoft SQL Server. You can edit Client Agent information at this time. For more information about client agents, see the *BrightStor ARCserve Backup Administrator Guide*.

19. Verify the user name and password for Microsoft SQL Server. To change the security information for Microsoft SQL Server, click Security and change the information on the dialog that is displayed.

20. After verifying or changing the security information, click OK to continue. The Submit Job dialog opens.

21. (Optional) Use the Submit Job dialog to select the job execution time, to submit the job on hold, to add an optional description for the backup job, or to select source priority.

22. Click OK. The Job Status window opens. Use this window to monitor the current status of your job. For more information about the Job Status window, see the *BrightStor ARCserve Backup Administrator Guide*.

Restoring Microsoft SQL Server Databases

This chapter contains information about restoring databases and Transaction logs using BrightStor ARCserve Backup, the BrightStor ARCserve Backup Agent for Microsoft SQL Server, and Microsoft SQL Server 7.0 or Microsoft SQL Server 2000.

Restore Overview

To *restore* is to load a database from a backup of that database and (if applicable) one or more backups of its Transaction log. If a database is lost or damaged, you can restore the database by reloading the most recent database backup and the successive log backups. A restore overwrites any information in the database with the backed up information. Use BrightStor ARCserve Backup and the BrightStor ARCserve Backup Agent for Microsoft SQL Server to perform restores using the SQL Server Restore statement.

When you restore a database, Microsoft SQL Server rolls back any uncommitted transactions that were active at the moment the restore began. When the restore is complete, the database is in the same state it was in when the Backup statement for the backup used in the restore was initiated, excluding any transactions that were active at that point.

After the data from the backup has been reloaded, Microsoft SQL Server reinitializes any remaining unused pages. For example, if a 100 MB database contains only five MB of data, Microsoft SQL Server rewrites all 100 MB of space. Consequently, it takes at least as long to restore a database as it does to create a database.

Microsoft SQL Server locks a database while restoring it, so that the database cannot be modified during the restore. However, users can access and modify other Microsoft SQL Server databases during this time.

If a failure occurs while a database is being restored, Microsoft SQL Server notifies the system administrator but does not recover the partially restored database.You must restart the database restore to complete the restore.

The destination database must have at least as much storage space allocated to it as the backed up database. The actual amount of data in the backed up database is irrelevant. To get information about allocated storage space, use the SQL Enterprise Manager or the DBCC CHECKALLOC statement.

If you have a media failure, restart Microsoft SQL Server. If, after a media failure, Microsoft SQL Server cannot access a database, it marks the database as suspect, locks it, and displays a warning message. You may need to drop (detach from Microsoft SQL Server) a damaged database, a process that you can perform using the SQL Enterprise Manager.

During a restore operation, the selected database must not be in use. Any data in the selected database is replaced by the restored data.

Restore Types

The BrightStor ARCserve Backup Agent for Microsoft SQL Server supports the following types of restores:

- **Complete database restore**—Restores the entire database.

- **Differential backup restore**—Restores the database to the point in time when you created the differential backup. Typically, you would supplement differential backups by creating multiple Transaction log backups after each database backup. Using a combination of full-database, differential, and Transaction log backups, you can minimize the time of database recovery and the amount of data loss due to failure.

- **Transaction log restore**—Restores the Transaction log. Restoring a Transaction log is also referred to as **applying** a Transaction log. When you restore a Transaction log, Microsoft SQL Server reexecutes the changes contained in the log and rolls back any transactions that were uncommitted when you backed up the Transaction log.

  After you have restored a database, you can load the differential backup (if any) and the Transaction log backups you created after backing up that database. Loading Transaction logs lets you to recover as much of a database as possible.

  You must load backups of the Transaction log in the sequence in which they were created. Microsoft SQL Server checks the timestamps on each backed up database and each backed up Transaction log to verify that the sequence is correct.

  After Microsoft SQL Server has loaded the entire sequence of Transaction log backups, the database is restored to its state at the time of the last Transaction log backup, excluding any uncommitted transactions. The only uncommitted transaction that Microsoft SQL Server does not roll back is the Microsoft SQL Backup Log transaction, which is completed as part of the restore process instead.

■ **File and file group restore** — Restores files or file groups. You can restore files and file groups from either a file or file group backup or from a full database backup. When restoring files or file groups, you must apply all of the differential file or file group backup sessions, followed by all of the Transaction log backup sessions performed after the file or file group backup. When you restore a file or file group, you must apply the Transaction log to the database files immediately after the last file or file group operation.

Important! While using Automatic Selection, you may be unable to restore a database to a different location on a disk (for example, to a different drive letter or directory path, or with a different file name) For more information about restoring to a different location, see <u>Restoring to an Alternative Disk Location Using Automatic Selection</u> *in this chapter.*

What Are Differential Backup Restores

A differential backup contains only the data that has changed since the last full backup. If you have performed multiple differential backups after a full backup, you will need only the latest differential backup to restore the database to its most recent state.

After you have selected a differential backup session to restore, the BrightStor ARCserve Backup Automatic Selection option automatically selects the appropriate full-database backup session and the proper options. Automatic Selection ensures that the correct sessions are restored in your job. Although you can package the appropriate sessions manually, Automatic Selection can save time.

When you restore a differential backup, the database must not be in use. Any data in the specified database is replaced by the restored data. If you are not using Automatic Selection, the database must be in a Loading state from a Full Database restore.

Unlike Transaction log restores, differential restores do not let you restore a database to the exact point of failure, but only to the point in time that you created the differential backup.

What Are Transaction Log Restores

When restoring from a Transaction log backup, you must remember to apply the Transaction log backup to the appropriate database, differential backup, or file group backup. In summary, when you are restoring, do the following:

■ Restore the database backup

■ Restore the latest differential backup, if any

■ Restore the Transaction log backup

When you select a Transaction log backup to restore, the Automatic Selection option automatically selects the appropriate Transaction log backup, differential backup, and database backups, and the proper options. Automatic Selection ensures that the correct sessions are being restored in your job. Although you can package the appropriate sessions manually, Automatic Selection can save time.

What Are File and File Group Restores

You can restore individual files or file groups from either a file or file group backup or from a full database backup. When you use this option, you must apply the Transaction log to the database immediately after the last file or file group restore operation. This allows the contents of the file to roll forward, making it consistent with the rest of the database.

If you have selected a file or file group backup to restore and use Automatic Selection, the Automatic Selection option automatically selects all of the Transaction log backups that are needed to run the restore successfully. Automatic Selection ensures that the correct sessions are restored by your job. Although you can package the appropriate sessions manually, Automatic Selection can save time.

If you have selected a file or file group differential backup to restore and use Automatic Selection, the Automatic Selection option selects the file or file group backup session on which the differential was based and all of the Transaction log backups that are needed to run the restore successfully.

Restoring a Master Database in Windows 2000, XP or 2003

Before you restore the master database, you may need to rebuild it from Microsoft SQL Server 7.0 or Microsoft SQL Server 2000 using the Microsoft SQL Server Rebuild Master utility. Restoring the master database requires that the restore operation have exclusive access to the SQL Server instance. To ensure this, you must start Microsoft SQL Server in single-user mode and restore the master database from the most recent backup.

Note: For complete instructions on rebuilding your Microsoft SQL Server 7.0 or Microsoft SQL Server 2000 master database, see the Microsoft SQL server documentation.

Important! Microsoft SQL Server Desktop Engine (MSDE) does not contain the Rebuild Master Database utility. To recreate the master and model databases if you are using MSDE, you must reinstall your MSDE-based application, and then restore the appropriate online backups.

A permissions conflict may occur when you run Microsoft SQL Server from a command line as system administrator while the BrightStor ARCserve Backup Agent for Microsoft SQL Server is running as a service. Use the following procedure to run Microsoft SQL Server in single-user mode as a service to avoid the permissions conflict.

Note: The following procedure for restoring a master database does not apply to a Windows NT environment. For information about restoring a master database in a Windows NT environment, see Restoring a Master Database in Windows NT in this chapter.

To start Microsoft SQL Server in single-user mode, follow these steps:

1. From the Start menu, choose Settings, Control Panel. From the Control Panel open Administrative Tools.

2. Open Services. The Services window opens.

3. Search the list of services for one of the following Microsoft SQL Server services:

   ■ **MSSQLServer**—For Microsoft SQL Server 7.0.

   ■ **MSSQLSERVER**—For a default instance of Microsoft SQL Server 2000.

   ■ **MSSQL$**—Named instances of Microsoft SQL Server 2000. The name of the instance follows MSSQL.

4. Right-click the service. From the pop-up menu, choose Properties. The Service Properties dialog opens.

5. Stop the Microsoft SQL Server service if it is running. To stop the service, click Stop on the General Tab in the Service Properties dialog.

6. In the Start parameters field at the bottom of the dialog, enter –c –m, as shown in the following example:

7. Click Start to restart the service, and then click OK.

Returning Microsoft SQL Server Service to Normal (Multi-User) Mode

When you finish restoring the master database, you must return Microsoft SQL Server service to normal (multi-user) mode. To return Microsoft SQL Server service to multi-user mode, follow these steps:

1. From the Start menu, choose Settings, Control Panel. From the Control Panel open Administrative Tools.

2. Open Services. The Services window opens.

3. Search the list of services for one of the following Microsoft SQL Server services:

   ■ **MSSQLServer**—For Microsoft SQL Server 7.0.

   ■ **MSSQLSERVER**—For a default instance of Microsoft SQL Server 2000.

   ■ **MSSQL$**—Named instances of Microsoft SQL Server 2000. The name of the instance follows MSSQL.

4. Right-click the service. From the pop-up menu, choose Properties. The Service Properties dialog opens.

5. Remove -c -m from the Start parameters field.

6. Click Start to restart the service, and then click OK.

For more information about this type of restore, as well as other special cases, see Microsoft SQL Server Books Online or the Microsoft web site.

Restoring a Master Database in Windows NT

When you restore a master database in a Windows NT Version 4.0, you must start the Microsoft SQL Server service in single-user mode. To start the Microsoft SQL Server service in single-user mode, follow these steps:

1. From the Control Panel, open Services. The Services dialog opens.

2. Search the list of services for one of the following Microsoft SQL Server services:

   ■ **MSSQLServer**—For Microsoft SQL Server 7.0.

   ■ **MSSQLSERVER**—For a default instance of Microsoft SQL Server 2000.

   ■ **MSSQL$**—Named instances of Microsoft SQL Server 2000. The name of the instance follows MSSQL$.

3. Stop the Microsoft SQL Server service if it is running. To stop the service, click the service and then click Stop.

4. In the Start parameters field at the bottom of the dialog, enter –c –m, as shown in the following example:
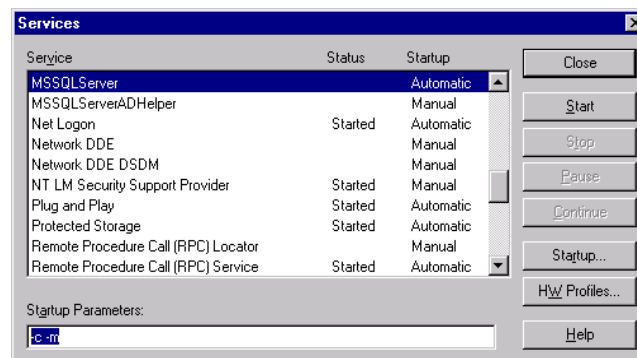
5. Click Start to restart Microsoft SQL server.

Important! None of the supporting Microsoft SQL Server services can be running during the master database restore job or the restore job will fail. If you are restoring the msdb database from a backup, you must stop the service named SQLServerAgent before the restore begins. You can restart it after the restore is complete. If you do not stop SQLServerAgent, it will not function properly after you have restored the master database.

Returning Microsoft SQL Server Service to Normal (Multi-User) Mode

When you finish restoring the master database, you must return the Microsoft SQL Server service to normal (multi-user) mode. To return the Microsoft SQL Server service to multi-user mode, follow these steps:

1. From the Control Panel, open Services. The Services dialog opens.

2. Search the list of services for one of the following Microsoft SQL Server services:

   - **MSSQLServer**—For Microsoft SQL Server 7.0

   - **MSSQLSERVER**—For a default instance of Microsoft SQL Server 2000

   - **MSSQL$**—Named instances of Microsoft SQL Server 2000. **MSSQL$** is followed by the name of the instance

3. If the Microsoft SQL Server service is running, stop the service by clicking the service, and then clicking Stop.

4. Click Start to restart Microsoft SQL Server.

   Note: Note that the Startup Parameters field is cleared.

Restore Options

The BrightStor ARCserve Backup Agent for Microsoft SQL Server provides the following restore options:

- BrightStor ARCserve Agent Automatic Selection
- Restore Type (Full or File and Filegroup)
- Force Restore Over Existing Files
- Log Point in Time Restore
- Restore Database Files As
- Recovery Completion State
- Database Consistency Check
- Restricted User Access After Restore
- Keep Replication Settings

Each option is explained in the sections that follow.

Using Automatic Selection

The BrightStor ARCserve Backup Automatic Selection option automatically selects:

- Other sessions that must be restored with the session you are restoring for the restore job to be successful
- Appropriate options needed for the restore job

The Automatic Selection option is the default option for every restore job. In most cases, you should accept Automatic Selection as your only restore option. Using Automatic Selection will save you time and prevent errors in packaging the restore job.

Important! *While using Automatic Selection, you may be unable to restore a database to a different location on a disk (for example, to a different drive letter or directory path, or with a different file name). For more information about restoring to a different location, see* *Restoring to an Alternative Disk Location Using Automatic Selection* *in this chapter.*

Using Restore Type

The Restore Type option lets you select the type of restore from the following choices:

■ **The Database option**—Use the Database option to restore complete databases, differential backups, and Transaction log backups.

■ **The Files or Filegroups option**—Use the File or Filegroups option to restore file or file group backups or files that belong to database backups, but not files that belong to log backups or differential backups. After you have selected the File or Filegroups option, you must select the files you want to restore.

■ **The Partial Restore option**—In Microsoft SQL Server 2000 only, use the Partial Restore option to:

– Restore part of a database to its original location

– Restore part of a database to another location so you can copy damaged or missing data back to the original database

You can use this option with full database backup sessions only.

A partial restore always restores the primary file group and other files you specify and their corresponding file groups. The result is a subset of the database. File groups that are not restored are marked as offline and are not accessible. The granularity of the partial restore operation is the database file group.

Backing Up a Transaction Log After Restoring a File or File Group

After restoring a file or file group, you must apply a Transaction log session to roll the contents of the file forward to make it consistent with the rest of the database. Therefore, each time you back up a file or file group, you should perform a Transaction log backup immediately afterwards.

Microsoft SQL Server requires that you restore all file groups, for which you created indexes since their last backup, in a single operation. You must fulfill this requirement whether you are restoring from a file group backup or from a full database backup. Microsoft SQL Server detects the file group index and compiles a list of the file groups you must restore. Microsoft SQL Server reports this information to you when the restore is run.

For more information about the requirements for restoring files and file groups, see the Microsoft SQL Server documentation.

Using Force Restore Over Existing Files

The Force Restore Over Existing Files option lets Microsoft SQL Server overwrite files it does not recognize as part of the database it is restoring. Use this option only if you receive a message from Microsoft SQL Server that tells you to use the With Replace option.

Microsoft SQL Server supports this option for file or file group restores.

Using Log Point in Time Restore

The Log Point in Time Restore option restores a database to the state it was in at a date and time you have specified. You should use Automatic Selection with this option.

Important! *You cannot use the Log Point in Time Restore option if the database you are recovering uses the Bulk-Logged recovery model.*

To find the correct log when you have selected the Log Point in Time Restore option, Microsoft SQL Server restores the record in each Transaction log containing the start and finish time of the backup. Microsoft SQL Server then searches this record for the time you have specified. If Microsoft SQL Server does not find the specified time, it cannot restore the log. If Microsoft SQL Server does find the specified time, it restores the log to the point in the record that contains the time you submitted. After this is done, the agent signals BrightStor ARCserve Backup to stop restoring. The database is then fully recovered. If there are other logs with the same time, those logs are ignored and the subsequent sessions are skipped.

The Log Point in Time Restore option has limitations. For example, you do not select Automatic Selection and choose the Force Restore Over Existing Files option. If you select to restore one or more logs belonging to the same database, but do not select the appropriate database, differential backup, and file group sessions to be restored first, the job will be incomplete and the subsequent sessions for that database will be ignored.

The options available for Log Point in Time Restore are:

- **Stop at time**—This option includes date and time fields in which you can enter a specific date and time. The option recovers the database to the specified date and time. This is the default option.

■ **Stop before log mark** — This option includes date and time fields in which you can set a specific date and time mark. The option recovers the database to the specified mark but does not include the transaction that contains the mark. If you do not check the After datetime check box, recovery stops at the first mark with the specified name. If you check the After datetime check box, recovery stops at the first mark with the specified name exactly at or after the date and time.

Note: This option is available in Microsoft SQL Server 2000 only.

■ **Stop at log mark** — This option includes date and time fields in which you can set a specific date and time mark. The option recovers the database to the specified mark, including the transaction that contains the mark. If you do not check the After datetime check box, recovery stops at the first mark with the specified name. If you check the After datetime check box, recovery stops at the first mark with the specified name exactly at or after the date and time.

Note: This option is available in Microsoft SQL Server 2000 only.

Using Restore Database Files As

Using the Restore Database Files As option, you can:

■ View the list of files for the database and related information.

■ Select the files to be restored in a file or file group backup session or a database backup session.

■ Change the location or file name of files during a restore.

Note: Use the location change function only with complete database restores or when using Automatic Selection.

Important! If you are restoring from an old log or differential backup, you may not be able to restore a database to a different location on a disk (for example, with a different file name or to a different drive letter, or directory path) while using Automatic Selection. For more information about restoring to a different location, see Restoring to an Alternative Disk Location Using Automatic Selection in this chapter.

Using Recovery Completion State

The Recovery Completion State option lets you specify the final state of a session restore using the following options:

- **Leave database operational. No additional transaction logs can be restored**—This option instructs the restore operation to roll back any uncommitted transactions. After the recovery process, the database is ready for use.

  Note: If you use Automatic Selection, you do not have to choose any of the Recovery Complete State selections manually for the automatically selected sessions because BrightStor ARCserve Backup performs the selection of sessions and the necessary options automatically. If you do not choose Automatic Selection, you must follow Microsoft SQL Server rules regarding the restore flow. For further information, see Microsoft SQL Server documentation.

- **Leave database nonoperational, but able to restore additional transaction logs**—This option instructs the restore operation **not** to roll back any uncommitted transactions. You must choose either this option or the Leave database read-only option if you need to apply another differential backup or Transaction log. Microsoft SQL Server requires that you use this option for all but the final session. You must also use this option for database restores with multiple Transaction log restores or when a restore requires multiple sessions (for example, a full database backup followed by a differential backup).

- **Leave database read-only and able to restore additional transaction logs**—This option prepares a standby (warm backup) server. A standby server is a second server that you can bring online if the primary production server fails. It contains a copy of the databases on the primary server. For further information about standby servers, see Microsoft SQL Server documentation.

Database Consistency Check (DBCC)

A Database Consistency Check (DBCC) tests the physical and logical consistency of a database. When you enable the database consistency check option for a restore, it performs the following test:

- **DBCC CHECKDB**—Checks the allocation and structural integrity of all the objects in the specified database. By default, the CHECKDB performs a check for indexes that can increase the overall execution time.

  Note: The system table indexes are checked regardless of whether you select this option.

- **DBCC CHECKCATALOG**—Checks for consistency in and between system tables in the specified database.

Using Restricted User Access after Restore

Available for Microsoft SQL Server 2000 only, the Restricted User Access after Restore option restricts access to a newly restored database to members of the db_owner, dbcreator, or sysadmin roles. In Microsoft SQL Server 2000, Restricted_User replaces the DBO_Only option from Microsoft SQL Server 7.0. This option requires the Leave database operational, no additional transaction logs can be restored option.

Using Keep Replication Settings

Available for Microsoft SQL Server 2000 only, the Keep Replication Settings option instructs the restore operation to preserve replication settings when restoring a published database to a server other than the one on which it was created. As a result, it prevents Microsoft SQL Server from resetting the replication settings when it restores a database or log backup on a warm standby server and recovers the database. Use the Keep Replication Settings option when setting up replication to work with log shipping.

You cannot select this option when restoring a backup with the Leave database non-operational, but able to restore additional transaction logs option. Only use this option with the Leave database operational, no additional transaction logs can be restored option.

Using SQL Agent Filter

You can use the SQL Agent Filter option in the Restore Manager to display backup sessions of a particular database belonging to a particular server name and, in the case of Microsoft SQL Server 2000, a particular instance. This option is available when you are using the Restore by Session method.

To display backup sessions of a database belonging to a server name, follow these steps:

1. Open the Restore Manager and select Restore, and then select Filter.

2. On the Filter dialog, select the SQL Agent Filter tab, as shown in the following example:
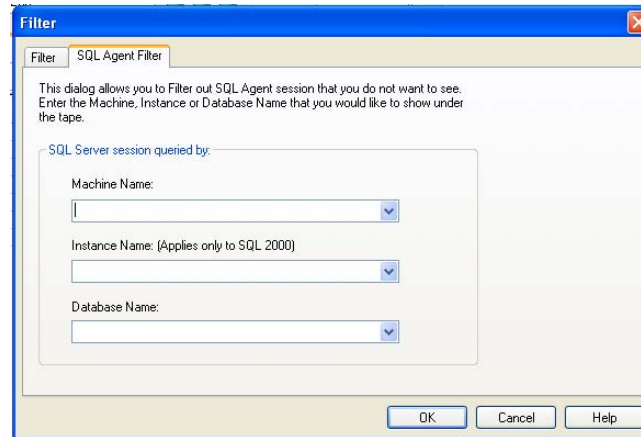
3. If you are using Microsoft SQL Server 7.0, enter a machine name, or a machine name and database name. If you are using Microsoft SQL Server 2000, enter a machine name and a database name, or a machine name, instance name, and database name.

    Note: If you have several databases with the same matching character set in the name, they will all be displayed.

4. Click OK.

    Note: After you apply the Microsoft SQL filter settings, you can expand media items to view the results. If a media item was expanded already, you must collapse it and then expand it again to see the results.

Restoring a Database

If a database is damaged or lost, you can restore the database by reloading the most recent database backup, the latest differential backup, and the succeeding Transaction log backups. If you have corrupted data in the database, you can reload a database backup over the former database.

When you restore a database from a backup, that database must not be in use because any data in the specified database is replaced by the restored data.

Restoring a Complete Database, Differential, Transaction Log, or File and File Group Backups

You can restore from the following types of backup sessions:

- Complete database backups
- Differential backups
- Transaction log backups
- File and file group backups

For any type of restore, you can use the following restore methods:

- **Restore by Tree**—This option displays a tree of the networks and computers backed up by BrightStor ARCserve Backup. To run a restore, you expand the networks and computers to display databases and files, and then select the databases or files that you want to restore. The databases displayed are from the most recent backup sessions. This is the default.

- **Restore by Session**—This option displays a list of media you have used when backing up with BrightStor ARCserve Backup. To run a restore, you select the media containing the backup you want, browse the session containing that backup, and select the specific database or log you want to restore.

For instructions on restoring by tree or restoring by session, see the sections, Restoring by Tree Method or Restoring by Session Method, in this chapter.

Note: BrightStor ARCserve Backup supports only Restore by Tree and Restore by Session for Microsoft SQL Server.

Restoring by Tree Method

To restore using the Restore by Tree method, follow these steps:

1. Open the Restore Manager. In the drop-down menu under the Source tab, select Restore by Tree if it is not already selected.

2. In the Source tab below the drop-down menu, expand the computer from which the database you want to restore was backed up. The database instances are displayed.

3. Expand the database instance that contains the database that you want to restore by clicking the yellow database icon.

4. Select the database by clicking its name, as shown in the following example:
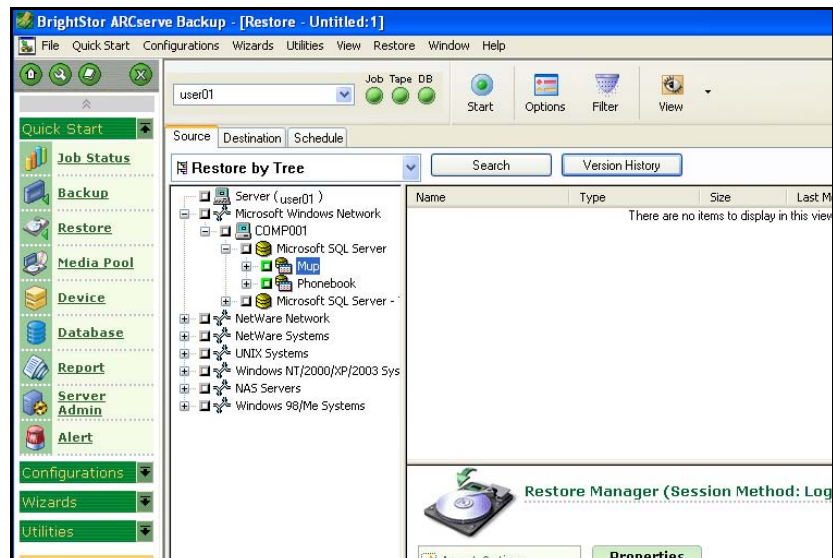
5. If you plan to use the most recent backup, go to Step 8. If you plan to use a backup other than the most recent one, click the Version History button. The Version History dialog opens.

   Note: Version History provides information on the media name attached to each backup session, its backup session number, backup method, and the date and time the backup was made. You can select the session to restore from the backup media using Version History.

6. Select a backup session to use for the restore, as shown in the following example:

7. Click Select. The Version History dialog closes.

8. Right-click the database name on the Source tab. A pop-up menu opens.

9. Choose Backup Agent Options. For Microsoft SQL Server 7.0, the following version of the Backup Agent Restore Options dialog opens:

For Microsoft SQL Server 2000, the following version of the Backup Agent Restore Options dialog opens:

Note: The dialog may vary depending on the restore sessions selected.

> **Tip:** The Automatic Selection option on the Backup Agent Restore Options dialog automatically selects the restore options that are appropriate for your backup. In most cases, you should accept Automatic Selection as your only option for a restore job.

10. Perform one of the following actions:

   ■ Click OK to let the Automatic Selection option select the appropriate restore options for the restore job. The Automatic Selection option is the default option for every restore job.

   ■ Manually select the options that you want to use for this restore session. When you are finished, click OK. For more information about options, see <u>Restore Options</u> earlier in this chapter.

11. In the Source tab, ensure that the session you want to restore is selected.

12. Click the Destination tab in the Restore Manager and select a destination using one of the following procedures:

To Restore	Action
To the **original** server using the **original** database name	Select the Restore files to their original locations option if not selected already.
To a **different** server, or a **different instance** on the original server, using the **original** database name	Clear the Restore files to their original locations option; then find and select the Microsoft SQL Server instance for the destination server. **Note:** If the database to be restored was backed up from an Microsoft SQL Server 7.0 instance and is being restored to a Microsoft SQL Server 2000 instance, you must still explicitly select the target instance even if it is a default instance.

To Restore	Action
Using a **different** database name	Clear the Restore files to their original locations check box, then select the server you want to be the destination.
	Find and select the Microsoft SQL Server instance on the destination server.
	In the space below the check box, enter a backslash and the new name of the database at the end of the displayed path, as shown in the following example:
	\\ABC12-3\dbasql70\Lightning

13. Click Start. The Session User Name and Password dialog opens, as shown in the following example:

14. Verify or change the user name or password for the Windows computer on which Microsoft SQL Server is loaded. To verify or change the user name or password, follow these steps:

    a. Select a session on the Machine tab and click Edit. The Enter User Name and Password dialog opens.

    b. Enter or modify the user name and password, if necessary.

    c. If a session password was assigned to this session, enter the session password.

    d. If you want the user name, password, and session password you entered applied to all the sessions that you are restoring, select the Apply [User Name and Password] to all rows option.

    e. Click OK to close the Enter User Name and Password dialog.

15. Verify or change the user name or password for the database servers to which you are restoring. To verify or change the user name or password for the database servers, follow these steps:

    a. Select the DBAgent tab.

    b. Select a session and click Edit. The Enter User Name and Password dialog opens.

    c. Enter or modify the user name and password, if necessary.

    d. If you want the user name, password, and session password you entered applied to all the sessions that you are restoring, select the Apply [User Name and Password] to all rows option.

    e. Click OK to close the Enter User Name and Password dialog.

16. Click OK on the Session User Name and Password dialog. The Submit Job dialog opens.

17. Click OK to submit this job. The Job Status window opens. Use this window to monitor your job.

Restoring by Session Method

To perform a restore using the Restore by Session method, follow these steps:

1. Open the Restore Manager. In the drop-down menu under the Source tab, select Restore by Session. A list of the media you have used when backing up with BrightStor ARCserve Backup opens.

2. If you want to create a filter to restore only the sessions from a specific server or the sessions from a specific database on a specific server, click the Filter tab at the top of the Restore Manager window. The Filter dialog opens.

    If you do not want to create a filter, go to Step 6.

3. Click the SQL Agent Filter tab. The SQL Agent Filter dialog opens.

4. Enter a machine name if you want to restore the sessions from a particular server, or a machine name and database name if you want to restore the sessions of a particular database.

    If you have Microsoft SQL Server 2000, you can also enter a machine name, instance name, and database name if you want to restore a particular instance of a database.

5. Click OK on the SQL Agent Filter dialog.

    Note: After you apply the SQL filter settings, you can expand the media item to view the results. If the media item was already expanded, you must collapse it and then expand it again to see the results.

6. Choose the media containing the backup you want to restore, expand the session containing that backup, and select the specific database or log you want to restore, as shown in the following example:
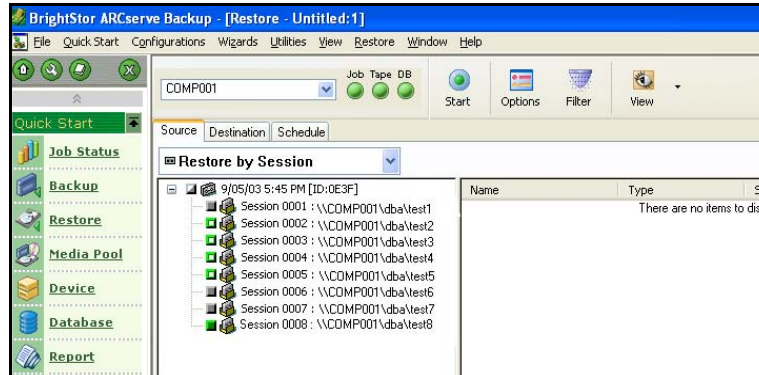
7. Right-click the name of the database or log that you want to restore. A pop-up menu opens.

8. Choose Backup Agent Options. For Microsoft SQL Server 7.0, the following version of the Backup Agent Restore Options dialog opens:

For Microsoft SQL Server 2000, the following version of the Backup Agent Restore Options dialog opens:

Note: The dialog may vary depending on the restore sessions selected.
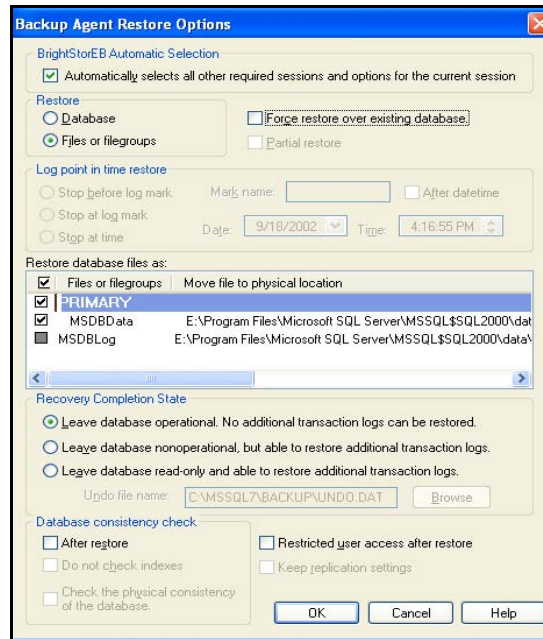
Tip: The Automatic Selection option on the Backup Agent Restore Options dialog automatically selects the restore options that are appropriate for your backup. In most cases, you should accept Automatic Selection as your only option for a restore job.

9. Perform one of the following actions:

   ■ Click OK. The Automatic Selection option selects the appropriate restore options for the restore job. The Automatic Selection option is the default option for every restore job.

   ■ Manually select the options that you want to use for this restore session. When you are finished, click OK. For more information about options, see Restore Options earlier in this chapter.

10. In the Source tab, ensure that the session you want to restore is selected.

11. Click the Destination tab in the Restore Manager and select a destination using one of the following procedures:

To Restore	Action
To the **original** server using the **original** database name	Select the Restore files to their original locations option if not selected already.
To a **different** server, or a **different instance** on the original server, using the **original** database name	Clear the Restore files to their original locations option; then find and select the Microsoft SQL Server instance for the destination server. **Note:** If the database to be restored was backed up from an Microsoft SQL Server 7.0 instance and is being restored to an Microsoft SQL Server 2000 instance, you must still explicitly select the target instance even if it is a default instance.
Using a **different** database name	Clear the Restore files to their original locations check box, then select the server you want to be the destination. Find and select the Microsoft SQL Server instance on the destination server. In the space below the check box, enter a backslash and the new name of the database at the end of the displayed path, as shown in the following example: \\ABC12-3\dbasql70\Lightning

12. Click Start. The Session User Name and Password dialog opens, as shown in the following example:

13. Verify or change the user name or password for the Windows computer on which Microsoft SQL Server is loaded. To verify or change the user name or password, follow these steps:

    a. Select a session on the Machine tab and click Edit. The Enter User Name and Password dialog opens.

    b. Enter or modify the user name and password, if necessary.

    c. If a session password was assigned to this session, enter the session password.

    d. If you want the user name, password, and session password you entered applied to all the sessions that you are restoring, select the Apply [User Name and Password] to all rows option.

    e. Click OK to close the Enter User Name and Password dialog.

14. Verify or change the user name or password for the database servers to which you are restoring. To verify or change the user name or password for the database servers, follow these steps:

    a. Select the DBAgent tab.

    b. Select a session and click Edit. The Enter User Name and Password dialog opens.

    c. Enter or modify the user name and password, if necessary.

    d. If you want the user name, password, and session password you entered applied to all the sessions you are restoring, select the Apply [User Name and Password] to all rows option.

    e. Click OK to close the Enter User Name and Password dialog.

15. Click OK on the Session User Name and Password dialog. The Submit Job dialog opens.

16. Click OK to submit this job. The Job Status window opens. Use this window to monitor your job.

Restoring to an Alternative Disk Location Using Automatic Selection

You can restore a database to a different location on a disk (for example, to a different drive letter or directory path, or with a different file name) while using Automatic Selection only if the Backup Agent Restore Options dialog displays file path entries for the data files.

Note: The Backup Agent Restore Options dialog will not have the complete file list for Transaction log and differential backups made using BrightStor ARCserve Backup Version 9.0 or earlier, or BrightStor Enterprise Backup Release 10.0.

To determine whether you can use Automatic Selection to restore a database or session to a different location, follow these steps:

1. Right-click the database if you are using Restore by Tree or the last backup session for this database if you are using Restore by Session. A pop-up menu opens.

2. Choose Backup Agent Options. The Backup Agent Restore Options dialog opens.

3. Look at the section in the middle of the dialog called Restore database files as.

   If the file groups and data files appear in this area, you can use Automatic Selection. To restore, follow the directions in Restoring by Tree Method or Restoring by Session Method earlier in this chapter.

Restoring to an Alternative Disk Location by Individual Session

If the file groups and data files are not displayed in the section called Restore database files as, you must restore the sessions individually to restore them to an alternative disk location. To restore sessions to an alternative disk location individually, use one of the following methods:

- Restore by Session using a single restore job

- Restore by Session using a separate job for each session

- Restore by Tree

For information on these restore methods, see the following sections: Restoring by Session Using a Single Restore Job, Restoring by Session Using a Separate Job for Each Session, or Restoring by Tree in this chapter.

Restoring by Session Using a Single Restore Job

If restoring by session using a single restore job, follow these steps:

1. Open the Restore Manager. In the drop-down menu under the Source tab, select Restore by Session. A list of the media you have used when backing up with BrightStor ARCserve Backup opens.

2. Choose the media containing the backup you want to restore, expand the session containing that backup, and select the current backup session.

3. Right-click the backup session. A pop-up menu opens.

4. Choose Backup Agent Options. The Backup Agent Restore Options dialog opens.

5. Clear the Automatic Selection check box and confirm that the following option is selected under Recovery Completion State:
   Leave database operational. No additional transaction logs can be restored

6. Click OK.

7. For each additional required backup of the database, perform the following steps:

    a.   Select the next most recent session.

    b.   Open the Backup Agent Restore Options dialog as described in Steps 3 and 4.

    c.   Clear Automatic Selection, and select the following option under Recovery Completion State.
       Leave database nonoperational, but able to restore additional transaction logs

    d.   Click OK.

8. For the earliest of these backup sessions, that is, the full backup on which the others depend, make the appropriate changes to the file paths and names.

    *Important! **Do not** edit the file names or paths for any of the sessions **except** the full backup session.*

9. Complete the restore job packaging and submit the restore job. For instructions on restoring by session, see <u>Restoring by Session Method</u> starting at Step 11.

Restoring by Session Using a Separate Job for Each Session

If restoring using a separate job for each session, you may want to submit each job on hold, and then make each job ready individually as the previous one finishes. To package the database restore as separate jobs, follow these steps:

1. Open the Restore Manager. In the drop-down menu under the Source tab, select Restore by Session. A list of the media you have used when backing up with BrightStor ARCserve Backup opens.

2. Choose the media containing the backup you want to restore, expand the session containing that backup, and select the most recent full database backup of the database you want to restore. This is the full backup on which the more recent backup sessions depend.

3. Right-click the backup session. A pop-up menu opens.

4. Choose Backup Agent Options. The Backup Agent Restore Options dialog opens.

5. Clear the Automatic Selection check box and edit the file names or paths as appropriate.

6. Select the following option under Recovery Completion State:
Leave database nonoperational, but able to restore additional transaction logs

7. Click OK to close the Backup Agent Restore Options dialog and submit the restore job.

8. Remove the selection from the backup session you included in the previous restore job, and then find and select the next backup session for the database you want to restore.

9. Right-click the backup session. A pop-up menu opens.

10. Select Backup Agent Options. The Backup Agent Restore Options dialog opens.

11. Clear the Automatic Selection check box.

12. If this is **not** the last session to be restored, select the following option under Recovery Completion State:
Leave database nonoperational, but able to restore additional transaction logs

If this **is** the last session to be restored, confirm that the following option is selected under Recovery Completion State:
Leave database operational. No additional transaction logs can be restored

13. Click OK to close the Backup Agent Restore Options dialog and submit the restore job. For instructions about restoring by session, see Restoring by Session Method starting at Step 11.

14. Repeat Steps 7 through 12 until all backup sessions have been submitted for the restore.

Restoring by Tree

If you are using the Restore by Tree method, you must submit each session as a separate restore job. You may want to submit each job on hold, and then make each job ready individually as the previous one completes. To restore sessions as separate jobs using the Restore by Tree method, follow these steps:

1. Open the Restore Manager. In the drop-down menu under the Source tab, select Restore by Tree if it is not already selected.

2. In the Source tab below the drop-down menu, expand the computer from which the database you want to restore was backed up. The database instances appear.

3. Expand the database instance that contains the database you want to restore.

4. Select the database.

5. Click Version History.

6. In the Version History dialog, scroll right to find the columns labeled Method and Backup Time.

   Note: Entries are displayed in reverse chronological order, meaning that more recent backups are displayed higher on the list.

7. Find and select the most recent backup whose method is Database and click Select.

8. Right-click the selected database session. A pop-up menu opens.

9. Choose Backup Agent Options. The Backup Agent Restore Options dialog opens.

10. Edit the file names or paths as appropriate, and select the following option under Recovery Completion State:
    Leave database nonoperational, but able to restore additional transaction logs

11. Click OK to close the Backup Agent Restore Options dialog and submit this restore job. For instructions about restoring by tree, see Restoring by Tree Method starting at Step 11.

12. Click Version History again and select the next backup session after the one currently selected.

13. Open the Backup Agent Restore Options dialog. Clear the Automatic Selection check box.

14. If this is **not** the last session to be restored, select the following option under Recovery Completion State:
    Leave database nonoperational, but able to restore additional transaction logs

    If this **is** the last session to be restored, confirm that the following option is selected under Recovery Completion State:
    Leave database operational. No additional transaction logs can be restored

15. Click OK to close the Backup Agent Restore Options dialog.

16. Submit the restore job. For instructions about restoring by tree, see Restoring by Tree Method starting at Step 11.

17. Repeat Steps 11 through 16 until all backup sessions have been submitted for a restore.

Chapter	**Backing Up and Restoring in a**
5	**Cluster Environment**

This chapter contains information about backing up and restoring database and transaction log files using BrightStor ARCserve Backup, the BrightStor ARCserve Backup Agent for Microsoft SQL Server, and Microsoft SQL Server or Microsoft SQL Server 2000 in a Microsoft SQL Server cluster environment.

Backing Up and Restoring in a Microsoft SQL Server Cluster Environment

BrightStor ARCserve Backup supports the Microsoft SQL virtual server in the Microsoft Clustering Server (MSCS) environment using Microsoft SQL Server 7.0 with Windows NT 4.0 and Microsoft SQL Server 2000 with Windows 2000.

You use BrightStor ARCserve Backup and the BrightStor ARCserve Backup Agent for Microsoft SQL Server to backup and restore a Microsoft SQL virtual server just like any nonclustered Microsoft SQL Server with the following important differences:

■ You must install the BrightStor ARCserve Backup Agent for Microsoft SQL Server on the local drives of all nodes in the Microsoft SQL virtual server.

Note: For information about installing the BrightStor ARCserve Backup Agent for Microsoft SQL Server, see Installing the Agent in a Standard Microsoft SQL Server Environment in the chapter "Installing the Agent."

■ If the node on which the Microsoft SQL virtual server is currently running fails over during a backup job, the backup job fails too, and you must restart the job.

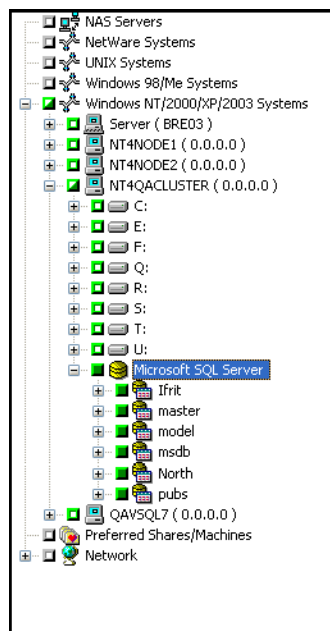## Backing Up in a Microsoft SQL Virtual Server 7.0 Environment

To back up in a Microsoft SQL Virtual Server 7.0 environment, follow the steps in these procedures:

■ Selecting server, protocol, security, and backup type

■ Selecting backup destination, schedule, and submitting the job

### Selecting Server, Protocol, Security, and Backup Type

To select the server, protocol, security, and backup type, complete the following steps:

1. Ensure that the Microsoft SQL virtual server is running in your Microsoft cluster environment on the same node as the Microsoft Cluster Server Quorum Resources.

2. Start BrightStor ARCserve Backup and open the Backup Manager.

3. Under the Source tab, either browse the MSCS computer through the Windows Systems or browse through the preferred shares (by adding the MSCS computer to the preferred shares). The Microsoft SQL virtual server object is located under the MSCS cluster on which the server is installed, as shown in the following example:

Important! In the Microsoft SQL Server 7.0 cluster environment, you must not go directly to the Microsoft SQL virtual server object in the Microsoft Network.

4. Right-click the Microsoft SQL virtual server object and select the Remote Protocol option from the pop-up menu. The Remote Protocol dialog opens, as shown in the following example:
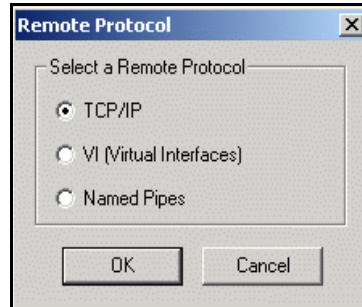

5. Select Named Pipes and click OK.

6. Right-click the Microsoft SQL virtual server object and select Security. The Security dialog opens.

7. Verify the security information (provided previously during configuration) displayed in the Security dialog. If it is correct, click OK. If it is not correct, change it and click OK.

8. Expand the Microsoft SQL virtual server object to display a list of databases for this server and select a database or database object.

    Note: For information about how to select a database to apply options properly for backup, see <u>Dynamic and Explicit Job Packaging</u> in the chapter "Backing Up Microsoft SQL Databases."

9. Right-click the database object. A pop-up menu opens.

10. Select Backup Agent Options. The Agent Backup Options dialog opens, as shown in the following example:
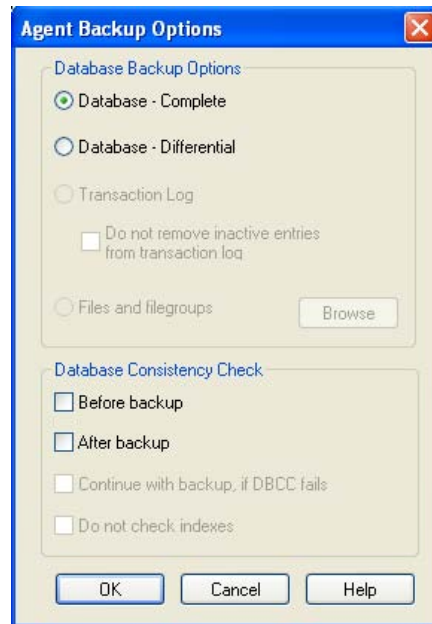
11. Select the type of backup that you want to perform. For more information about backup types, see Types of Backups in the chapter "Backing Up Microsoft SQL Server Databases."

12. If you **did not** choose Files/Filegroups, go to Step 14. If you did choose Files/Filegroups, click the Browse button. The Specify Filegroups and Files dialog opens.

13. Select the files or file groups that you want to back up, as shown in the following example. Click OK when you are finished.
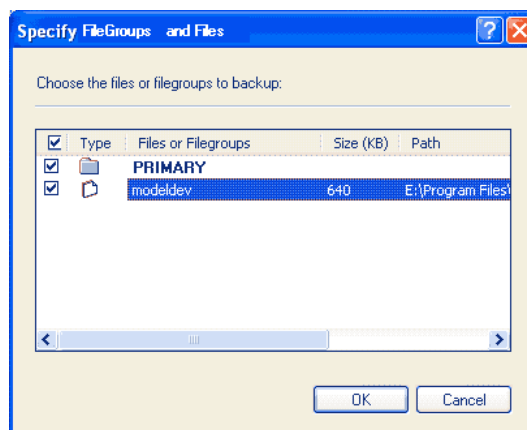
14. (Optional) On the Agent Backup Options dialog, enable a Database Consistency Check and select the Database Consistency Check options. For more information about Database Consistency Checks, see Checking the Consistency of a Database in the chapter "Backing Up Microsoft SQL Server Databases"and in your Microsoft SQL documentation.

15. Click OK.

16. Repeat Steps 8 through 15 for each database or database object that you are backing up on this job.

Selecting Backup Destination, Schedule, and Submitting the Job

To select the backup destination, schedule, and submit the job, complete the following steps:

1. Click the Destination tab in the Backup Manager and select a backup destination, as shown in the following example:
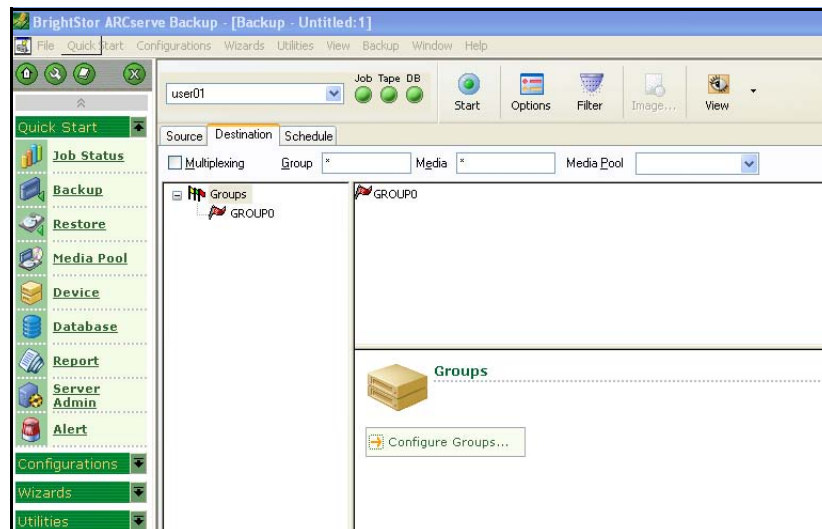
Note: You can use the * symbol in the Group or Media fields to create partial wildcards when you select a backup destination. For example, if you are backing up to two sets of groups, one with all member names beginning GroupA and the other with all member names beginning with GroupB, you can select all the GroupA member names by entering GroupA* in the Group field. For more information about selecting devices and media, see the *BrightStor ARCserve Backup Administrator Guide*.

2. Click the Schedule tab and select the scheduling options for this backup job. For information about scheduling backups, see the *BrightStor ARCserve Backup Administrator Guide*.

3. Click Start. The Security and Agent Information dialog opens, as shown in the following example:

Note: In this dialog, the column and button labeled Agent refer to the client agent, not the BrightStor ARCserve Backup Agent for Microsoft SQL Server. If you want, you can edit client agent information at this time. For more information about client agents, see the *BrightStor ARCserve Backup for Client Agents Guide*.

4. In the Security and Agent Information dialog, verify the user name and password for the computer where Microsoft SQL Server is running and for the Microsoft SQL virtual server instance. To enter or change security information for the computer or the Microsoft SQL virtual server instance, perform these steps:

   a. Select the computer or the Microsoft SQL virtual server instance object and click Security. The Security dialog opens.

   b. Enter the user name and password and click OK.

   Note: You should use the user name and password of a domain administrator for machine authentication because a domain administrator is not dependent on the computer the Microsoft SQL server instance is running on. Remember, you must specify a domain user in the form of DomainName\UserName.

5. Click OK. The Submit Job dialog opens.

6. (Optional) Use the Submit Job dialog to select the job execution time, submit the job on hold, add an optional description for the backup job, or select source priority.

7. Click OK. The Job Status window opens. Use this window to monitor the current status of your job. For more information about the Job Status window, see the *BrightStor ARCserve Backup Administrator Guide*.

Restoring by Tree in a Microsoft SQL Virtual Server 7.0 Environment

To perform a restore using the Restore by Tree method in a Microsoft SQL Virtual Server 7.0 environment, follow these steps:

1. Open the Restore Manager. In the drop-down menu under the Source tab, select Restore by Tree if it is not already selected.

2. In the Source tab below the drop-down menu, expand the virtual Windows system from which the database you want to restore was backed up. The database instances appear.

3. Expand the Microsoft SQL virtual server instance that contains the database you want to restore.

4. Select the database you want to restore.

5. If you want to use a backup that is **not** the most current backup, click Version History. The Version History dialog opens. If you want to use the most current backup, go to Step 7.
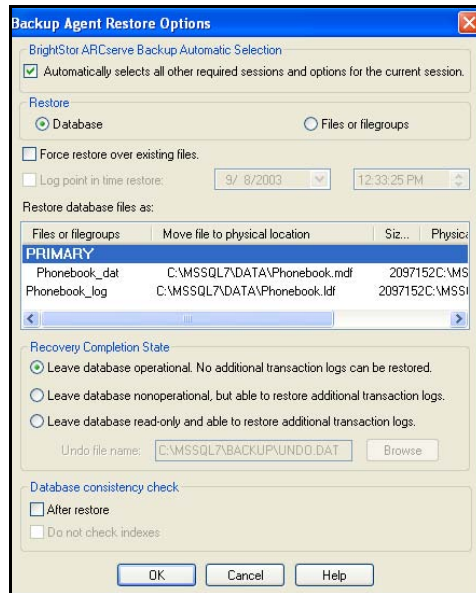
   Version History provides information on the media name attached to each backup session, its backup session number, backup method, and the date and time the backup was made. Using Version History, you can select the session to restore from the backup media.

6. Select a backup session to use for the restore, as shown in the following example; then click Select. The Version History dialog closes.
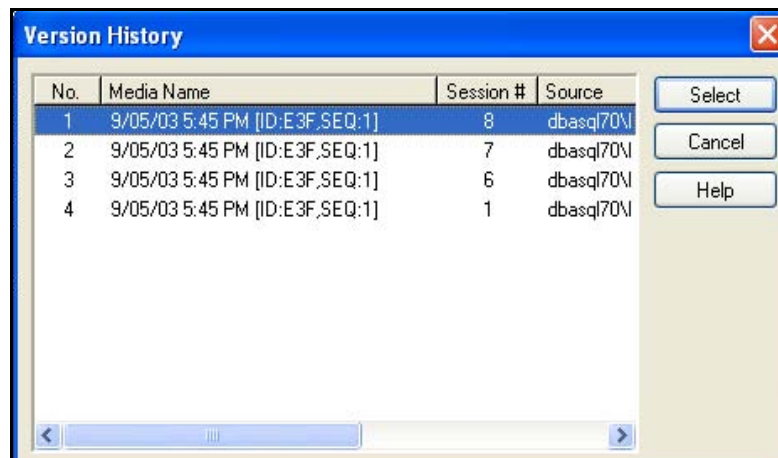
7. Right-click the database you selected to restore. A pop-up menu opens.

8.   Select Backup Agent Options. The Backup Agent Restore Options dialog opens, as shown in the following example:

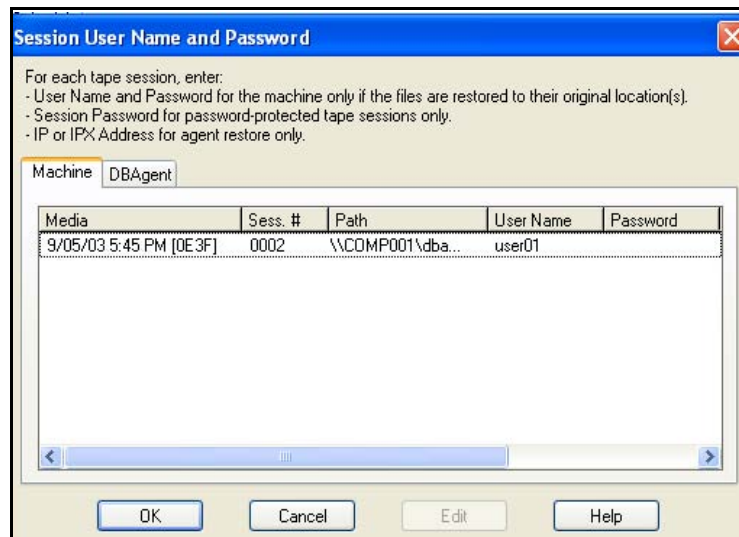**Note:** The dialog may vary depending on the restore sessions selected.

> **Tip:** The Automatic Selection option on the Backup Agent Restore Options dialog automatically selects the restore options that are appropriate for your backup. In most cases, you should accept Automatic Selection as your only option for a restore job.

9.   Perform one of the following actions:

   ■   Click OK to let the Automatic Selection option select the appropriate restore options for the restore job. The Automatic Selection option is the default option for every restore job.

   ■   Select the options that you want to use for this restore session manually. When you are finished, click OK. For more information about options, see Restore Options in the chapter "Restoring Microsoft SQL Server Databases."

10. In the Source tab, ensure that the session you want to restore is selected.

11. Click the Destination tab in the Restore Manager window and select a destination using one of the following procedures:

To Restore	Action
To the **same** server using the **same** database name	Select the Restore files to their original locations option if not selected already.
To a **different** server, or a **different instance** on the original server, using the **same** database name	Clear the Restore files to their original locations option; then find and select the Microsoft SQL server object for the destination server. **Note:** If the database to be restored was backed up from a Microsoft SQL Server 7.0 instance and is being restored to a Microsoft SQL Server 2000 instance, you must still explicitly select the target instance even if it is a default instance.
Using a **different** database name	Clear the Restore files to their original locations check box, then select the server you want to be the destination. Find and select the Microsoft SQL server instance on the destination server. In the space below the check box, enter a backslash and the new name of the database at the end of the displayed path, as shown in the following example: \\ABC12-3\dbasql70\Lightning

12. Click Start. The Session User Name and Password dialog opens, as shown in the following example:

13. Verify or change the user name or password for the Windows machine on which Microsoft SQL Server is loaded. To verify or change the user name or password, follow these steps:

    a. Select a session on the Machine tab and click Edit. The Enter User Name and Password dialog opens.

    b. Enter or modify the user name and password, if necessary.

    c. If a session password was assigned to this session, enter the session password.

    d. If you want the user name, password, and session password you entered applied to all the sessions that you are restoring, select the Apply [User Name and Password] to all rows option.

    e. Click OK to close the Enter User Name and Password dialog.

    Note: You should use the user name and password of a domain administrator for machine authentication because a domain administrator is not dependent on the computer on which the Microsoft SQL server instance is running. Remember, you must specify a domain user in the form of DomainName\UserName.

14. Verify or change the user name or password for the database servers to which you are restoring. To verify or change the user name or password for the database servers:

    a. Select the DBAgent tab.

    b. Select a session and click Edit. The Enter User Name and Password dialog opens.

    c. Enter or modify the user name and password, if necessary.

d. If you want the user name, password, and session password you entered applied to all the sessions that you are restoring, select the Apply [User Name and Password] to all rows option.

e. Click OK to close the Enter User Name and Password dialog.

Note: You must use the Microsoft SQL-native user with system administrator privileges. You cannot use a Windows user for Microsoft SQL Server authentication in a Microsoft SQL Server 7.0 cluster.

15. Click OK on the Session User Name and Password dialog. The Submit Job dialog opens.

16. Click OK to submit this job. The Job Status window opens. Use this window to monitor your job.

Restoring by Session in a Microsoft SQL Virtual Server 7.0 Environment
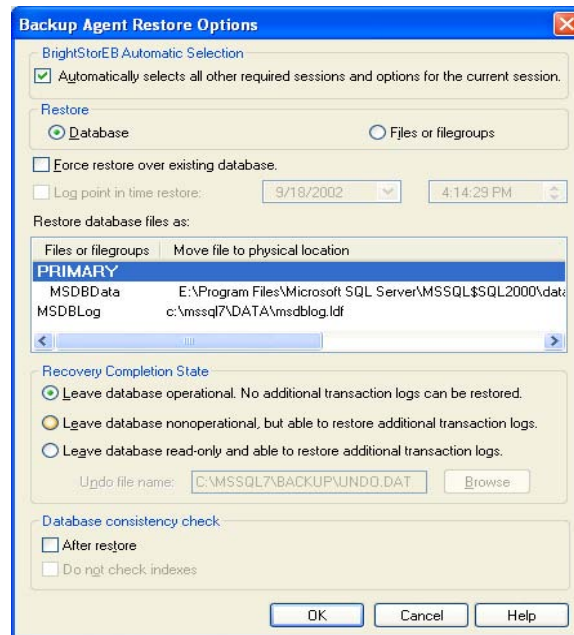
To perform a restore using the Restore by Session method, follow these steps:

1. Open the Restore Manager. In the drop-down menu under the Source tab, select Restore by Session. A list of the media you have used when backing up with BrightStor ARCserve Backup opens.

2. If you want to create a filter to restore only the sessions from a specific server or the sessions from a specific database on a specific server, click the Filter tab in the Restore Manager. The Filter dialog opens. If you do not want to create a filter, go to Step 6.

3. Click the SQL Agent Filter tab. The SQL Agent Filter dialog opens.

4. Enter a machine name if you want to restore the sessions from a particular server, or a machine name and database name if you want to restore the sessions of a particular database.

5. Click OK on the SQL Agent Filter dialog.

    Note: Once you apply the SQL filter settings, you can expand the media item to view the results. If the media item was already expanded, you must collapse it and then expand it to see the results.

6. Choose the media containing the backup you want to restore, expand the session containing that backup, and select the specific database or log you want to restore.

7. Right-click the name of the database or log you want to restore. A pop-up menu opens.

8. Select Backup Agent Options. The Backup Agent Restore Options dialog opens, as shown in the following example:

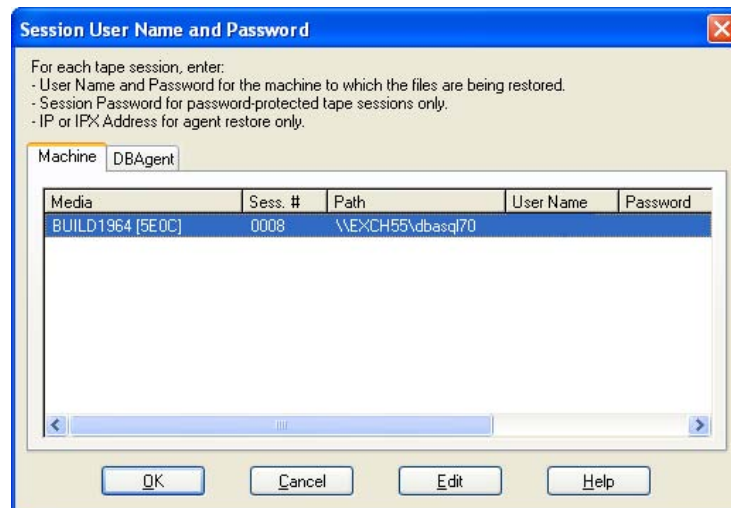**Note:** The dialog may vary depending on the Restore sessions selected.

> **Tip:** The Automatic Selection option on the Backup Agent Restore Options dialog automatically selects the restore options that are appropriate for your backup. In most cases, you should accept Automatic Selection as your only option for a restore job.

9. Perform one of the following actions:

    ■   Click OK to let the Automatic Selection option select the appropriate restore options for the restore job. The Automatic Selection option is the default option for every restore job.

    ■   Manually select the options that you want to use for this restore session. When your are finished, click OK. For more information about options, see Restore Options in the chapter "Restoring Microsoft SQL Server Databases."

10. In the Source tab, ensure that the session you want to restore is selected.

11. Click the Destination tab in the Restore Manager and select a destination using one of the following procedures:

To Restore	Action
To the **same** server using the **same** database name	Select the Restore files to their original locations option if not selected already.
To a **different** server, or a **different instance** on the original server, using the **same** database name	Clear the Restore files to their original locations option; then find and select the Microsoft SQL server object for the destination server. **Note:** If the database to be restored was backed up from a Microsoft SQL Server 7.0 instance and is being restored to a Microsoft SQL Server 2000 instance, you must still explicitly select the target instance even if it is a default instance.
Using a **different** database name	Clear the Restore files to their original locations check box, then select the server you want to be the destination. Find and select the Microsoft SQL server instance on the destination server. In the space below the check box, enter a backslash and the new name of the database at the end of the displayed path, as shown in the following example: \\ABC12-3\dbasql70\Lightning

12. Click Start. The Session User Name and Password dialog opens, as shown in the following example:

13. Verify or change the user name or password for the Windows computer on which Microsoft SQL Server is loaded. To verify or change the user name or password, follow these steps:

    a. Select a session on the Machine tab and click Edit. The Enter User Name and Password dialog opens.

    b. Enter or modify the user name and password, if necessary.

    c. If a session password was assigned to this session, enter the session password.

    d. If you want the user name, password, and session password you entered applied to all the sessions that you are restoring, select the Apply [User Name and Password] to all rows option.

    e. Click OK to close the Enter User Name and Password dialog.

    Note: You should use the user name and password of a domain administrator for machine authentication because a domain administrator is not dependent on the computer on which the Microsoft SQL server instance is running. Remember, you must specify a domain user in the form of DomainName\UserName.

14. Verify or change the user name or password for the database servers to which you are restoring. To verify or change the user name or password for the database servers, follow these steps:

    a. Select the DBAgent tab.

    b. Select a session and click Edit. The Enter User Name and Password dialog opens.

    c. Enter or modify the user name and password, if necessary.

    d.   If you want the user name, password, and session password you entered applied to all the sessions that you are restoring, select the Apply [User Name and Password] to all rows option.

    e.   Click OK to close the Enter User Name and Password dialog.

    Note: You must use the Microsoft SQL-native user with system administrator privileges. You cannot use a Windows user for Microsoft SQL server authentication in a Windows NT 4.0 Microsoft SQL Server 7.0 cluster.

15. Click OK on the Session User Name and Password dialog. The Submit Job dialog opens.

16. Click OK to submit this job. The Job Status window opens. Use this window to monitor your job.

Backing Up a Microsoft SQL Virtual Server 2000 Environment

To back up in a Microsoft SQL Virtual Server 2000 environment, follow the steps in these procedures:

■   Selecting server, protocol, security, and backup type

■   Selecting backup destination, schedule, and submitting the job

### Selecting Server, Protocol, Security, and Backup Type

To select a server, protocol, security, and backup type, complete the following steps:

1. Verify that Microsoft SQL virtual server is running in your Microsoft cluster environment.

2. Start BrightStor ARCserve Backup and open the Backup Manager.

3. Under the Source tab, find and expand the Microsoft SQL virtual server computer, **not** the physical nodes or the Windows virtual server. The Microsoft SQL virtual server instances are located under the Microsoft SQL virtual server object with which they are associated, as shown in the following example:
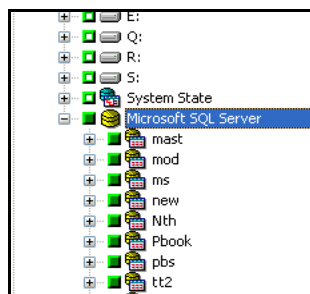
> **Note:** Browse the Microsoft SQL virtual server instances through their associated Microsoft SQL virtual server only. Browsing from any other entry point may cause backup failures if the Windows virtual server or the Microsoft SQL Virtual Server 2000 moves to a different node of the cluster. Do not browse through the MSCS computer for the Microsoft SQL Virtual Server 2000 configuration.

4. Right-click the Microsoft SQL virtual server object and select the Remote Protocol option from the pop-up menu. The Remote Protocol dialog opens, as shown in the following example:
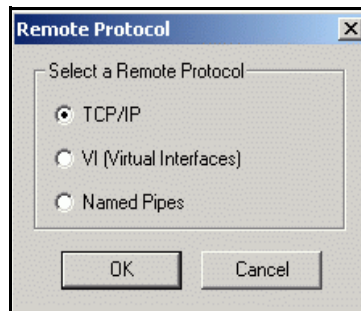

5. Select TCP/IP and click OK.

6. Right-click the Microsoft SQL virtual server object and select Security. The Security dialog opens.

7. Verify the security information (previously provided during configuration) in the Security dialog. If it is correct, click OK. If it is not correct, change it and click OK.

8. Expand the Microsoft SQL virtual server object to display a list of databases for this server and select a database or database object.

9. Right-click the database object. A pop-up menu opens.

10. Select Backup Agent Options. The Agent Backup Options dialog opens, as shown in the following example:
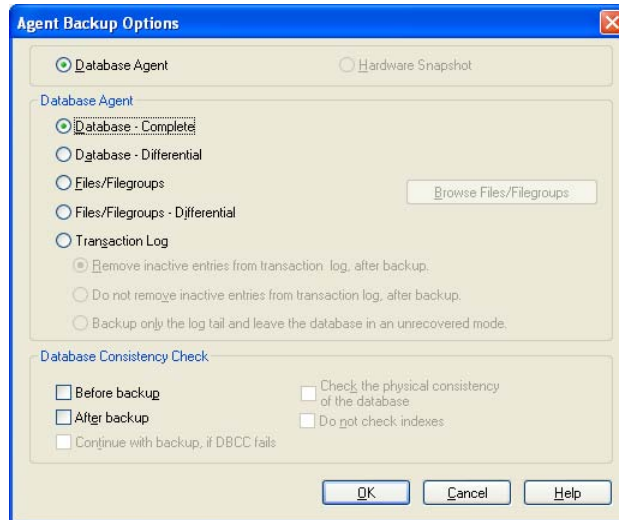
11. Select the type of backup that you want to perform. For more information about backup types, see Types of Backups in the chapter "Backing Up Microsoft SQL Server Databases."

12. If you **did not** choose Files/Filegroups or Files/Filegroups - Differential, go to Step 14. If you did choose Files/Filegroups or Files/Filegroups - Differential, click the Browse Files/Filegroups button. The Specify Filegroups and Files dialog opens.

13. Select the files or file groups you want to back up, as shown in the following example. Click OK when you are finished.
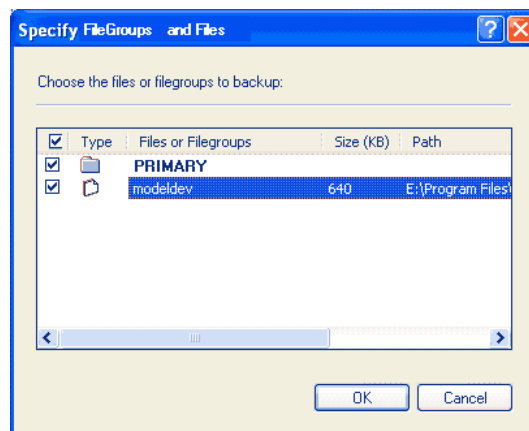

14. (Optional) Enable a Database Consistency Check and select the Database Consistency Check options. For more information about Database Consistency Checks, see Checking the Consistency of a Database in the chapter "Backing Up Microsoft SQL Server Databases"and in your Microsoft SQL documentation.

15. Click OK.

16. Repeat Steps 8 through 15 for each database or database object that you are backing up in this job.

Selecting Backup Destination, Schedule, and Submitting the Job

To select a backup destination, schedule, and submit the job, complete the following steps:

1. Click the Destination tab in the Backup Manager and select a backup destination, as shown in the following example:
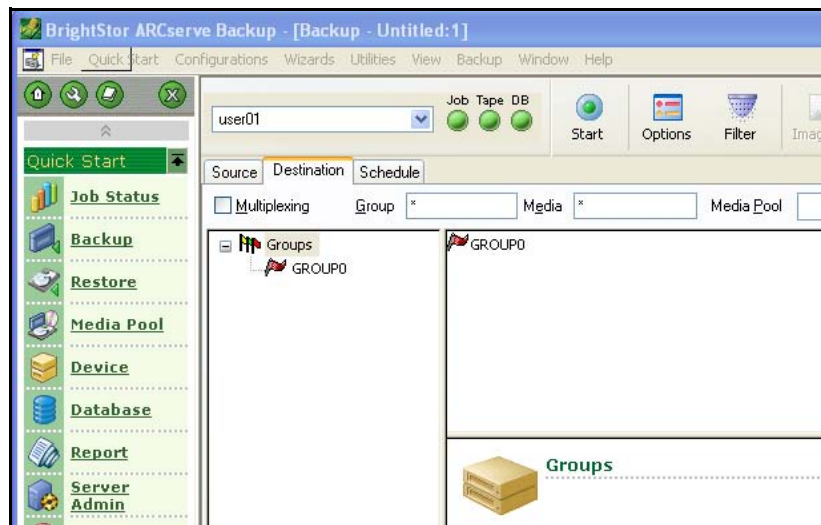
   Note: You can use the * symbol in the Group or Media fields to create partial wildcards when you select a backup destination. For example, if you are backing up to two sets of groups, one with all members names beginning GroupA and the other with all members names beginning GroupB, you can select all the GroupA members names by typing GroupA* in the Group field. For more information about selecting devices and media, see the *BrightStor ARCserve Backup Administrator Guide*.

2. Click the Schedule tab and select the scheduling options for this backup. For information about scheduling backups, see the *BrightStor ARCserve Backup Administrator Guide*.

3. Click Start. The Security and Agent Information dialog opens, as shown in the following example:

Note: In this dialog, the column and button labeled Agent refer to the client agent, not the BrightStor Enterprise Backup Agent for Microsoft SQL Server. If you want, you can edit client agent information at this time. For more information about client agents, see the *BrightStor ARCserve Backup Client Agents Guide*.

4. In the Security and Agent Information Dialog, verify the user name and password for the computer where Microsoft SQL Server is running and for the Microsoft SQL virtual server instance. To enter or change security information for the computer or the Microsoft SQL virtual server instance, complete the following steps:

   a. Select the computer or the Microsoft SQL virtual server instance object and click Security.

   b. In the Security dialog that opens, enter the user name and password and click OK.

   Note: You should use the user name and password of a domain administrator for machine authentication because a domain administrator is not dependent on the computer on which the Microsoft SQL server instance is running. Remember, you must specify a domain user in the form of DomainName\UserName.

5. Click OK. The Submit Job dialog opens.

6. (Optional) Use the Submit Job dialog to select the job execution time, submit the job on hold, add an optional description for the backup job, or select source priority.

7. Click OK to submit this job. If you selected Run Now, the Job Status window opens. Use this window to monitor your job. For more information about the Job Status window, see the *BrightStor ARCserve Backup Administrator Guide*.
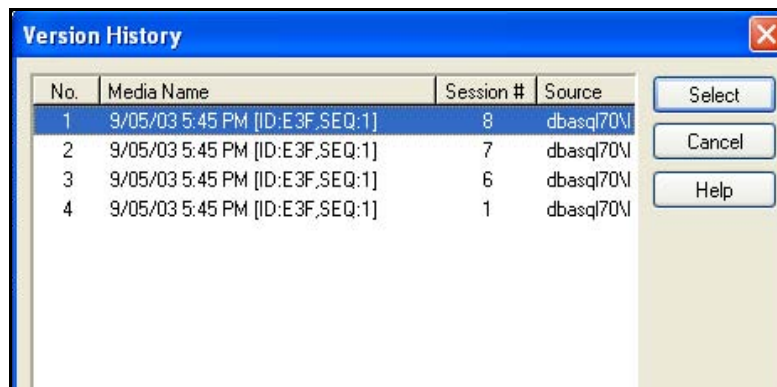
Restoring by Tree in a Microsoft SQL Virtual Server 2000 Environment

To restore using the Restore by Tree method in an Microsoft SQL Virtual Server 2000 environment, follow these steps:

1. Open the Restore Manager. In the drop-down menu on the top of the Source tab, select Restore by Tree if it is not already selected.

2. In the Source tab below the drop-down menu, expand the Microsoft SQL virtual server computer name that the database you want to restore was backed up from. The database instances appear.

3. Expand the Microsoft SQL virtual server instance that contains the database you want to restore.

4. Select the database that you want to restore.

5. If you want to use a backup that is not the most current backup, click Version History. The Version History dialog opens. If you want to use the current backup, go to Step 7.

    Version History provides information on the media name attached to each backup session, its backup session number, backup method, and the date and time the backup was made. Using Version History, you can select the session to restore from the backup media.

6. Select a backup session to use for the restore, as shown in the following example; then click Select. The Version History dialog closes.

7. Right-click the database name on the Source tab. A pop-up menu opens.

8. Select Backup Agent Options. The Backup Agent Restore Options dialog opens, as shown in the following example:
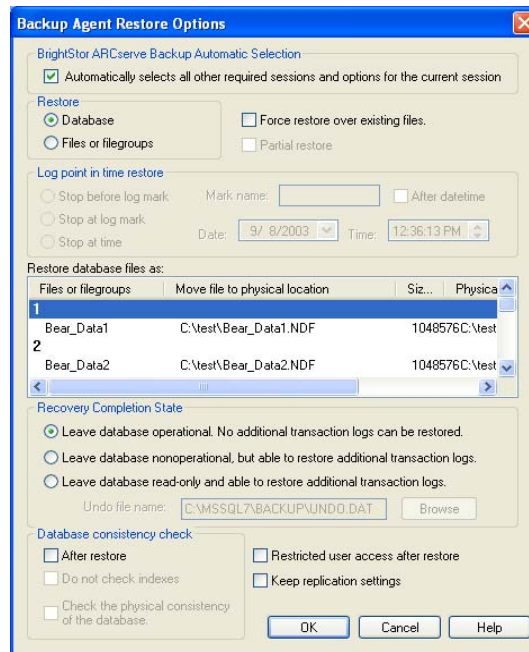
Note: The dialog may vary depending upon the restore sessions selected.
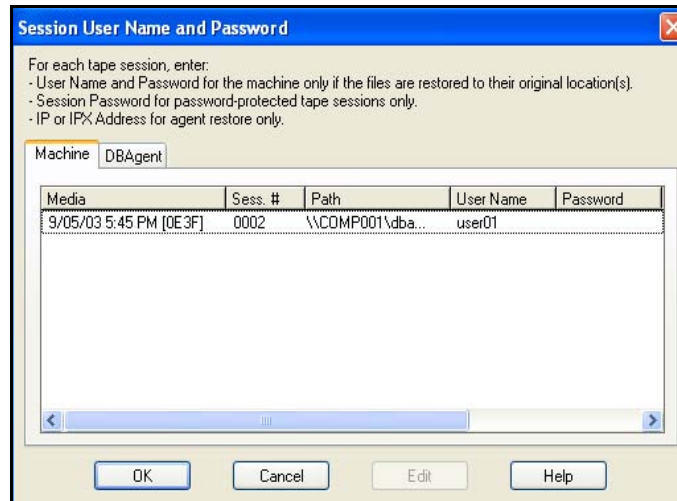
> **Tip:** The Automatic Selection option on the Backup Agent Restore Options dialog automatically selects the restore options that are appropriate for your backup. In most cases, you should accept Automatic Selection as your only option for a restore job.

9. Perform one of the following actions:

   ■ Click OK to let the Automatic Selection option select the appropriate restore options for the restore job. The Automatic Selection option is the default option for every restore job.

   ■ Manually select the options that you want to use for this restore session. When you are finished, click OK. For more information about restore options, see Restore Options in the chapter "Restoring Microsoft SQL Databases."

10. In the Source tab, ensure that the session you want to restore is selected.

11. Click the Destination tab in the Restore Manager window and select a destination using one of the following procedures:

To Restore	Action
To the **same** server using the **same** database name	Select the Restore files to their original locations option if not selected already.
To a **different** server, or a **different instance** on the original server, using the **same** database name	Clear the Restore files to their original locations option; then find and select the Microsoft SQL server object for the destination server. **Note:** If the database to be restored was backed up from a Microsoft SQL Server 7.0 instance and is being restored to a Microsoft SQL Server 2000 instance, you must still explicitly select the target instance even if it is a default instance.
Using a **different** database name	Clear the Restore files to their original locations check box, then select the server you want to be the destination. Find and select the Microsoft SQL server instance on the destination server. In the space below the check box, enter a backslash and the new name of the database at the end of the displayed path, as shown in the following example: \\ABC12-3\dbasql70\Lightning

12. Click Start. The Session User Name and Password dialog opens, as shown in the following example:

13. Verify or change the user name or password for the Windows computer on which Microsoft SQL server is loaded. To verify or change the user name or password, follow these steps:

   a. Select a session on the Machine tab and click Edit. The Enter User Name and Password dialog opens.

   b. Enter or modify the user name and password, if necessary.

   c. If a session password was assigned to this session, enter the session password.

   d. If you want the user name, password, and session password you entered applied to all the sessions that you are restoring, select the Apply [User Name and Password] to all rows option.

   e. Click OK to close the Enter User Name and Password dialog.

   Note: You should use the user name and password of a domain administrator for machine authentication because a domain administrator is not dependent on the computer on which the Microsoft SQL server instance is running. Remember, you must specify a domain user in the form of DomainName\UserName.

14. Verify or change the user name or password for the database servers to which you are restoring. To verify or change the user name or password for the database servers, follow these steps:

   a. Select the DBAgent tab.

   b. Select a session and click Edit. The Enter User Name and Password dialog opens.

   c. Enter or modify the user name and password, if necessary.

d. If you want the user name, password, and session password you entered applied to all the sessions that you are restoring, select the Apply [User Name and Password] to all rows option.

e. Click OK to close the Enter User Name and Password dialog.

15. Click OK on the Session User Name and Password dialog. The Submit Job dialog opens.

16. Click OK to submit this job. The Job Status window opens. Use this window to monitor your job.

Restoring by Session in a Microsoft SQL Virtual Server 2000 Environment

To perform a restore using the Restore by Session method, follow these steps:

1. Open the Restore Manager. In the drop-down menu under the Source tab, select Restore by Session. A list of the media that you have used when backing up with BrightStor ARCserve Backup opens.

2. If you want to create a filter to restore only the sessions from a specific server or the sessions from a specific database on a specific server, click the Filter tab in the Restore Manager. The Filter dialog opens. If you do not want to create a filter, go to Step 6.

3. Click the SQL Agent Filter tab. The SQL Agent Filter dialog opens.

4. Enter a machine name if you want to restore the sessions from a particular server, a machine name and database name if you want to restore the sessions of a particular database, or a machine name, instance name, and database name if you want to restore a particular instance of a database.

5. Click OK on the SQL Agent Filter dialog.

    Note: Once you apply the SQL filter settings, you can expand the media item to view the results. If the media item was already expanded, you must collapse it and then expand it again to see the results.

6. Choose the media containing the backup you want to restore, expand the session containing that backup, and select the specific database or log you want to restore.

7. Right-click the name of the database or log you want to restore. A pop-up menu opens.

8. Choose Backup Agent Options. The Backup Agent Restore Options dialog opens.

    Tip: The Automatic Selection option on the Backup Agent Restore Options dialog automatically selects the restore options that are appropriate for your backup. In most cases, you should accept Automatic Selection as your only option for a restore job.

9. Perform one of the following actions:

- Click OK to let the Automatic Selection option select the appropriate restore options for the restore job. The Automatic Selection option is the default option for every restore job.

- Manually select the options that you want to use for this restore session. When you are finished, click OK. For more information about restore options, see Restore Options in the chapter "Restoring Microsoft SQL Databases."

10. In the Source tab, ensure that the session you want to restore is selected.

11. Click the Destination tab in the Restore Manager window and select a destination using one of the following procedures:

To Restore	Action
To the **same** server using the **same** database name	Select the Restore files to their original locations option if not selected already.
To a **different** server, or a **different instance** on the original server, using the **same** database name	Clear the Restore files to their original locations option; then find and select the Microsoft SQL server object for the destination server. **Note:** If the database to be restored was backed up from a Microsoft SQL Server 7.0 instance and is being restored to a Microsoft SQL Server 2000 instance, you must still explicitly select the target instance even if it is a default instance.
Using a **different** database name	Clear the Restore files to their original locations check box, then select the server you want to be the destination. Find and select the Microsoft SQL server instance on the destination server. In the space below the check box, enter a backslash and the new name of the database at the end of the displayed path, as shown in the following example: \\ABC12-3\dbasql70\Lightning

12. Click Start. The Session User Name and Password dialog opens, as shown in the following example:

13. Verify or change the user name or password for the Windows computer on which Microsoft SQL Server is loaded. To verify or change the user name or password, follow these steps:

    a. Select a session on the Machine tab and click Edit. The Enter User Name and Password dialog opens.

    b. Enter or modify the user name and password, if necessary.

    c. If a session password was assigned to this session, enter the session password.

    d. If you want the user name, password, and session password you entered applied to all the sessions that you are restoring, select the Apply [User Name and Password] to all rows option.

    e. Click OK to close the Enter User Name and Password dialog.

    Note: You should use the user name and password of a domain administrator for machine authentication because a domain administrator is not dependent on the computer on which the Microsoft SQL server instance is running. Remember, you must specify a domain user in the form of DomainName\UserName.

14. Verify or change the user name or password for the database servers to which you are restoring. To verify or change the user name or password for the database servers:

    a. Select the DBAgent tab.

    b. Select a session and click Edit. The Enter User Name and Password dialog opens.

    c. Enter or modify the user name and password, if necessary.

    d. If you want the user name, password, and session password you entered applied to all the sessions that you are restoring, select the Apply [User Name and Password] to all rows option.

    e. Click OK to close the Enter User Name and Password dialog.

15. Click OK on the Session User Name and Password dialog. The Submit Job dialog opens.

16. Click OK to submit this job. The Job Status window opens. Use this window to monitor your job.

Disaster Recovery in a Microsoft SQL Server 7.0 Cluster Environment

To perform a disaster recovery in a Microsoft SQL Server 7.0 cluster environment, follow these steps:

1. Reinstall Microsoft SQL Server, but not the Microsoft SQL virtual server.

2. Reinstall the BrightStor ARCserve Backup Agent for Microsoft SQL Server, if necessary.

3. Set the BrightStor ARCserve Backup SQL Agent services and the SQL Agent services to log in as the domain administrator.

4. Start SQL Server in single user mode.

5. Restore the Microsoft SQL Server master database.

6. Set up the Microsoft SQL virtual server and reinstall the BrightStor ARCserve Backup Agent for Microsoft SQL Server with the new Microsoft SQL virtual server settings.

7. Restart Microsoft SQL Server in normal, multi-user mode and restore the rest of the databases, starting with msdb.

Note: For more information about recovering from a disaster, see the *BrightStor ARCserve Backup Disaster Recovery Option Guide*.

Disaster Recovery in a Microsoft SQL Server 2000 Cluster Environment

To perform a disaster recovery in a cluster environment, follow these steps:

1. Reinstall Microsoft SQL Server, and then either reinstall Microsoft SQL virtual server or rebuild the master database.

2. Reinstall the BrightStor ARCserve Backup Agent for Microsoft SQL Server, if necessary.

3. Set the BrightStor ARCserve Backup SQL Agent services and the SQL Agent services to log in as the domain administrator.

4. Take the Microsoft SQL virtual server offline and start Microsoft SQL Server in single-user mode.

5. Open the SQL Server DBAgent Configuration dialog and change the Maximum VDI size to 64 KB.

6. Restore the Microsoft SQL Server master database.

7. Restart Microsoft SQL Server in normal, multi-user mode and restore the rest of the databases, starting with msdb.

Note: For more information about recovering from a disaster, see the *BrightStor ARCserve Backup Disaster Recovery Option Guide*.

Backing Up and Restoring Using Multi-Striping

This chapter contains information about backing up and restoring a Microsoft SQL database using the Multi-Striping feature. These processes use the BrightStor ARCserve Backup, BrightStor® ARCserve® Backup Enterprise Module, BrightStor ARCserve Backup Agent for Microsoft SQL Server, and Microsoft SQL Server 7.0 or Microsoft SQL Server 2000.

Using Multi-Striping with the Agent

The BrightStor ARCserve Backup Agent for Microsoft SQL Server, in combination with the multistreaming feature of the BrightStor ARCserve Backup Enterprise Module, is capable of using multiple processes and multiple backup devices to accelerate your backup beyond the speed of a single tape drive. With extremely large databases (for example, anything over 100 GB), this can make the difference between a backup taking a few hours or an entire day. For more information about multistreaming, see the *BrightStor ARCserve Backup Administrator Guide*.

In a single-stripe backup job, a single backup device is used; each database backup is written to one session on one backup media. In a multistriped backup, the multistreaming option is enabled and two or more groups are selected, and the number of backup devices is between 2 and 32. After Multi-Striping is enabled, several child or subjobs are sent simultaneously to the number of devices specified. If the requested number of devices specified are unavailable, the master job waits until they become available or creates as many child jobs as there are available devices (at least two). You can have as many jobs running simultaneously as you have devices or groups on your system.

The following illustration shows the backup process using Multi-Striping.

```
┌─────────────────────────────────────────────┐    -Multi Stream option selected
│  Multi-Striping enabled based on selected options │   -Number of backup devices between 2 and 32
└─────────────────────────────────────────────┘    -Two or more devices or device groups are selected

        ┌──────────────────────────────────────────────┐
        │  For a Multi-Striped database backup, the master job: │
        │      Checks available devices                        │
        │      Creates multiple child jobs based on available tape │
        │      drives; Child jobs select devices and media     │
        └──────────────────────────────────────────────┘

            ┌──────────────────────────────────────────┐
            │  Agent for Microsoft SQL Server, Microsoft SQL │
            │  Server, and ODBC interface communicate    │
            └──────────────────────────────────────────┘

            ┌──────────────────────────────────────────┐
            │  Master job contacts Microsoft SQL Server to │
            │  begin backup and releases child jobs to continue │
            └──────────────────────────────────────────┘

        ┌──────────────────────────────────────────────┐
        │  Master job and child jobs communicate:              │
        │      Master monitors progress of child jobs and updates status │
        │      Child jobs for multistreaming signal master when complete │
        │      Multi-Striped master job reports when child jobs complete  │
        └──────────────────────────────────────────────┘

            ┌──────────────────────────────────────────┐
            │  Multi-Striped master job creates master session for Multi- │
            │  Striped backup, containing an index of tapes and sessions │
            │  written by child jobs                      │
            └──────────────────────────────────────────┘
```

Advantages

The major advantage of using BrightStor ARCserve Backup Agent for SQL Server with Multi-Striping is speed. With Multi-Striping, the combined data transfer speed of all of these devices can serve the target database. This enables the database to be archived up to 32 times faster than using a single drive. Multi-Striping offers dramatic improvements in throughput for local backup and recovery of very large databases by splitting the data across the allocated devices. With enough devices, this allows extremely large databases, which may have taken an entire day to backup to a single device, to be archived in less than an hour. Multi-Striping offers robustness and makes highly efficient use of system resources.

System Requirements

To use the BrightStor ARCserve Backup Agent for MS SQL Server with Multi-Striping properly, you must ensure that the following requirements are met:

■ Install and run the following programs on the same computer with the databases on which you are using this feature:

– Microsoft Windows 2000 or 2003 with the required service packs. For a list of requirements, see the readme file.

– Microsoft SQL Server 7.0 or 2000 with the required service packs. For a list of requirements, see the readme file.

– BrightStor ARCserve Backup r11.1

– BrightStor ARCserve Backup Enterprise Module r11.1

– BrightStor ARCserve Backup Agent for Microsoft SQL Server r11.1

■ Attach multiple backup devices to this machine, or one or more tape changers with multiple drives. You can use up to 32 drives in parallel for a single database.

■ We recommend that the machine being used has at least two CPUs.

For a list of machine requirements and required applications for this agent, see the readme file. Check the Computer Associates web site located at ca.com for any updates to the requirements.

Limitations and Operating Requirements

The following list provides the current limitations of the Multi-Striping feature:

■ This feature supports local backup and restore only; remote backup and restore are not supported.

■ Tape Copy by Session is not supported for all the sessions associated with the Multi-Striping backup. Whole media cloning is the only tape copy method supported.

■ You cannot use Multi-Striping on the master, msdb, and model SQL Server databases. A master database requires that only a single connection be made to Microsoft SQL Server; Multi-Striping requires multiple connections. Other system databases, such as model or msdb, are too small to gain significant benefits from Multi-Striping.

■ You must select a Multi-Striping SQL master session to restore its child sessions.

■ At the time of a restore, all related backup media must be present and listed in the BrightStor ARCserve Backup database.

■ At the time of a restore, the same number of backup devices that were used to backup the database must be available.

Backing Up a Local Microsoft SQL Database Using Multi-Striping

This procedure provides the basic steps required to back up a local database using Multi-Striping.

Important! *You must have properly configured your device groups and a media pool for a multistreamed backup operation before performing a multi-striped local backup. For information on how to configure device groups and a media pool, see the online help. For information on tuning your parameters, see Configuring the Parameters for Multi-Striping in the chapter "Installing the Agent."*

1. Open the BrightStor ARCserve Backup Manager application. A sample Home Page is shown here:
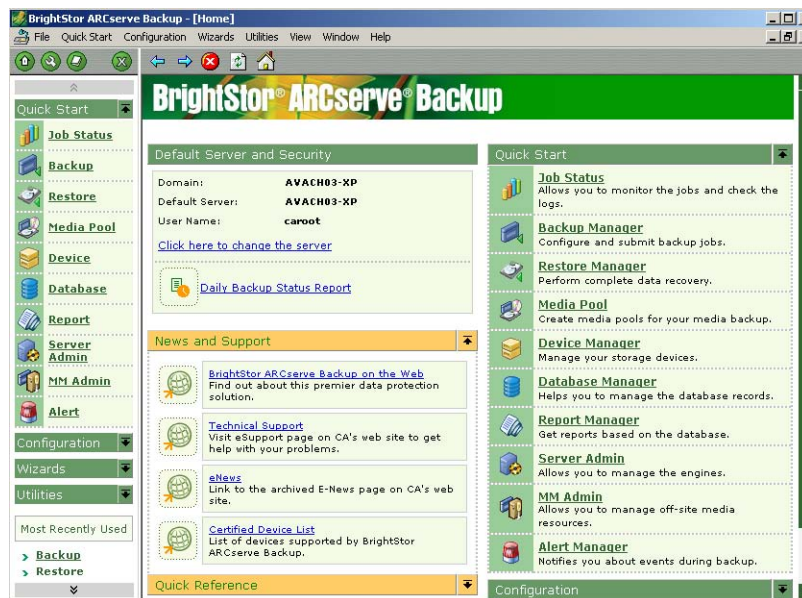
> **Tip:** To open the Home Page from the Start menu, choose Programs, Computer Associates, BrightStor, ARCserve Backup, Manager.

2. From the Quick Start bar or the Quick Start menu, open the Backup Manager.

3. In the Source tab, find and expand the local server, as shown in the following example:
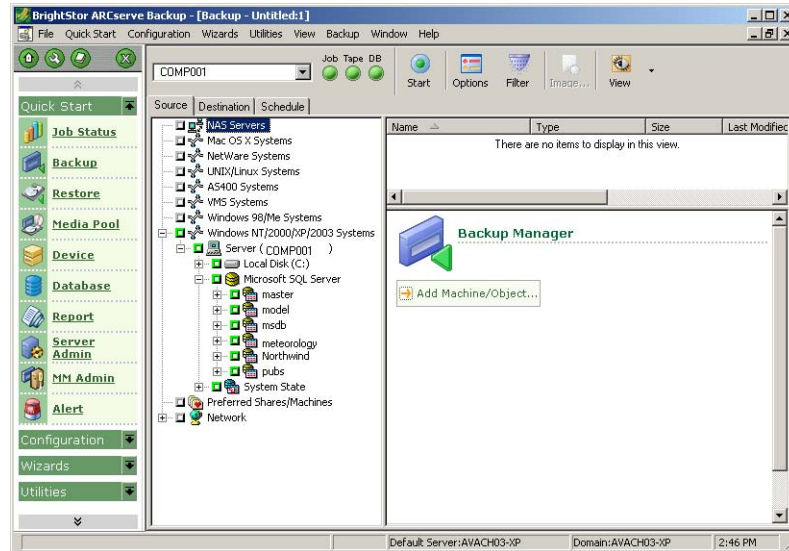
4. Right-click the Microsoft SQL Server on which you want to perform a Multi-Striped backup, and select Security, as shown in the following example:
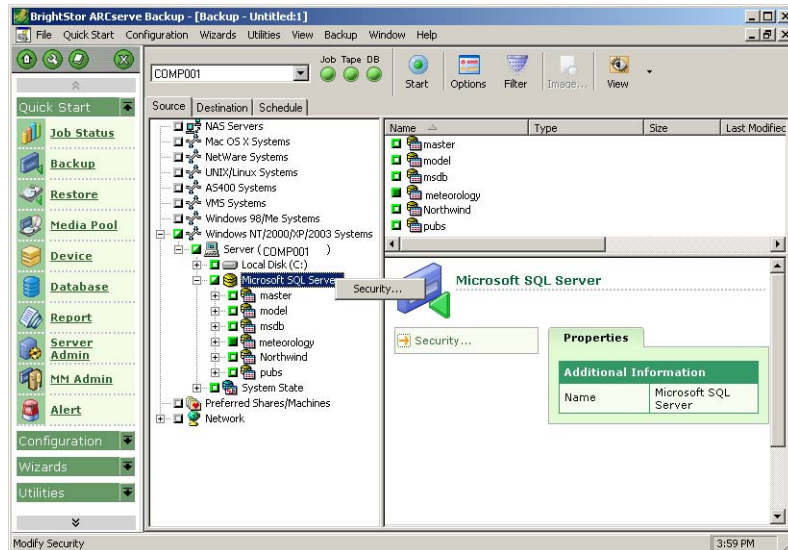
5.   On the Security dialog, enter the user name and password for a user who has the system administrator role for the Microsoft SQL Server, and click OK: Expand the local Microsoft SQL Server as shown in the following example:
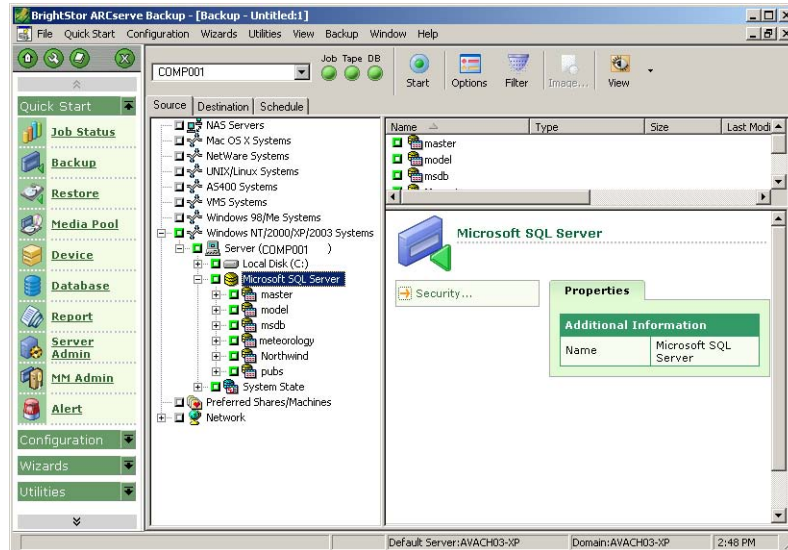
6.   Select the first database on which you want to perform a Multi-Striped backup by clicking the green box to the left of the database name. The box becomes filled.

7.   Right-click the database name and select Agent Option from the pop-up menu. If you are using Microsoft SQL Server 2000, the following Agent Backup Options dialog opens:
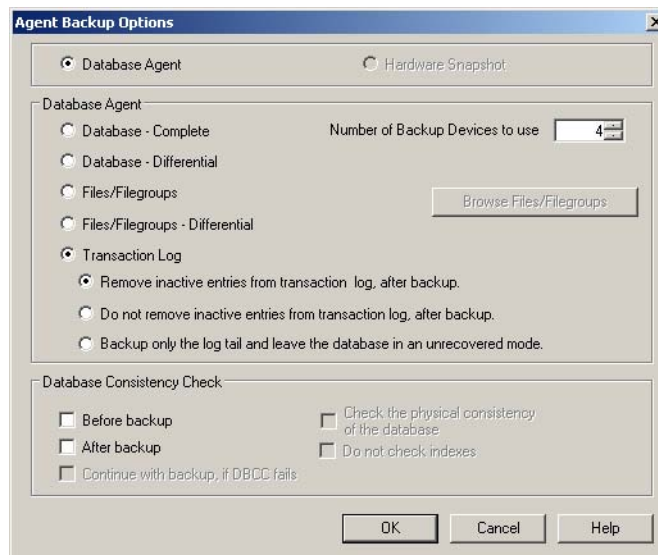
If you are using Microsoft SQL Server 7.0, the following Agent Backup Options dialog opens:
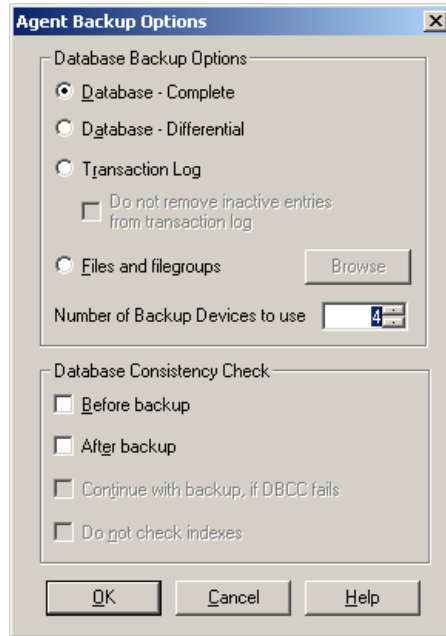
8. In the field labeled Number of Backup Devices to use, enter the number of backup media devices (between 2 and 32) that you want to use to backup this database.

    Note: If you enter a 1 in this field, Multi-Striping will be deactivated for this database and it will be backed up to a single device.

9. Select other backup options, as applicable. Then click OK.

    Note: For information on database consistency checks, see Checking the Consistency of a Database in the chapter "Backing Up Microsoft SQL Server Databases."

10. Repeat Steps 7 through 10 for each database on which you want to use Multi-Striping.

11. Select the Destination tab. Then select the Multi Stream and Use Any Group options, as shown in the following example:
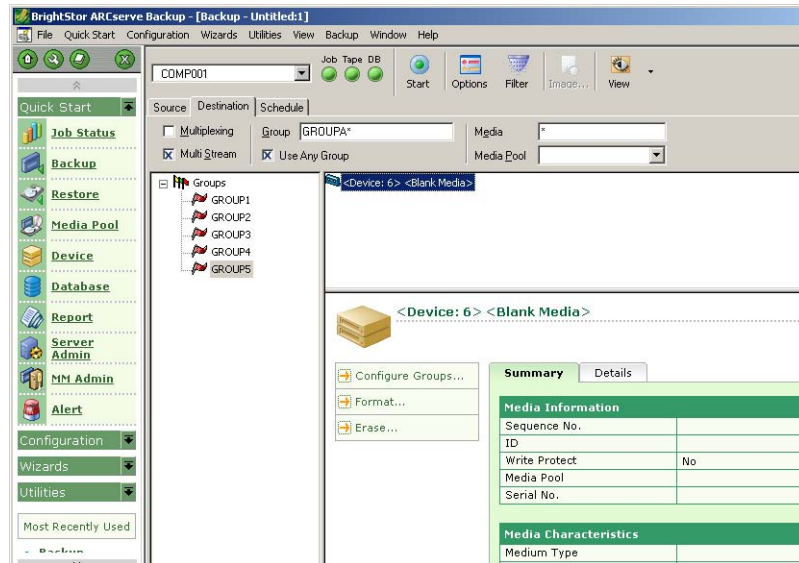
Note: To use Multi-Striping, you must select the Multi Stream option, and select two or more groups or a single group that contains two or more backup devices. You must also have selected more than one backup device on the Microsoft SQL Server 2000 Agent Backup Options dialog. Otherwise, this feature will be deactivated and your backup will be unsuccessful. For information on multistreaming and multiple backup devices, see the *BrightStor ARCserve Backup Administrator Guide*.

12. Choose a media pool from the drop-down list or enter a media pool in the Media Pool field.

13. Select the Schedule tab. Set the appropriate scheduling options, including rotation and GFS (grandfather-father-son) settings, if applicable. An example is shown next:
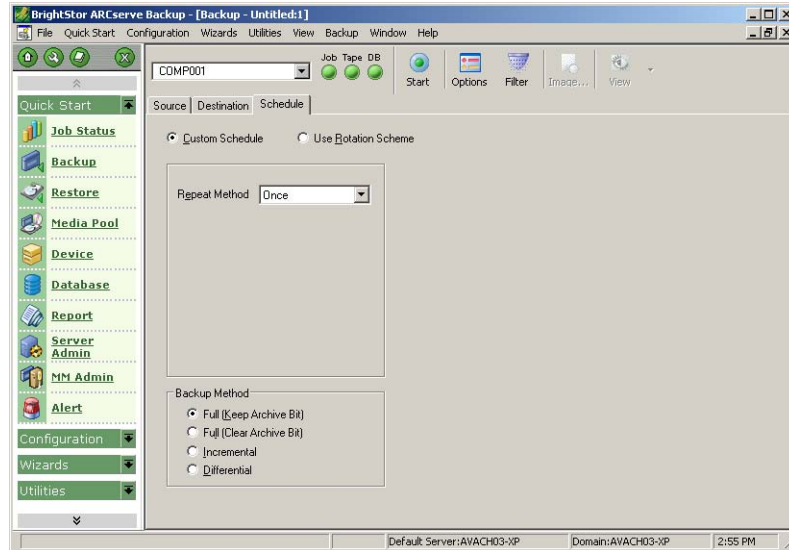
Note: Selecting the differential or incremental backup methods override options selected for individual databases. If you select the incremental backup method, the agent performs a Transaction log backup for databases using the full or bulk-logged recovery models, and a differential backup for databases using the Simple Recovery model. For more information about recovery models, see the *Microsoft SQL Server Books Online*.

14. If you use Rotation Scheme, choose the appropriate scheduling options, including rotation and GFS settings, if applicable.
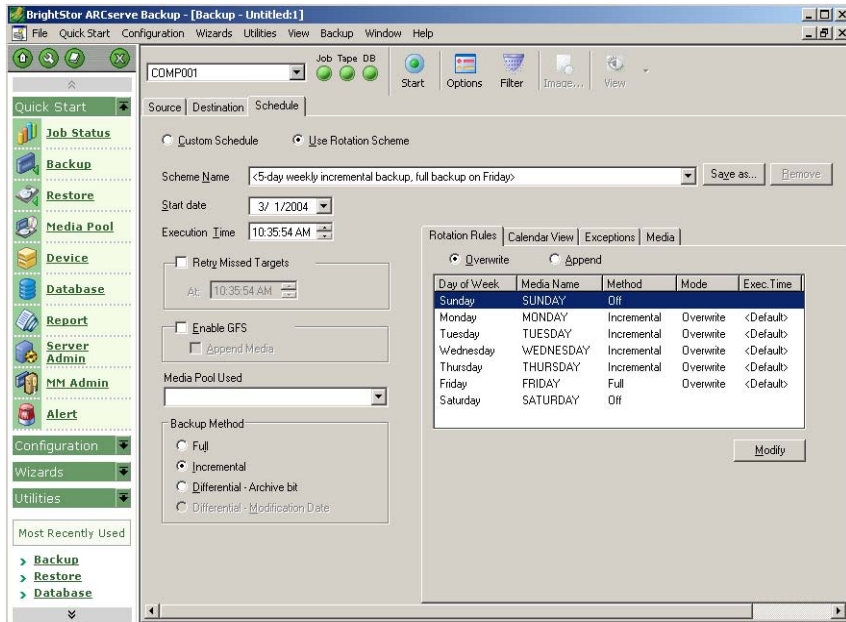
Note: For information on rotation schemes, see the *BrightStor ARCserve Backup Administrator Guide.*

15. Click Start. The Security and Agent Information dialog opens, as shown in the following example:
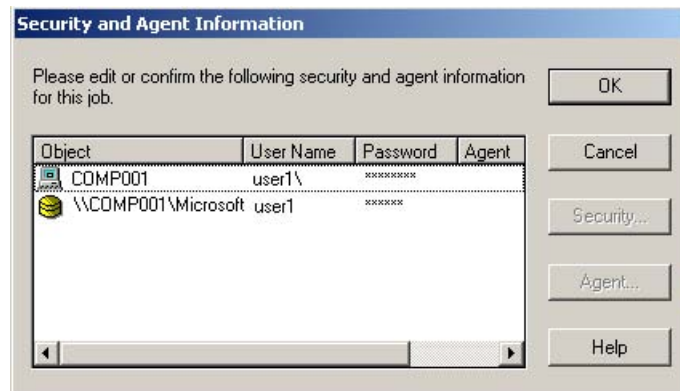
16. On the Security and Agent Information dialog, verify that the authentication information shown is correct. To change a user name or password, highlight the entry, click Security, and make the changes. When you are done, click OK to submit the job. The Submit Job dialog opens.

    Note: The job runs successfully if the machine authentication is omitted for the local server. The BrightStor ARCserve Backup System Account is used as machine authentication for local backup operations.

17. On the Submit Job dialog, enter a description, if needed, and specify when to run the job:

   – To run the job immediately, select Run Now and click OK.

      Note: The Run Now option is unavailable when more than one device group is selected.

   – To run a job on a specific date and time, select Run On. Then enter a date from the Date drop-down list; enter hour, minutes, and seconds in the Time field. Click OK.

   – Run the job at a later time without specifying a time or date now, select Run On and then select Submit on Hold. Click OK.

18. To monitor the job, open the Job Status Manager from the Quick Start bar or the Quick Start menu.

19. The job you submitted from the Backup Manager serves as a master job for this backup. When the job first begins, it starts several child or sub-jobs, one for each backup media device of a Multi-Striped database backup, and one for each multistreaming item included in the job. The following example provides a sample of a master job for a backup:
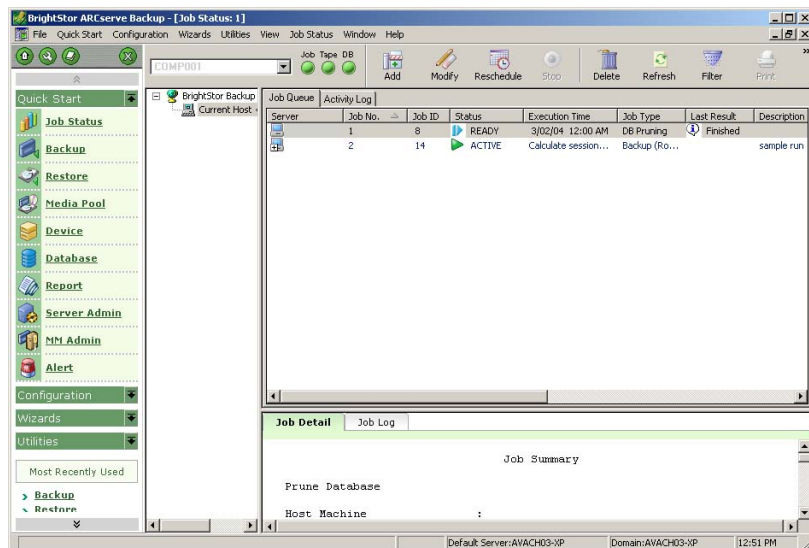
   Note: If the number of backup devices available is too few to support simultaneous Multi-Striped backups from the same master job, the master job performs these backups sequentially.

20. Each child job begins and obtains a backup device and media. After all child jobs have started for a particular database, the Backup Agent instructs the Microsoft SQL server to begin transferring data.

21. When each child job completes, it reports its completion status to the master job.

22. When all child jobs are complete for the backup job, the master job creates a master session on backup media for each multi-striped database backup and reports its own completion status.

Restoring a Local Microsoft SQL Database Using Multi-Striping

This procedure provides the basic steps required to restore a local database using Multi-Striping.

Important! You must have properly configured your device groups for a Multi-Striped operation before performing a Multi-Striped local restore. For information on how to configure device groups, see the online help. For information on tuning your parameters, see Configuring the Parameters for Multi-Striping in the chapter "Installing the Agent." The media containing the master session and all child sessions must be available and listed in the BrightStor ARCserve database. If not listed there, you must merge these media. For more information on merging tapes, see the BrightStor ARCserve Backup Administrator Guide.

1. Open the BrightStor ARCserve Backup Manager application. A sample Home Page is shown next.

> **Tip:** To open the Home Page choose Programs, Computer Associates, BrightStor, ARCserve Backup, Manager.

2. On the BrightStor ARCserve Backup dialog, select Restore from the Quick Start menu or the Quick Start Toolbar.
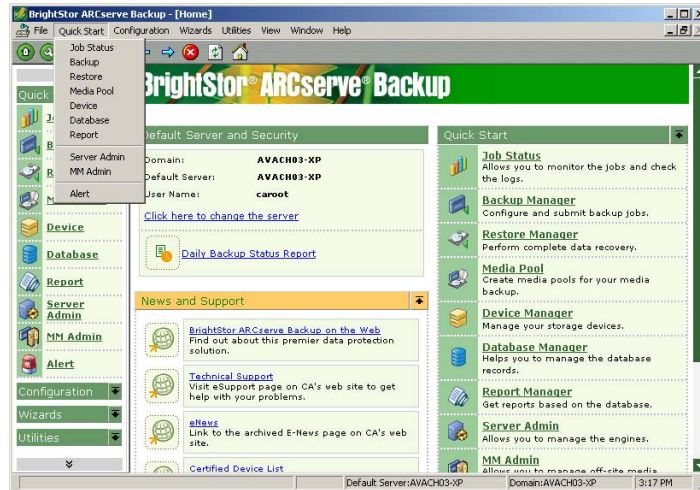
3. On the BrightStor ARCserve Backup - Restore dialog, under the Source tab, select one of the following options from the drop-down list:
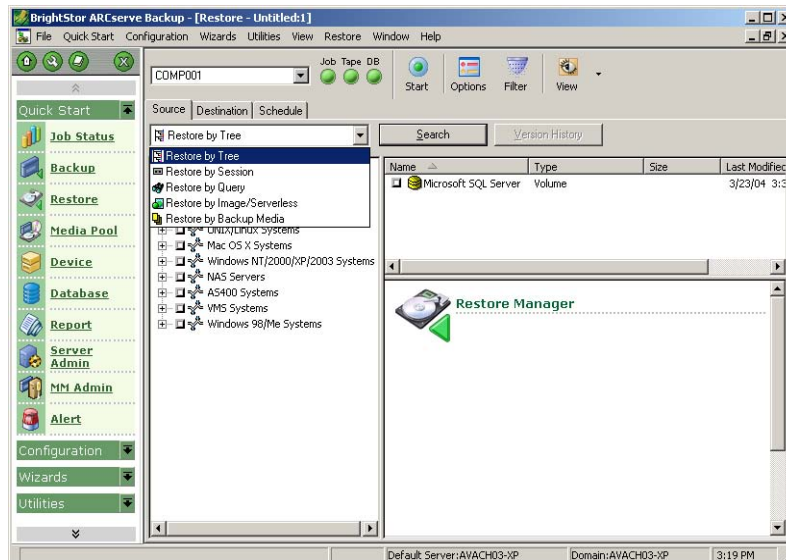
– **Restore by Tree** to build a directory tree of all machines, directories, and files that were backed up. Then go to Step 4.

– **Restore by Session** to display all media used for backups and the source for each session on the media. Then go to Step 5.

4. Find and expand the media containing the master session for the Multi-Striped backup that you want to restore. Then select the master session for that backup, as shown in the following example. (Notice that a master session, like a standard database backup session, is preceded by a green box; a child session is preceded by a gray box. You cannot select child sessions directly).
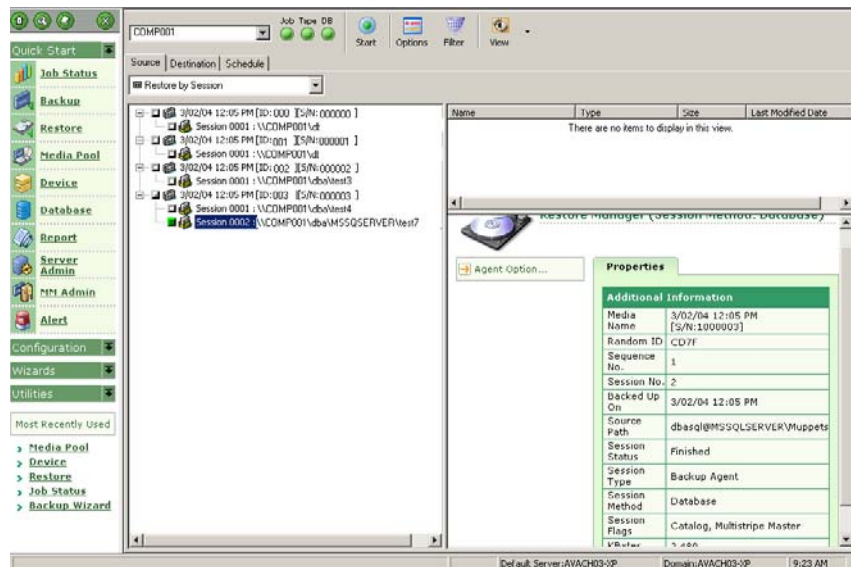
Note: If you select a differential or Transaction log backup, the Automatic Session Selection feature automatically identifies any standard database backups and the master sessions for multistripe backups on which the selected session depends. Child sessions are not selected through the Automatic Session selection feature. These sessions are identified during the restore process.

If your backup history for a given database includes both Multi-Striped backups and regular database backups, they can be restored together safely.

5. (Optional) You may select one or both of the following options:

– To restore options other than the defaults, right-click the selected session and select Backup Agent Options from the pop-up menu.

– To restore to an alternate SQL Server instance on the local server, or give the database a different name as part of the restore process, use the Destination tab.

Note: For information on restoring databases, see the chapter "Restoring Microsoft SQL Server Databases."

6. After you have selected all appropriate options, click Start.

7. The Session User Name and Password dialog opens, as shown in the following example:
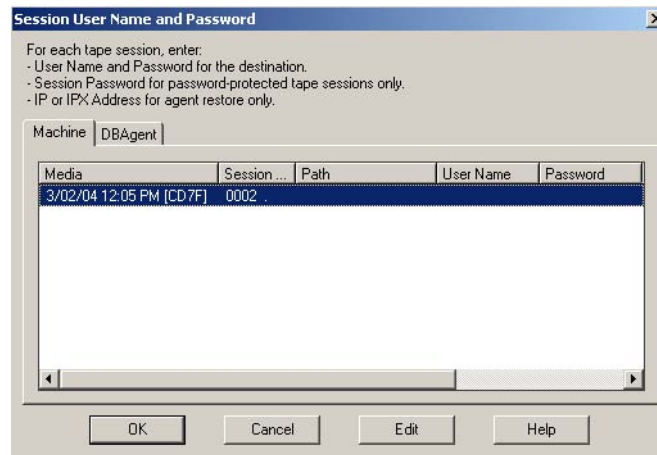
8. For each session, you must set the appropriate authentication information. To do this, double-click the first session. The User Name and Password dialog opens.

9. Enter the user name and password for Windows authentication for the server. If you used a Session Password as part of your backup options, enter this password in the appropriate field. To apply the same Windows user name and password to the entire session, select the Apply [User Name and Password] to All Rows option. Then click OK.

10. Click the DBAgent folder tab. Repeat Steps 7 and 8, but enter the user name and password for authentication to the Microsoft SQL server instance.

   Note: You do not need to reenter session password information again here.

11. Click OK. The Submit Job dialog opens.

12. On the Submit Job dialog, enter a description and job execution time options. Then click OK to submit the job.

13. To monitor the job, open the Job Status Manager from the Quick Start bar or the Quick Start menu.

As with a backup job, the job you submitted from the Restore Manager serves as a master job; however, a restore job does not use the Multi-Striping feature in the same way as a backup job. Operations are performed sequentially, with the master job starting child jobs for one restore operation at a time.

For each backup being restored, the master job determines if the backup to be restored is a Multi-Striped backup or a regular database backup. For a regular database backup, the backup session is restored normally. For a Multi-Striped backup, the master job again starts several child jobs, one for each child job started for the backup as displayed in the following Job Status dialog.

Each child job begins and obtains one of the media to which the backup was recorded. When all child jobs have begun, the agent instructs Microsoft SQL Server to prepare to restore, and then starts transferring data.

When each child job completes, it reports its completion status to the master job. After all child jobs for a given restore are completed, the master job proceeds to the next restore, if any, until all selected sessions have been restored, creating additional child jobs as appropriate.

When all restores are completed, the master job reports its own completion status to the Job Status Manager.

Troubleshooting and Disaster Recovery

This appendix explains the most common messages for BrightStor ARCserve Backup and the BrightStor ARCserve Backup Agent for Microsoft SQL Server, and provides important information about disaster recovery.

Agent and ARCserve Backup Error Messages

This section explains the most common error messages for BrightStor ARCserve Backup and BrightStor ARCserve Backup Agent for Microsoft SQL Server.

Backup or restore failed.

Reason:

There are a number of reasons for backup or restore failure.

Action:

Try the following actions:

- See <u>Valid Operations with Database Options</u> in this chapter to determine if the backup or restore failed because an incompatible database option was set.

- Check the BrightStor ARCserve Backup Agent for Microsoft SQL Server log file called dbasql.log for specific errors. The log is located in the Backup Agent directory.

- See your Microsoft SQL Server manual for information on backup and restore operations.

Multistreaming is being disabled because there is only one backup device.

Reason:

When using Multi-Striping, you must have selected at least two devices on the Agent Backup Options dialog or the Use Any Group option on the Destination tab. If you have selected two devices on the Agent Backup Options dialog and have selected only one backup device on the Destination tab, multistreaming will be disabled.

Action:

From the Source tab, right-click the database that you want to back up or restore, and select Agent Options. On the Agent Backup Options dialog, ensure that you have selected at least two and not more than 32 backup devices. Then on the Destination tab, ensure that you have selected the Use Any Groups option or have selected at least two device groups.

Multi-Striping Backup of Database XXX will be skipped. Multi-Striping requires the use of the Multi Stream option.

Reason:

You have selected to backup or restore a database using the Multi-Striping feature by choosing more than one device on the Agent Backup Options dialog. You have not, however, selected the Multi Stream option on the Destination tab.

Action:

Ensure that the Multi Stream option on the Destination tab is selected.

2247—Multi Stream backup requires two or more backup devices. Only one is selected. Backup will occur without Multi Stream.

Reason:

You have selected the Multi Stream option on the Destination tab, but have selected only one backup device on the Agent Backup Options dialog. This feature will not be enabled unless you select two or more devices.

Action:

To use multistreaming, you must have selected two or more backup devices on the Source tab and the Multi Stream option on the Destination tab.

No Microsoft SQL Server icon in BrightStor ARCserve Backup browser.

There are several reasons for this message.

Reason:

The Backup Agent RPC Server service is not running or not functioning.

Action:

Restart the Backup Agent RPC Server service.

Reason:

The BrightStor ARCserve Backup Agent for Microsoft SQL Server is not installed.

Action:

Install the BrightStor ARCserve Backup Agent for Microsoft SQL Server.

Reason:

No agent entry exists in the registry. It should be found at:

```
SOFTWARE\ComputerAssociates\BrightStor ARCserve Backup\DSAgent\
CurrentVersion\agent\dbasql70
```

or

```
SOFTWARE\ComputerAssociates\BrightStor ARCserve Backup\DSAgent\
CurrentVersion\agent\dbasql@INSTANCENAME
```

Action:

Reinstall the BrightStor ARCserve Backup Agent for Microsoft SQL Server.

Backup Agent Error—(82) The Backup Agent appears to hang when double clicking on it.

Reason:

Microsoft SQL Server is not running.

Action:

Start Microsoft SQL Server.

Backup Agent Error—(83) Remote pipe open failed: time-out.

Reason:

The Backup Agent RPC Server service on the remote machine is not responding.

Action:

Restart the Backup Agent RPC Server service on the remote computer. If it continues to fail, consider rebooting the remote computer.

Backup Agent Error—(85)

Reason:

An incorrect password has been submitted.

Action:

Enter the correct password for the database server.

E8542—Failed to receive data from the SQL server database agent.

Reason:

The network connection was lost. (EC=10054)

Action

- Check the network connections.
- Verify that the BrightStor ARCserve Backup Agent for Microsoft SQL Server services are running.

E8562—Failed to receive data from the database agent.

Reason:

The backup or restore job was waiting for the BrightStor ARCserve Backup Agent for Microsoft SQL Server and received no reply within the timeout period. (EC=10060)

Action:

Increase the timeout period on the BrightStor ARCserve Backup server by changing the TCPTimeout value in the following registry key:

```
HKEY_LOCAL_MACHINE\SOFTWARE\ComputerAssociates\BrightStor ARCserve
Backup\Base\Task\Common\DBAgentsSettings.
```

This value is measured in seconds. The default value is 1200 (20 minutes).

E8601—Failed to connect agent

BrightStor ARCserve Backup may have failed to connect to the BrightStor ARCserve Backup Agent for Microsoft SQL Server for a number of reasons.

Reason:

The Backup Agent RPC Server service is not running on the target server.

Action:

Restart the Backup Agent RPC Server service on the target server.

Reason:

The Backup Agent Remote service is not running on the target server.

Action:

Restart the Backup Agent Remote service on the target server.

Reason:

The target database instance may be stopped or inaccessible.

Action:

Verify that the target database server instance is running on the target server. If it is not, restart it.

Reason:

The target server may be unreachable over the network.

Action:

Check the network connections.

Reason:

Machine authentication failure may have occurred.

Action:

■   Check the user name and password for the target server logon.

■   Specify domain or machine authentication for the target server logon.

Reason:

The BrightStor ARCserve Backup Agent for Microsoft SQL Server DLL failed to load into memory on the target server.

Action:

■   Verify that the target server has sufficient free memory available.

■   Verify that the BrightStor ARCserve Backup Agent for Microsoft SQL Server DLL exists on the target server.

■   Verify that the DLL path is correct in the target server registry.

E8602—Failed to read from database. Backup Agent Error - (73)

Reason:

- trunc.log on chkpt is enabled and is attempting to back up a log.

- select into/bulkcopy is set and is attempting to back up a log.

Action:

Disable these options in the database.

E8604—Failed to start backup - Backup Agent Error - (73)

Reason:

A database has been marked as read-only and an attempt to back up the transaction log was made.

Action:

Reenable write access to the database.

E8604—Failed to start backup - Backup Agent Error - (406) VDI message: The API was waiting and the timeout interval had elapsed.

Reason:

A backup failed because Microsoft SQL Server did not respond to the BrightStor ARCserve Backup Agent for Microsoft SQL Server within the time-out period.

Action:

In the Microsoft SQL Server DBAgent Configuration dialog, increase the VDI wait time (ms) value. The default value is 120000 (2 minutes.) This value is measured in milliseconds.

Restore of the master database failed.

Reason:

To restore the master database, you must start Microsoft SQL Server in single-user mode.

Action:

Start Microsoft SQL server in single-user mode. For more information, see Restoring a Master Database in Windows 2000, XP or 2003 or Restoring a Master Database in Windows NT in the chapter "Restoring Microsoft SQL Server Databases."

E8602—Failed to read from database. Backup Agent Error - (405-409 or 512-520)

Reason:

An internal error has occurred in a Virtual Device during a remote backup using TCP.

Action:

Complete these steps:

1. Restart the Backup Agent RPC Server service and the Backup Agent Remote service.

2. Restart Microsoft SQL Server.

If you are unsuccessful after attempting both of these options, contact Computer Associates Technical Support through the web site ca.com.

Backup Agent Messages

Backup Agent Message	Explanation
143	The current log session contains the time required by the user. The database was fully recovered, so this session is the last log session restored for the current job.
144	The current log session is skipped because of a STOPAT restore option found in a previous session.
146	The required time was not found in this log session or the database is in an unrecovered state.

Limitations of ARCserve Backup and the Agent

- BrightStor ARCserve Backup (like Windows NT) does not allow special characters to be used in file names, file group names, and database names. Examples include /, *, <>, ?.

- When restoring a file or file group, if there are no log sessions to follow the file or file group session, BrightStor ARCserve Backup cannot verify if the file was modified. As a result, it does not know what the final recovery completion state should be. By default, it chooses the Leave database non-operational, but able to restore additional transaction logs option. Each time you back up a file or file group, ensure that you back up a log immediately afterwards.

Microsoft SQL Server Error Messages

Microsoft SQL Server errors can occur for a variety of reasons and can appear in several different BrightStor ARCserve Backup error messages. If a Microsoft SQL Server error occurs, find the value shown for NativeError.

3023—Backup and file manipulation operations on a database must be serialized.

Reason:

An attempt was made to backup or restore a database while another backup or restore operation was still in progress on that database.

Action:

Close all programs that might be accessing the database, including the SQL Server Enterprise Manager. Wait for other operations on the database to complete and retry the operation.

3101—Exclusive access could not be obtained because the database is in use.

Reason:

An attempt was made to restore a database while another program was accessing that database.

Action:

Close all programs that might be accessing the database, including the SQL Server Enterprise Manager, and retry the operation.

3108—"RESTORE DATABASE" must be used in single user mode when trying to restore the master database.

Reason:

An attempt was made to restore the master database without starting the database server in single-user mode.

Action:

For instructions on starting the database server in single-user mode, see Restoring a Master Database in Windows 2000, XP or 2003 or Restoring a Master Database in Windows NT in the chapter "Restoring Microsoft SQL Server Databases."

4305 or 4326—The log in this backup set terminates at …, which is too early to apply to the database.

Reason:

■   An attempt was made to restore transaction logs out of order, with an older log being restored after a newer one.

■   An attempt was made to restore a transaction log after a more recent backup.

Action:

Restore the last full or differential database backup again, and then re-apply the transaction logs in the order in which they were backed up.

For additional information, see the Microsoft SQL Server Books Online.

Limitations of the Microsoft SQL Server Database

- If you have named a Microsoft SQL database with a special character (such as /, *, <>, ?), by default, Microsoft SQL Server names the file, file group, or database with the same characters. To perform a backup or restore job, you must first rename the file, file group, or database so it does not include one of these special characters.

- If you use the Log point in time restore option for Microsoft SQL Server 7.0, or the Stop at time, Stop at log mark, or Stop before log mark options for Microsoft SQL Server 2000, and the specified time stamp or mark is not found by the Microsoft SQL Server, the database remains in a loading state and the job result is incomplete.

Valid Operations with Database Options

The following table lists each database option and states if a backup or restore can be performed if a given database option is set:

Backup Option	Database Backup	Log Backup	Database Restore	Log Restore
Read only	YES	YES**	YES	YES
Dbo use only	YES	YES	YES	YES
No chkpt on recovery	YES	YES	YES	YES
do not recover	NO	NO	NO	NO
Not recovered	NO	NO	NO	NO
trunc.log on chkpt.	YES	NO	N/A	N/A
Single user	YES*	YES*	YES	YES
Select into/bulkcopy	YES	NO	N/A	N/A

* Provided that the single connection to the database is not in use.

* * Microsoft SQL Server 7.0 only.

Replication of Microsoft SQL Server

According to Microsoft, the replication capability of Microsoft SQL Server is not specifically designed to accomplish hot backups. See the *Microsoft SQL Server Database Administrator Guide* for more information about how to back up and, more importantly, restore in a replication scenario.

Microsoft SQL Server Disaster Recovery

The BrightStor ARCserve Backup Agent for Microsoft SQL Server uses the Microsoft SQL Server Backup and Restore database functions, but these functions do not actually back up the physical files that make up the database. Consequently, for a restore to succeed, the database must exist; the Load command restores the data into it.

The Master Database

For Microsoft SQL Server to run, the master database must be set up as follows:

- A master database and a model database **must** exist.

- To have a master and a model database, you must either reinstall Microsoft SQL Server, rebuild the master database using Microsoft SQL Server setup, or restore an offline copy of the master database from media.

- After the master database exists, Microsoft SQL Server must be running to execute the Restore command.

To restore the master database, Microsoft SQL server must be running in single-user mode. For more information about restoring the master database, see Restoring a Master Database in Windows 2000, XP or 2003 or Restoring a Master Database in Windows NT in the chapter "Restoring Microsoft SQL Server Databases."

Avoiding Potential Restore Problems

The master database tracks all the resources allocated to Microsoft SQL Server. If you do not perform an offline backup after you have made a major change in the Microsoft SQL Server configuration, restore problems can occur.

For example, suppose you have an Microsoft SQL Server configuration with five databases in addition to the master database. You back up the master database. Then one database is dropped (detached from Microsoft SQL Server) and the files that make it up are deleted, but you do not perform an offline backup. If the master database backup is restored at this point, it would contain the information for the dropped database that does not exist. As a result, Microsoft SQL Server would mark it as suspect (that is, inaccessible by users). You would need to drop the database again.

To avoid such problems, you should perform at least one offline backup. Also, every time there is a major change in the Microsoft SQL Server configuration (database creation, device addition, or dropping a database), you should perform an offline backup.

Suggested Database Restore Sequence

Restore the databases in the following order to avoid any conflicts:

1. Restore the master database first in single-user mode.

2. Restart the Microsoft SQL Server in multi-user mode, and then restore msdb immediately after you restore the master database.

3. Restore all other databases in normal, multi-user mode.

Note: These suggestions are not requirements, but following them speeds and simplifies the disaster recovery procedure. If you restore other databases in addition to the master database before restoring msdb, Microsoft SQL server loses part of the backup and restore history for those other databases when msdb is restored.

For further information, see the Microsoft SQL Server documentation.

Disaster Recovery Scenario

A typical disaster recovery scenario consists of the following steps:

1. Reinstall Windows if necessary.

2. Reinstall BrightStor ARCserve Backup, if necessary.

3. Perform one of the following steps as appropriate:

   - If an offline backup exists, restore it.

   - If an offline backup does not exist and you have the SQL rebuildm.exe utility, use the utility to recreate the master and model database. For more information on this, see the Microsoft documentation.

   - If an offline backup does not exist and you do not have the SQL rebuildm.exe utility, reinstall the SQL server or MSDE-based application.

4. Reinstall the BrightStor ARCserve Backup Agent for Microsoft SQL Server, if necessary.

5. Start Microsoft SQL Server in single-user mode and restore the master database. After the restoration is complete, Microsoft SQL Server automatically stops.

6. Restart Microsoft SQL Server in normal, multi-user mode.

7. Restore the MSDB database.

8. Restore all other databases and transaction logs except the replication database.

9. If replication is being used, restore the replication database.

Disaster Recovery in the Cluster Environment

The following procedures instruct you in recovering from a disaster in both a Microsoft SQL Server 7.0 cluster environment and a Microsoft SQL Server 2000 cluster environment.

Disaster Recovery in a Microsoft SQL Server 7.0 Cluster Environment

To perform disaster recovery in an Microsoft SQL Server 7.0 cluster environment, follow these steps:

1. Set up Microsoft SQL Server, but do not set up Symmetric virtual server for the Microsoft SQL Server.

2. Reinstall the BrightStor ARCserve Backup Agent for Microsoft SQL Server.

3. Start Microsoft SQL Server in single-user mode.

4. Restore the master database of Microsoft SQL Server.

5. Restart Microsoft SQL Server.

6. Set up Symmetric virtual server for the Microsoft SQL Server.

7. Reinstall the BrightStor ARCserve Backup Agent for Microsoft SQL Server to enable the Symmetric virtual server-related settings.

8. Restore the msdb database.

9. Restore the rest of the databases.

Disaster Recovery in a Microsoft SQL Server 2000 Cluster Environment

To perform disaster recovery in a Microsoft SQL Server 2000 cluster environment, follow these steps:

1. Set up Microsoft SQL virtual server.

2. Reinstall the BrightStor ARCserve Backup Agent for Microsoft SQL Server.

3. Start Microsoft SQL virtual server in single-user mode.

4. Restore the master database of the Microsoft SQL virtual server.

5. Restart Microsoft SQL Server to restore the rest of the databases.

Configuring Microsoft SQL Server Security Settings

This appendix explains how to configure Microsoft SQL Server security settings for BrightStor ARCserve Backup.

Types of Microsoft SQL Authentication

Microsoft SQL Server provides two types of user authentication:

■   One based on applying the user's Windows login identification

■   One that uses a separate user list specific to Microsoft SQL Server

Although Microsoft recommends using only Windows authentication wherever possible, there are certain instances where it is appropriate, or even necessary, to enable Microsoft SQL server-based authentication. For example, you must use Microsoft SQL Server authentication for Microsoft SQL Server 7.0 or Microsoft SQL Server 2000 when the database is running on an active cluster.

Authentication Requirements

When using Microsoft SQL Server authentication, you must specify a user account with system administrator access privileges. By default, Microsoft SQL Server creates an account named **sa** with this level of access, but the BrightStor ARCserve Backup Agent for Microsoft SQL Server can use any account with equivalent privileges.

When using Windows authentication, any account with administrator equivalency for the machine on which the database is running will usually have system administrator access privileges for the database.

Note: A Windows or domain administrator will not automatically have system administrator access privileges for the database if the BUILTIN\Administrators login entry in Microsoft SQL Server has been removed or does not have this role, or if there is a separate login entry in Microsoft SQL Server for the user that does not have this role.

Changing User Authentication

No matter which authentication option you choose, you must configure both Windows and BrightStor ARCserve Backup accordingly. Also, if you change the option, you must update settings so that both Windows and BrightStor ARCserve Backup reflect the change. If you are using Microsoft SQL Server 2000, you must make the change separately for each instance of the server.

To change user authentication and update the settings for both Windows and BrightStor ARCserve Backup so that this change is reflected, you must perform the following series of procedures in the order in which they are listed:

- **Stage 1** — Check and change the Microsoft SQL Server authentication method.

- **Stage 2** — Update the BrightStor ARCserve Backup Agent for Microsoft SQL Server account configuration.

- **Stage 3** — Check and change the ODBC settings.

- **Stage 4** — Update the Backup Manager in BrightStor ARCserve Backup.

The procedures are contained in the following sections.

Checking and Changing the Microsoft SQL Server Authentication Method

To check or change the Microsoft SQL Server authentication method, follow these steps:

1. On the system where Microsoft SQL Server is running, open the SQL Server Enterprise Manager. At the left side of the window is a pane labeled Tree, with Console Root at the top.

2. Expand the entries below Console Root until you reach the instance of the database server.

3. Right-click the instance, and select Properties from the drop-down menu. The Properties dialog opens.

4. In the Properties dialog, choose the Security tab.

5. Under Authentication, select either Microsoft SQL Server and Windows to enable Microsoft SQL server-based authentication or Windows Only to enable only Windows user names and passwords.

6. Click OK.

Updating the Agent Account Configuration

To update the BrightStor ARCserve Backup Agent for Microsoft SQL Server account configuration, follow these steps:

1. From the Start menu, start the Microsoft SQL Account Configuration utility. The Account Configuration dialog opens, as shown in the following example:

2. Locate the Microsoft SQL Server instance that you modified in Stage 1.

3. Select either SQL authentication or NT authentication, according to the following criteria:

   ■ If you have set SQL Server for Windows Only, then select NT authentication.

   ■ If you have selected Mixed Mode and want to be able to back up SQL using only SQL native users, then select SQL authentication.

   ■ If you have selected Mixed Mode and want to be able to back up SQL using either Windows or SQL users, select NT authentication.

4. If you have selected SQL authentication, enter the user name and password for an SQL native user with system administrator privileges.

5. If SQL server is in a cluster environment, verify that the cluster-related information is correct.

6. Click Finish to apply the changes.

Checking and Changing the ODBC Settings

To check and change the ODBC (open database connectivity) settings, follow these steps:

1. On the system where Microsoft SQL Server is running, perform one of the following procedures, depending on the version of Windows you are running:

   ■ Open the Start Menu and select Administrative Tools

   ■ Open the Start Menu. Then select Control Panel and Administrative Tools.

2. Select Data Sources (ODBC) The ODBC Data Source Administrator dialog opens.

3. Select the System DSN folder tab, as shown in the following example:
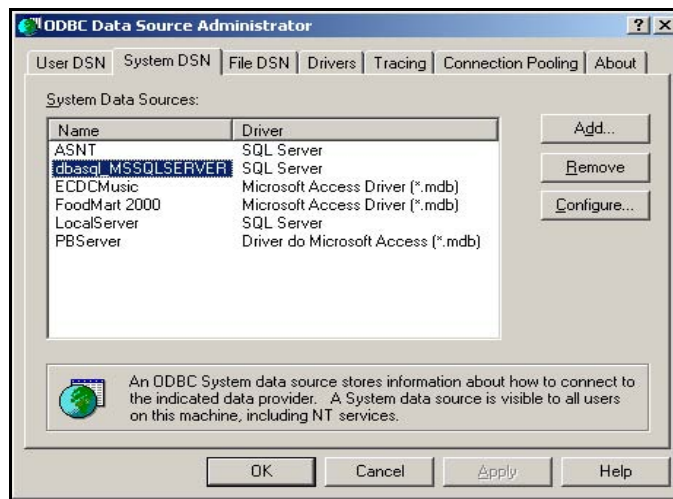
4. Find and select the Microsoft SQL Server instance or instances. For Microsoft SQL Server 7.0, the instance is called DBASQL7. For Microsoft SQL Server 2000, the default instance is called dbasql_MSSQLSERVER. Other instances use the format dbasql_ followed by the instance name.

5. Click Configure. The Microsoft SQL Server DSN Configuration dialog opens. The name field should show the same name as the entry you selected to configure. The Description field should say SQL Backup Agent. The Server field should show the computer on which SQL Server is running.

6. Click Next **without changing any settings**. The dialog should now present the question: "How should SQL Server verify the authenticity of the login ID?," and give the options of Windows NT authentication and SQL Server authentication, as shown in the following example:
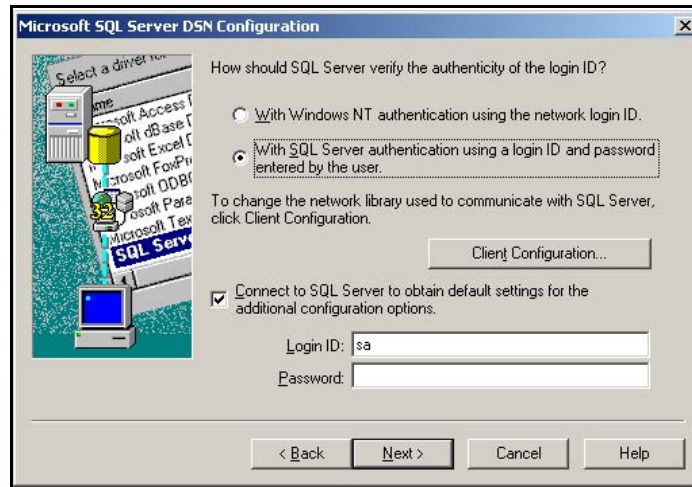
- If you selected Windows Only for SQL Server in Stage 1 Step 2, ensure that Windows NT authentication is selected.

- If you selected Mixed Mode for SQL Server in Stage 1 Step 2, you can select either Windows NT authentication to enable both Windows and Microsoft SQL Server-native user logins or Microsoft SQL Server authentication to enable only Microsoft SQL Server-native user logins.

- If you have selected Microsoft SQL Server authentication, ensure that the specified login ID has system administrator access. If you are uncertain, just use **sa**, and consult the Microsoft SQL Server documentation for instructions on setting the password for this account in Microsoft SQL Server. Also, reenter the password to ensure it is correct.

7. Click Next. If you have specified SQL Server authentication, and either the login ID or password is incorrect, an error message is displayed. Press OK to close the error message, reenter the login ID and password, and click Next.

8. Click Next to proceed to the next dialog, and then click Finish. The ODBC Microsoft SQL Server Setup dialog opens, summarizing the settings. Click Test Data Source.

The SQL Server ODBC Data Source Test dialog opens. In a few seconds, the dialog displays the results of a quick connection test, as shown in the following example:
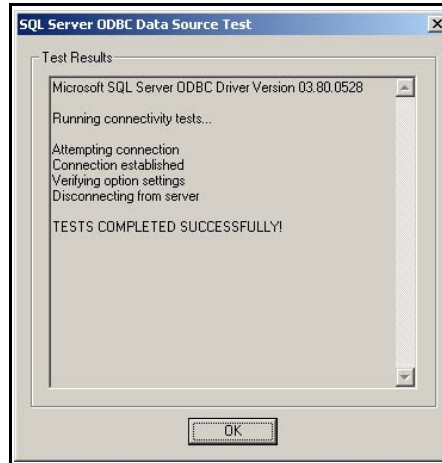
- ■ If the SQL Server ODBC Data Source Test dialog reports that the tests completed successfully, click OK to close this dialog, and then click OK on the ODBC Microsoft SQL Server Setup dialog. You are returned to the ODBC Data Source Administrator dialog. Click OK to close.

- ■ If the SQL Server ODBC Data Source Test dialog reports any errors or failures, this is due to an error in ODBC or the Microsoft SQL Server. See the Microsoft SQL Server documentation for troubleshooting instructions.

Updating the Backup Manager in BrightStor ARCserve Backup

To update the BrightStor ARCserve Backup Manager, follow these steps.

1. On the system where you have installed BrightStor ARCserve Backup, start BrightStor ARCserve Backup and open the Backup Manager.

2. Select the Source tab.

3. On the left pane containing the navigation tree, find the server on which Microsoft SQL Server is running and expand that server to show the database. (If the server is not present, consult the *BrightStor ARCserve Backup Getting Started* for instructions on how to add it.)

4. Right-click the database and choose Security from the pop-up menu. The Security dialog opens, as shown in the following example:

5. If you are using Windows security, specify the user name for the account that you are using to access the server and either enter the password or leave the field blank. If you are using Microsoft SQL Server security, enter the user name and password for the Microsoft SQL Server account, and then click OK.

6. If you have any recurring backup jobs already scheduled for this Microsoft SQL Server, select the Job Status Manager, and then the Job Queue folder tab.

7. Select an applicable backup job and click Modify on the toolbar. The Backup Manager opens.

8. Perform Steps 3 through 5 for this job, and then click Start to resubmit the backup job.

9. Repeat Steps 7 and 8 for each applicable backup job.

Note: If you have any restore jobs scheduled for this Microsoft SQL Server, you must delete and recreate them.

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