BrightStor® ARCserve® Backup for UNIX

Enterprise Option for DB2 UDB Guide

r11.5

Contents

Chapter 4: Best Practices   55

Appendix A: Frequently Asked Questions   59

Appendix B: Troubleshooting   63

Chapter 1: Introducing the Option

BrightStor® ARCserve® Backup is a comprehensive storage solution for applications, databases, and file systems. It provides backup and restore capabilities for databases (such as IBM DB2 Universal Database for UNIX), business-critical applications, and network clients. In addition, BrightStor ARCserve Backup helps administrators simplify running UNIX backup and restore jobs by using a Java-based graphical user interface (GUI), parallel streaming, and advanced device management.

Among the options BrightStor ARCserve Backup offers is the BrightStor® ARCserve® Backup Enterprise Option for DB2 UDB. This Option provides backup and restore capabilities for the IBM DB2 Universal Database (Workgroup and Enterprise editions), referred to as DB2 UDB throughout this guide. The BrightStor ARCserve Backup Enterprise Option for DB2 UDB integrates with BrightStor ARCserve Backup into the full-featured backup and restore capabilities of BrightStor ARCserve Backup.

This integration offers the following functionality:

- Provides advanced backup and restore performance, simplified administration, broad device compatibility, and unsurpassed reliability.

- You can use the option backup and restore services to multiple DB2 UDB databases running on multiple Solaris and AIX systems.

- The option also maximizes your DB2 UDB data storage protection by allowing you to use BrightStor ARCserve Backup to customize the type of protection you need based on your particular storage requirements.

The option supports backup and restore operations launched from the BrightStor ARCserve Backup user interface or from these DB2 UDB user interfaces:

- DB2 Control Center

- DB2 Command Center

- DB2 Command Line Processor (CLP)

By using the option, you can back up and restore the following DB2 UDB objects:

- An entire database

- Tablespaces

- Archived log files

- History file

- Load copy

Architectural Overview

BrightStor ARCserve Backup can be installed on the same host as the option and DB2 UDB, or it can be installed on a separate host. Before you install any option, you need to install BrightStor ARCserve Backup on a host. When BrightStor ARCserve Backup is installed on the same host, communication with the option is local. When installed on a separate host, BrightStor ARCserve Backup communicates with the option remotely over a LAN/WAN. Whether communication is remote or local, BrightStor ARCserve Backup and the Option work together to back up or restore DB2 UDB database objects.

A DB2 UDB instance is defined as a logical database server environment. A DB2 database is created within a DB2 UDB instance on the database host.

The option provides services that allow BrightStor ARCserve Backup to back up and restore a DB2 UDB database associated with the option. Architecturally, the option is positioned between BrightStor ARCserve Backup and a DB2 UDB database, as shown in the following diagram:
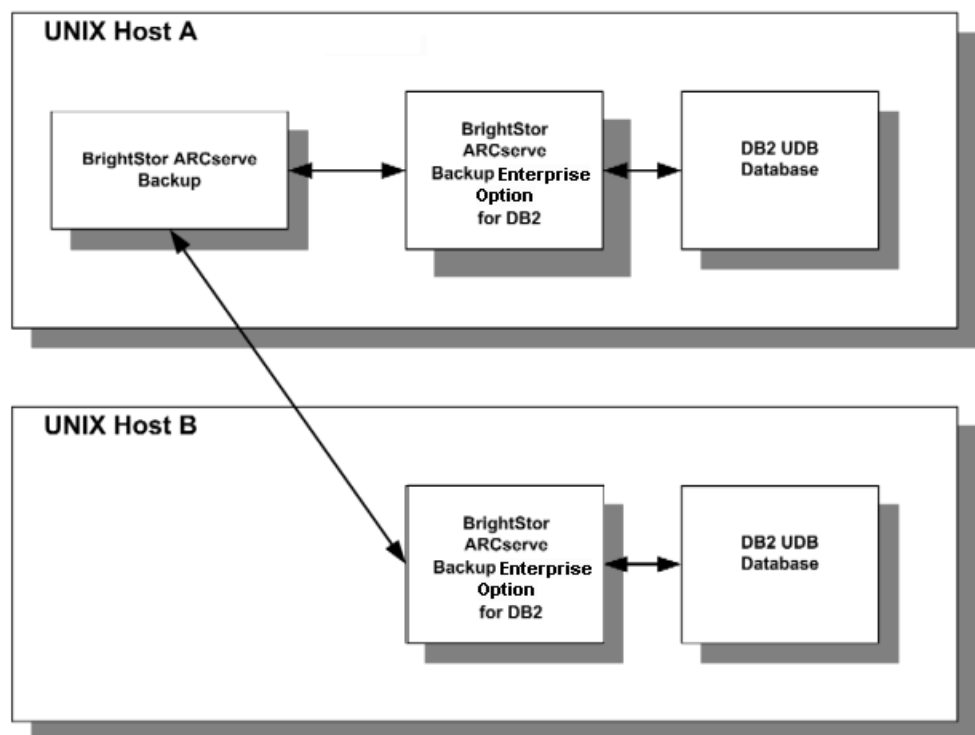
The networking capabilities of BrightStor ARCserve Backup enable the option to be located on any UNIX host where a DB2 UDB database is located.

One option must reside on each host running a DB2 UDB database that is to be managed by BrightStor ARCserve Backup.

The following sections provide additional information on how the option works with DB2 UDB.

How the Option Works During a Backup

You can use the option to perform backups with either BrightStor ARCserve Backup or a DB2 UDB user interface. The diagrams in the following sections show the interaction between the option, its supporting components, and DB2 UDB.

The following supporting components enable the option to interact with DB2 UDB:

- The option library. This option component is loaded and opened by DB2 UDB. The option library interacts directly with DB2 UDB and handles the exchange of data between DB2 UDB and the option.

- The user exit. This option component enables DB2 UDB to archive, back up, and restore active log files.

  Note: The user exit program does not support logging on a raw device (a disk or disk portion that has no file system). This user exit program, db2uext2, is supplied by Computer Associates.

Backup Data Flow Using BrightStor ARCserve Backup

The Option performs backups using BrightStor ARCserve Backup, as illustrated in the following diagram:
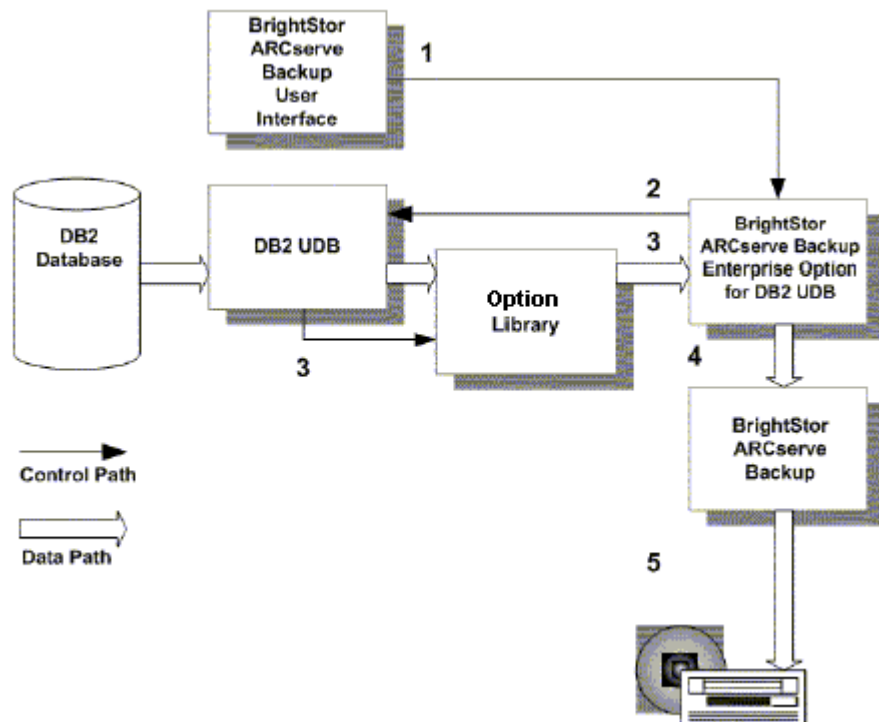
1. The user issues a backup command from the BrightStor ARCserve Backup user interface and the option starts.

2. The option instructs DB2 UDB to load the option library and start the backup.

3. DB2 UDB loads the option library and begins sending data.

4. The option transfers the data to BrightStor ARCserve Backup.

5. BrightStor ARCserve Backup saves the data to a storage medium.

Backup Data Flow Using the DB2 UDB User Interface

The option enables BrightStor ARCserve Backup to process backup jobs initiated from a DB2 UDB user interface, as shown in the following diagram:
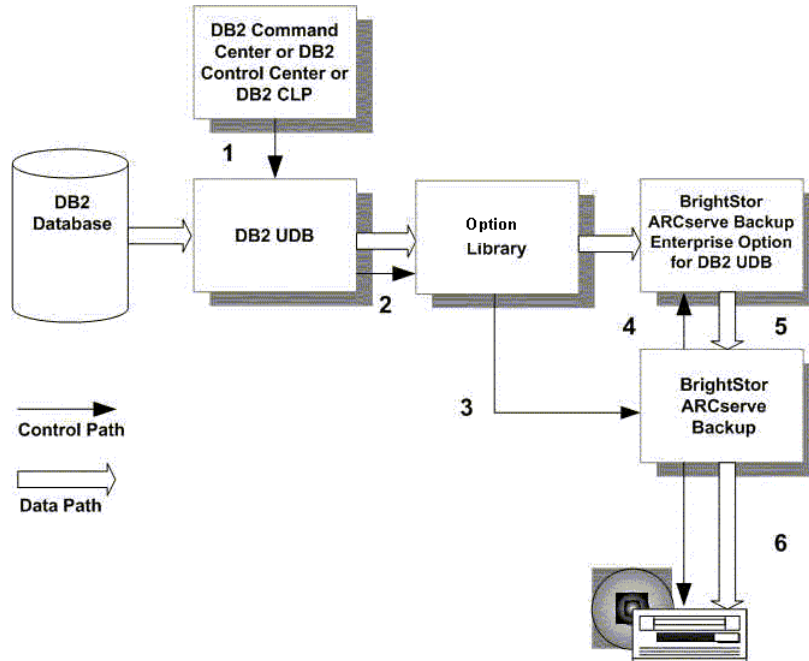
1. A backup command is issued through the DB2 Command Center, the DB2 Control Center, or the DB2 Command Line Processor (CLP). The backup command must instruct DB2 UDB to load the option library provided by BrightStor ARCserve Backup.

2. DB2 UDB loads the option library and starts the backup.

3. A new restore job is registered with BrightStor ARCserve Backup and is configured according to the options included in the DB2 UDB command.

4. BrightStor ARCserve Backup starts the option to process the new backup request.

5. DB2 UDB starts copying data to BrightStor ARCserve Backup through the option library and the option.

6. BrightStor ARCserve Backup copies the data to a storage medium.

How the Option Works During a Restore

You can use the option to perform restores with either BrightStor ARCserve Backup or a DB2 UDB user interface.

Restore Data Flow Using BrightStor ARCserve Backup

The option restores DB2 UDB objects with BrightStor ARCserve Backup, as shown in the following diagram:
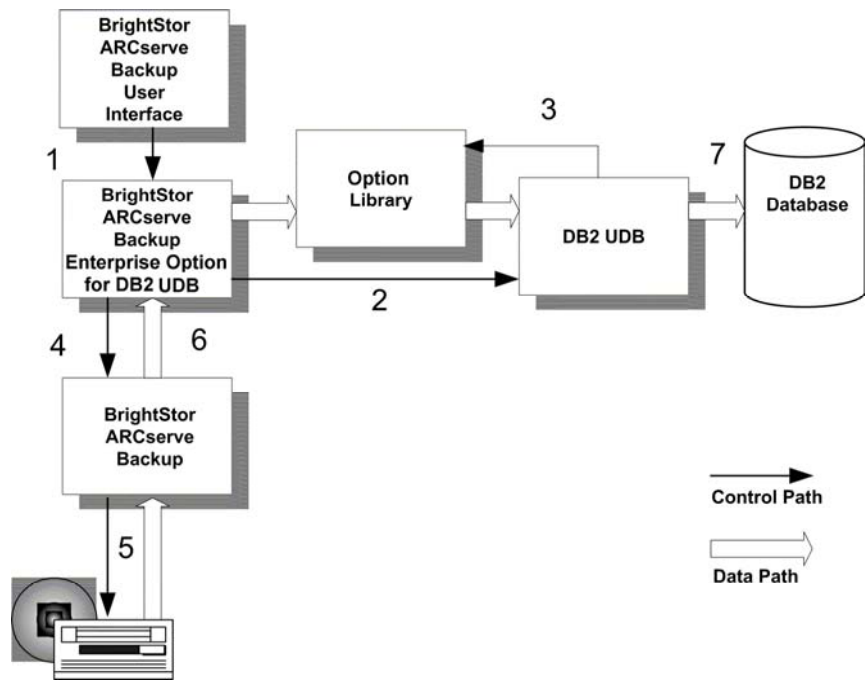
1. The user issues a restore command from the BrightStor ARCserve Backup user interface; the option starts.

2. The option informs DB2 UDB of the restore request.

3. DB2 UDB loads the option library.

4. The option informs BrightStor ARCserve Backup of the restore request.

5. BrightStor ARCserve Backup accesses the storage medium and begins restoring the data.

6. BrightStor ARCserve Backup copies the data to the option.

7. The option copies the data to DB2 UDB through the option library.

Note: If the restore job includes a rollforward option, the option does not terminate after the restore is completed. In this case, the option identifies the backed up archived logs required for the rollforward operation and initiates a restore job for those log files. This process is described in Restore Archived Log Files Automatically in this chapter.

Restore Data Flow Using the DB2 UDB User Interface

The option performs restores initiated from a DB2 UDB user interface, as shown in the following diagram:
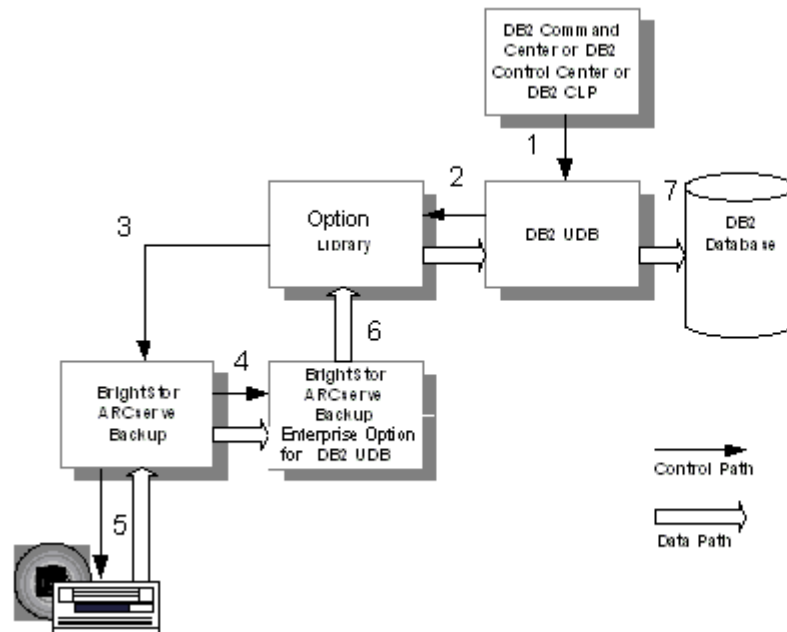
1. The user initiates a restore command through the DB2 Command Center, the DB2 Control Center, or the DB2 Command Line Processor (CLP). The backup command must instruct DB2 UDB to load the option library provided by BrightStor ARCserve Backup.

2. DB2 UDB loads the option library and starts the restore.

3. A new restore job is registered with BrightStor ARCserve Backup, reflecting the options included in the DB2 UDB command.

4. BrightStor ARCserve Backup starts the option to initiate the restore command.

5. BrightStor ARCserve Backup accesses the storage medium and begins restoring the data.

6. BrightStor ARCserve Backup copies data to the option and the option copies it to DB2 UDB using the option library.

7. DB2 UDB restores the database with the provided data.

Note: Automated restoration of archived log files is possible only by using BrightStor ARCserve Backup. For more information, see Restore Archived Log Files Automatically later in this chapter.

Back Up and Restore Archived Log Files

You can automatically back up archived log files with the option. When you initiate a rollforward restore job from the Restore Manager, the option automatically selects the required archived log files from the backup media and restores them to the active log file location.

Back Up Archived Log Files Automatically

Before you can back up archived log files automatically with BrightStor ARCserve Backup, you must enable the option user exit. The option user exit is a program that DB2 UDB calls when a log file needs to be archived. This program moves the log file to a user-specified archive location. For instructions on how to enable the user exit, see Enable the User Exit in the chapter "Installing the Option."

If you enable the option user exit program to back up archived log files automatically, the option backs up these files as shown in the following diagram:
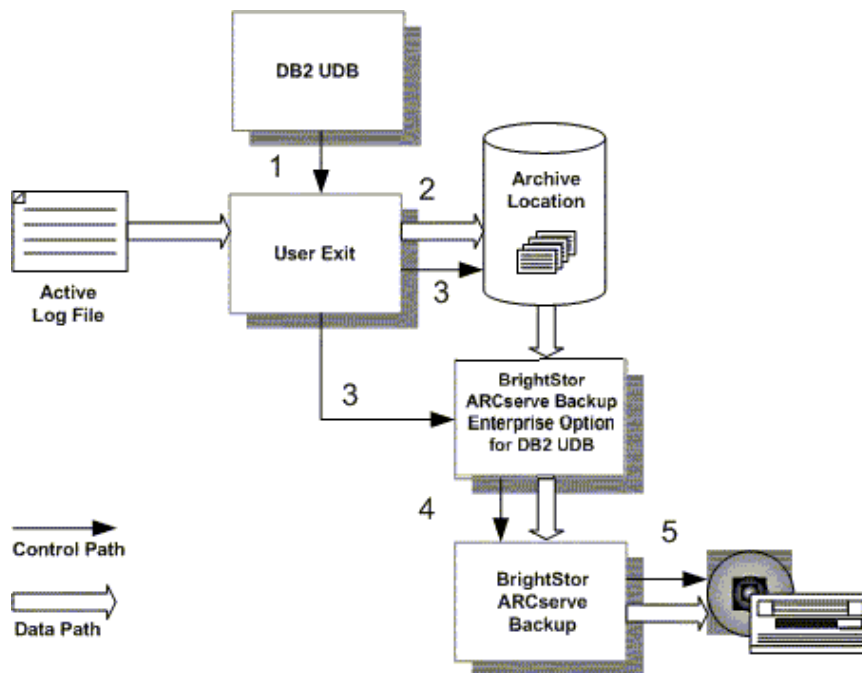
1. DB2 UDB instructs the option user exit to copy the active log file.

2. The user exit copies the active log to a user-specified archive location.

3. The user exit monitors the archive location; when the archived log files aggregate to a user-specified limit, the user exit starts the option and initiates a backup job with BrightStor ARCserve Backup.

4. The option copies the archived log files to BrightStor ARCserve Backup and clears the archive location.

5. BrightStor ARCserve Backup copies the archived log files to the storage medium.

Restore Archived Log Files Automatically

Automatic restoration of archived log files is possible when you initiate a rollforward restore with BrightStor ARCserve Backup.

Note: If you initiate a rollforward restore from a DB2 UDB user interface, you must restore the backed up log files to the retrieval location manually.

During a BrightStor ARCserve Backup rollforward restore, archived log files are automatically restored by the option, as shown in the following diagram:
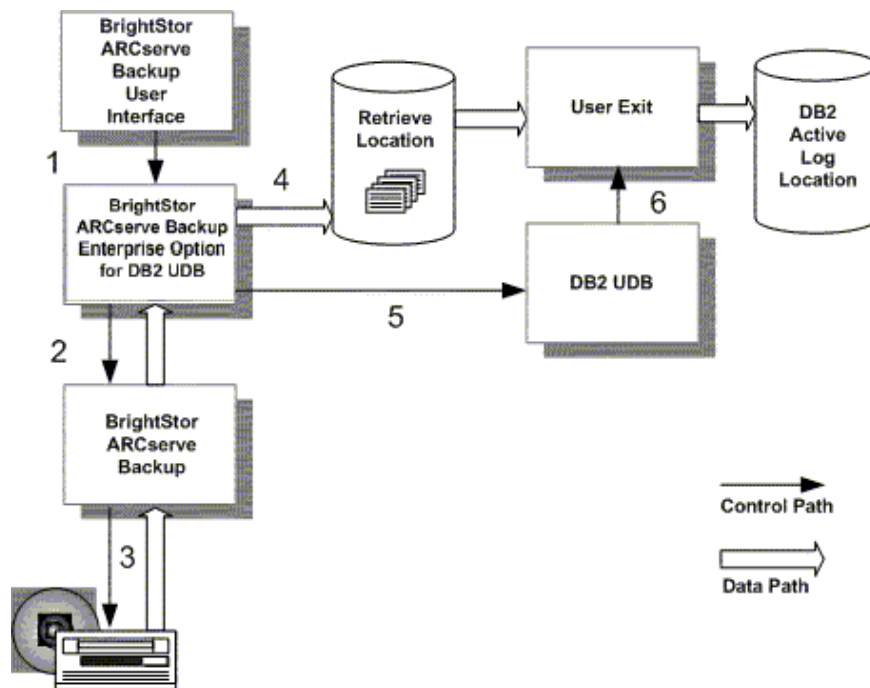
1. The user initiates a rollforward restore, as described in Restore Data Flow Using BrightStor ARCserve Backup in this chapter.

2. After the database objects are restored, the option identifies the archived log files required to carry out the rollforward restore and requests a restore job for them.

3. BrightStor ARCserve Backup accesses the storage medium, obtains the specified files, and copies them to the option.

4. The option restores the specified archived log files to the retrieve location.

5. The option issues a rollforward command to DB2 UDB.

6. DB2 UDB instructs the option user exit to retrieve the log files and copy them to the active log location.

Chapter 2: Installing the Option for DB2 UDB

This chapter provides an installation checklist and the information you need to configure the BrightStor ARCserve Backup Enterprise Option for DB2 UDB. The information in this chapter assumes you are familiar with the characteristics and requirements of UNIX system operation in general, and with Solaris and AIX operating systems in particular. System requirements for the BrightStor ARCserve Backup server are included in the Readme file and the *Getting Started*. Be sure to check ca.com for any updates to the requirements.

Upgrade Consideration

If you have been using a previous version of BrightStor Enterprise Backup, when you install the BrightStor ARCserve Backup Enterprise Option for DB2 UDB, we strongly recommend that you first make a full offline backup of your database.

Installation Checklist

Use this checklist to ensure that you have met all of the prerequisites and have all of the information you need to complete the installation:

Items to check before installation:

- Is the target host running Solaris 7, 8, or 9 or AIX 4.3.2/3 or 5L?

- Is BrightStor ARCserve Backup installed on the target host or on a host with a network connection to the target host?

- Is IBM DB2 Universal Database (Workgroup or Enterprise edition) installed on the target machine?

  Write your DB2 UDB home directory location here for future reference:

  _____

- Have you determined the directory where the option is to be installed?

- The option can be installed in any user-specified location in the file system.

- Is adequate free space available in the intended installation directory?

- Is there adequate memory available?

- Does the person installing the option have root or superuser privileges?

- You must log in with root or superuser privileges to install the option.

- Do you know the CD drive device name and location in the file system? This information is required during the installation procedure.

- Write your CD drive device name and location here for future reference:

  _____

  _

Install the Option

Install the BrightStor ARCserve Backup Enterprise Option for DB2 UDB on each database server to be supported by BrightStor ARCserve Backup.

Perform Post-Installation Tasks

After you install the BrightStor ARCserve Backup Enterprise Option for DB2 UDB, you must complete the following tasks before you can use the newly installed option:

- Configure the option
- Create a BrightStor ARCserve Backup user equivalency
- Enable the User Exit
- Enable incremental backups

These tasks are described in the following sections.

Configure the Option

To configure the option, follow these steps:

1. Change to the option home directory.

2. As the root user, type the following command to run the setup script:

    ./casdb2setup

3. Enter the option home directory when prompted. The default setting is the current directory. If the current directory is not the home directory, enter the path name for the appropriate directory.

4. Indicate whether the option is being installed locally or remotely.

    ■ Enter **y** if you are installing the option and BrightStor ARCserve Backup on the same machine (locally). You are then prompted for the BrightStor ARCserve Backup home directory. Accept the default location or enter a new directory path.

    ■ Enter **n** if you are installing the option and BrightStor ARCserve Backup on a different machine (remotely). You are then prompted for the node name where BrightStor ARCserve Backup is installed. Enter the name of the node.

5. Verify the location where DB2 UDB is installed (see bullet 3 in the Installation Checklist in this chapter). Accept the default location, or enter a new directory path.

6. If the setup script is unable to find the location of a DB2 UDB instance, you must enter the directory path for the DB2 UDB instance that the option is to work with.

7. Read the following important message that displays, and press Enter to continue:

    You must use CA's user exit for backup and restore of archived log files with BrightStor ARCserve Backup. CA's user exit program (BABDB2AGT_HOME/db2uext2) is about to be copied under the sqllib/adm path for each of your instances.

    After the successful completion of ./casdb2setup, please make sure that user exit logging is enabled in every database configuration file.

    Note: If a user exit exists in sqllib/adm, it is renamed to db2uext2.orig.

8. Enter the directory path for your archive location. The archive location is where an active log file is archived to disk.

9. Enter the directory path for your retrieve location. The retrieve location is where archived log files are retrieved from disk. The retrieve location and the archive location can be the same. Press Enter to set the retrieve path to equal the archive path, or enter a new directory path for the retrieve path.

Important! *For every instance of DB2 UDB, ensure that all users with a high level of administrative authority have read and write access to both the archive and retrieve paths.*

10. Specify whether you want to enable automated backup of archived logs:

   ▪ If yes, enter **y**; you must then enter the archive capacity in megabytes (the default is 20 MB). For more information about automated backups, see Backup and Restore Archived Log Files in the chapter "Introducing the Option" and Manage Archived Logs in the chapter "Backup and Restore DB2 Databases."

   ▪ If you do not enable the automated backup of archived log files now, you can do so later. For more information, see Enable and Disable Automatic Archived Log File Backup in the appendix "Modify Option Backup and Restore Parameters."

11. If the option is already registered with the BrightStor ARCserve Backup Common Module for Agents (a component of BrightStor ARCserve Backup), you are asked if you want to re-register it. Enter **y** or **n**.

12. If you have previously installed the option, the configuration file sqluv.cfg already exists and contains your previous parameter settings. If the file exists, you are asked whether it is to be recreated.

   ▪ If you want to keep the settings in your existing sqluv.cfg file, enter **n**.

   ▪ If you want to install a new sqluv.cfg file with default settings, enter **y**.

   Note: This prompt does not appear if the configuration file does not exist.

13. Enter the name of a UNIX user who can connect to this system and who is also a BrightStor ARCserve Backup user.

14. Enter the password of that user. The password must have at least four characters.

   The option is now configured.

   Note: After creating new DB2 instances, you must either run the casdb2setup script again or use the following steps to run the userexitupdate script in order to allow the databases from the newly created instances to use CA's user exit:

   1. Log on to the BrightStor ARCserve Backup host as root.

   2. Change to the directory, BABDB2AGT_HOME.

   3. From the command line, enter the command:

   ```
   ./userexitupdate
   ```

   Important! *Make sure that you create a BrightStor ARCserve Backup user equivalency for every user that has the authority to start backup and restore operations before or after running the setup. See Creating a BrightStor ARCserve Backup User Equivalency in this chapter for details.*

After configuring the option, the option is registered with the BrightStor ARCserve Backup Common Module for Agents. The option registration is recorded in the file /opt/CA/BABcmagt/agent.cfg.

Create a BrightStor ARCserve Backup User Equivalency

When you create a user equivalency, you are creating an equivalent user to caroot (you must know the password for caroot). After you have designated a UNIX user on a given host as equivalent to caroot, that user can access the entire authentication database.

You must add a DB2 user equivalency to allow the option to:

- Manage the storage of your archived logs.
- Backup or restore a database with a DB2 user interface.
- Use the Rollforward option in BrightStor ARCserve Backup.

To create a user equivalency, follow these steps:

1. Log on to the BrightStor ARCserve Backup host as root.
2. Enter the following command to create the user equivalency:

    ca_auth –equiv add *username hostname* causer [BAB_*username password*]

    Replace:

    - *username* with the name of the UNIX user for whom the equivalency is being created
    - *hostname* with the name of the host where the user account specified by username is located (typically, the host where the option is running)
    - *BAB_username* with a BrightStor ARCserve Backup administrator, such as caroot
    - *password* with the password for the administrator specified in BAB_username.

For more information about the ca_auth command and creating user equivalencies, see the *Administrator Guide*.

Enable the User Exit

To manage the backup and restore of archived log files, you must enable the DB2 database configuration parameter, userexit, with the db2 update command. The userexit parameter must be enabled in the configuration file of each DB2 database that is operating with a BrightStor ARCserve Backup Enterprise Option for DB2 UDB.

Enter the following command from the DB2 CLP to enable the user exit:

```
db2 update db cfg for dbalias using userexit on
```

Replace *dbalias* with the database alias.

Starting with DB2 8.2, use the following command from the CLP to enable the user exit:

```
db2 update db cfg for dbalias using logarchmeth1 userexit
```

Replace dbalias with the database alias.

This command causes DB2 to place the database in a backup pending state. In a pending state the database is not accessible. You must complete a full offline database backup to return the database to a nonpending state.

Note: You will not be able to expand the database in the Backup Manager tree view. This is an expected result of the database's being in the backup pending state.

Use one of the following methods to complete a full offline database backup:

- Before you initiate the backup job from the Backup Manager, select the Offline option on the DB2 Options tab.

- Initiate the offline backup of the entire database from a DB2 user interface.

Enable Incremental Backups

The following two conditions are required for using the BrightStor ARCserve Backup Enterprise Option for DB2 UDB incremental and incremental delta backup options:

- The DB2 UDB version must be Version 7.2 or higher.

- You must enable the track modified pages (trackmod) parameter in the database configuration file.

To enable the track modified pages (trackmod) parameter, issue the following command from the DB2 CLP:

```
db2 update db cfg for dbalias using trackmod on
```

Replace *dbalias* with the database alias.

Modify Option User Information

When you configured the option, you provided a user name and password for a UNIX user who can connect to the host and who is also a BrightStor ARCserve Backup user. You must modify the entries in the BABDB2AGT_HOME/sqluv.cfg file if:

- You change the password for the current user name.

- You want to use a different user name.

Modify the Option User Name

To modify the option user name, follow these steps:

1. Open the file BABDB2AGT_HOME/sqluv.cfg for editing.

2. Locate the user name (username) parameter, and then enter the value for the new user name.

3. Change to the option home directory.

4. Set the following environment variables:

    On Solaris:

    `export LD_LIBRARY_PATH=/opt/CA/BABcmagt:$LD_LIBRARY_PATH`

    On AIX:

    `export LIBPATH=/opt/CA/BABcmagt:$LIBPATH`

    From the command line, enter the command:

    `./cas_encr` *new_password*

    where *new_password* is case-sensitive, entered in plain text.

    The ASCII encrypted value of the new password is returned.

5. In the file BABDB2AGT_HOME/sqluv.cfg, locate the password parameter, and then enter the encrypted value for the new password. It is very important to copy the exact value that was returned by cas_encr.

6. Save the file.

Control the Option Manually

During the installation of the option, you can specify that the option is to automatically start up and shut down when the operating system starts and stops. If you did not choose automatic startup, or if you want to shut down and restart the option manually at any time, or check the option status, you can log on as root and perform one of the following actions:

- **To disable the DB2 option**, enter the following command at the UNIX command line:

  `caagent disable 37`

- **To enable the DB2 option**, enter the following command at the UNIX command line:

  `caagent enable 37`

- **To view the status of the DB2 option**, enter:

  `caagent list 37`

  Note: The object type number, 37, is for the Enterprise Option for DB2 UDB.

Add or Remove a DB2 UDB Instance

You are strongly advised to run userexitupdate to configure the user exit each time a DB2 UDB instance is added or removed. You can also run casdb2setup whenever you want to change the option configuration. For instructions on running casdb2setup, see Configure the Option in this chapter.

Remove the BrightStor ARCserve Backup Enterprise Option for DB2 UDB

When you remove the BrightStor ARCserve Backup Enterprise Option for DB2 UDB the user exit program provided by Computer Associates is also removed automatically. You can, however, continue to have your own user exit program enabled. The procedures for removing the option are detailed in the following sections.

Important! *Before you remove the option, you are advised to plan for managing your recoverable database archived log files without the option and the user exit. Recoverable databases are databases that are enabled for rollforward logging. The log files are kept or retained after the transactions are committed (written) to the database. A recoverable database can be restored and then benefit from a rollforward recovery. By allowing the rollforward recovery, the database will not lose the transactions that occurred since the backup.*

Disable the User Exit Parameter

Follow these steps to disable the userexit parameter from the database configuration file of every database before you remove the option, or if you do not want to work with a user exit program any longer.

1. Log in as root.

2. From any command line, issue the command:

   `db2 update db cfg for `*dbalias*` using userexit off`

   For DB2 UDB 8.2, you can also use the following command:

   `db2 update db cfg for dbalias using logarchmeth1 off`

3. Replace *dbalias* with the database alias.

Remove the Option in Solaris

To remove the BrightStor ARCserve Backup Enterprise Option for DB2 UDB from Solaris, follow these steps:

1. Log in as root.

2. From any command line, issue the command:

    pkgrm BABdb2

3. At the prompt, confirm that you want to remove the option package (BABdb2) by entering **y** for yes.

The option is removed from your system.

After you remove the BrightStor ARCserve Backup Enterprise Option for DB2 UDB, remember to enable your own user exit program, if necessary.

Remove the Option in AIX

To remove the BrightStor ARCserve Backup Enterprise Option for DB2 UDB from AIX, follow these steps:

1. Log in as root.

2. From any command line, issue the command:

    ```
    installp -u BABdb2
    ```

The option is removed from your system.

After you remove the BrightStor ARCserve Backup Enterprise Option for DB2 UDB, remember to enable your own user exit program, if necessary.

Chapter 3: Backing Up and Restoring DB2 Databases

After you install and configure the BrightStor ARCserve Backup Enterprise Option for DB2 UDB, you can backup and restore DB2 database information from BrightStor ARCserve Backup. In addition, BrightStor ARCserve Backup functionality is extended to the DB2 UDB user interface.

Using the option, you can back up and restore the following DB2 UDB objects:

- An entire database
- Tablespaces
- Archived log files
- History file
- Load copy

This chapter describes the option functionality when the option is installed with a local or remote DB2 database. This chapter assumes:

- You already have a BrightStor ARCserve Backup user account.
- That you are logged on to BrightStor ARCserve Backup.
- That you are familiar with the general operation of BrightStor ARCserve Backup.

For more information on the general operation of BrightStor ARCserve Backup, see the *Getting Started*.

Backup Types

Before you use the option, note the backup types for BrightStor ARCserve Backup and DB2. The following table displays the difference between the backup types incremental and differential:

BrightStor ARCserve Backup Type	Equivalent DB2 UDB Type	Definition
Incremental	Incremental delta	Backup of data that has changed since the last successful backup operation of any type (full/incremental/ incremental delta).
Differential	Incremental	Backup of data that has changed since the most recent successful full backup operation.

Connect to a DB2 Database

To connect to a DB2 database, follow these steps:

1. From the Backup Manager, click the Source tab. From the Restore Manager, select the Destination tab.

2. Locate the database in the tree view and expand it. The Instance login dialog appears automatically.
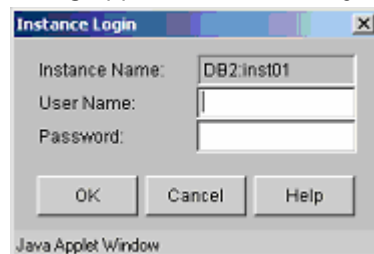
   Note: You cannot select the instance level. You can, however, expand the instance level and select from the databases and tablespaces beneath it.

3. Enter your user name and password on the Instance Login dialog, and then click OK.

Configure Buffer Parameters

Before beginning your backup job, you can modify BrightStor ARCserve Backup parameters to suit your particular needs. For example, buffer values are set with the following parameters:

- DB2_BUFFSIZE defines the backup and restore buffer size used by DB2 UDB. This parameter represents the number of 4 KB pages.

- DB2_NUMBUFFER defines the number of data transfer buffers used by DB2 UDB during backup or restore.

For parameter definitions and the procedure for modifying the parameters, see the appendix "Modify Option Backup and Restore Parameters."

Use the Backup Manager

The following is an overview of the procedures involved with using the Backup Manager to back up a DB2 database. For detailed information about the standard features of the Backup Manager, see the *Getting Started*.

1. From the Source tab, select the DB2 UDB objects to be backed up.

   Note: You cannot select the instance level; however, you can expand the instance level and select the databases and tablespaces beneath it.

2. On the Access tab, select the type of backup you want to perform.

3. On the Destination tab, select a medium for the backup destination.

4. On the DB2 Options tab, select the options you want to apply to the backup. For more information, see Select Backup Options in this chapter.

5. Click the Submit, Option, and Filter buttons as required to:

   - Enter additional information about the backup job.

   - Submit the backup job.

   Note: When an instance is offline, in a pending state, or in a circular logging mode, the following deferral message appears:

   Database *dbname* is either offline, in a pending state, or is using circular logging. Jobs may be submitted, but authentication can only be performed at job execution time.

Select Backup Options

You can select backup options on the DB2 Options tab in the Backup Manager.
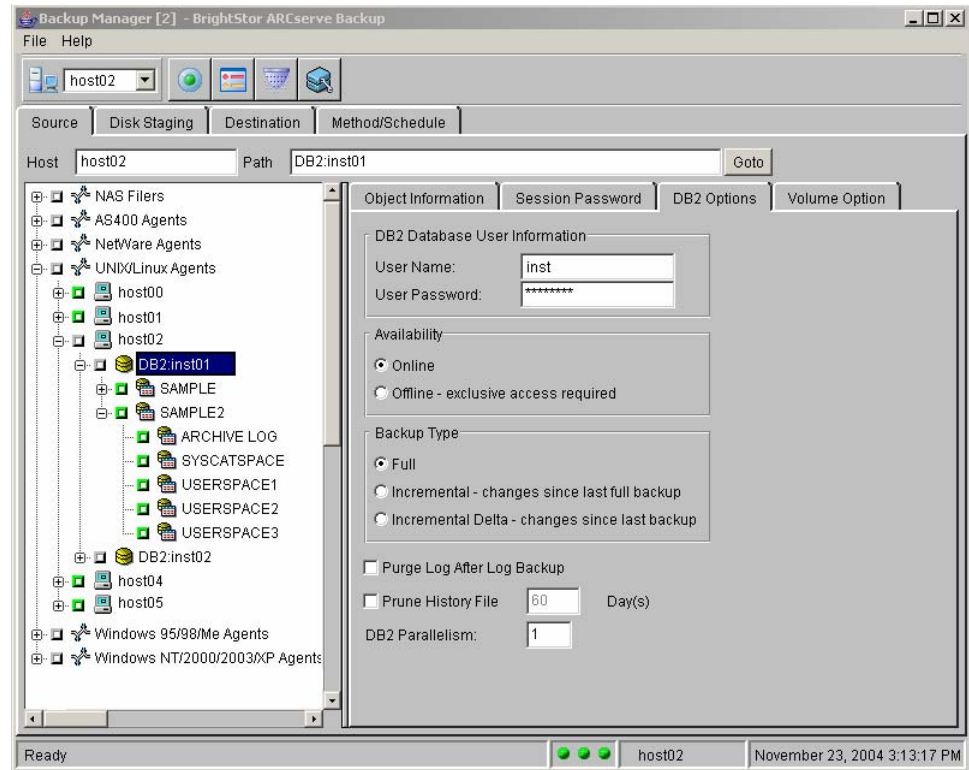
You can select the following options on the DB2 Options tab.

- **DB2 Database User Information—**Specifies the DB2 UDB user submitting the backup request.

  Enter your DB2 UDB user name and password in the User Name and User Password fields.

- **Availability—**Specifies the database availability during the backup. Select one of the following:

  - **Online—**This option is used at the database or tablespace level. Other users can connect to the database while the backup is running. The online option is available only when the database is configured to use the option user exit (the recommended configuration) or logretain (a parameter from the DB2 database configuration file). You can use this option with the multistreaming option if the database is not in a pending or problem state.

    Note: If you use logretain instead of the option user exit, you can still execute an online backup; however, the option will not handle the backup and restore log files. You must back up the log files manually.

  - **Offline—**This option is used at the database or tablespace level. Users must not be connected to the database while the backup is running. You must choose this option while the database is in a backup pending state or is using circular logging. You cannot use this option with the multistreaming option.

  Note: With circular logging, the database reuses the log files in rotation. Using circular logging, a log file can become full and produce an error. When you restore a database using circular logging, you lose all the changes that occurred since the backup unless you re-enter your transactions manually.

  Default: Online

- **Backup Type—**Specifies the scope of the data to be included in the backup. Select one of the following:

  - **Full—**Backs up all of the data in the selected DB2 UDB object (database or tablespace).

  - **Incremental—**Backs up the data that has changed since the most recent successful full backup operation.

  - **Incremental Delta—**Backs up the data that has changed since the last successful backup operation of any type (full, incremental, or incremental delta).

  Note: To use the incremental and incremental delta options, you must meet the following requirements:

  You must be using DB2 UDB Version 7.2 or higher. When you are working with an earlier DB2 UDB version, the option executes a full backup even when these options are selected.

You must enable the track modified pages (trackmod) parameter in the database configuration file, as described in Enable Incremental Backups in the chapter "Installing the Option."

Default: Full.

- **Purge Log After Log Backup—**Specifies if all files in the log archive location are to be deleted after the successful completion of an archived log backup.

    This option is useful if you did not configure the option to automatically back up archived logs.

    Default: Not selected.

- **Prune History File—**Specifies if the history file is to be reduced in size by limiting the number of days included in the file.

    Select this option to reduce the size of the history file that is part of every backup image (the actual backup of the data that is identified by names like DB.<Node Number>.<timestamp>.<sequence>). The value in the Day(s) field indicates the number of days to be retained in the history file. This value is calculated starting from the local time of the machine where the backup operation starts. Accept the default value or enter a new value.

    Although this option decreases the size of the history file, the most recent full database backup image is always retained.

    Default: Not selected. When this option is selected, the default number of days to be retained is 60.

- **DB2 Parallelism—**Specifies the number of tablespaces read in parallel by the backup utility command when issued by BrightStor ARCserve Backup.

    This option corresponds to the parallelism parameter in the DB2 UDB backup command. Accept the default value or enter a new value.

    Default: 1

Schedule Regular Backups Using Rotation

You can schedule your DB2 UDB backups to run automatically on a regular basis by creating a BrightStor ARCserve Backup rotation or GFS (Grandfather-Father-Son) rotation job. While using rotation jobs, your backup strategy can include full, incremental, or incremental delta DB2 UDB backup types.

Consider the following before using the option with BrightStor ARCserve Backup rotation and GFS rotation jobs:

- A backup job designated as incremental in BrightStor ARCserve Backup is executed as an incremental delta backup job by DB2 UDB.

- A backup job designated as differential in BrightStor ARCserve Backup is executed as an incremental backup job by DB2 UDB.

- Online or Offline status is applied to the entire rotation job, as set on the DB2 Options tab.

- With rotation jobs, the incremental and incremental delta options selected from the DB2 Options tab are ignored because the backup type specified on the Calendar View tab takes precedence.

- You cannot mix incremental and differential backups using rotation jobs.

Be sure that you understand how media rotation works so as not to lose any data. For detailed information about rotation and GFS rotation jobs, see the *Administrator Guide*.

Configure Buffer Parameters

Before beginning your backup job, you may want to modify BrightStor ARCserve Backup parameters to suit your particular needs. For example:

- DB2_BUFFSIZE defines the backup and restore buffer size used by DB2. This parameter represents the number of 4 KB pages.

- DB2_NUMBUFFER defines the number of data transfer buffers used by DB2 during backup or restore.

- DB2_RESTORE_DB_WITHOUT_ROLLING_FORWARD defines whether or not DB2 UDB will put the database in a rollforward pending state after a successful restore.

For more information about parameter definitions and the procedure for modifying the parameters, see the appendix "Modify Option Backup and Restore Parameters."

Use the Restore Manager

The following is an overview of the procedures involved with using the Restore Manager to restore a DB2 database. For detailed information about using the Restore Manager, see the *Getting Started*.

To use the standard features of the Restore Manager, follow these steps:

1. From the Source tab, select the data source for the restore. The names of the backup images have the following format:

   ■ DB.Node Number.timestamp.sequence number. Backups with the DB prefix were taken at the database level.

   ■ TSP.Node Number.timestamp.sequence number. Backups with the TSP prefix were taken at the tablespace level.

   ■ COPY.Node Number.timestamp.sequence number. Backups with the COPY prefix were taken when the user issued a load command with the load library option.

2. On the DB2 Options tab accessible from the Destination tab, select the options you want to apply to the restore job. For more information about the options, see Select Restore Options in this chapter.

3. Click the Submit, Option, and Filter buttons as required to:

   ■ Enter additional information about the restore job.

   ■ Submit the restore job.

Note: If you try to expand a database from the Destination tab while an instance is offline, in a pending state, or in a circular logging mode, the following message appears:

Database *dbname* is either offline, in a pending state, or in a circular logging mode. Jobs may be submitted, but authentication can only be performed at job execution time.

Select the Restore Options

Select restore options on the DB2 Options tab on the following Restore Manager window:
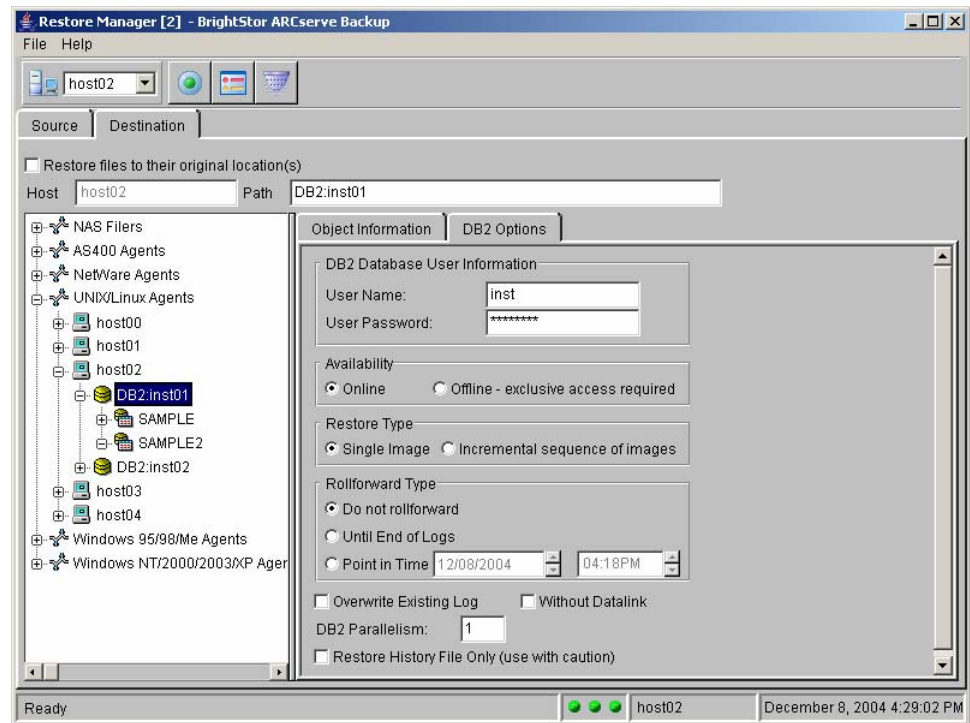
You can select the following options on the DB2 Options tab:

- **DB2 Database User Information—**Identifies the DB2 UDB user submitting the restore job.

  Enter your DB2 UDB user name and password in the User Name and User Password fields.

- **Availability—**Specifies the database availability during the restore. Select one of the following:

  - **Online—**This option is used at the tablespace level only. Other users can be connected to the database while one or more tablespaces are being restored. If syscatspace is being restored, however, no users can be connected to the database.

  - **Offline—**This option is used at the database and tablespace level.

  Default: Online

- **Restore Type—**Specifies the scope of the data to be included in the restore. Select one of the following:

  - **Single Image—**Select this option when only one backup image is needed to restore the database (regardless of the rollforward usage you plan to do).

  - **Incremental sequence of images—**Select this option to restore backup images produced by an incremental backup. This option does not start an automatic incremental restore.

  To use this option when you are manually restoring, see Restore an Incremental Sequence of Images with the db2ckrst Utility in this chapter.

  Default: Single Image.

  Note: You can also perform an automatic incremental restore from a DB2 UDB interface. For more information about this type of restore, see Perform an Automatic Incremental Restore from DB2 in this chapter.

- **Rollforward Type—**Specifies the rollforward status of the submitted restore job.

  To use the following Rollforward options:

  - The database to be restored must be enabled for using the db2uext2 user exit.

  - Ensure that you have created a BrightStor ARCserve Backup user equivalency for your user.

  For more information, see Create a BrightStor ARCserve Backup User Equivalency and the section Enable the User Exit in the chapter "Installing the Option."

  Do not rollforward—Select this option to prevent a rollforward restore.

  Until End of Logs—Select this option to implement a rollforward restore. This option restores data to the end of the applicable archived log file.

Point in Time—Select this option to implement a rollforward restore. This option restores data to the specified date and time in the applicable archived log file. When specifying the date, use the format yyyy/mm/dd; when specifying the time, use the format hh:mm:ss.

Note: When you implement a point-in-time rollforward using BrightStor ARCserve Backup, the BrightStor ARCserve Backup server and the option must be in the same time zone.

Default: Do not rollforward.

- **Overwrite Existing Log—**Overwrites existing log files with restored log files.

    Select this option to overwrite an existing log file in the retrieval location with the restored version of the log file. By default, the existing log file in the retrieval location is retained and the restored log file is renamed log_file_name.RESTORED. The retrieval location is specified during the option configuration.

    Default: Not selected

- **Without Datalink—**Applies reconcile status to tables with Datalink columns. A datalink value contains a logical reference from the database to a file stored outside the database.

    Default: Not selected

- **DB2 Parallelism—**Specifies the number of tablespaces written in parallel by the backup utility command when issued by BrightStor ARCserve Backup.

    This option corresponds to the parallelism parameter in the DB2 UDB backup command. Accept the default value or enter a new value.

    Default: 1

- **Restore History File Only—**Restores only the history file from the selected backup image.

    Default: Not selected

Restore to a Different Database

You can use a database backup image to copy or move a database to a local or remote instance of DB2 UDB.

- If the source and target database configurations are identical, you can restore an offline or online full database backup image to your target instance using BrightStor ARCserve Backup.

- If your source and target database configurations are not identical, the following conditions apply:

  - If your target system has a different file system layout or a different number of physical devices and you are able to reconfigure the target system, ensure that you do so before you restore.

  - If your target database cannot be configured to mirror your source database, you must perform a redirected restore operation. For more information, see Performing a Redirected Restore from DB2 in this chapter.

  - If your source and target servers have different operating systems, see the DB2 UDB documentation to determine if your cross-platform combination is supported.

Note: Consider setting the DB2_RESTORE_DB_WITHOUT_ROLLING_FORWARD parameter to true in the option configuration file BABDB2AGT_HOME/sqluv.cfg. Restoring a full offline database backup image is easier because you do not need to transfer the appropriate archived logs to satisfy the rollforward utility.

In addition, you can issue the command db2 list history from a DB2 UDB user interface to search for the logs you need to transfer and to determine which database backup image was taken online or offline.

Preliminary Steps

Complete the following preliminary steps, as needed, before you submit your restore job:

- If you restore a database from one host to another and you plan to roll forward your database on the destination host using the option:

    - Set the ORIGINAL_CLIENT_HOST parameter in the option configuration file BABDB2AGT_HOME/sqluv.cfg to the name of your original client host.

    - Create a backup of your archived log files with the option on the original client host. Remember that you will need to roll forward your database if you restore from an online database backup image or if you set DB2_RESTORE_DB_WITHOUT_ROLLING_FORWARD to false in the option configuration file sqluv.cfg.

- If you restore your database on the same host, ensure that there is no definition for the ORIGINAL_CLIENT_HOST parameter in the option configuration file sqluv.cfg.

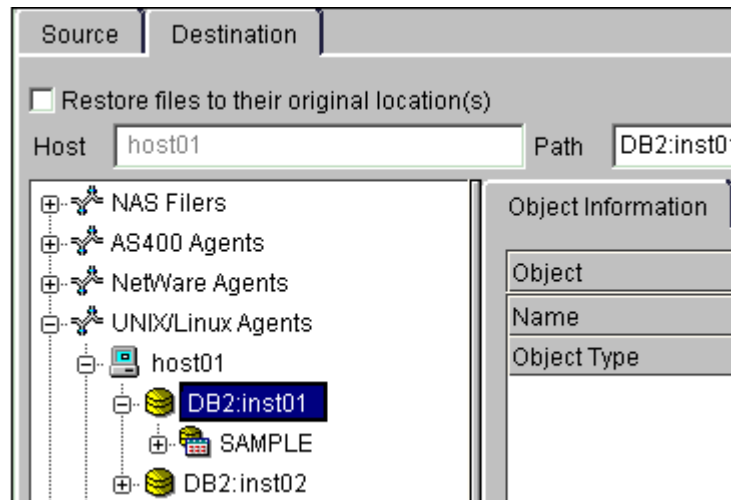To restore a database backup image to another host or database (or both):

1. On the Restore manager Restore tab, select the database backup image.
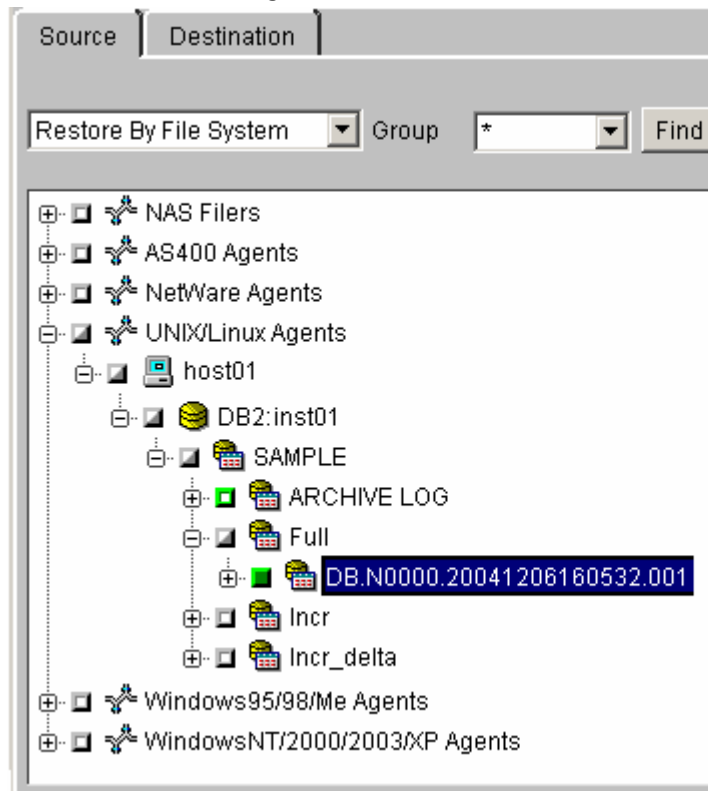
2. Click the Destination tab and select the destination host.

   Note: An option must be installed on the selected host.

3. Expand the target instance name of your choice from the tree view, as shown in the following example:


   Note: The target instance must exist.

4. Select the restore options from the DB2 Options tab. Ensure that you select the Offline option and enter your user name and password.

5. Select your destination database under the instance name in the tree view. If your destination database does not exist and you want DB2 UDB to create it for you, enter the name of your destination database in the Path field on the Destination tab.

   Note: The destination instance and database names must be separated by a forward slash character (/).

Restore to a different database Example 1

In the following example, database SAMPLE is restored as database SAMPLE2 in instance inst01:
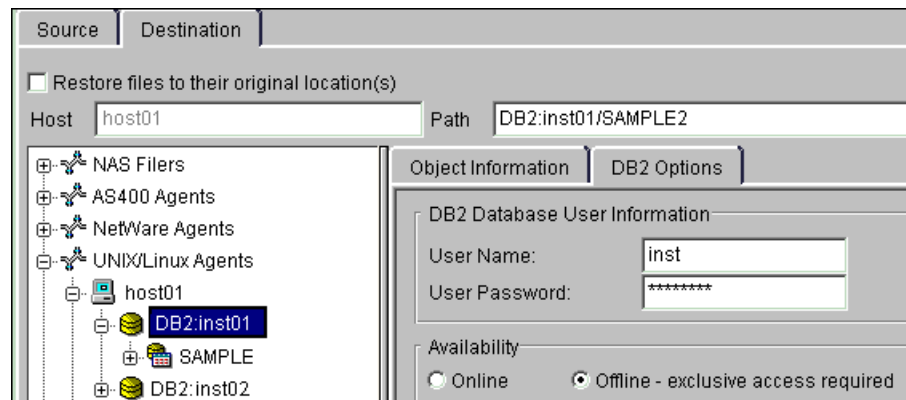
- To restore the selected database to a new database path, enter that path in the Path field after the destination instance and database names; otherwise, you do not need to provide this information.

  Note: If the database name is missing, the option uses the source database name as the destination database name.

- If you have set the ORIGINAL_CLIENT_HOST parameter in the option configuration file sqluv.cfg, do not forget to disable it after the successful completion of the restore operation.

  Note: If you choose to restore an online database backup image and want to start the rollforward command manually, remember to restore your archived logs to your retrieve path.

Restore to a different database Example 2

In the following example, the database selected on the Source tab (SAMPLE) is to be restored offline as database SAMPLE2 under /dsk00/iuser in instance inst01:
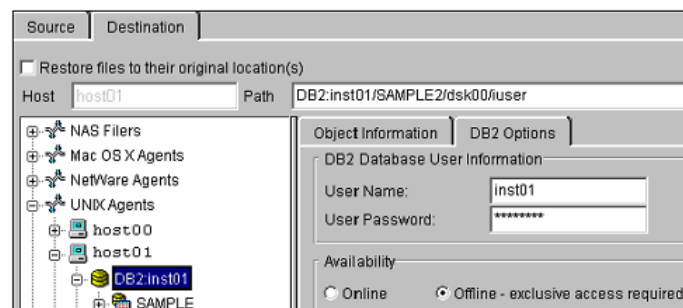
Manage Archived Logs

The option manages the backup and restoration of archived logs with the user exit program db2uext2, which is supplied by Computer Associates.

During the option configuration process, you can enable automated backup of archived log files. If you did not enable automated backup of archived log files, you can back up your archived logs manually at any time using the Backup Manager.

Note: You must enable the DB2 database configuration parameter userexit in each of the DB2 database configuration files. For more information, see Enable the User Exit in the chapter "Installing the Option."

When the size of the backed up archive log files in the archive location reaches a certain capacity, the option user exit automatically initiates a backup and clears the archive location. This ensures that the archive location never runs out of disk space.

Note: Even if you enabled the automated backup option, you can still initiate a manual backup of archived log files at any time using BrightStor ARCserve Backup.

Archived logs that are backed up together in a single session are grouped under an archive log backup tag with a DB2 node number and a timestamp, as shown in this illustration:

For more information about the automated archived log backup process, see Backup and Restore Archived Log Files in the chapter "Introducing the Option."

Modify Automated Archive Backup Parameters

You can set or modify the following automated archive backup parameters in the option configuration file BABDB2AGT_HOME/sqluv.cfg:

- The archive area size limit (DB2_ARCLOG_QUOTA)

- A destination group (ARCHLOGS_DESTGROUP)

- A destination tape (ARCHLOGS_DESTTAPE)

- A destination media pool (ARCHLOGS_MEDIAPOOL)

For parameter definitions and the procedure for modifying the parameters, see the appendix "Modify Option Backup and Restore Parameters."

Restore and Retrieve Archived Log Files

When you initiate a rollforward restore job from the Restore Manager:

1. BrightStor ARCserve Backup first restores the specified DB2 UDB objects.

2. After the DB2 UDB objects are restored, the option automatically identifies the required archived log files and initiates a separate restore job to restore them to the retrieve location.

3. The option then issues a rollforward command to DB2 UDB; DB2 UDB instructs the option user exit to retrieve the log files and move them to the active log location.

A rollforward operation can be set to occur for a particular time or to the end of logs. The option restores the proper archived logs to the retrieve location before the recovery of the DB2 UDB object begins.

The option user exit program retrieves the backed up archived log files from the retrieve location and places them in the active log location. You can specify the same directory for archiving and retrieving the log files.

Note: When choosing directories for the archived log files (archive location and retrieve location), you must ensure that all DB2 UDB users who have the proper authority (SYSADM, SYSCTRL, or SYSMAINT) for each instance can access these directories with read and write permissions. A DB2 UDB instance is defined as a logical database server environment. A DB2 database is created within a DB2 UDB instance on the database host.

Use a DB2 User Interface for Backup or Restore

To perform a back up or restore using a DB2 UDB user interface, you must:

- Load the option library.

- Make sure you have created a BrightStor ARCserve Backup user equivalency. For more information, see Create a BrightStor ARCserve Backup User Equivalency in the chapter "Installing the Option for DB2 UDB."

- Always issue the backup and restore commands as the proper DB2 UDB user, without specifying options, as shown in the following example:

  user username using password

- Always set the DB2 UDB OPEN num-sessions SESSIONS parameter to 1.

- When issuing the restore command, always specify the taken at timestamp option to identify which backup you want to restore. Because the option saves the timestamp in every backup image name, you can use the BrightStor ARCserve Backup Restore Manager to find the one you need. Alternatively, you can find your timestamp using the history file and the db2 list history command, as shown in the following example:

  db2 list history backup all for *dbalias*

  Replace *dbalias* with the database alias.

- If you restore a database from one host to another using the DB2 UDB user interface:

  - Set the ORIGINAL_CLIENT_HOST parameter in the option configuration file BABDB2AGT_HOME/sqluv.cfg to the name of your original client host.

  - Set the DB2UI_ORIGINAL_INSTANCE parameter in the option configuration file sqluv.cfg to the name of your original DB2 UDB instance.

  - Create a backup of your archived log files with the option on the original client host. Remember that you will need to roll forward your database if you restore from an online database backup image.

  - After successful completion of the restore operation, disable the ORIGINAL_CLIENT_HOST and DB2UI_ORIGINAL_INSTANCE parameters in the option configuration file sqluv.cfg by placing a hash mark (#) in front of the parameter and also deleting their definitions.

- If you restore your database on the same host, ensure that there is no definition for the ORIGINAL_CLIENT_HOST parameter in the option configuration file sqluv.cfg.

■   Modify the BABDB2AGT_HOME/sqluv.cfg file to configure any other option parameters you want to apply. For parameter definitions and the procedure for modifying the parameters, see the appendix "Modify Option Backup and Restore Parameters."

Load the Option Library from DB2

When you initiate a backup or restore operation from a DB2 UDB user interface, you must ensure that DB2 UDB loads the libcasdb2_xx.so option library. The following sections contain examples of commands that load the option library.

Note: When using a DB2 UDB user interface, remember to specify the proper library version (32-bit or 64-bit). To check the instance version, use the db2level command.

Use the DB2 Control Center

The following procedure demonstrates how to enter a command that loads the option library using the DB2 Control Center:

1.   Open the Backup Table Space dialog.

2.   Click the Backup tab.

3.   From the Media type list, select Vendor DDL.

4.   In the DLL field, enter the location and name of the BrightStor ARCserve Backup option library for DB2 UDB. For example:

/opt/CA/BABdb2agt/libcasdb2_32.so

Use the DB2 Command Center

The following procedure demonstrates how to enter a backup command that loads the option library using the DB2 Command Center. The command includes the name and location of the BrightStor ARCserve Backup option library for DB2 UDB.

1.   In the Command Center, click the Interactive tab.

2.   In the Command field, enter your command. For example:

backup db sample tablespace userspace1 online load /opt/CA/BABdb2agt/libcasdb2_32.so buffer 16 without prompting

Note: Substitute the example values with your library version and database, tablespace, and path names.

Use the DB2 Command Line Processor

The following example shows the command you can use to load the library with the DB2 Command Line Processor:

```
db2 backup db dbalias load BABDB2AGT_HOME/libcasdb2_32.so without prompting
```

Replace:

- *dbalias* with the database alias

- *BABDB2AGT_*HOME with the option's home directory path

Note: This example specifies the 32-bit library. To check the instance version, use the db2level command.

Remember that prompting mode is not supported. If an interruption occurs, you are not prompted.

Perform a Redirected Restore from DB2

You can perform a redirected restore from a DB2 UDB user interface by using the DB2 UDB restore command and the option. A redirected restore can be very useful in certain situations, for instance:

- When you are restoring a database to another host and you cannot keep the same database configuration

- When you restore a tablespace and you have to consider unavailable or inaccessible tablespace containers because of a media failure or similar problem

- When you restore a tablespace and you want to modify one or more container definitions

Before you submit your restore job, consider the following procedures:

- If you restore a database from one host to another using the DB2 UDB user interface:

  - Set the ORIGINAL_CLIENT_HOST parameter in the option configuration file BABDB2AGT_HOME/sqluv.cfg to the name of your original client host.

  - Set the DB2UI_ORIGINAL_INSTANCE parameter in the option configuration file sqluv.cfg to the name of your original DB2 UDB instance.

  - Create a backup of your archived log files with the option on the original client host. Remember that you will need to roll forward your database if you restore from an online database backup image.

  - After successful completion of the restore operation, disable the ORIGINAL_CLIENT_HOST and DB2UI_ORIGINAL_INSTANCE parameters in the option configuration file sqluv.cfg by placing a hash mark (#) in front of the parameter and also deleting their definitions.

- If you restore your database on the same host, ensure that there is no definition for the ORIGINAL_CLIENT_HOST parameter in the option configuration file sqluv.cfg.

- Modify the BABDB2AGT_HOME/sqluv.cfg file to configure any other option parameters you want to apply. For more information, see the appendix "Modify Option Backup and Restore Parameters."

Redirected Restore from DB2 Example

In the following basic example, an offline backup image of a database named sample1 is restored as a new database named sample2 using a redirected restore.

Note: Wait for DB2 UDB output after issuing each command.

1. Issue the db2 restore command:

   db2 restore db sample1 load *BABDB2AGT_HOME*/libcasdb2_*xx*.so into sample2 taken at 20030311151120 redirect without rolling forward

   Replace:

   – *BABDB2AGT_*HOME with the option's home directory path

   – *xx* with the 32-bit or 64-bit library version

2. Redefine tablespace containers. To do so, use the DB2 UDB set tablespace containers command (see the DB2 UDB documentation for details).

3. Continue the restore with the following command:
   ```
   db2 restore db sample1 continue
   ```

When you issue the restore command, you can use any of the command options offered by the db2 restore command, including the options to:

- Change your buffer size and keep the original database name.

- Replace an existing database.

For more information about the db2 restore command, see your DB2 UDB documentation.

Perform an Automatic Incremental Restore from DB2

You can perform an automatic incremental restore from a DB2 UDB user interface by specifying the automatic incremental option in your restore command, as shown in the following example:

```
db2 restore db sample incremental automatic load BABDB2AGT_HOME/libcasdb2_xx.so
taken at timestamp
```

Replace:

- *BABDB2AGT_*HOME with the option home directory path

- *xx* with the 32-bit or 64-bit library version

- *timestamp* with the chronological identifier of the target incremental image that you want to restore

DB2 UDB builds the restored backup chain using the database history file. For more details, see your DB2 UDB documentation.

Use DB2 UDB Utilities

The BrightStor ARCserve Backup Enterprise Option for DB2 UDB works with the following DB2 UDB utilities:

- db2 load

- db2 rollforward

- db2ckrst

The following sections describe the conditions and command syntax required for the option to interact with these utilities.

Perform Backups with the db2 load Utility

You can either use the BrightStor ARCserve GUI to restore with the rollforward option or use the DB2 Command Line Processor (CLP) to restore load copy backups while rolling forward the database. When you load data into a table using the db2 load utility, the command option you specify affects how you use the Enterprise Option for DB2 UDB to back up the information in your database.

The options you can specify include:

- **nonrecoverable —**When this command option is specified, use the option to back up the database or tablespace affected by the load operation after the database or tablespace commit point.

- **copy no—**When this command option is used on a database enabled for rollforward recovery, the tablespaces affected by the load operation are put in a backup pending state. After the load finishes, use the option to back up the database objects.

- **copy yes—**This command option can be used only if your database is enabled for rollforward recovery. In this case, you must also use the load library command option to save a copy of the loaded data.

  Note: Backing up your database before using the load utility can be useful in case you encounter an unrecoverable load operation failure.

  Important! *Ensure that you apply FixPak 8 to your DB2 UDB Version 7.1 or Version 7.2 instance before performing backups with the db2 load utility.*

db2 Load utility Example

The following example shows how to format a db2 load command with the copy yes option:

```
db2 load from file1.exp of ixf messages load.msg insert into tablename copy yes
load BABDB2AGT_HOME/libcasdb2_xx.so
```

Replace:

- *tablename* with the name of the table being updated

- *BABDB2AGT_*HOME with the option home directory path

- *xx* with the 32-bit or 64-bit library version

Remember that the number of I/O sessions to be opened with the option is 1.

The following backup image is produced:

```
COPY.Node Number.timestamp.sequence_number
```

The variables timestamp and sequence_number represent the chronological and numeric identifiers automatically assigned to the load copy backup image.

For more information about the db2 load command and its options, see the DB2 UDB documentation.

Restore Load Copy Images with the db2 rollforward Utility

Load copy images are the actual backups or copies of loaded data. Each backup (image) is identified by the name COPY.Node Number.Timestamp.sequence number. To restore load copy backup images, you must use the rollforward utility. You can browse your load copy backup images on the Source tab in the Restore Manager, as shown in the following example.
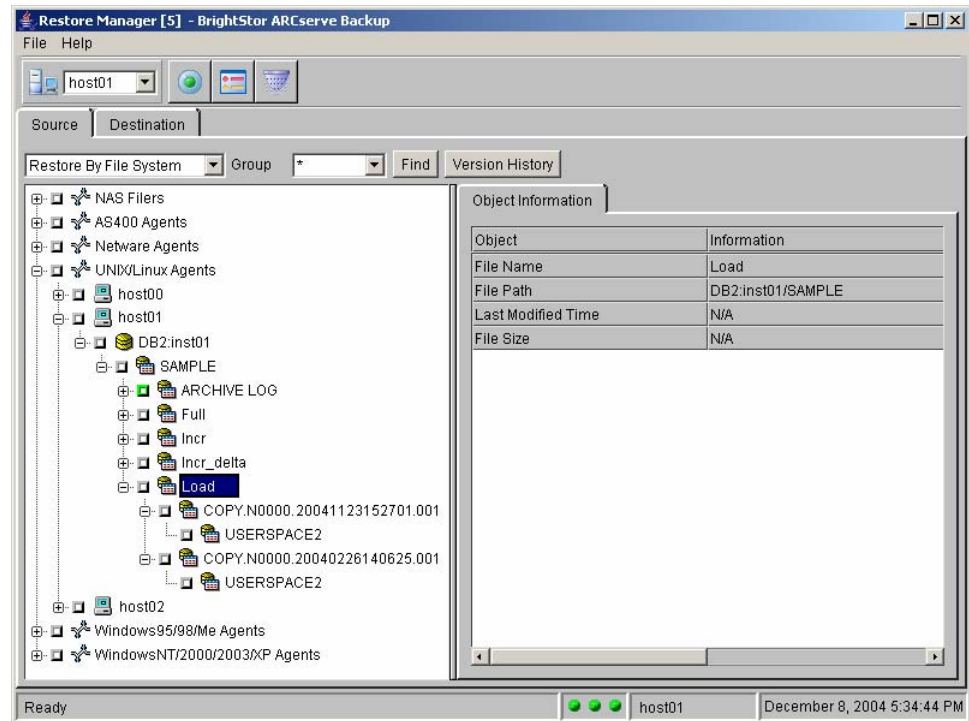
You can restore and recover your database with your load copy images by selecting the rollforward option from BrightStor ARCserve Backup or you can manually issue the db2 rollforward command from the DB2 CLP. When using the DB2 CLP command, you need to ensure that all the necessary logs are available in the staging area. The rollforward command locates the specified load copy backup images and instructs the option to restore them.

Restore an Incremental Sequence of Images with the db2ckrst Utility

If you want to manually restore incremental backups using the BrightStor ARCserve Backup Incremental sequence of images option, you can create your own restore scenario or you can obtain a DB2 UDB scenario by using the db2ckrst utility.

Note: When using db2ckrst, ensure that your history file is not corrupted.

db2ckrst Utility Example

The following command example shows how to get an incremental restore using timestamp 20030310152923 for database sample2:

```
db2ckrst -d sample2 -t 20030310152923 -r tablespace
```

This command results in the following output:
```
= = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
restore db sample2 tablespace ( userspace1 ) incremental taken at 20030310152923
restore db sample2 incremental taken at 20030310152539
restore db sample2 incremental taken at 20030310152726
restore db sample2 incremental taken at 20030310152923
= = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
```

Select the Incremental sequence of images option on the DB2 Options tab in the Restore Manager. Submit each listed restore command, one at a time, by selecting the proper backup image. When you restore the last incremental image from the list, you can select the Rollforward option on the DB2 Options tab in the Restore Manager to finish the recovery of your DB2 database or tablespaces.

For more information on how to use the db2ckrst utility and to get more information on how to restore incremental backup images, see the DB2 UDB documentation.

Chapter 4: Best Practices

This chapter presents best practices for performing backups and restores of DB2 UDB databases with the option.

Develop a Good Backup and Recovery Strategy

When you develop your backup and recovery strategy, consider the following suggestions:

- **Full backups—**Create a full database backup regularly; it is easier to recover a database from a full database backup image.

- **Tablespace-level backups—**A recoverable database allows tablespace-level backups, which can be done online or offline. For an isolated application error, it is easier to restore from a tablespace level backup image. If you have a table that is distributed across multiple tablespaces, back up and restore those tablespaces together.

- **Incremental backups—**Starting with DB2 UDB Version 7.2, you can create online or offline incremental backup images. Incremental backup images are smaller than full backup images and can improve your backup speed. In some situations, it can be faster to restore from a full backup image instead of going through an incremental restore scenario. Consider mixing incremental and incremental delta backups to reduce the time to restore a database or tablespace.

- **Online or offline backups—**Offline backups are usually faster, but require exclusive access to the database. Online backups allow other connections to the database while the backup is taking place. Consequently, online backups reduce the database downtime.

- **Performance tuning—**You can improve your backup and restore performance with the option by adjusting the following DB2 parameters to fit your needs:

  - The buffer size used by DB2 during backup and restore.

  - The number of buffers used by DB2 during backup and restore.

  - The DB2 parallelism value, which is usually set to the number of tablespaces being backed up in your database. Ensure that your system has enough free memory and CPU idle cycles when you increase this value.

For more information about tuning your DB2 UDB for performance, see your DB2 documentation.

Use a Test Environment

Test your backup and recovery strategy in a test environment before you move to a production system. By thoroughly testing your proposed backup and recovery strategy, you can identify and correct unexpected problems before they occur in a production situation.

Make Databases Recoverable

For production databases, you are advised to enable rollforward logging to make your database recoverable. For the option to manage the backup and restore of your recoverable databases, you must:

- Enable the DB2 database configuration parameter userexit in your database configuration file.

- Use the user exit program, db2uext2, provided by Computer Associates.

Recoverable databases support online and offline backup and restore operations, and can be rolled forward to a specific time or to the end of the logs. With recoverable databases, you must provide disk space to store the archived log files.

Nonrecoverable databases are databases that use circular logging, where the log files are reused by the database. Nonrecoverable databases are useful only when your database is small, simple, and experiences relatively few transactions. With nonrecoverable databases, no additional disk space is required to store the archived log files. Nonrecoverable databases can only be backed up using a full, offline database-level backup strategy. In addition, they can only be restored by using the last full, offline backup. Consequently, any changes made to the database after its last full, offline backup are lost, unless you manually reenter the changes that occurred since the backup.

Both recoverable and nonrecoverable databases must be backed up regularly.

Always Apply the Latest DB2 FixPak

To ensure that you have the latest enhancements to the option's features, you must apply the latest DB2 FixPak level.

Do Not Overwrite Logs

Do not use the Overwrite Existing Log option from the BrightStor ARCserve Backup Restore Manager if you share the same directory location to archive and retrieve your log files on disk. If you select the Overwrite Existing Log option in this situation, you risk overwriting archived log files before they have been backed up.

To protect your archived log files, restore them to a separate retrieval directory. You specify a retrieve path when you configure the option. If you want to change the retrieve path after you configure the option, see Modifying the Archive and Retrieve Paths in the appendix "Modify Option Backup and Restore Parameters."

Initiate Backups After Organizational Changes

You should Initiate a backup each time that you:

- Rename a tablespace. To restore a tablespace that has been renamed, you must use the new tablespace name.

- Reorganize a table. By backing up the corresponding tablespace after you reorganize a table, you avoid the data reorganization that occurs with the rollforward utility when that tablespace is restored.

- Change the tablespace or database configuration. Whenever you change something in the configuration or organization of a database or tablespace, create a new backup.

Use Automated Log Backups

Automated log backups simplify the management of archived logs. In addition, if you are concerned about managing disk space in your archive directory, the automated log backup feature sets a limit to the collection of archived logs (20 MB by default). When the collected archived logs reach the specified limit, they are automatically backed up and the archive directory is cleared.

Appendix A: Frequently Asked Questions

This appendix includes frequently asked questions and answers that can help you resolve issues that may arise when using the BrightStor ARCserve Backup Enterprise Option for DB2 UDB. You can find additional information in the appendix "Troubleshooting."

What happens if I do not specify a buffer size while using the backup and restore commands through a DB2 user interface?

If you do not specify a buffer size while using the backup command through a DB2 user interface, the backup utility will use the default backup buffer size backbufsz defined in the database manager. If you do not specify a buffer size while using the restore command through a DB2 user interface, the restore utility will use the default restore buffer size restbufsz defined in the database manager.

How is it possible for multiple DB2 instances and databases to share the same archive path when using the user exit program provided by Computer Associates?

When the user exit program is called by DB2 for the first archival request, it creates three subdirectories in the archive location you specified during setup:

```
archive_path/instance_name
    /database_alias
    /node_number
```

The user exit uses these directories to keep the log files separated from the archived log files belonging to other databases.

When restoring archived log files, three similar subdirectories are created in the retrieve location you specified during setup:

```
retrieve_path/instance_name
    /database_alias
    /node_number
```

Remember that your archive and retrieve paths do not have to be set to the same directory path.

Why do I get an error when I try to restore a full database backup image using the online option?

The online restore option is applied at tablespace level. Tablespaces cannot be restored online while the catalog tablespace (syscatspace) is included in the tablespace list, and they cannot be restored in a different destination database. Resubmit the restore job using the Offline option.

When I submit a job to my remote BrightStor ARCserve Backup server, why does it stay in a ready state for a certain period of time?

One possible cause is that your job schedule time has not yet arrived. You can reschedule the job with the Job Status Manager or you can use Run now when submitting your next job. You may also want to check the time on your BrightStor ARCserve Backup host to ensure it accurately represents the current date and time.

Why am I not able to browse or back up my temporary tablespaces?

The DB2 backup utility fails when temporary tablespaces are included in the tablespace backup list. Temporary data is not backed up at tablespace level by DB2.

I am expanding my host in the Backup Manager, but I cannot see my DB2 instance. What can I do?

Use this procedure:

1. On the system where the option is running, log in as root.

2. Ensure that the Enterprise Option for DB2 UDB is registered with the Common Agent in /opt/CA/BABcmagt/agent.cfg.

3. Ensure that your Common Agent is running by issuing the command:

`caagent status`

4. If the Common Agent is not running, issue the command:

`caagent start`

5. Verify that the option is enabled with the Common Agent by issuing the command:

`caagent list 37`

6. If the option is not enabled and running, issue the command:

`caagent enable 37`

7. Close the Backup Manager and reopen it to expand your host again.

If you still cannot see your DB2 instance, consult the browser log file BABDB2AGT_HOME/logs/casdb2br.log and look for possible error messages.

When can I select the Point in Time option as a rollforward type in the BrightStor ARCserve Backup Restore Manager options?

This option can be applied in either of the following cases:

- When the catalog tablespace (syscatspace) is not in the list of restored table spaces

- While doing an offline restore of an offline full database backup image (with WITHOUT_ROLLING_FORWARD set to false in sqluv.cfg).

Also, you must restore a backup image that is earlier than the selected point in time.

Note: When you select the Point in Time option for a rollforward using BrightStor ARCserve Backup, the BrightStor ARCserve Backup server and the option must be in the same time zone.

Sometimes when I use the rollforward command, DB2 tries to retrieve an archived log file that does not exist, and it returns code SQL1268N with error 28 at the end of the rollforward operation. What do I do?

Manually launch the rollforward command again from the DB2 CLP using the stop argument:

```
db2 rollforward db dbalias stop
```

```
Replace dbalias with the database alias.
```

When I select the Point in Time option in BrightStor ARCserve Backup Restore Manager, do I have to specify the time in ISO (International Standard time or Greenwich time) format like the rollforward utility requires me to do with DB2 Version 7.1 and Version 7.2?

No. The Enterprise Option for DB2 UDB converts the time to ISO format when it calls the rollforward utility.

Why do I get an SQL1119N reason code 2 error while using an automatic incremental restore from the DB2 Command Line Processor?

Your version of DB2 UDB is not up to date. Ensure that you have applied DB2 FixPak 8 to your DB2 UDB Version 7.2 instance.

Appendix B: Troubleshooting

This appendix contains solutions for problems that may be encountered during the daily operation of the BrightStor ARCserve Backup Enterprise Option for DB2 UDB.

Browsing Error

This section provides solutions for errors encountered while browsing databases with BrightStor ARCserve Backup.

Error occurs while browsing

Reason:

An Error Occurs While Browsing a Database with BrightStor ARCserve Backup.

Solution:

To determine the cause of the error, check the browser log file: BABDB2AGT_HOME/logs/casdb2br.log.

General Errors

This section provides solutions for general errors encountered while using the option with BrightStor ARCserve Backup or with DB2 UDB.

Job Failure

Problem:

A restore or backup job fails when submitted from either the Backup Manager or from a DB2 UDB user interface.

Solution:

Job failure can result from many causes. To determine the cause, examine the following logs for possible reasons for the failure:

BABDB2AGT_HOME/logs/casdb2agtd.log (the option log)

BABDB2AGT_HOME/logs/db2uext.log (the user exit log)

BrightStor ARCserve Backup Activity Log

instance_home/sqllib/db2dump/db2diag.log (the DB2 diagnostic log)

Insufficient Information in the Option Log File

Problem:

When examining the option log file for possible causes of job failure, more information may be needed.

Solution:

Tracing is not enabled in the option configuration file. To add tracing results to the casdb2agtd.log file, add the debug level environment variable to the option configuration file:

1. Log on as root user.

2. Open the file /opt/CA/BABcmagt/agent.cfg for editing.

3. Locate the Enterprise Option for DB2 UDB section (37) and add a new line in the DB2 section with the rest of the variables that start with ENV. For example:

    ENV CA_ENV_DEBUG_LEVEL=4

    The following is an example of an entry in agent.cfg for the option.

    ```
    [37]
    # DB2 UDB Agent
    NAMEDB2 UDB Agent
    VERSION    11.5.0
    HOME    /opt/CA/BABdb2agt
    ENV    CAS_ENV_DB2_AGENT_HOME=/opt/CA/BABdb2agt
    #ENVCAS_HOME=/opt/CA/BrightStorARCserve
    ENV    CAS_INITIATED=1
    ENV LD_LIBRARY_PATH=[…]:$LD_LIBRARY_PATH
    BROWSER casdb2br
    AGENT    casdb2agtd
    ```

4. Save the file.

5. From the command line, enter the following command:

    caagent update

    Remember to reset the debug environment variable to 0 when you are done troubleshooting; otherwise, the log file size will increase unnecessarily.

Errors while Restoring a Cancelled or Failed Backup Job

Problem:

Problems with Restoring a Cancelled or Failed Backup Job

Solution:

Do not attempt to restore a cancelled or failed backup job. The unknown status of the cancelled or failed job will result in unpredictable restore results. Check the log files for possible reasons for the failure.

DB2 UDB Errors

This section provides solutions for specific errors encountered while using the option with DB2 UDB.

Job Failure with SQL2048N Error Message

Problem:

The following error message is typical of this condition:

```
SQL2048N  An error occurred while accessing object "login info".  Reason code:
"<reason-code>"
```

Solution:

See the related explanation for more information about this error message:

1. Enter the following command from the DB2 CLP:

    db2 "? SQL2048N"

2. See the explanation for your reason code from the displayed list of reason codes.

3. Determine a solution from the user response section.

Job Failure with SQL2009C Error Message

Problem:

The following error message is typical of this condition:

```
SQL2009C  Not enough memory available to run the utility.
```

Solution:

You must modify the UTIL_HEAP_SZ parameter in the database configuration file:

1. Enter the following command from the DB2 CLP:

   db2 "? SQL2009C"

2. Follow the DB2 instructions.

Back Up or Restore Error Code SQL2062N with Reason Code 11

Problem:

The following error message is typical of this condition:

```
SQL2062N An error occurred while accessing media
BABDB2AGT_HOME/libcasdb2_xx.so>.Reason code "11"
```

Where:

- *BABDB2AGT*_HOME represents the option's home directory path.

- *xx* specifies the 32-bit or 64-bit library version.

Solution:

Verify that you have created a BrightStor ARCserve Backup user equivalency for the user who is initiating the command and for the user you registered during setup. For more information, see Create a BrightStor ARCserve Backup User Equivalency in the chapter "Installing the Option."

Automatic Incremental Restore, Do Not Work

Reason:

Some Option Features, Such as Automatic Incremental Restore, Do Not Work

Although a feature appears in BrightStor ARCserve Backup, the feature does not seem to work.

Solution:

The DB2 UDB components necessary to implement the feature are not present. Apply the latest DB2 FixPak to update DB2 UDB.

Appendix C: Restrictions

The BrightStor ARCserve Backup Enterprise Option for DB2 UDB is subject to the following restrictions:

- DB2 prompting mode is not supported. You cannot provide feedback to the BrightStor ARCserve Backup server or to the option in case of an interruption during a backup or restore operation.

- When selecting the Point in Time option for a rollforward through BrightStor ARCserve Backup, the BrightStor ARCserve Backup server and the option must be in the same time zone.

- Partitioned databases are not supported by the option.

- The option user exit program does not support logging on raw devices.

- Because of limitations in DB2 UDB Version 7.1, BrightStor ARCserve Backup cannot perform incremental backup and restore operations for that DB2 UDB release.

  Note: Automatic incremental restore is supported when using the option with DB2 UDB 7.2 with FixPak 8. It is also supported by DB2 UDB version 8.1 and 8.2.

- The DB2 OPEN num-sessions SESSIONS parameter is not supported. If you include this parameter when issuing commands from the DB2 CLP, you must set the parameter to 1.

- The option does not support UNIX to Windows cross-platform backups.

Appendix D: Modify Option Backup and Restore Parameters

When you submit a backup or restore job using ca_backup or ca_restore, various user-defined parameters are passed to BrightStor ARCserve Backup or DB2 UDB from the option configuration file BABDB2AGT_HOME/sqluv.cfg. Other parameters in the sqluv.cfg file are reserved for the option user exit. Finally, some parameters can be set when using BrightStor ARCserve Backup to initiate backup and restore jobs.

After the option is configured, you can change the backup and restore parameters in the sqluv.cfg. To change a backup or restore parameter described in this appendix, you must edit the parameter in the sqluv.cfg option configuration file.

Note: Entries in this file are not case-sensitive.

Important! *When the sqluv.cfg file is initially installed, some parameters have a hash mark(#) at the beginning of the line and are therefore not enabled. You can enable or disable a parameter by removing or adding a hash mark (#) at the beginning of the parameter line.*

To modify the backup and restore parameter settings, follow these steps:

1. Open the file BABDB2AGT_HOME/sqluv.cfg for editing.

2. Locate the parameter you want to work with and make your modifications:

   - To disable a parameter, enter a hash mark (#) at the beginning of the line.

   - To enable a parameter, ensure that there is no hash mark at the beginning of the line and enter a value for the parameter.

   - To modify a parameter, enter the parameter's new definition and ensure that there is no hash mark at the beginning of the line.

3. Save the file.

Common Parameter Modification Tasks

The sqluv.cfg file contains more than 40 parameters that can be modified to match the requirements of your backup and restore environment. However, there are several tasks that are commonly performed when operating the option. These tasks are described in the following sections.

Modify Buffer Information

To change the DB2_BUFFSIZE and DB2_NUMBUFFER, follow these steps:

1. Open the file BABDB2AGT_HOME/sqluv.cfg for editing.

2. Locate the line defining the DB2_BUFFSIZE or the DB2_NUMBUFFER value.

3. Replace the existing value with the new value.

4. Save the file.

Modify the Archive and Retrieve Paths

You specify an archive path and a retrieve path when you configure the option. If you want to change the archive path or the retrieve path after you configure the option, you can do so by editing the option configuration file:

1. Open the file BABDB2AGT_HOME/sqluv.cfg for editing.

2. Locate the line defining the DB2_USEREXIT_ARCLOG_PATH or the DB2_USEREXIT_RETLOG_PATH value.

3. Replace the existing path definition with the new path definition.

4. Save the file.

Modify the Archive Location Capacity

You specify a maximum capacity for the archive location when you configure the option. If you want to change the capacity of the archive location after you configure the option, you can do so by editing the option configuration file:

1. Open the file BABDB2AGT_HOME/sqluv.cfg for editing.

2. Locate the line defining the DB2_ARCLOG_QUOTA value.

3. Replace the existing capacity definition with the new capacity value (in megabytes).

4. Save the file.

Enable and Disable Automatic Archived Log File Backup

When you configure the option, you specify if you want to enable automatic backup of archived log files. If you want to change this setting after you configure the option, you can do so by editing the option configuration file:

1. Open the file BABDB2AGT_HOME/sqluv.cfg for editing.

2. Locate the line defining the DB2_ARCLOG_QUOTA value.

   - To enable automatic backup of archived log files, enter a value (in megabytes) greater than 0 for the capacity of the archive location. The option user exit automatically backs up the collected archived log files when this capacity is reached. The default is 20 MB. Ensure that there is no hash mark (#) at the beginning of the line.

   - To disable automatic backup of archived log files, enter 0 for the archived log file capacity.

3. Save the file.

Backup and Restore Parameter Definitions

This section provides definitions of all parameters in the sqluv.cfg file. The parameters are listed here in alphabetical order; in the sqluv.cfg file, they are listed by function.

APPEND_BACKUP_CMDLINE=command_line_arguments

Specifies arguments and values to append to the ca_backup command line generated by the DB2 UDB option library or by the option user exit program, when submitting a backup job. This is a generic way of providing parameters that are not supported by the DB2 UDB option library.For example, the disk staging functionality can be supported when using a DB2 user interface with the relevant ca_backup arguments defined in this variable.

Note: This parameter does not appear in the sqluv.cfg file when the file is installed. If you want to use this parameter, you must add it to the file.

APPEND_RESTORE_CMDLINE=command_line_arguments

Specifies arguments and values to append to the ca_restore command line generated by either of the following:

- The DB2 UDB option library when it is loaded for a restore operation by a DB2 UDB user interface.

- The option when it is initiated from BrightStor ARCserve Backup with the rollforward option (that is, when restoring archived log files to the retrieve path to effect a rollforward restore of the database).

This is a generic way of providing parameters that are not supported by the DB2 UDB option library.

Note: This parameter does not appear in the sqluv.cfg file when the file is installed. If you want to use this parameter, you must add it to the file.

ARCHLOGS_DESTGROUP=device_group_name

Specifies the name of the BrightStor ARCserve Backup destination device group to be used for an automated backup of the archived logs files initiated by the option's user exit program. When this parameter is not specified, any available device group is used.

Note: This parameter is applied only when the DB2_ARCLOG_QUOTA parameter is set to a value higher than 0.

ARCHLOGS_DESTTAPE= tape_name

Specifies the name of the BrightStor ARCserve Backup destination media to be used for an automated backup of the archived log files initiated by the option's user exit program. When not specified, any available media is used.

Note: This parameter is applied only when the DB2_ARCLOG_QUOTA parameter is set to a value higher than 0.

ARCHLOGS_MEDIAPOOL=media_pool_name

Specifies the name of the BrightStor ARCserve Backup destination media pool to be used for an automated backup of the archived logs files initiated by Computer Associates user exit program. By default, none is specified and no media pool is used.

DB2_ARCLOG_QUOTA=quota

Sets the maximum capacity of the archive location, in megabytes, specified as an integer. Set this value to 0 to disable the automated backup of the archived log files. Otherwise, the option user exit automatically backs up the collected archived log files when this capacity is reached. The default value is 20.

DB2_HOME_LOCATION_DIR=DB2_UDB_home_directory

Specifies the path where DB2 UDB is installed.

DB2_BUFFSIZE=buffer_size

Sets the backup and restore buffer size (number of 4 KB pages) used by DB2 UDB when the job is initiated through BrightStor ARCserve Backup. The default value is 16.

DB2_NUMBUFFER=number_of_buffers

Sets the number of data transfer buffers used by DB2 UDB during backup or restore. This value is used when the job is initiated by BrightStor ARCserve Backup. The default value is 4.

DB2_RESTORE_DB_WITHOUT_ROLLING_FORWARD=true | false

Indicates whether the database will be put in a rollforward pending state after a restore.

Enter one of the following values:

- **true—**The database is not put into a rollforward pending state at the end of the restore operation. When set to true, the option generates the restore command specifying that DB2 UDB will not put the database in a rollforward pending state after a successful restore.

- **false—**The database is put into a rollforward pending state at the end of the restore operation.

This parameter is applied only when both of the following conditions apply:

- The option initiates an offline restore of an offline full database backup image.

- The Do not Rollforward option is selected on the DB2 Options tab of the BrightStor ARCserve Backup Restore Manager.

DB2_USEREXIT_ARCLOG_PATH=archive_path

Specifies the directory path for the archive location for archived log files. For more information, see Backup and Restore Archived Log Files in the chapter "Introducing the Option."

DB2_USEREXIT_RETLOG_PATH=retrieve_path

Specifies the directory path for the retrieve location of restored archived log files. For more information, see Backup Archived Log Files Automatically in the chapter "Introducing the Option."

DB2UE_DAYOFWEEK= true | false

Enables the option user exit program to use the media defined for the current day of the week during automated backup of DB2 UDB archived log files. The parameter indicates if the destination tape or media pool defined as values for DB2UI_DESTTAPESUN through DB2UI_DESTTAPESAT and for DB2UI_MEDIAPOOLSUN through DB2UI_MEDIAPOOLSAT are to be used instead of the default values specified for the ARCHLOGS_DESTTAPE and ARCHLOGS_MEDIAPOOL parameters.

Enter one of the following values:

- **true—**Use the destination tape or media pool definition specified by the DB2UI_DESTTAPESUN through DB2UI_DESTTAPESAT and for DB2UI_MEDIAPOOLSUN through DB2UI_MEDIAPOOLSAT parameters.

- **false—**Use the default values specified in the ARCHLOGS_DESTTAPE through ARCHLOGS_MEDIAPOOL parameters.

  Note: This parameter is applied only when the DB2_ARCLOG_QUOTA parameter is set to a value higher than 0.

DB2UI_DAYOFWEEK=true | false

Indicates if the destination tape or media pool defined for DB2UI_DESTTAPESUN through DB2UI_DESTTAPESAT and for DB2UI_MEDIAPOOLSUN through DB2UI_MEDIAPOOLSAT are to be used instead of the default values specified for in the DB2UI_DESTTAPE and DB2UI_MEDIAPOOL parameters.

Enter one of the following values:

- **true—**Use the destination tape or media pool definition specified by the DB2UI_DESTTAPESUNthrough DB2UI_DESTTAPESAT and for DB2UI_MEDIAPOOLSUN through DB2UI_MEDIAPOOLSATparameters.

- **false—**Use the default values specified in the DB2UI_MEDIAPOOLSUN through DB2UI_MEDIAPOOLSATparameters.

    Note: This is a backup parameter only.

DB2UI_DESTGROUP=device_group_name

Specifies the name of the BrightStor ARCserve Backup destination device group to be used for a backup operation initiated from a DB2 UDB user interface. When this parameter is not specified, any available device group is used.

Note: This is a backup parameter only.

DB2UI_DESTTAPE=tape_name

Specifies the name of the BrightStor ARCserve Backup destination media to be used for a backup operation initiated from a DB2 UDB user interface. When not specified, any available media is used.

Note: This is a backup parameter only.

DB2UI_DESTTAPESUN=tape_name

Specifies the name of the media to be used if the job runs on a Sunday and the DB2UI_DAYOFWEEK parameter is set to true. If this parameter is not specified, the DB2UI_DESTTAPE value applies.

Note: This is a backup parameter only.

DB2UI_DESTTAPEMON=tape_name

Specifies the name of the media to be used if the job runs on a Monday and the DB2UI_DAYOFWEEK parameter is set to true. If this parameter is not specified, the DB2UI_DESTTAPE value applies.

Note: This is a backup parameter only.

DB2UI_DESTTAPETUE=tape_name

Specifies the name of the media to be used if the job runs on a Tuesday and the DB2UI_DAYOFWEEK parameter is set to true. If this parameter is not specified, the DB2UI_DESTTAPE value applies.

Note: This is a backup parameter only.

DB2UI_DESTTAPEWED=tape_name

Specifies the name of the media to be used if the job runs on a Wednesday and the DB2UI_DAYOFWEEK parameter is set to true. If this parameter is not specified, the DB2UI_DESTTAPE value applies.

Note: This is a backup parameter only.

DB2UI_DESTTAPETHU=tape_name

Specifies the name of the media to be used if the job runs on a Thursday and the DB2UI_DAYOFWEEK parameter is set to true. If this parameter is not specified, the DB2UI_DESTTAPE value applies.

Note: This is a backup parameter only.

DB2UI_DESTTAPEFRI=tape_name

Specifies the name of the media to be used if the job runs on a Friday and the DB2UI_DAYOFWEEK parameter is set to true. If this parameter is not specified, the DB2UI_DESTTAPE value applies.

Note: This is a backup parameter only.

DB2UI_DESTTAPESAT=tape_name

Specifies the name of the media to be used if the job runs on a Saturday and the DB2UI_DAYOFWEEK parameter is set to true. If this parameter is not specified, the DB2UI_DESTTAPE value applies.

Note: This is a backup parameter only.

DB2UI_EJECT=true | false

Indicates whether the tape is ejected at the end of the backup operation.

- **true—**The tape is ejected at the end of the backup operation.
- **false—**The tape is not ejected at the end of the backup operation.

   Note: This is a backup parameter only.

DB2UI_EMAIL=email_address

Sends a copy of the Activity Log to the specified email address. The default is none.

DB2UI_LOGDETAIL=summary | all

Specifies whether a summary or all activities of the job is logged in the file specified by the DB2UI_LOGFILE parameter.

Enter one of the following values:

- **Summary—**Logs a summary of the job's activities to the file.
- **All—**Logs all of the job's activities to the file.

DB2UI_LOGFILE=log_file_path

Records activities during the backup job to the specified filename.

DB2UI_MEDIAPOOL=media_pool_name

Specifies the name of the BrightStor ARCserve Backup destination media pool to use for a backup operation. By default, none is specified and no media pool is used.

Note: This is a backup parameter only.

DB2UI_MEDIAPOOLSUN=media_pool_name

Specifies the name of the media pool to be used if the job runs on a Sunday and the DB2UI_DAYOFWEEK parameter is set to true. If this parameter is not specified, the DB2UI_MEDIAPOOL value applies.

Note: This is a backup parameter only.

DB2UI_MEDIAPOOLMON=media_pool_name

Specifies the name of the media pool to be used if the job runs on a Monday and the DB2UI_DAYOFWEEK parameter is set to true. If this parameter is not specified, the DB2UI_MEDIAPOOL value applies.

Note: This is a backup parameter only.

DB2UI_MEDIAPOOLTUE=media_pool_name

Specifies the name of the media pool to be used if the job runs on a Tuesday and the DB2UI_DAYOFWEEK parameter is set to true. If this parameter is not specified, the DB2UI_MEDIAPOOL value applies.

Note: This is a backup parameter only.

DB2UI_MEDIAPOOLWED=media_pool_name

Specifies the name of the media pool to be used if the job runs on a Wednesday and the DB2UI_DAYOFWEEK parameter is set to true. If this is parameter not specified, the DB2UI_MEDIAPOOL value applies.

Note: This is a backup parameter only.

DB2UI_MEDIAPOOLTHU=media_pool_name

Specifies the name of the media pool to be used if the job runs on a Thursday and the DB2UI_DAYOFWEEK parameter is set to true. If this parameter is not specified, the DB2UI_MEDIAPOOL value applies.

Note: This is a backup parameter only.

DB2UI_MEDIAPOOLFRI=media_pool_name

Specifies the name of the media pool to be used if the job runs on a Friday and the DB2UI_DAYOFWEEK parameter is set to true. If this parameter is not specified, the DB2UI_MEDIAPOOL value applies.

Note: This is a backup parameter only.

DB2UI_MEDIAPOOLSAT=media_pool_name

Specifies the name of the media pool to be used if the job runs on a Saturday and the DB2UI_DAYOFWEEK parameter is set to true. If this parameter is not specified, the DB2UI_MEDIAPOOL value applies.

Note: This is a backup parameter only.

DB2UI_ORIGINAL_INSTANCE=instance_name

Specifies the name of the original instance when restoring data from one host to another from a DB2 UDB user interface.

Note: This is a restore parameter only. Do not define this parameter if you are restoring to another host using BrightStor ARCserve Backup.

DB2UI_PRINTER=printer_name

Sends a copy of the Activity Log to the specified printer. The printer must be set up in the $BAB_HOME/config/caloggerd.cfg configuration file under the PRINTER_SETUP option. The default is no printer. For more information on printer setup, see the *Administrator Guide*.

DB2UI_SNMP=true | false

Indicates whether to use the SNMP alert option of the BrightStor ARCserve Backup logger. Enter one of the following values:

- **true—**The logger uses the SNMP alert option.

- **false—**The logger does not use the SNMP alert option. This is the default value.

DB2UI_SPANTAPEMETHOD=owritesameblank | owritesameblankany |owritesameanyblank

Specifies the sequence of actions when tape spanning is implemented.

Enter one of the following values:

- **owritesameblank—**Attempts to use the media specified as the DB2UI_DESTTAPE parameter. If it cannot be used, the job attempts to use a blank media. This is the default value.

- **owritesameblankany—**Attempts to use the media specified as the DB2UI_DESTTAPE parameter. If it cannot be used, the job attempts to use a blank media. If none is available, the job uses any tape.

- **owritesameanyblank—**Attempts to use the media specified as the DB2UI_DESTTAPE parameter. If it cannot be used, the job attempts to use any other tape. If none is available, the job attempts to use a blank media.

  Note: This is a backup parameter only.

DB2UI_SPANTAPETIMEOUT=number_of_minutes

Specifies the number of minutes (entered as an integer) allowed for mounting a media before the job times out. This parameter applies only when tape spanning (backup continues on the next tape when the tape capacity is exceeded) is implemented. The default value is blank (infinite).

DB2UI_TAPEFORMAT= tar | cpio | BAB

Specifies the tape format for the backup job when the job is initiated by a DB2 UDB user interface. The BrightStor ARCserve Backup, tar, and cpio tape formats are supported. The default value is BAB.

Enter one of the following values:

- **tar—**The backup job is saved in the tar format.

- **cpio—**The backup job is saved in the cpio format.

- **BAB—**The backup job is saved in the BrightStor ARCserve Backup format.

Note: This is a backup parameter only.

DB2UI_TAPEMETHOD=append | owritesameblank |owritesameblankany | owritesameanyblank

Specifies the sequence of actions for handling tapes (when tape spanning is not implemented).

Enter one of the following values:

- **append—**Adds the session after the last one on the media. This is the default value.

- **owritesameblank—**Attempts to use the media specified as the DB2UI_DESTTAPE parameter. If it cannot be used, the job attempts to use a blank media.

- **owritesameblankany—**Attempts to use the media specified as the DB2UI_DESTTAPE parameter. If it cannot be used, the job attempts to use a blank media. If none is available, the job uses any tape.

- **owritesameanyblank—**Attempts to use the media specified as the DB2UI_DESTTAPE parameter. If it cannot be used, the job attempts to use any other tape. If none is available, the job attempts to use a blank media.

  Note: This parameter requires the DB2UI_DESTTAPE or the DB2UI_DESTTAPESUN through DB2UI_DESTTAPESAT parameters to be set. This is a backup parameter only.

DB2UI_TAPETIMEOUT=number_of_minutes

Indicates the number of minutes (specified as an integer) allowed for mounting a media before the job times out. The default value is 5.

DB2UI_TIMEOUT=number_of_minutes

Specifies the number of minutes (specified as an integer) that DB2 UDB waits for the BrightStor ARCserve Backup Enterprise Option for DB2 UDB to be started before timing out. The default value is 30.

Note: This parameter must be set when using a DB2 UDB user interface.

DB2UI_TNG=true | false

Indicates whether to use the Unicenter® Network and Systems Management event option.

Enter one of the following values:

- **true—**The logger uses the Unicenter NSM event option.

- **false—**The logger does not use the Unicenter NSM event option. This is the default value.

HOST=host_name

Specifies the name of the host where BrightStor ARCserve Backup runs.

ORIGINAL_CLIENT_HOST=host_name

Specifies the name of the original client host when restoring data from one host to another.

Note: This is a restore parameter only. This parameter must be set when the restore operation involves two different hosts and is initiated either through a DB2 UDB user interface or BrightStor ARCserve Backup.

PASSWORD=encrypted_password

Sets the encrypted ASCII password value for the UNIX user specified in the USERNAME parameter.

Note: This password is automatically encrypted when entered during the configuration process. If you want to modify this password, see Control the Option Manually in the chapter "Installing the Option."

Important! *If you change the password for the user account of the UNIX user that is entered in the USERNAME parameter, the option will no longer be able to issue ca_backup and ca_restore commands.*

USERNAME=user_name

Specifies the name of a UNIX user who can connect to the host where the BrightStor ARCserve Backup Enterprise Option for DB2 UDB is running. This user must also be a BrightStor ARCserve Backup user.

Important! *If you delete the user account for the UNIX user that is entered in the USERNAME parameter, the option will no longer be able to issue ca_backup and ca_restore commands.*

Glossary

archive logging

Log files that are committed and are closed become offline archived logs.

backup type

See offline database backup, online database backup.

circular logging

Log files that are reused, where the content is not preserved.

database parameters

The main parameters for controlling backup behavior are:
tra ck modified pages
TRACKMOD=ON - enable Incremental-/Delta-Backup by starting tracking database updates;
TRACKMOD=OFF - disable Incremental-/Delta-Backup;

LOGRETAIN=ON - enable archive logging
LOGRETAIN=OFF - enable circular logging

USEREXIT=ON - The userexit parameter causes the database manager to call a user exit program for archiving and retrieving database logs. This parameter allows roll-forward recovery and automatically enables logretain to be active.

full online database backup (full)

A full copy of all database pages; standard metadata set (database configuration, table space definitions, database history).

incremental delta online database backup (incremental)

Database pages updated since last successful full, incremental or incremental delta backup; standard metadata set (db configuration, table space definitions, db history); full copy of changed LOB and LF data types from previous full, incremental or incremental delta backup.

incremental online database backup (cumulative)

Database pages updated since last successful full backup; standard metadata set (database configuration, table space definitions, db history); full copy of changed LOB and LF data types from previous full, incremental or delta backup.

log file

See online log file, offline log file.

logging

See circular logging, archive logging.

offline database backup

A database in a deactivated status, log parameters settings for circular logging (LOGRETAIN = OFF and USEREXIT = OFF), only crash recovery or version recovery possible.

offline log file

A filled log file, moved from log file path to archive storage.

online backup classification

See full online database backup (full), incremental online database backup (cumulative), incremental delta online database backup (incremental).

online database backup

Database activated (database files in use), log parameters settings for archive logging (LOGRETAIN=ON and/or USEREXIT=ON), rollforward recovery enabled.

online log file

A log file with active content in a defined database log directory.

recovery history file

Special logging repository for tracking various database activity: backup, restore, rollforward, alter, rename, quiesce tablespace, load, drop, reorganization of table or update of table statistics. Entries from this file are read with the LIST HISTORY command.

rollforward

The option used to recover a database from the log files after a restore. It reapplies the changes made to the database since the backup. The DB2 rollforward option allows the recovery of a database or database object to the point of the last successful transaction or to a specific point in time.

Index

load utility • 51
rollforward utility • 53

V

version checking, instance • 48