BrightStor® ARCserve® Backup for Linux

Enterprise Option for SAP R/3 for Oracle Guide
r11.5

Contents

Chapter 1: Introducing the Option

BrightStor® ARCserve® Backup is a comprehensive storage solution for applications, databases, distributed servers, and file systems. It provides backup and restore capabilities for databases, business-critical applications, and network clients. In addition, BrightStor ARCserve Backup helps administrators simplify running 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 SAP R/3 for Oracle. This option allows you to back up and restore SAP R/3 databases. This guide describes the fundamentals of the Enterprise Option for SAP R/3 for Oracle and provides information about:

- Concepts, features, and functionality
- Installing the option
- Configuring the option
- Using the option
- Best practices
- Troubleshooting

The Basics

The Enterprise Option for SAP R/3 for Oracle (the option) enables you to use BrightStor ARCserve Backup to back up and restore online and offline SAP R/3 databases and the objects they contain. The option handles all communications between BrightStor ARCserve Backup and the SAP R/3 database server while data is being backed up and restored. This communication includes preparing, retrieving, and processing the data sent back and forth across the network.

The option enables you to process jobs efficiently, without interrupting operations, and assists in performing the following functions:

Action	Function
Backup	When a backup request is made, the option contacts the database, retrieves the necessary data, and sends it to BrightStor ARCserve Backup, where the objects are backed up to storage devices.

Action	Function
Restore	BrightStor ARCserve Backup retrieves the objects to be restored from the storage devices and passes them to the option. The option then writes this data to the database, completing the restore process.
Inquiry	Log information is collected, providing job analysis using an analysis tool.

The option helps you manage your SAP R/3 environment by enabling you to:

- Remotely manage backups

- Back up tablespaces belonging to online databases

- Restore a complete database or individual database objects, tablespaces, control files, or archive logs

- Perform inquiries about specific SAP R/3 objects

- Back up to a wide array of storage devices

- Perform host duplication

Features

The option provides the following features that enhance performance:

- **The backup option integration module**—Provides the infrastructure for the option. The backup option integration module serves as the interface that communicates information between BrightStor ARCserve Backup and SAP R/3.

- **Multistreaming backups**—Enables you to back up a job to multiple storage devices concurrently, enhancing backup performance by drastically reducing the backup window. Multistreaming enables you to split a job so that it uses multiple storage devices simultaneously. The backup option integration module provides the intelligence to stream jobs based on the number of file systems and the number of available storage devices.

- **Enhanced destination options**—Enables you to specify a different destination tape for each day of the week in single stream mode or specify media pools in multistreaming mode. Using the enhanced destination options, you can better organize your backup tapes. For more information about enhanced destination options, see the "Installing the Option" chapter.

- **Host duplication**—Enables you to duplicate all of the data from one SAP R/3 server to another. To use the host duplication feature, the configuration on each server must be exactly the same.

The Backup Option Integration Module

The Enterprise Option for SAP R/3 for Oracle application is used to store its data in Oracle databases. The backup option integration module is the option interface for Oracle databases. The backup option integration module links BrightStor ARCserve Backup to SAPDBA. The SAPDBA modules handle the activity within your database, and the backup option integration module handles the mechanics of data transfer.

For the option to be able to use SAPDBA, the SAP R/3 application must be running. When SAPDBA starts a job, the backup option integration module is automatically invoked. When the backup option integration module is invoked, it handles the backup, restore, and inquiry requests.

The following diagram illustrates the sequence and process of these operations:
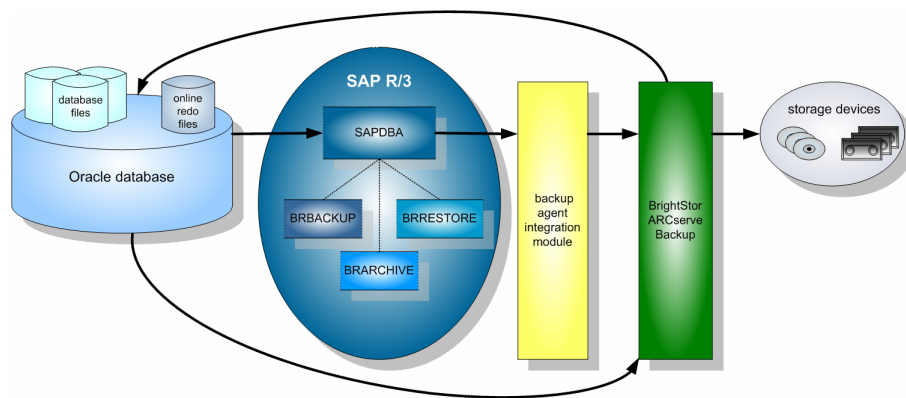
Multistreaming Backups

The multistreaming capability increases the speed and efficiency of your backups by enabling you to back up a job to multiple tapes concurrently. Both online and offline procedures can be performed using the multistreaming capability.

To use the multistreaming backup feature, you need to set the following variables in the util_par_file:

- **MULTISTREAM value**—Set this variable to true to enable the multistreaming feature.
- **MAXSTREAMS value**—Set this variable to the maximum number of storage devices that you want to run concurrently.

Note: The default location of the util_par_file is at /opt/CA/BABsapagt.

After you set these variables, multistreaming distribution is determined based on the number of file systems to back up, using the MAXSTREAMS value you set. For more information on configuring these variables, see the "Installing the Option" chapter.

The following diagram illustrates how the option processes information by performing parallel jobs, without interrupting other SAP R/3 activities:
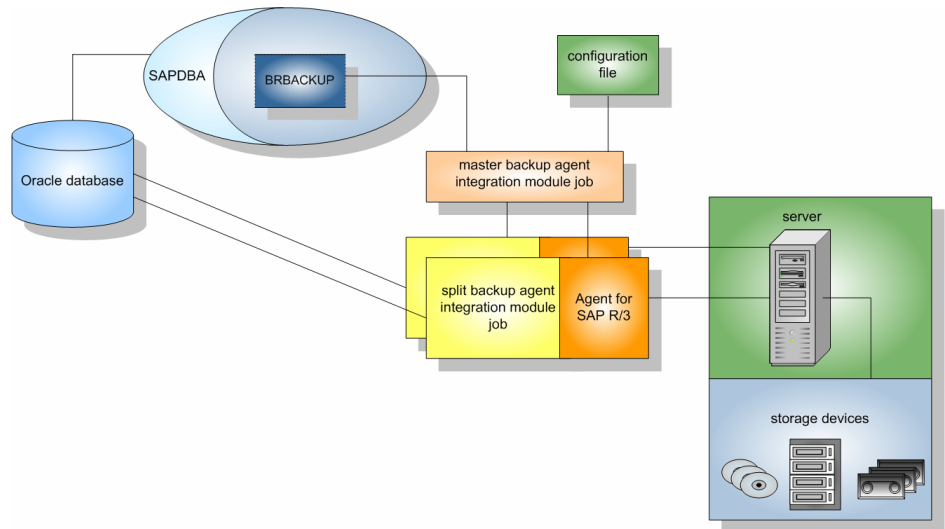
How Multistreaming Backups Work Example

The following example illustrates data on four file systems being backed up to two storage devices. Because there are two storage devices, two jobs are created for the four file systems. Jobs are split according to the maximum number that you set in the MAXSTREAMS value (in this example, MAXSTREAMS is set to 2).

A backup request triggers the following process:

1. When the job request is made, SAP notifies the backup option integration module of the request.

2. The backup option integration module processes the job and regroups the four file systems in accordance with the MAXSTREAMS value you set.

3. The backup option integration module sends BrightStor ARCserve Backup the information to process the jobs.

4. BrightStor ARCserve Backup communicates with the option to start the job request.

5. When the option finishes processing the data, the backup option integration module is contacted. The backup option integration module aggregates the results of each job.

The following diagram illustrates data on four file systems being backed up to two storage devices:
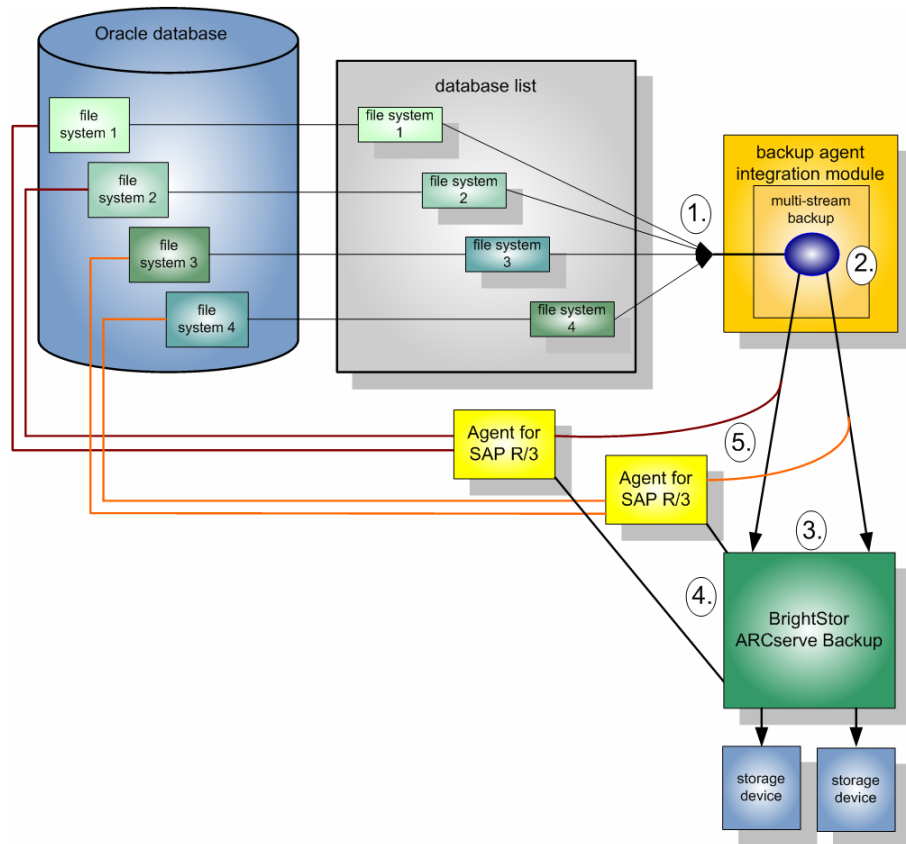
Host Duplication

The host duplication facility enables you to copy all of the data on the host server and transfer it to another. This feature is extremely useful when:

- You are upgrading your server and you need to move your data to a new system without shutting it down for hardware migration.

- You want to maintain a duplicate server as a backup in case your current system fails.

The following diagram illustrates the process of host duplication:
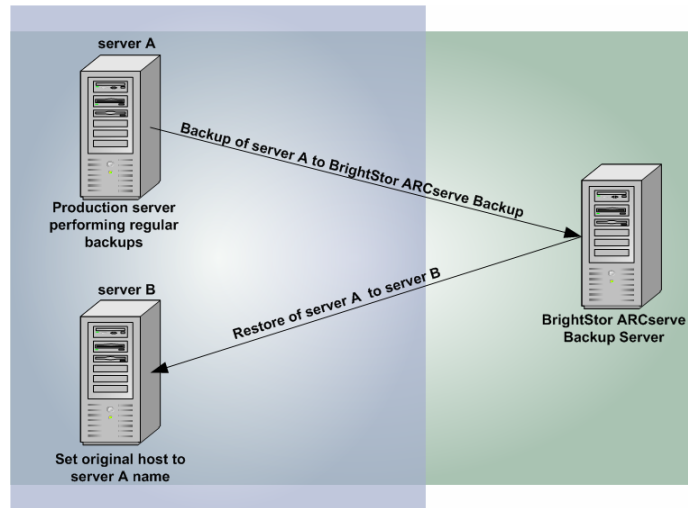
To enable this feature, set the original host parameter in util_par_file to the name of the host from which the data being backed up originated. For more information about configuring these variables, see the "Installing the Option" chapter.

Note: Reset the host duplication parameter after the job is complete.

Chapter 2: Installing the Option

This chapter describes how to install and configure the Enterprise Option for SAP R/3 for Oracle.

Installation Prerequisites

Before installing the Enterprise Option for SAP R/3 for Oracle, verify the following prerequisites:

- Your system meets the minimum hardware and software requirements needed to install BrightStor ARCserve Backup. For a list of requirements, see the readme file.

- The BrightStor ARCserve Backup base product is installed in your system, including the BABmgr and BABsvr packages.

- You have superuser privileges.

- You have a SAP R/3 server installed on the machine where you will be installing the option.

Option Installation

Install the Enterprise Option for SAP R/3 for Oracle on each database server you want BrightStor ARCserve Backup to manage.

For information about how to install the option, see the *Getting Started*.

Option Configuration

After you install the BABsap and the BABbaim packages on your system, you need to configure the option. Before configuring the option, ensure that the following items are available:

Check This Item	Your Value
The SAP Oracle SID	
The directory path for the Oracle home directory	

Check This Item	Your Value
The path for the BrightStor ARCserve Backup home directory (This applies if BrightStor ARCserve Backup is on the same system as the option.)	
The path for the SAP home directory	
The path for the option home directory	

You are now ready to begin configuring the option.

Run the Setup Script

To run the setup script for the option, follow these steps:

1. Enter the following command in the option home directory:

    ```
    ./sapsetup
    ```

2. To select the default home directory for the option, press Enter. The default directory is:

    ```
    /opt/CA/BABsapagt
    ```

    To enter a directory other than the default, enter the directory path and press Enter.

3. Indicate whether BrightStor ARCserve Backup and the option are installed on the same or different machines.

    ```
    Is BrightStor ARCserve Backup installed on this machine? (y/n)
    ```

    If BrightStor ARCserve Backup and the option are installed on the same machine, press Enter to select the default (y). If BrightStor ARCserve Backup and the option are not installed on the same machine, enter **n**.

    If you entered n, skip Step 4 and proceed to Step 5.

4. Enter the home directory for BrightStor ARCserve Backup. To select the default directory, press Enter. The default directory is:

    ```
    /opt/CA/BrightStorARCserve
    ```

    To enter a directory other than the default, type the directory path and press Enter.

5. Indicate whether Oracle and the option are installed on the same machine.

   ```
   Is ORACLE installed on this machine? (y/n)
   ```

   If Oracle and the option are installed on the same machine, enter **y**.

6. Enter the Oracle home directory path. Press Enter to use the default Oracle home directory. The default directory is:

   ```
   /opt/oracle
   ```

   To enter a directory other than the default, type the directory path and press Enter.

7. Enter the Oracle SID. To select the default, press Enter. The default ID is:

   SAPID

   To enter an SID other than the default, type the alternate SID and press Enter.

8. Enter the SAP home directory. To select the default directory press Enter. The default directory is:

   ```
   /usr/sap
   ```

   To enter a directory other than the default, type the directory path and press Enter.

9. To register the option, when prompted, enter **y**.

The setup script (sapsetup) calls the utility parameter file setup script (pfilesetup). You can manually run pfilesetup later if you want to create different utility parameter files. The pfilesetup script configures the utility parameter file needed by BABbaim.

The following is an example of the entries in pfilesetup:

```
HOST =<server where BrightStor ARCserve Backup is installed>
USERNAME=<name of a user who has access to the SAP/Oracle files on the client
node>
PASSWORD=<password of that user>
DESTGROUP=<BrightStor ARCserve Backup device group>
DESTTAPE=<tape name>
MEDIAPOOL=<media pool name>
```

The setup is complete. The next step is to edit the backup and restore configuration profiles.

Configuration Files

To configure the option, you must edit the following configuration files:

- **util_par_file**—This file customizes the backup option integration module parameter file, which controls the backup process. The default location of the util_par_file is at /opt/CA/BABsapagt.

- **init<SID>.sap**—This file contains the SAPDBA configuration file, which is part of the SAP environment.

Edit util_par_file to Define Environment Variables

By editing util_par_file, you define the environment variables for the backup option integration module. To set the values for the parameters in this file, run sapsetup or pfilesetup.

When the option performs a SAP R/3 backup job, the backup option integration module creates a backup job and sends it to BrightStor ARCserve Backup to execute. The job is submitted using the backup parameters that you set in util_par_file. In util_par_file you can:

- Designate tapes you want to use

- Define backup group properties

- Define media pool properties

- Define multistreaming properties

The complete path of the parameter file must be specified for the util_par_file entry in the init<SID>.sap configuration file. The util_par_file parameters are identical to the ca_backup parameters.

For more information about parameters, see the appendix "Using Command Line Utilities" in the *Administrator Guide*.

Required Options

You must set the following parameters in util_par_file:

```
HOST=          < CA_host >
USERNAME=      <name of a user who has access to the SAP/Oracle files on the
client node>
PASSWORD=      <password of that user>
```

Additional Options

You can set the following optional parameters to customize options for tapes, group names, and media pools:

```
Options:

PRIORITY=        < priority level >
ORIGINALHOST=< Original Hostname of the Backup when restoring one hosts data to
another host >

Log Options:

SNMP=            < True/False >
TNG=             < True/False >
EMAIL=           < john.smith@ca.com >
PRINTER=< lp >

Destination Options:

EJECT=           < True/False >

DESTTAPE=        < Tape Name >
DESTGROUP=       < Device Group Name >
MEDIAPOOL=       < Media Pool Name >

TAPEMETHOD=      < Append / Overwrite / Owritesameblank / Owritesameblankany /
Owritesameanyblank >
SPANTAPEMETHOD=< Overwrite / Owritesameblank / Owritesameblankany /
Owritesameanyblank >

TAPETIMEOUT=     < minutes >
SPANTAPETIMEOUT=< minutes >
```

Multistreaming Options

To use the multistreaming feature, set the following parameters:

```
MULTISTREAM=     < True / False >
MAXSTREAMS=      < Maximum number of streams to use >
```

Schedule Options

You can set the following schedule options, which enable you to use a different tape, media pool, or both, following a seven-day cycle:

```
DAYOFWEEK =      < True / False >

Without Multi-Streaming

DESTTAPESUN=     < Tape Name to use on Sunday >
DESTTAPEMON=     < Tape Name to use on Monday >
DESTTAPETUE=     < Tape Name to use on Tuesday >
DESTTAPEWED=     < Tape Name to use on Wednesday >
DESTTAPETHU=     < Tape Name to use on Thursday >
DESTTAPEFRI=     < Tape Name to use on Friday >
DESTTAPESAT=     < Tape Name to use on Saturday >


With Multi-Streaming

MEDIAPOOLSUN=< Media Pool Name to use on Sunday >
MEDIAPOOLMON=< Media Pool Name to use on Monday >
MEDIAPOOLTUE=< Media Pool Name to use on Tuesday >
MEDIAPOOLWED=< Media Pool Name to use on Wednesday >
MEDIAPOOLTHU=< Media Pool Name to use on Thursday >
MEDIAPOOLFRI=< Media Pool Name to use on Friday >
MEDIAPOOLSAT=< Media Pool Name to use on Saturday >
```

If you do not specify a tape for the current day when you set the schedule options, the tape specified in the DESTTAPE is used as the default.

Note: Tape names cannot exceed 24 characters.

If you do not specify a media pool for the current day when using multistreaming, the media pool specified in MEDIAPOOL is used as the default.

Note: To comment out a line, enter # at the beginning of a line. This method applies to all options.

The SAPDBA Configuration File

The SAPDBA configuration file, called init<SID>.sap, is part of the SAP environment and includes all of the backup and archive parameters. This configuration file provides the backup option integration module with critical parameters, including:

- backup_dev_type
- util_par_file

Use the following format when you specify these parameters:

- For an offline backup:

  backup_dev_type = util_file
  util_par_file= <par_file name>

- For an online backup:

  backup_dev_type = util_file_online
  util_par_file= <par_file name>

When specifying the value for the util_par_file parameter, you must specify the full path. For example:

```
backup_dev_type = util_file
util_par_file = /usr/sap/OR2/SYS/exe/run/initOR2.utl
```

Note: If you do not set the default for the backup_dev_type and util_par_file parameters in init<SID>.sap, you can change the default by using the SAPDBA backup menu.

Add User Equivalency to the SAPDBA User

Before you can use the option, you must add the SAPDBA user as a BrightStor ARCserve Backup user. This provides necessary permission and enables the backup option integration module to send jobs to the BrightStor ARCserve Backup server. The authentication equivalency settings must be established by a user with proper privileges.

Note: Within BrightStor ARCserve Backup, the unique key is hostname.username. You cannot use the User Profile Manager.

To add user equivalency for the SAPDBA user, follow these steps:

1. Load BrightStor ARCserve Backup and verify that it is running.

2. From the BrightStor ARCserve Backup server command line, set the user equivalency as shown in the following example:

   ```
   ca_auth [-cahost <hostname>] –equiv add <SAPDBAUser> <hostname>
   <BABBackupUser> [<BABUsername> <BABpassword>]
   ```

   For example:

   ```
   $>ca_auth –cahost oraserver -equiv add oracer ultra2 caroot caroot ""
   ```

   This command authorizes SAPDBA user, oracer, on the ultra2 machine, to use the BrightStor ARCserve Backup user name, caroot, on the oraserver host.

   Note: In this example, caroot has no password, which is why "" is used.

For more information about setting user equivalency, see the appendix "Using Command Line Utilities" in the *Administrator Guide.*

Environment Variables Settings

Before you can back up your database, you must set the following environment variables:

- CASAP_HOME (to the path of the option)

- ORACLE_HOME

- BAB_HOME (to the path of BrightStor ARCserve Backup, if the option and BrightStor ARCserve Backup are running on the same machine)

Use the following command to set the library path:

```
LD_LIBRARY_PATH=$CASAP_HOME/lib:/opt/CA/BABcmagt:$LD_LIBRARY_PATH
```

You can now submit a backup through SAPDBA.

Remove the Option

To remove Enterprise Option for SAP R/3 for Oracle from your server, use the following command:

```
rpm -e BABsap
```

Chapter 3: Using the Database Administration Functions

You can perform operations such as backups, restores, or inquiries by using the SAPDBA menu or by entering SAPDBA commands at the command line. This chapter provides information about using the SAPDBA menu to back up and restore data. For information about using the command line, see the SAP R/3 documentation.

SAPDBA

By using the SAPDBA menu, you can perform various database administration functions, including:

- Backing up, restoring, and recovering data

- Starting up and shutting down databases

- Extending tablespaces

- Monitoring and analyzing space on the database

- Reorganizing databases

- Recovering databases

SAPDBA uses BRBACKUP, BRARCHIVE, and BRRESTORE modules (which are embedded in the menu structure of SAPDBA) to integrate with the database backup, restore, and inquiry functions.

SAPDBA evaluates logs to decide if data can be recovered using the selected backups. SAPDBA evaluates the selected backup method and determines if it will prevent recovery between the time of the backup and the selected recovery end time (point in time). If SAPDBA cannot perform a recovery, it rejects the selected backup or recovery procedure.

The following diagram shows how a SAP R/3 database is backed up when BrightStor ARCserve Backup is installed on a local server:
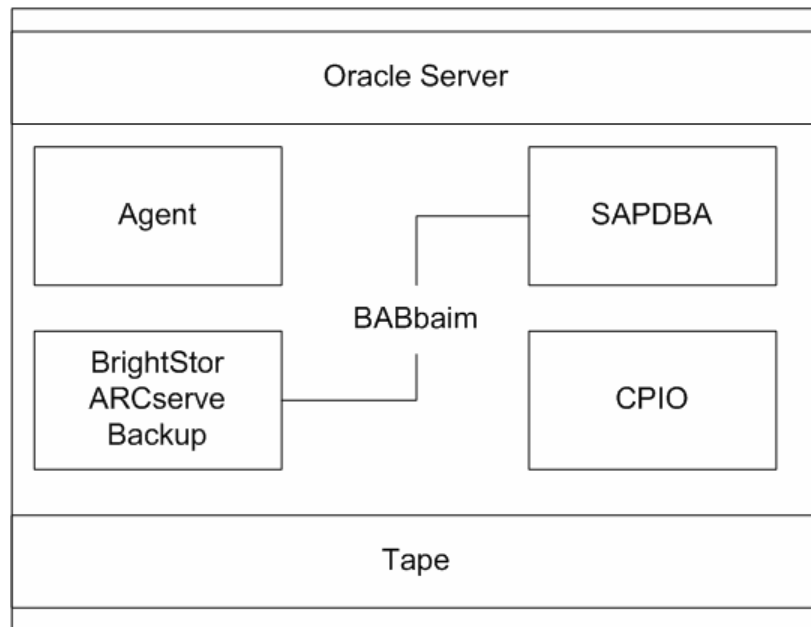
The following diagram shows how a SAP R/3 database is backed up when BrightStor ARCserve Backup is installed on a remote server:
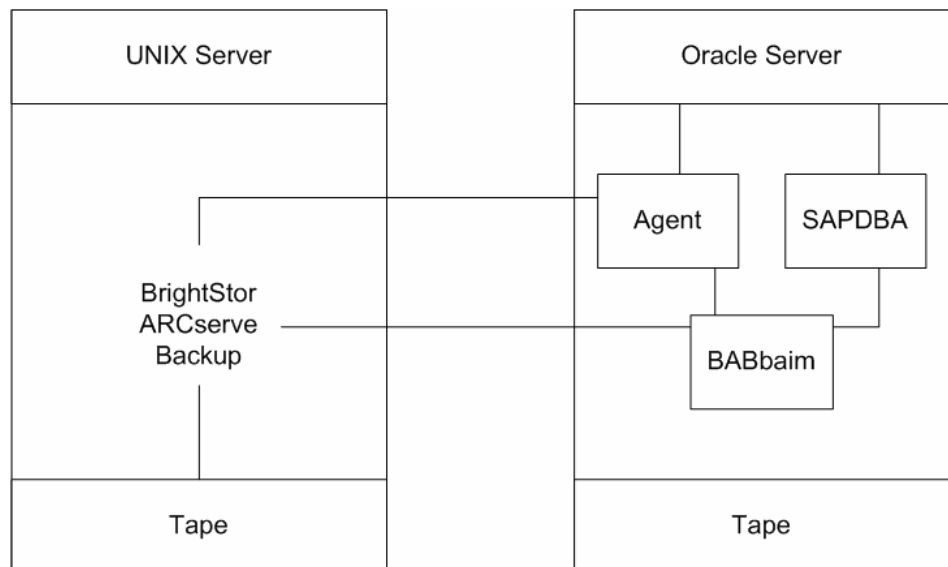
SAPDBA Functions

SAPDBA can restore and back up an entire database or reset the database to a previous state. When you start a job, SAPDBA is automatically started. SAPDBA functions are determined by the properties that are set in util_par_file.

For more information on setting util_par_file properties, see the section Configure Parameter File Settings in the "Installing the Option" chapter.

The following table describes the modules that are available for Oracle database administration:

Module	Function
BRBACKUP	Brings database servers online or offline, checks the file status, and places database tablespaces into backup mode to maintain consistency.
BRARCHIVE	Provides online and offline backup of control files, data files, and online redo log files as well as profiles and logs for backups.
BRRESTORE	Recovers database data files, control files, and online redo log files. Checks for available space prior to a restore while removing files that may be overwritten during the recovery.

When these modules are used, events are logged in the file system and corresponding database tables. When BRBACKUP or BRARCHIVE runs, backup logs and profiles are saved, enabling sophisticated volume management.

Database Backup Using SAPDBA

SAPDBA lets you back up complete databases or individual database objects such as tablespaces, control files, or archive logs. It works with BrightStor ARCserve Backup to back up data while the database is online or offline. When performing an online backup, the database is running and still accessible to users; when performing an offline backup, the database shuts down and is inaccessible to users.

Back Up Online Databases with SAPDBA

When you back up an online database, BACKINT is called with a file list and the environment is defined in util_par_file. BACKINT initiates the backup with BrightStor ARCserve Backup and synchronizes the process between BRBACKUP and BrightStor ARCserve Backup.

An example of synchronization is when a tablespace is put into backup mode. If BRBACKUP successfully puts the tablespace into backup mode, BACKINT communicates the file name to the option. When the option has finished moving the data, BACKINT tells BRBACKUP to remove the backup mode on the tablespace. At the end of the backup, BACKINT exits with the appropriate exit code.

To back up an online database, follow these steps:

1. Log on to SAPDBA. The SAP Database Administration screen displays.

```
-------------------------------------------------------------------------------
                   SAPDBA V4.6D - SAP Database Administration
-------------------------------------------------------------------------------
                  ORACLE version : 8.1.7.0.0
                  ORACLS_SID     : CIS
                  ORACLE_HOME    : /dsk600/oracle/product/8.1.7PAS
                  DATABASE       : open
                  SAPR3          : not connected

           a - Startup/Shutdown instance     h - Backup database
           b - Instance information           i - Backup offline redo files
           c - Tablespace administration      j - Restore/Recovery
           d - Reorganization                 k - DB check/verification
           e - Export/import                  l - Show/Cleanup
           f - Archive mode                   m - User and Security
           g - Additional functions

           q - Quit

           Please select ==>  _                       ~Copyright by SAP AG~
```

2. Select h− Backup database.

   The Backup Database screen displays.

```
-------------------------------------------------------------------------------
                              Backup Database
-------------------------------------------------------------------------------
                                    Current value
        a - Backup Function          Normal backup
        b - Parameter file           initPAS.sap
        c - Backup Device type       external backup tool <backint>
        d - Objects for backup       all
        e - Backup type              force
        g - Query only               no
        h - Special Options ...

        i - Standard backup          yes
        j - Backup from disk backup
        k - Restart backup
        l - Make part. backup compl.

        S - Start BRBACKUP <V4.6D>
        q - Return
        Please select ==>  _                          ~Copyright by SAP AG~
```

3. Select c - Backup Device type. The Select backup device type screen displays:

```
-----------------------------------------------------------------------------
                     Select backup device type <2003-04-16>
-----------------------------------------------------------------------------

    Current Selection: external backup tool <backint> online

    a - local tape
    b - local tape auto changer
    c - local tape juke box
    d - remote tape
    e - remote tape auto changer
    f - remote tape juke box
    g - external backup tool <backint>
    h - external backup tool <backint> online
    i - external backup tool <backint> with rman
    k - local disk
    l - local disk <create database copy>
    m - local disk <create standby database>
    n - remote disk
    o - remote disk <create database copy>
    p - remote disk <create standby database>

    q - Return

    Please select ==>                             "Copyright by SAP AG"
```

4. Select h – external backup tool <backint> online.

5. Enter **q** to return to the Backup Database screen.

6. From the Backup Database screen, select e – Backup type.

7. From the Select backup device type screen, select h – external backup tool <backint> online.

8. Enter **q** to return to the Backup Database screen and select d - Objects for backup.

    The Backup Mode/Backup Objects screen displays:

```
-----------------------------------------------------------------------------
                         Backup Mode/Backup Objects
-----------------------------------------------------------------------------
    Current selections:   "all"

    a -   "all"       -   whole database backup
    b -   "all_data"  -   whole database backup without index tablespaces
    c -   "full"      -   full      backup <level 0>
    d -   "incr"      -   incremental backup <level 1>
    e -   "sap_dir"   -   SAP     directories backup
    f -   "ora_dir"   -   ORACLE directories backup
    g -   "~all"      -    a tablespace name
    h -   "all"       -   an ORACLE file id <number>
                          or a range of file ids <number>-<number>
    i -               -   an absolute file or directory name
    j -               -   a combination: <item> or <item>,<item>,

    q -   Return
Please select ==>   _                             "Copyright by SAP AG"
```

9. Specify the mode and objects to apply to this backup.

10. Enter **q** to return to the Backup Database screen.

11. Select s - Start BRBACKUP to begin the back up.

Back Up Offline Databases

This example illustrates a backup of database files that were detected during the last online connection to the option.

Note: The control file is not backed up when an offline database is backed up. For more information about backup and recovery procedures, see the *Administrator Guide*.

1. Log on to SAPDBA. The SAP Database Administration screen displays.

```
--------------------------------------------------------------------------
                  SAPDBA V4.6D - SAP Database Administration
--------------------------------------------------------------------------
                   ORACLE version : 8.1.7.0.0
                   ORACLS_SID     : CIS
                   ORACLE_HOME    : /dsk600/oracle/product/8.1.7
                   DATABASE       : open
                   SAPR3          : not connected

         a - Startup/Shutdown instance    h - Backup database
         b - Instance information          i - Backup offline redo files
         c - Tablespace administration     j - Restore/Recovery
         d - Reorganization                k - DB check/verification
         e - Export/import                 l - Show/Cleanup
         f - Archive mode                  m - User and Security
         g - Additional functions

         q - Quit _

         Please select ==>    _

                                                      ~Copyright by SAP AG~
```

2. Select h - Backup database. The Backup Database screen displays.

```
--------------------------------------------------------------------------
                              Backup Database
--------------------------------------------------------------------------
                              Current value
    a - Backup Function             Normal backup
    b - Parameter file              initCER.sap
    c - Backup device type          external backup tool <backint>
    d - Objects for backup          all
    e - Backup type                 offline <force>
    g - Query only                  no
    h - Special options...

    i - Standard backup             yes
    j - Backup from disk backup
    l - Restart backup
    m - Make part. backups compl.

    S - Start BRBACKUP <V4.6D>
    q - Return

    Please select ==>    _                      ~Copyright by SAP AG~
```

3. From the Backup Database screen, select c – Backup device type.

   The Select backup device type screen displays.

   ```
   --------------------------------------------------------------------------------
                      Select backup device type <2003-04-16>
   --------------------------------------------------------------------------------

      Current Selection: external backup tool <backint>

      a - local tape
      b - local tape auto changer
      c - local tape juke box
      d - remote tape
      e - remote tape auto changer
      f - remote tape juke box
      g - external backup tool <backint>
      h - external backup tool <backint> online
      i - external backup tool <backint> with rman
      k - local disk
      l - local disk <create database copy>
      m - local disk <create standby database>
      n - remote disk
      o - remote disk <create database copy>
      p - remote disk <create standby database>

      q - Return

      Please select ==>  _                          "Copyright by SAP AG"
   ```

4. From the Select backup device type screen, select g – external backup tool <backint>.

5. Enter **q** to return to the Backup Database screen.

6. From the Backup Database screen, select e – Backup type, and confirm that the current value is set to offline.

7. Enter q to return to the Backup Database screen.

8. From the Backup Database screen, select d – Objects for backup. The Backup Mode/Backup Objects screen displays:

   ```
   --------------------------------------------------------------------------------
                           Backup Mode/Backup Objects
   --------------------------------------------------------------------------------

      Current selections:  "all"

      a -   "all"       -  whole database backup
      b -   "all_data"  -  whole database backup without index tablespaces
      c -   "full"      -  full        backup <level 0>
      d -   "incr"      -  incremental backup <level 1>
      e -   "sap_dir"   -  SAP    directories backup
      f -   "ora_dir"   -  ORACLE directories backup
      g -   "all"       -  a tablespace name
      h -   "all"       -  an ORACLE file id <number>
                           or a range of file ids <number>-<number>
      i -               -  an absolute file or directory name
      j -               -  a combination: <item> or <item>,<item>,…

      q -   Return

      Please select ==>  _                          "Copyright by SAP AG"
   ```

9. Specify the mode and objects to apply to this backup.

10. Enter **q** to return to the Backup Database screen.

11. Select s - Start BRBACKUP to begin the backup.

Back Up the Offline Redo Log

To back up offline redo logs, follow these steps:

1. Log on to SAPDBA. The SAP Database Administration screen displays. Ensure that you are in archive log mode and that automatic archiving is enabled. For more information, see your SAP R/3 documentation.

```
--------------------------------------------------------------------------------
                 SAPDBA V4.6D – SAP Database Administration
--------------------------------------------------------------------------------
                    ORACLE version : 8.1.7.0.0
                    ORACLS_SID     : CIS
                    ORACLE_HOME    : /dsk600/oracle/product/8.1.7PAS
                    DATABASE       : open
                    SAPR3          : not connected

          a – Startup/Shutdown instance    h – Backup database
          b – Instance information          i – Backup offline redo files
          c – Tablespace administration     j – Restore/Recovery
          d – Reorganization                k – DB check/verification
          e – Export/import                 l – Show/Cleanup
          f – Archive mode                  m – User and Security
          g – Additional functions

          q – Quit

          Please select ==>    _                        "Copyright by SAP AG"
```

2. From the SAP Database Administration screen, select i – Backup offline redo files.

3. The Backup Offline Redo Logs screen displays:

```
--------------------------------------------------------------------------------
                        Backup Offline Redo Logs
--------------------------------------------------------------------------------
        Current value
   a – Archive function            Save offline redo logs
   b – Parameter file              initCER.sap
   c – Archive device type         external backup tool <backint>
   d – Number of redo logs         1000
   f – Query only                  no
   g – Fill tapes permanently      no
   h – Special options...

   i – Standard backup of offline redo files      yes
   j – Backup from disk backup                     no

   q – Return

   S – Start BRBACKUP <V4.6D>
   Please select ==>    _                           "Copyright by SAP AG"
```

4. From the Backup Offline Redo Logs screen, select h – Special options. The Backup Offline Redo Logs: Special Options screen displays.

```
--------------------------------------------------------------------------------
-
                  Backup Offline Redo Logs: Special Options
--------------------------------------------------------------------------------
        Current value
   a – Confirm archive parameters     no
   b – Backup utility parameter file  /opt/CA/BABsapagt/initCER.utl
   c – Enter password interactively   no
   d – Apply logs into standby DB     don´t apply
   j – Language                       English

   l – Show installed versions

   q – Return

   Please select ==>    _                           "Copyright by SAP AG"
```

5. Specify any additional options to apply to this backup. The Backup Offline Redo Logs screen displays.

6. Enter **i** to select - Standard backup of offline redo files.

7. Enter **d** - Number of redo logs. When prompted, enter the number of redo logs to be included in the backup.

8. Enter **q** to return to the Backup Archive Logs screen.

9. Enter **s** - Start BRARCHIVE.

Data Restoration and Recovery Using SAPDBA

SAPDBA can be used to restore and recover data. To do this you must be in expert mode. For more information on enabling expert mode and using the SAPDBA menu to restore and recover data, see your SAP R/3 documentation.

Chapter 4: Best Practices

This chapter presents best practices for using the Enterprise Option for SAP R/3 for Oracle to backup and restore Oracle databases managed by SAP R/3 for Oracle.

Effective Backup and Recovery Strategies

Plan your backup and recovery strategies for a database before you create the database, and maintain a regular backup schedule to ensure smooth recovery in case of database or media failure. If such planning is not considered before database creation, database recovery may not be possible in certain cases.

For more information about disaster recovery planning, see the "Disaster Recovery" appendix.

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

- **Full backups**—Full database backups should be performed regularly; it is easier to recover a database from a full backup.

- **Tablespace-level backups**—Recoverable databases allow 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.

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

- **Performance tuning—**You can improve performance of backup and restore operations by tuning your SAP R/3 parameters.

  For more information about tuning SAP R/3 parameters for performance, see your SAP R/3 documentation.

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.

Log File Protection

Do not overwrite log files if you archive and retrieve files on the same directory. To protect your archived log files, restore them to a separate retrieval directory.

Backups After Organizational Changes

Initiate a backup each time you take the following actions:

- Rename a tablespace.
- Restore a tablespace that has been renamed, using the new tablespace name.
- Reorganize a table.
- Back up a corresponding tablespace after you reorganize a table.
- Change the tablespace or database configuration.
- Change anything in the configuration or organization of a database or tablespace.

Current Option Information

To ensure that you are current with the latest information about the option, visit Computer Associates Customer Support at http://ca.com/support.

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 Enterprise Option for SAP R/3 for Oracle. You can find additional information in the "Troubleshooting" appendix.

Why is the option not contacted when I invoke a backup job?

If the option is not contacted, check to make sure that you have user privileges. Check the backup log to see if you are an authorized user. You must have user privileges to perform backups.

My first backup job was successful, but my second backup job failed. Why did this happen?

Check to see if your eject parameter is set to true. If the eject parameter is set to true, it will automatically eject the tape after the first backup, causing the next backup job to fail because there is no available tape to write to.

I have the multistreaming parameter set to true and the MAXSTREAMS value set to 2. If I have two available storage devices, why is the data only being written to one storage device?

Multistreaming backups are based on the parameter values you set. If you have the MAXSTREAMS value set to 2, the second storage device is used during a backup. If, however, you have two storage devices but have only one filesystem, the backup will write to only one storage device.

Appendix B: Troubleshooting

This appendix provides helpful information about the following troubleshooting issues:

- Debug Methods
- Option Logs
- Job Status Information
- Database Manager

Debug Methods

You can use debug methods to help you troubleshoot problems. The following information will assist you in finding errors. When setting the debug level, set the number high to log more information or low to log less information. When you set the debug level, a value of 1 is the lowest and a value of 4 is the highest.

Debug Levels

To set the debug mode of the option, add the env statements shown in the following /opt/CA/BABcmagt/agent.cfg file.

```
[20]
# SAP/Oracle Agent
NAME    SAPAgent
VERSION 11.0.0
HOME    /opt/CA/BABsapagt
ENV CA_ENV_DEBUG_LEVEL=value
ENV     CAS_HOME=/opt/CA/BrightStorARCserve
ENV     ORACLE_HOME=/opt/oracle
ENV     SAPSID=C11
ENV     LD_LIBRARY_PATH=/opt/CA/CAlib:/opt/CA/BABcmagt:$LIBPATH
ENV     SHLIB_PATH=/opt/CA/CAlib:/opt/CA/BABcmagt:$LIBPATH
ENV     LIBPATH=/opt/CA/CAlib:/opt/CA/BABcmagt:$LIBPATH
#BROWSER
AGENT   sapagentd
BAB     reports
```

Use the BrightStor ARCserve Backup Report Manager to view the activity log.

Option Logs

The option logs are found in $CASAP_HOME/logs/sapagentd.log. Option logs record information about jobs. This information can help solve problems you may encounter when performing an operation.

Job Status Information

When the option is used to back up or restore a database, you can view the status of the job. To monitor the job activity, click the Job Status Manager icon in the BrightStor ARCserve Backup Quick Start window.

After a backup or restore job is submitted to BrightStor ARCserve Backup by the option, you can monitor the status of the job using the Job Status Manager.

For more information about the Job Status Manager, see the *Administrator Guide* and the *Getting Started*.

Database Manager

Use the Database Manager to view detailed information about your backup job. You can view backed up file names, media name, and session information.

The following figure shows a view of the Restore Manager:

Appendix C: Directory and File Locations

This appendix provides a reference for the directories and files that are located in $CASAP_HOME.

SAP Directories

The following directories are located under $CASAP_HOME:

- **data**—internal data (release-specific information)
- **lib**—run-time libraries
- **logs**—log files
- **nls**—messages files

SAP Files

The following files are located in $CASAP_HOME:

- **backint**—The interface between SAP and the option that needs to be copied into the SAPEXE dir.
- **ca_backup**—The program used to submit backup jobs.
- **ca_encr**—The program used to encrypt passwords during setup.
- **ca_restore**—The program used to submit restore jobs.
- **ckyorn**—The program used to read user information during setup.
- **initCER.utl**—The .utl file created after setup.
- **pfilesetup**—The script used to create the .utl file.
- **sapagentd**—The daemon called by the common agent to perform a job.
- **sapsetup**—The script used to set up the option.

The following data file is located under $CASAP_HOME/data:

- **relversion**—Stores the BrightStor ARCserve Backup build number that the option was built against.

The following log files are located under $CASAP_HOME/logs:

- **ca_backup.log**—Logs the output of the latest ca_backup command
- **ca_restore.log**—Logs the output of the latest ca_restore command
- **sapagentd.log**—Logs option activity

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