

BrightStor® ARCserve® Backup for UNIX

Agent for Lotus Domino Guide **r11.5**



Computer Associates®

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Chapter 1: Introducing the Agent

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.

Among the agents BrightStor ARCserve Backup offers is the BrightStor® ARCserve® Backup Agent for Lotus Domino. This agent communicates with Lotus Domino and BrightStor ARCserve Backup to back up the Lotus Domino database on a local or remote server. The agent handles all communication and transference of data packets between BrightStor ARCserve Backup and the Lotus Domino database server.

This guide covers the BrightStor ARCserve Backup Agent for Lotus Domino. The agent uses the Lotus Domino (Release 5 and Release 6) Backup and Recovery Application Programming Interface (API), which can back up Lotus Domino databases and transaction logs using either a graphical user interface (GUI) or a command line. This guide also provides information about using the BrightStor ARCserve Backup Agent for Lotus Domino on the platform. See the readme file for a list of currently supported platforms and the hardware and software requirements to install the agent.

Agent Benefits

The agent provides the following benefits:

- Flexible backup capabilities of a BrightStor ARCserve Backup server to create and manage backups.
- Complete data protection for your Lotus Domino databases, configuration files, and transaction logs.
- Incremental and differential backup of your Lotus Domino databases.
- Flexible scheduling capabilities. For example, you can submit a job for a date you specify and select a repeat method, or you can select a rotation scheme (a preset weekly backup strategy consisting of full backup jobs).

Agent Features

BrightStor ARCserve Backup Agent for Lotus Domino offers these features:

- **Online or Offline Full Backup**

BrightStor ARCserve Backup Agent for Lotus Domino copies databases to a staging area on disk, captures any changes made during the backup, and sends these changes with the backup files to the BrightStor ARCserve Backup server. Transaction logs and configuration files are sent directly to the BrightStor ARCserve Backup server from their original location.

- **Online or Offline Incremental Backup**

BrightStor ARCserve Backup Agent for Lotus Domino backs up the full log segments and reports to Lotus Domino when the backup is complete. Lotus Domino then chooses to either rename and reuse these log segments or delete them when the server is shut down. This feature requires that the Archive Transaction Logging option be enabled by the Lotus Domino administrator.

- **Online or Offline Restore**

BrightStor ARCserve Backup Agent for Lotus Domino restores databases, transaction log files, and configuration files. Databases are brought from the BrightStor ARCserve Backup server to a temporary directory (which serves as a staging area) where they remain until a recovery is initiated. Transaction log files and configuration files are brought from the BrightStor ARCserve Backup server and restored to their original location, eventually overwriting and replacing the original files.

- **Online or Offline Recovery**

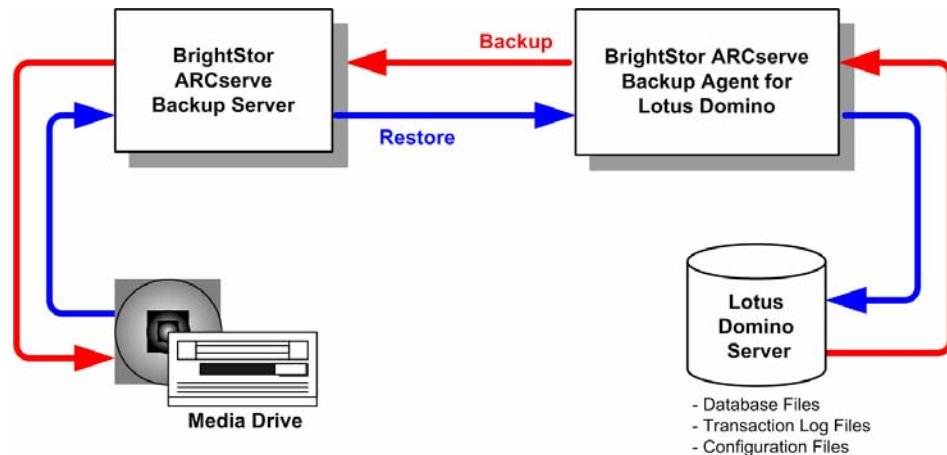
BrightStor ARCserve Backup Agent for Lotus Domino recovers a database that has been restored in the temporary directory (staging area). The recovery process uses the transaction logs to roll forward the database to its current state (full automatic recovery) or to a specified point in time (point-in-time automatic recovery).

- During a **full recovery**, the agent recovers the backup file using the rollback information added to it, the transaction logs used during and since the backup, and the current transaction logs.
- During a **point-in-time recovery**, the agent recovers the database up to the specified date by using the active transaction log during the backup, any transaction logs that were archived since the backup was performed (up to the specified point in time) and, if necessary, the current transaction logs also up to the specified point in time.

Note: When operating from a command line, the recovery process is always full. When operating from a GUI, the recovery process is optional; you can either perform a full recovery or a point-in-time recovery, or you can disable the recovery process.

Agent Architecture

The Lotus Domino server is composed of objects such as database files, configuration files, and transaction log files. BrightStor ARCserve Backup and BrightStor ARCserve Backup Agent for Lotus Domino can back up and restore the objects dynamically, while the Lotus Domino server is online. The following illustration shows the general overall relationship between BrightStor ARCserve Backup and Lotus Domino:



Agent Overview

BrightStor ARCserve Backup Agent for Lotus Domino integrates with BrightStor ARCserve Backup and provides backup and restore functionality for a Lotus Domino server environment while the system is online or offline. Performing online backups streamlines the process by eliminating the need to replicate the database and take the Lotus Domino server offline to back up the database. Because you can perform an online backup, you do not have to stop the Lotus Domino server. This online backup process is ideal for businesses that require continuous availability and operate every day, 24 hours a day.

BrightStor ARCserve Backup Agent for Lotus Domino uses the Lotus Domino Native Backup and Recovery API. This API uses transactional log recovery. When transaction logging is enabled, the system captures database changes and writes them to the transaction log.

BrightStor ARCserve Backup Agent for Lotus Domino supports incremental and differential backups, rather than always requiring full database backups, which makes your backup procedure run much faster than full backup jobs. If a system or media fails, you can use both the transaction logs and the full database backup to recover your databases.

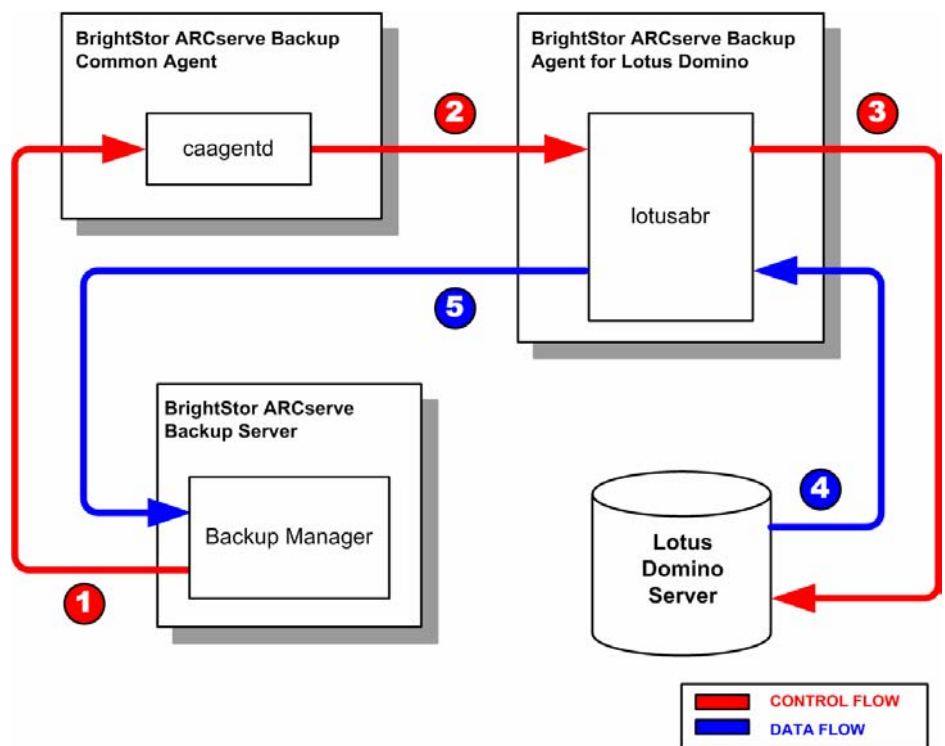
Agent Functions with the GUI

BrightStor ARCserve Backup Agent for Lotus Domino provides the capability to perform browse, backup, and restore functions for Lotus Domino databases, transaction log files, and configuration files using the graphical user interface (GUI). These functions are initiated from the GUI on the BrightStor ARCserve Backup server. The GUI allows you to access the Backup Manager and the Restore Manager to perform these functions.

Using the Backup Manager, you can browse and back up Lotus Domino database files, transaction log files, and configuration files. Using the Restore Manager, you can browse and restore Lotus Domino databases, archived transaction log files, and configuration files that were previously backed up by BrightStor ARCserve Backup.

Backup Browse Function

The following illustration shows how the agent and Lotus Domino work together to perform a backup browse:



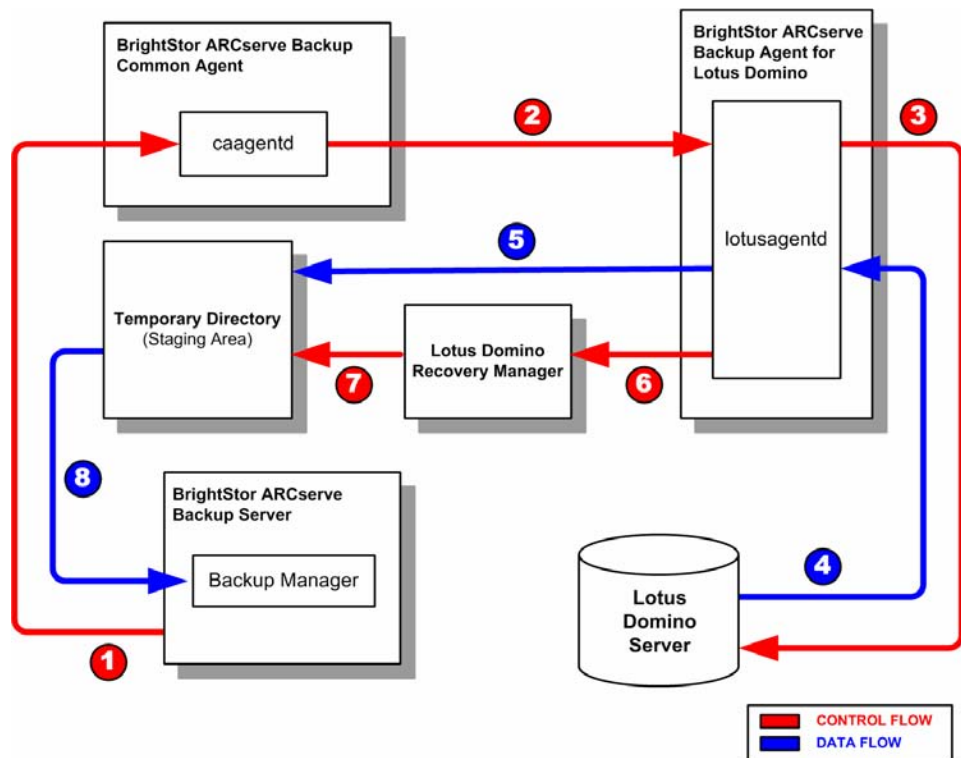
The Lotus agent browser command (lotusabr) is invoked by the common agent daemon (caagentd) to obtain information about Lotus Domino objects available for backup. The lotusabr command then builds a list of objects containing information about the databases that are logged. The lotusabr command adds the transaction logs waiting to be archived and the Lotus Domino configuration files to the list. The content of the list is then sent to the Backup Manager on the BrightStor ARCserve Backup server.

Backup Function (GUI)

BrightStor ARCserve Backup Agent for Lotus Domino provides the capability to perform offline backups and online backups. Using the agent, you can back up database files, transition log files, or configuration files.

Database File Backup (GUI)

You can back up database files while the Lotus Domino server is online or offline using BrightStor ARCserve Backup Agent for Lotus Domino. The following illustration shows how the agent and Lotus Domino work together to back up a database file using the GUI:



Online Database Backup (GUI)

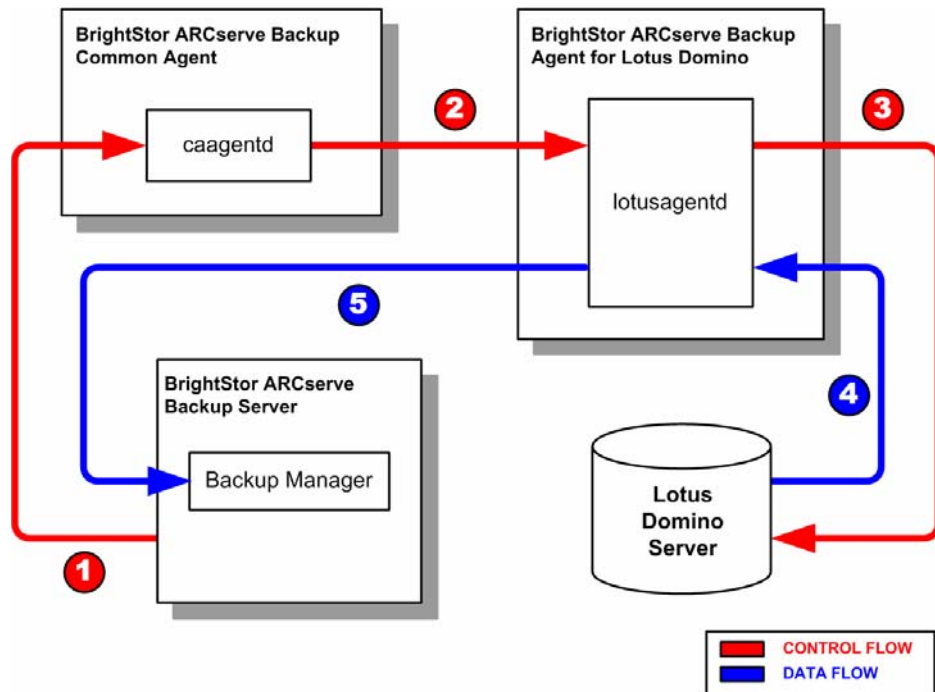
When performing an online database backup, the Lotus Domino server is running. The Lotus agent daemon (lotusagentd) is invoked by the common agent daemon (caagentd) with a list of objects to be backed up. For each database file, lotusagentd will call the Lotus API functions to notify Lotus Domino that the file is being backed up. Since the Lotus Domino server is running, there could be transactions pending while the backup is being performed. As a result, the Lotus Domino Recovery Manager will keep track of these transactions and lotusagentd will copy the database to a temporary directory (staging area). After the database is completely copied to the temporary directory, lotusagentd will invoke the Lotus API to add the rollback information to the backup file. The lotusagentd will then send the backup file to the BrightStor ARCserve Backup server. If you select the Remove existing "RESTORED" archived log copies option, lotusagentd removes any transaction log copies (files ending with .TXN.RESTORED). If you select the Remove existing "OLD" configuration files copies option, lotusagentd removes any configuration files copies (files ending with ID.*RESTORED, .CNF.*RESTORED, .INI.*RESTORED, .NCF.*RESTORED, or .NJF.*RESTORED).

Offline Database Backup (GUI)

When performing an offline database backup, the Lotus Domino server is shut down. The Lotus agent daemon (lotusagentd) is invoked by the common agent daemon (caagentd) with a list of objects to be backed up. For each database file, lotusagentd will call the Lotus API functions to notify Lotus Domino that the file is being backed up. There should no transactions pending because the Lotus Domino server is shutdown. As a result, lotusagentd will simply send the database file to the BrightStor ARCserve Backup server. If you select the Remove existing "RESTORED" archived log copies option, lotusagentd removes any transaction log copies (files ending with .TXN.RESTORED). If you select the Remove existing "OLD" configuration files copies option, lotusagentd removes any configuration files copies (files ending with ID.*RESTORED, .CNF.*RESTORED, .INI.*RESTORED, .NCF.*RESTORED, or .NJF.*RESTORED).

Transaction Log File Backup (GUI)

You can back up transaction log files while the Lotus Domino server is online or offline using BrightStor ARCserve Backup Agent for Lotus Domino. The following illustration shows how the agent and Lotus Domino work together to back up (archive) a transaction log file using the GUI:



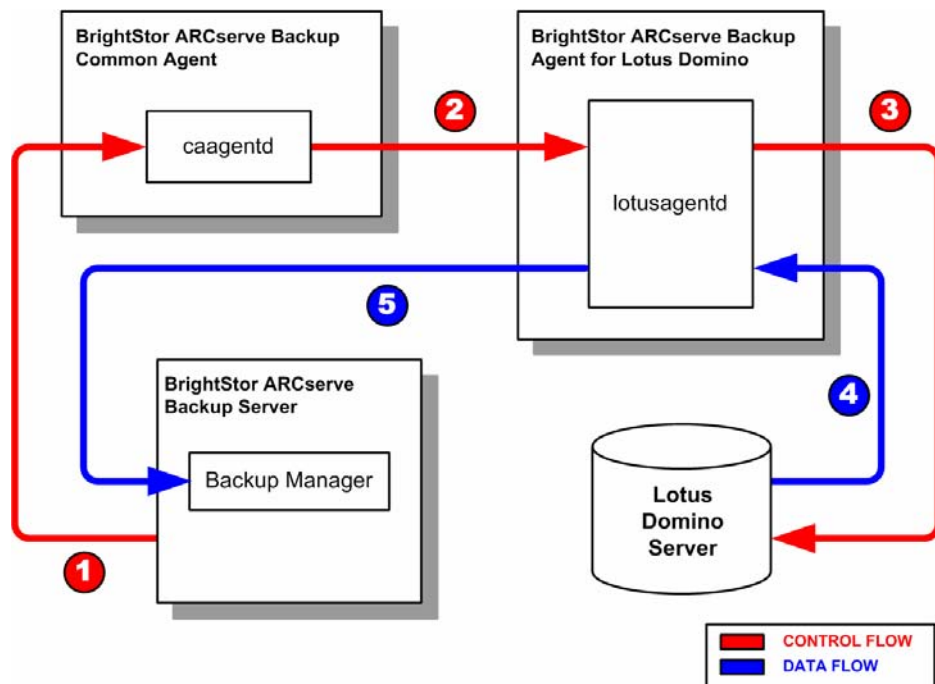
The process of backing up a transaction log file online and backing up a transaction log file offline is the same.

When backing up transaction log files, the Lotus agent daemon (lotusagentd) is invoked by the common agent daemon (caagentd) with a list of objects to be archived. When archiving transaction log files, only the generic Ready-to-archive logs tab can be selected from the BrightStor ARCserve Backup manager interface. As a result, when lotusagentd is invoked to archive the log files, it in turn invokes the Lotus API to verify which log files are waiting to be archived. When this verification is complete, lotusagentd then sends each ready-to-archive log to the BrightStor ARCserve Backup server. After the log files are sent to the BrightStor ARCserve Backup server, lotusagentd calls the Lotus API functions to notify Lotus Domino that the log files have been archived, if the Purge logs after archival backup option is selected. Lotus Domino then chooses to rename and reuse this log file or delete it when the server shuts down.

If you select the Remove existing "RESTORED" archived log copies option, lotusagentd removes any transaction log copies (files ending with .TXN.RESTORED). If you select the Remove existing "OLD" configuration files copies option is selected, lotusagentd removes any configuration files copies (files ending with ID.*RESTORED, .CNF.*RESTORED, .INI.*RESTORED, .NCF.*RESTORED, or .NJF.*RESTORED).

Configuration File Backup (GUI)

You can back up configuration log files using BrightStor ARCserve Backup Agent for Lotus Domino. The following illustration shows how the agent and Lotus Domino work together to back up a configuration log file using the GUI:



When performing an configuration file backup, the Lotus agent daemon (lotusagentd) is invoked by the common agent daemon (caagentd) with a list of objects to be backed up. When lotusagentd is invoked it sends each configuration file to the BrightStor ARCserve Backup server. If you select the Remove existing "RESTORED" archived log copies option, lotusagentd removes any transaction log copies (files ending with .TXN.RESTORED). If you select the Remove existing "OLD" configuration files copies option, lotusagentd removes any configuration files copies (files ending with ID.*RESTORED, .CNF.*RESTORED, .INI.*RESTORED, .NCF.*RESTORED, or .NJF.*RESTORED).

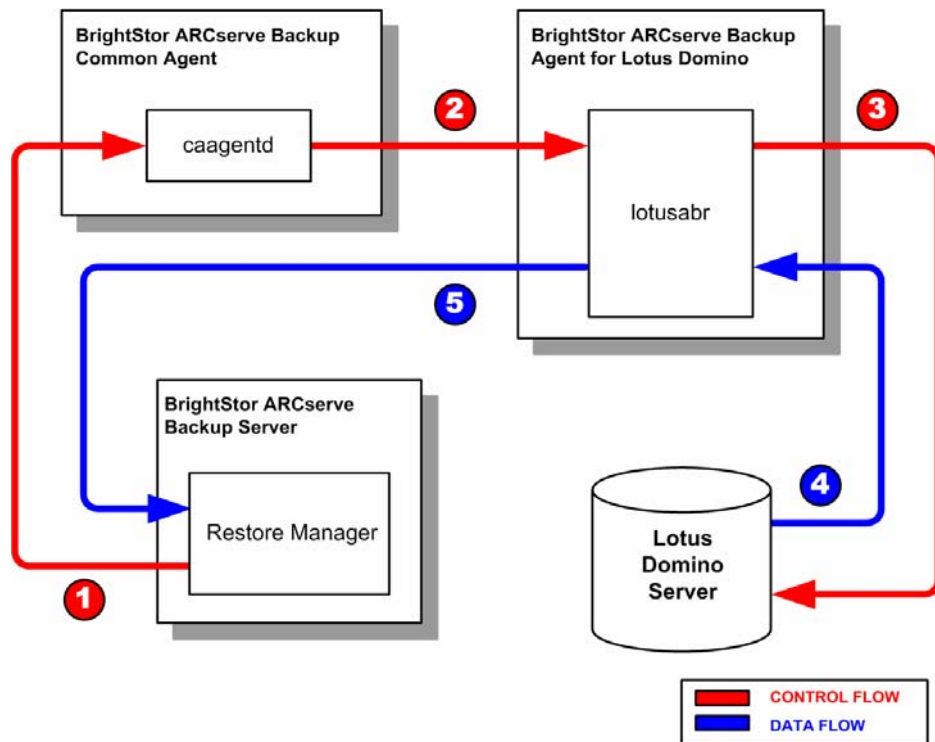
Restore Browse Function

The BrightStor ARCserve Backup server displays information about the Lotus Domino backups in the Source and Destination tabs of the Restore Manager browser. All browsing restore functions are performed using these tabs.

- You can select the Lotus Domino objects to be restored from the Source tab.
- You can select the Lotus Domino server for the objects to be restored from the Destination tab.

You must enter a user name and password (with proper access rights) to access to the Lotus Domino server.

The following illustration shows how the agent and Lotus Domino work together to perform a restore browse:

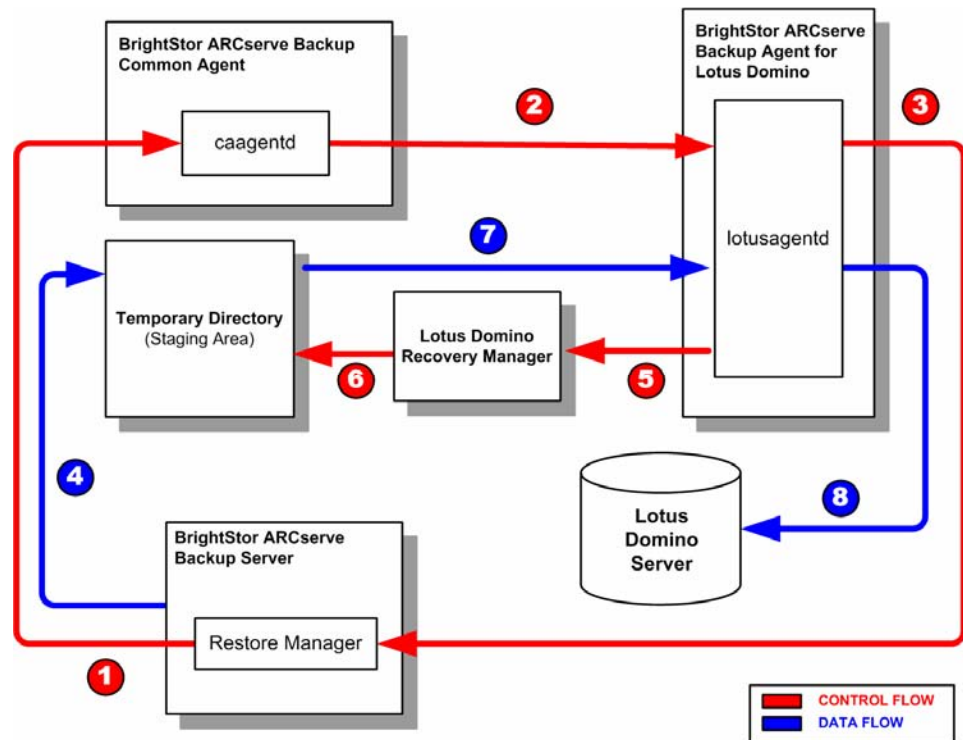


Restore Function (GUI)

BrightStor ARCserve Backup Agent for Lotus Domino provides the capability to perform offline restores and online restores. Using the agent, you can restore database files, archived transaction log files, or configuration files.

Database File Restore (GUI)

You can restore database files while the Lotus Domino server is online or offline using BrightStor ARCserve Backup Agent for Lotus Domino. The following illustration shows how the agent and Lotus Domino work together to restore a database file using the GUI:



Offline Database Restore (GUI)

When performing an offline database restore, the Lotus Domino server is shut down. The Lotus agent daemon (lotusagentd) is invoked by the common agent daemon (caagentd) with a list of objects to be restored.

- If the **Full Automatic Recovery** method is selected, lotusagentd will bring each database file from the BrightStor ARCserve Backup server to the temporary directory (staging area). After the database file is available in the temporary directory, lotusagentd will invoke the Lotus API functions to notify Lotus Domino that the restored database file should be recovered.

The Lotus Domino Recovery Manager will then recover the restored database file using the rollback information added to it, the transaction log used during the backup, any transaction logs archived since the backup, and the current transaction log. After the recovery, the restored database file will be an exact up-to-date image of the database. If the transaction logs used during and since the backup have been archived, they must be restored before the database file is restored.

If the recovery is successful, the original database will automatically be deleted. Then, lotusagentd copies the recovered database from the temporary directory back to its original location on the Lotus Domino server.

- If the **Point in Time Recovery** method is selected, lotusagentd will bring each database file from the BrightStor ARCserve Backup server to the temporary directory (staging area). After the database file is available in the temporary directory, lotusagentd will invoke the Lotus API functions to notify Lotus Domino that the restored database file should be recovered.

The Lotus Domino Recovery Manager will then perform a point-in-time recovery of the database up to the specified date, using the active transaction log used during the backup, any transaction logs archived since the backup (up to the specified point in time), and the current transaction log (up to the specified point in time). After the recovery, the restored database file will be an exact up-to-date image of the database at the specified point in time.

If the database is replicated, the Lotus Domino Recovery Manager will reset the Replica ID of the recovered database. The purpose of resetting the Replica ID is to prevent any transactions that were committed into replicas after the specified point in time from being replayed into the recovered database, thus nullifying the intended point-in-time recovery and instead bringing the recovered database to the current replica state.

The recovered database is also assigned a new database instance identification (DBIID). The purpose of the new DBIID is to void any transactions recorded in the transaction logs for the current DBIID that were committed after the specified point in time. If the transaction logs used during and since the backup and up to the specified point in time have been archived, they must be restored before restoring the database file.

A Point-in-Time Recovery cannot precede the last full backup of the database to be recovered. If the recovery is successful, the original database will automatically be deleted. Then, lotusagentd copies the recovered database from the temporary directory back to its original location on the Lotus Domino server.

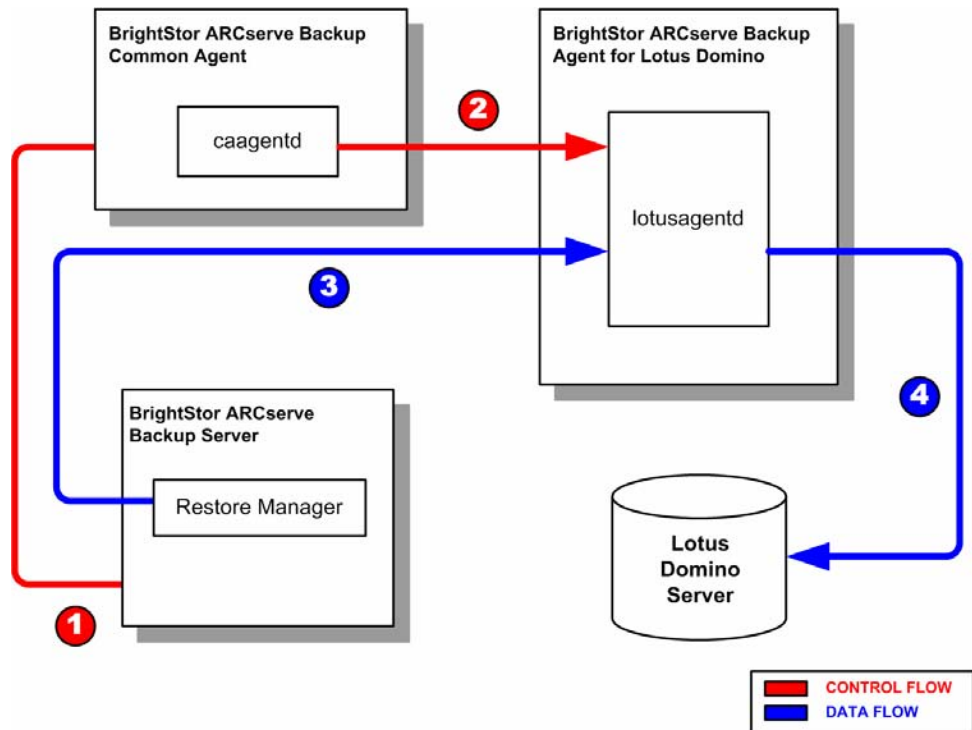
- If the **Overwrite Existing Files** method is not selected, and the original database still exists, the restored backup file will not overwrite the original database. Instead, an error will be generated and the restore job will process the next file to be restored.
- If the **No Recovery** method is selected, the database is restored without being recovered. The database will remain in the state it was when the backup was performed. If transaction logging is enabled, the database will be recovered eventually by the Lotus Domino server.

Online Database Restore (GUI)

When performing an online database restore, the Lotus Domino server is running. The online database restore process is the same as the offline restore process, except that the original database is also taken offline (if it exists) before it is deleted. As a result, there cannot be any users connected to the database when it is taken offline. All users must disconnect from the database before the online database restore process is started.

Archived Transaction Log File Restore (GUI)

You can restore archived transaction log files while the Lotus Domino server is online or offline using BrightStor ARCserve Backup Agent for Lotus Domino. The following illustration shows how the agent and Lotus Domino work together to restore an archived transaction log file using the GUI:



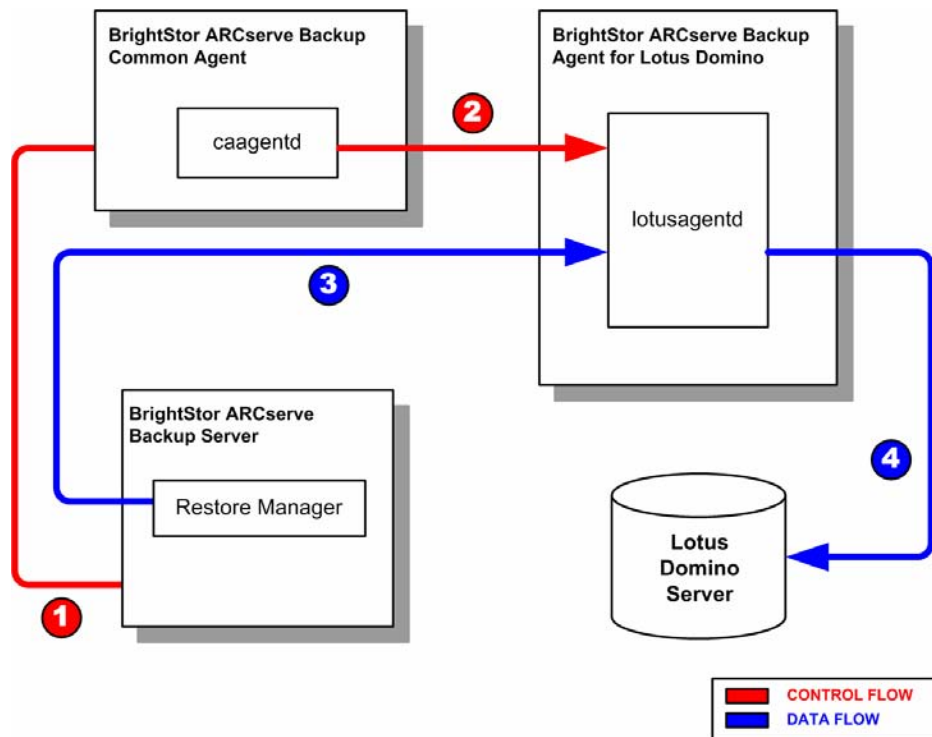
The process of restoring an archived log file with the Lotus Domino server online and offline is the same.

When restoring archived transaction log files, the Lotus agent daemon (lotusagentd) is invoked by the common agent daemon (caagentd) with a list of objects to be restored. When a restore of an archived transaction log file is initiated, lotusagentd is invoked to bring each log file from the BrightStor ARCserve Backup server back to its original location in the Lotus Domino server and overwriting the original log file (if it exists). If the Overwrite Existing Files option is not selected, and the original log file still exists, the restored log file will not overwrite the original log file. Instead, a File exists error will be generated and the restore job will process to the next file to be restored.

After the archived log file is restored, an extra copy will be made automatically, adding the .RESTORED extension to the file name. This .RESTORED log file can be used if the same log file is needed again for recovery of several databases. The Lotus Domino Recovery Manager deletes a log file as soon as it is used for recovery. If the same log file is needed for another recovery, Lotus recommends that it be restored again. However this process of restoring a log file is both time and resource consuming, and as a result, BrightStor ARCserve Backup Agent for Lotus Domino automatically produces an extra .RESTORED copy. If the same log file is now needed for another recovery, the .RESTORED log file can be used instead of having to restore another log file. After all databases have been recovered, the .RESTORED copies of the archived log files can be manually deleted, or if the Remove existing "RESTORED" archived log copies option is selected, these log file copies will be automatically deleted when the next backup is performed.

Configuration File Restore (GUI)

You can restore configuration files using BrightStor ARCserve Backup Agent for Lotus Domino. The following illustration shows how the agent and Lotus Domino work together to restore a configuration file using the GUI:



When performing a configuration file restore, the Lotus agent daemon (lotusagentd) is invoked by the common agent daemon (caagentd) with a list of objects to be restored.

When a configuration file restore is initiated, lotusagentd is invoked to bring each configuration file from the BrightStor ARCserve Backup server back to its original location on the Lotus Domino server and overwriting the original configuration file (if it exists). If the Overwrite Existing Files option is not selected, and the original configuration file still exists, the restored configuration file will not overwrite the original configuration file. Instead, a File exists error will be generated and the restore job will process to the next file to be restored.

After the configuration file is restored, an extra copy will be made automatically, adding the .OLD.timestamp extension to the file name. If the extra copy cannot be made (with the OLD.timestamp extension) and the Overwrite Existing Files option is selected, the process is terminated with an error generated. After all configuration files have been restored, the .OLD.timestamp copies of the configuration files can be manually deleted, or if the Remove existing "OLD" configuration file copies option is selected, automatically deleted when the next backup is performed.

Agent Functions with the Command Line

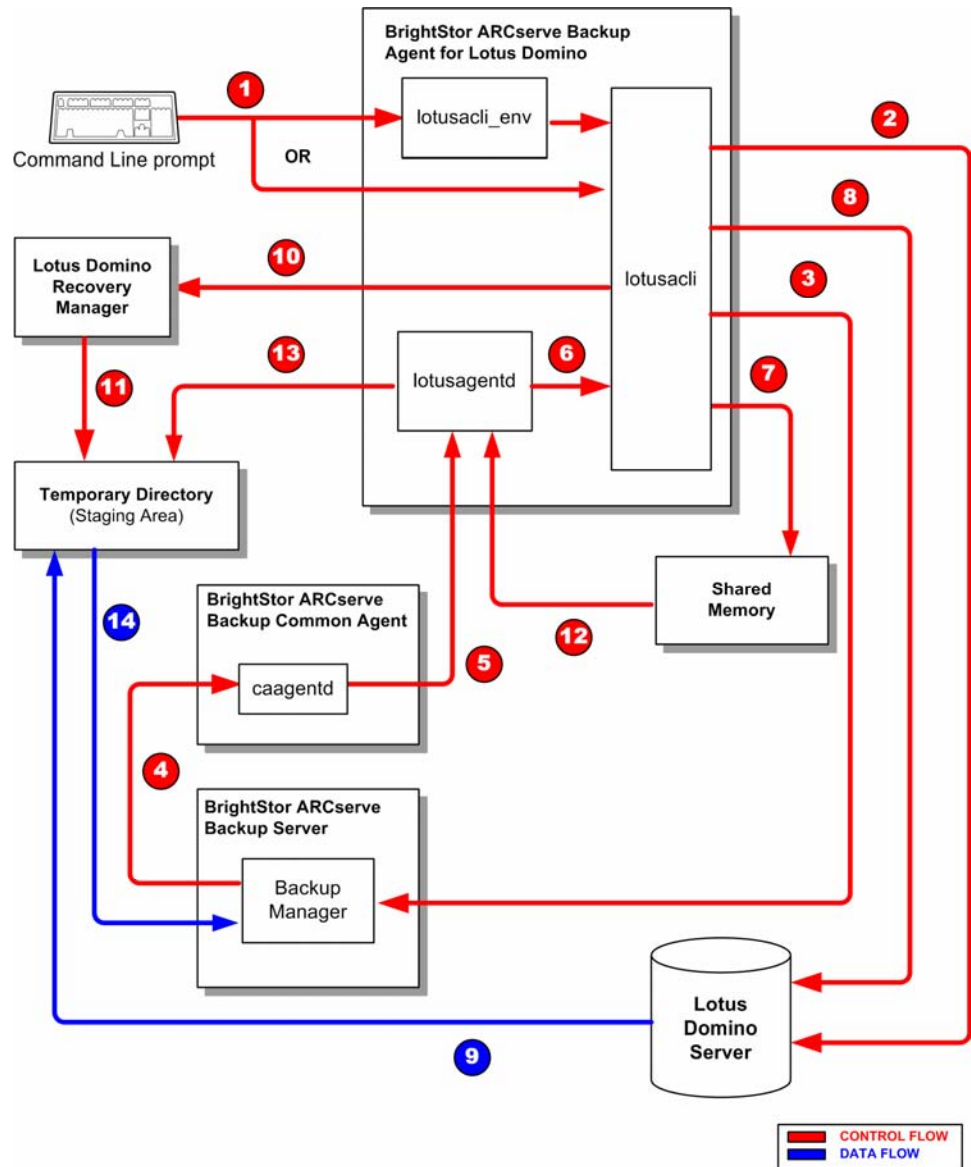
BrightStor ARCserve Backup Agent for Lotus Domino provides the capability to backup and restore Lotus Domino databases and transaction log files using the Command Line Interface (CLI). Backups and restores are initiated on the client host from the command line prompt or from a script using the Lotus agent command line interface (lotusaccli) program or the Lotus agent command line interface environment (lotusaccli_env) program. The command line implements the backup and restore functions of the Lotus API for handling backup and restore jobs and for archiving transaction log files.

Backup Function (CLI)

BrightStor ARCserve Backup Agent for Lotus Domino provides the capability to perform offline backups and online backups. Using the agent, you can back up database files and transaction log files.

Database File Backup (CLI)

You can back up database files while the Lotus Domino server is online or offline using BrightStor ARCserve Backup Agent for Lotus Domino. The following illustration shows how the agent and Lotus Domino work together to back up a database file using the command line:



Offline Database Backup (CLI)

When performing an offline database backup, the Lotus Domino server is shut down. Depending on the method selected for defining the command line related environment variables (automatic or manual), either the Lotus agent command line interface (lotusaccli) program or the Lotus agent command line interface environment (lotusaccli_env) program will be invoked from the command line prompt. If the runtime environment variables are to be defined automatically, lotusaccli_env is invoked before lotusaccli is invoked. If the runtime environment variables are to be defined manually, lotusaccli is invoked directly from the command line prompt.

For each database file, lotusaccli will call the Lotus API functions to notify Lotus Domino that the file is being backed up. There should be no transactions pending because the Lotus Domino server is shut down. As a result, lotusaccli will simply copy the database file to the temporary directory (staging area) and notify the Lotus agent daemon (lotusagentd) that the file is available to be sent to the BrightStor ARCserve Backup server.

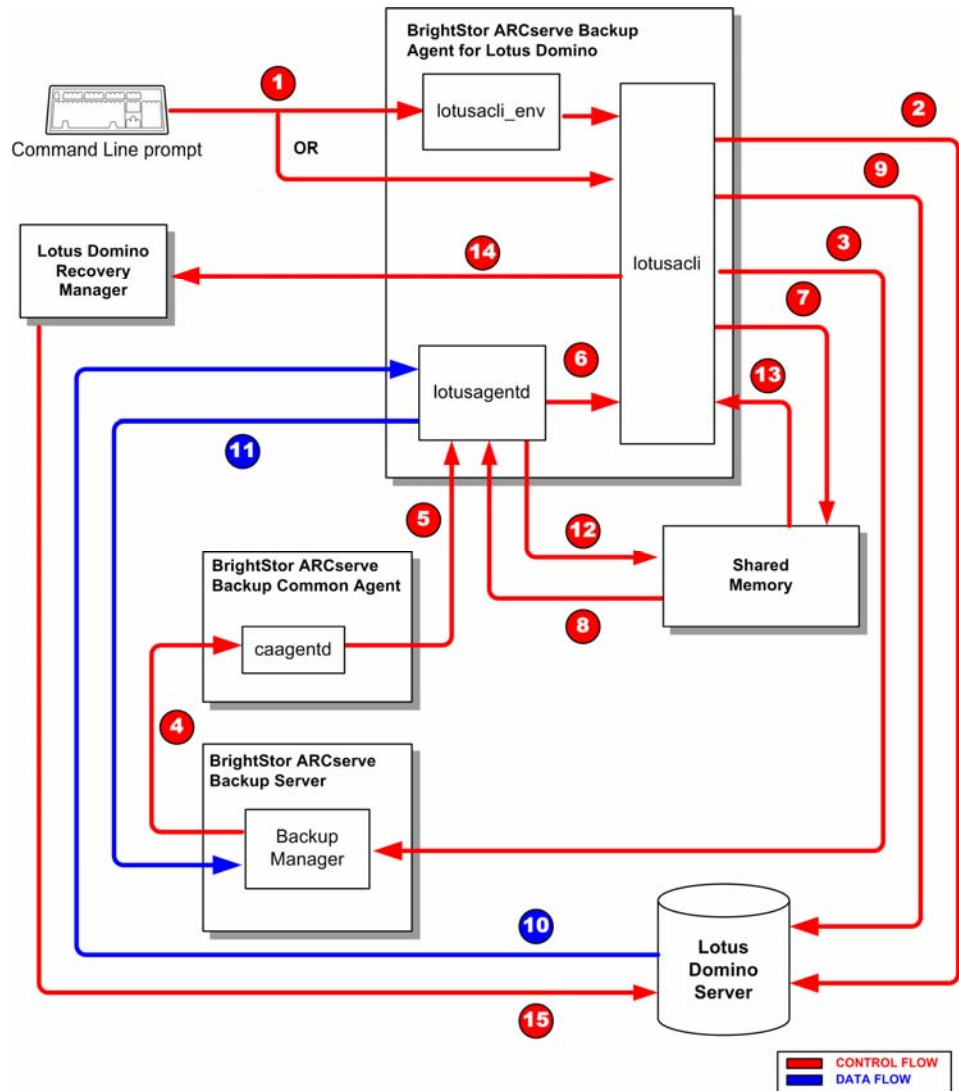
Online Database Backup (CLI)

When performing an online database backup, the Lotus Domino server is running. Depending on the method selected for defining the command line related environment variables (automatic or manual), either the Lotus agent command line interface (lotusaccli) program or the Lotus agent command line interface environment (lotusaccli_env) program will be invoked from the command line prompt. If the runtime environment variables are to be defined automatically, lotusaccli_env is first invoked before invoking lotusaccli. If the runtime environment variables are to be defined manually, lotusaccli is invoked directly from the command line prompt.

For each database file, lotusaccli will call the Lotus API functions to notify Lotus Domino that the file is being backed up. Since the Lotus Domino server is running, there could be transactions pending while the backup is being performed. As a result, the Lotus Domino Recovery Manager will keep track of these transactions and lotusaccli will copy the database to a temporary directory (staging area). After the database is completely copied to the temporary directory, lotusaccli will invoke the Lotus API to add the rollback information to the backup file. The lotusaccli will then notify the Lotus agent daemon (lotusagentd) that the file is available to be sent to the BrightStor ARCserve Backup server.

Transaction Log File Backup (CLI)

You can back up transaction log files while the Lotus Domino server is online or offline using BrightStor ARCserve Backup Agent for Lotus Domino. The following illustration shows how the agent and Lotus Domino work together to back up (archive) a transaction log file using the command line:



The process of backing up transaction log files with the Lotus Domino server online and offline is the same.

Depending on the method selected for defining the command line related runtime environment variables (automatic or manual), either the Lotus agent command line interface (lotusaccli) program or the Lotus agent command line interface environment (lotusaccli_env) program will be invoked from the command line prompt. If the runtime environment variables are to be defined automatically, lotusaccli_env is first invoked before invoking lotusaccli. If the runtime environment variables are to be defined manually, lotusaccli is invoked directly from the command line prompt.

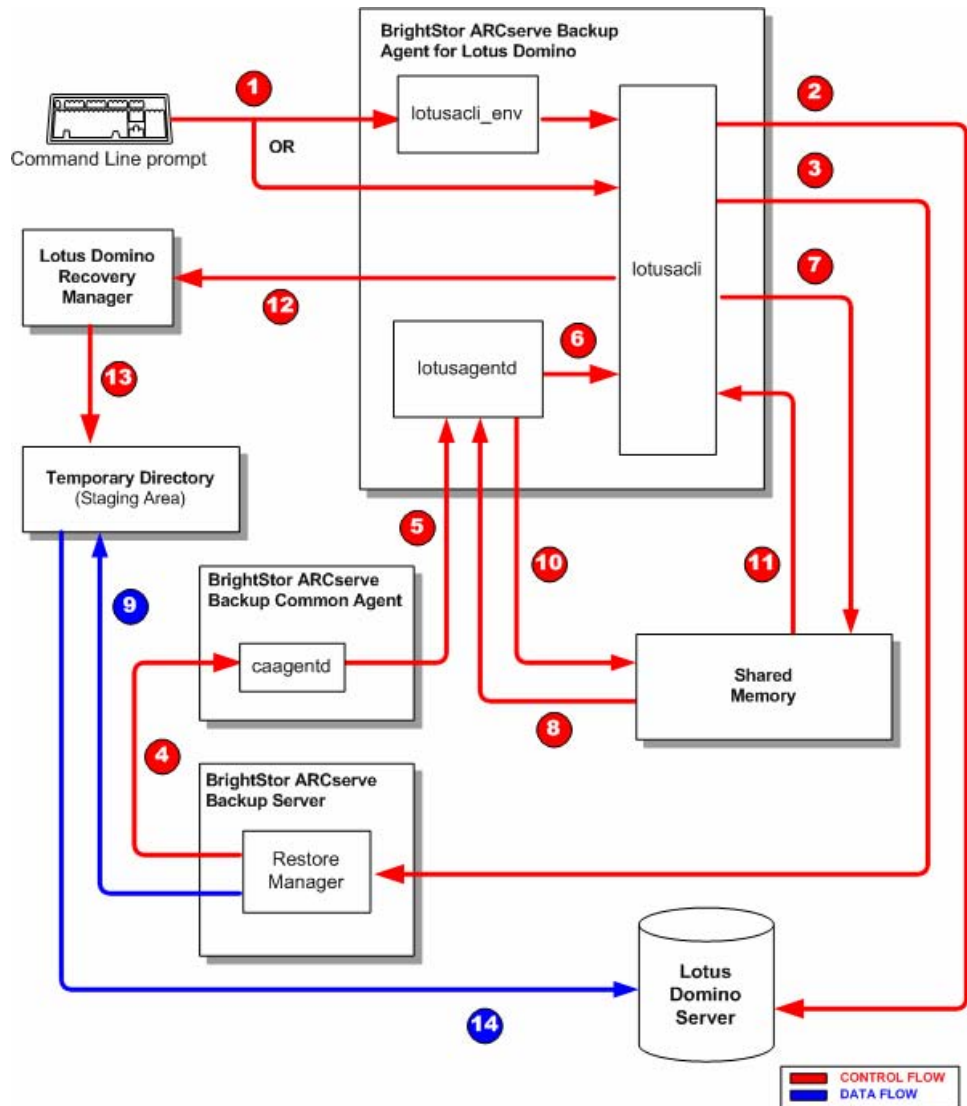
When lotusaccli is called with a list of log files to be backed up, it in turn invokes the Lotus API functions to verify which logs are waiting to be archived. When this verification is complete, for each ready-to-archive log, lotusaccli notifies the Lotus agent daemon (lotusagentd) that the file is available to be sent to the BrightStor ARCserve Backup server. After lotusagentd has successfully sent the ready-to-archive log to the BrightStor ARCserve Backup server, lotusaccli then notifies the Lotus Domino server that the log file has been archived.

Restore Function (CLI)

BrightStor ARCserve Backup Agent for Lotus Domino provides the capability to perform offline restores and online restores using the command line. Using the agent, you can restore database files and archived transaction log files.

Database File Restore (CLI)

You can restore database files while the Lotus Domino server is online or offline using BrightStor ARCserve Backup Agent for Lotus Domino. The following illustration shows how the agent and Lotus Domino work together to restore a database file using the command line:



Offline Database Restore (CLI)

When performing an offline database restore, the Lotus Domino server is shut down. Depending on the method selected for defining the command line related runtime environment variables (automatic or manual), either the Lotus agent command line interface (lotusaccli) program or the Lotus agent command line interface environment (lotusaccli_env) program will be invoked from the command line prompt. If the runtime environment variables are to be defined automatically, lotusaccli_env is first invoked before invoking lotusaccli. If the runtime environment variables are to be defined manually, lotusaccli is invoked directly from the command line prompt.

For each database file, lotusaccli will ask the Lotus agent daemon (lotusagentd) to bring each database file from the BrightStor ARCserve Backup server to the temporary directory (staging area). After the database files are available in the temporary directory, lotusaccli will invoke the Lotus API functions to notify Lotus Domino that the restored database files should be recovered. The Lotus Domino Recovery Manager will then recover the restored database files using the rollback information added to it, the transaction log used during the backup, any transaction logs archived since the backup, and the current transaction log. After the recovery, the restored database files will be an exact up-to-date image of the database.

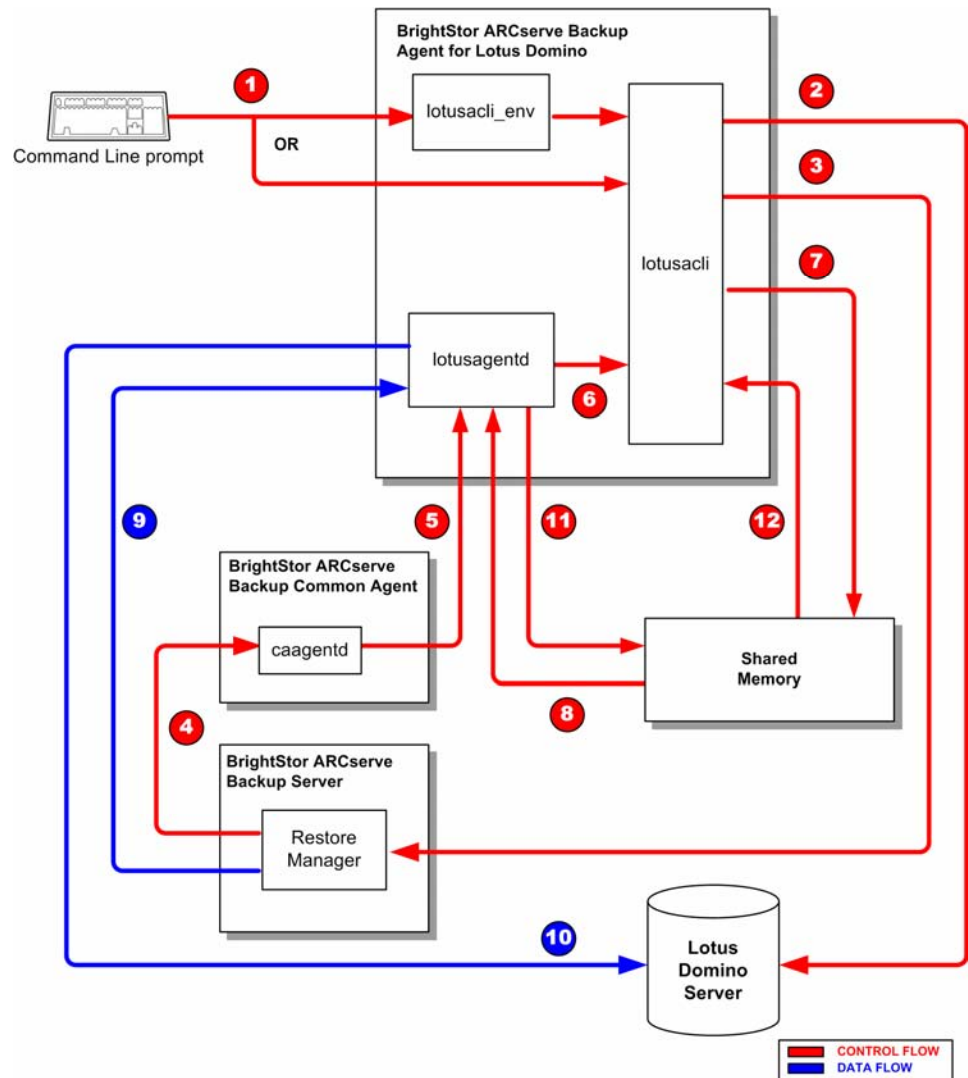
If the transaction logs used during and since the backup have been archived, they must be restored before the database files are restored. If the recovery is successful, the original database will automatically be deleted. Then, lotusaccli copies the recovered database files from the temporary directory back to its original location on the Lotus Domino server. If you do not want the original database files to be deleted, you can define a save database environment variable (SAVEDB_DIR) to locate a directory where lotusaccli will copy the original database files before being overwritten by the recovered backup files.

Online Database Restore (CLI)

When performing an online database restore, the Lotus Domino server is running. The online database restore process is the same as the offline restore process, except that the original database is also taken offline (if it exists) before it is deleted. As a result, there cannot be any users connected to the database when it is taken offline. All users must disconnect from the database before the online database restore process is started.

Archived Transaction Log File Restore (CLI)

You can restore archived transaction log files while the Lotus Domino server is online or offline using BrightStor ARCserve Backup Agent for Lotus Domino. The following illustration shows how the agent and Lotus Domino work together to restore an archived transaction log file using the command line:



The process of restoring an archived log file online is the same as the process of restoring an archived log file offline.

Depending on the method selected for defining the command line related runtime environment variables (automatic or manual), either the Lotus agent command line interface (lotusaccli) program or the Lotus agent command line interface environment (lotusaccli_env) program will be invoked from the command line prompt. If the runtime environment variables are to be defined automatically, lotusaccli_env is first invoked before invoking lotusaccli. If the runtime environment variables are to be defined manually, lotusaccli is invoked directly from the command line prompt.

For each log file, lotusaccli will ask the Lotus agent daemon (lotusagentd) to bring each archived log file from the BrightStor ARCserve Backup server back to its original location on the Lotus Domino server, overwriting the original log file with the restored archived log file. If you do not want the original log files to be deleted, you can define a save log environment variable (SAVELOG_DIR) to locate a directory where lotusaccli will copy the original log files before being overwritten by the restored log files.

After the archived log file is restored, an extra copy will be made automatically, adding the .RESTORED extension to the file name. This .RESTORED log file can be used if the same log file is needed again for recovery of several databases. The Lotus Domino Recovery Manager deletes a log file as soon as it is used for recovery. If the same log file is needed for another recovery, Lotus recommends that it be restored again. However this process of restoring a log file is both time and resource consuming, and as a result, BrightStor ARCserve Backup Agent for Lotus Domino automatically produces an extra .RESTORED copy. If the same log file is now needed for another recovery, the .RESTORED log file can be used instead of having to restore another log file. After all databases have been recovered, the .RESTORED copies of the archived log files can be manually deleted, or if the Remove existing "RESTORED" archived log copies GUI option is selected, these log file copies will be automatically deleted when the next GUI backup job is performed.

Displayed Backup Information

Using the inquire function in you can display information about the backups you have performed. There are four types of inquire functions that are invoked using the lotusaccli program with specific command line arguments:

- To see all the files that have been backed up (regardless of the backup ID), issue the following command:

```
#NULL
```

- To see all the files that have been backed up for a specific backup ID, issue the following command:

```
LOTUSAG_20000901165224
```

- To see all the backups taken for a specific file, issue the following command:

```
#NULL /opt/notes/local/notesdata/reports.nsf
```

- To see a specific file in a specific backup ID, issue the following command:

```
LOTUSAG_20000901165224 /opt/notes/local/notesdata/reports.nsf
```

You can also check the BrightStor ARCserve Backup database using the Database Manager, the Job Manager, and the Restore Manager.

Here is an example of how the lotusaccli program can be called from the prompt when performing a database inquire:

```
su - notes
$ /opt/CA/BABlotusagt/lotusaccli -f inquire -i ifilelist.txt -p
/opt/CA/BABlotusagt/lotusaccli.cfg
```

In this example, -f supports three functions (backup, restore, inquire), -i is the text file containing the inquire parameters, and -p is the command line configuration file.

Displayed Output

The lotusaccli program automatically displays all outputs to the default output device. However, it is possible to use the -o <output file> command line argument to redirect the output of lotusaccli to a different output file.

Database Instance Identification (DBIID)

When transaction logging is enabled, Lotus Domino assigns a database instance identification (DBIID) to each database. When Lotus Domino records a transaction in the log, it includes the DBIID. During recovery, Lotus Domino uses this DBIID to match transactions to databases.

Some database maintenance activities can cause Lotus Domino to assign a new DBIID to a database. After Lotus Domino assigns a new DBIID, all new transactions recorded in the log use this new DBIID. However, any old transactions still have the old DBIID, which will not correspond to the new DBIID. As a result, Lotus Domino cannot apply these old transactions to the database. To avoid losing data, you should immediately perform a full database backup whenever a database receives a new DBIID. When you perform this full backup, you capture all the database transactions up until that point and ensure that Lotus Domino only needs the new transactions (with the new DBIID) to restore the database.

Backup Strategies

The goal of a good backup strategy is to prevent the loss of valuable data by ensuring that the data can be recovered from a combination of backup data and transaction log files. The key to any successful backup strategy is to perform regular backups. Although different Lotus Domino installations and databases often require different backup frequencies, all installations and databases should be backed up at regularly scheduled intervals.

Important! *You should plan your backup and recovery strategies before you begin using the Lotus Domino server. If you do not plan these strategies before using the Lotus Domino server, you may not be able to recover your data if a disk failure occurs.*

A typical backup strategy for Lotus Domino would be to perform full backups (database files, configuration files, and transaction log files) of the Lotus Domino server on a weekly basis. In addition, incremental backups (ready-to-archive logs) would be performed on a daily basis. The actual frequency of backups depends on the average number of transactions in the Lotus Domino server.

A *transaction log* is a listing of all the transactions that occurred on a database from a specific point in time to the current time. To ensure that backup files contain the most current transactions, you should back up your transaction logs more frequently than your databases. For example, you can back up a transaction log once a day and the entire database once a week. If you need to restore the database, the most recently backed up transaction would then be no more than twenty-four hours old. More frequent transaction log backups would give you files with transactions that are even more recent. If the automatic Purge logs after archival option is not selected (the default), the Lotus Domino system administrator must manually purge the transaction logs.

General Backup Considerations

Consider the following information when planning your backup strategy:

- The importance of each database
- The volatility of each database
- The size of each database
- The length of time you have available on any given day to perform backups (referred to as the backup window of opportunity)
- The time required to recover the database if a failure occurs

Database Importance

The importance of a database is often the most crucial factor in determining the direction of your backup strategy. Important or critical databases should:

- Be backed up often.
- Archive the associated transaction log files so that they can be recovered up to the latest committed transaction.
- Archive the associated transaction log files often.

Note: When you archive transaction log files frequently, you reduce the number of transactions potentially lost if your database and transaction log files fail and have to be recovered.

Database Volatility

The volatility of a database often determines your backup strategy. Volatile databases should be backed up more frequently to reduce the potential for data loss. You may also need to perform daily database backups to reduce the size of transaction log files and the time needed to roll forward through these log files during recovery. In addition, because these transaction log files can get very large, you may need to use the backup option called Purge logs after archival. This option automatically reclaims disk space by deleting old transaction log files.

Database Size

The size of a database often affects when and how often you can back it up. For example, very large databases take a long time to back up. Because of the long backup time, you may need to back up very large databases only once a week, during weekends. If the size of a database indicates weekly backups, then it is vital that you archive the associated transaction log files more frequently than the database. If the database is also important or volatile, you should back up the transaction log files daily.

Backup Window of Opportunity

The backup window of opportunity you have available often determines when you can back up a database. For example, a database that is heavily used during the work day, but little used after 6 p.m. gives you a 12- or 13-hour, nightly backup window of opportunity. In contrast, a database that is used heavily 24 hours a day, Monday through Friday, but not used on weekends gives you a two day, weekend backup window of opportunity. In either case, you must adjust your backup strategy to accommodate the backup window of opportunity available to you.

Length of Recovery Time

If your objective is to decrease the time needed to recover a database, you can:

- Try to reduce the size of the database before backing it up by using commands to reorganize indexes or reclaim index space that is unused.
- Back up the database more often. More frequent database backups result in smaller transaction log files that take less time to roll forward through.
- Keep archived transaction log files available on disk. If you keep transaction log files on disk, you will only need to restore and recover the database but not its log files.
- Have a standby system that is ready, or nearly ready, to take over from your online system. For example, you can regularly recover the latest database and transaction log files to the standby system so that it can quickly replace the online system if it fails.

Purge Transaction Log Files After Archival

When you archive a transaction log file, the log file is backed up to tape. The log file, however, is not deleted from the disk. As you perform subsequent backups, the log files accumulate. To help save disk space, these accumulated log files should be purged after archival. The method for purging these log files varies depending on whether you are using the GUI or the command line.

- From the GUI, when performing a full backup (weekly) you can purge old transaction log files by selecting the backup option called Purge logs after archival. Because this option removes transaction logs after they are backed up, you can use this option to remove old transaction logs automatically. When performing an incremental backup (daily) from the GUI, do not select the Purge logs after archival option.
- From the command line, when performing a backup you can purge transaction log files automatically after they are archived by setting the PURGELOGS option in the lotusaccli.cfg file to Y. If the PURGELOGS option is set to N (the default), the log files are not purged after they are archived. As part of the cfgsetup script you will be prompted to set the PURGELOGS to either Y or N.

Note: For command line jobs, you can also use the Purge logs after archival option from the GUI to purge transaction log files that have been archived.

Required Options

The following parameters are required:

```
HOST= <server where BrightStor ARCserve Backup is installed>
USERNAME= <name of a user who has access to the Lotus Domino files on the client
node>
PASSWORD= <password of that user>
```

Automatic Repeat Backups

You can set backup jobs to run at repeating intervals. For example, to run a backup job every Sunday at midnight, set the repeating interval to seven days and, when you submit the job, schedule it to run on Sunday at midnight. After the backup completes, BrightStor ARCserve Backup automatically reschedules the job to execute every Sunday at midnight. The method for setting automatic repeat backups varies depending on whether you are using the GUI or the command line

- From the GUI, you can set the repeating interval on the Repeating Interval tab, which is displayed from the Method/Schedule tab of the Backup Manager. When you set the repeating interval, set the backup method on the Repeating Interval tab to full.
- From the command line, you can set the repeating interval using the scheduling command line arguments that are specific to `ca_backup`. As part of running the `cfgsetup` script there are prompts related to scheduling options. The selected options then get set in the `lotusacli.cfg` file that is used when a backup job is submitted. Alternately, the `lotusacli` program can be scheduled using the UNIX cron command.

Contact Technical Support

For online technical assistance and a complete list of locations and phone numbers, contact Customer Support at <http://ca.com/supportconnect>. Customer support is available 24 hours a day, 7 days a week.

- U.S. and Canada 1-800-645-3042
- International (1) 631-342-4683

Chapter 2: Installing the Agent

This chapter provides the information you need to install and configure the BrightStor ARCserve Backup Agent for Lotus Domino. The information in this chapter assumes you are familiar with the characteristics and requirements of the specified operating systems in general, and with administrator responsibilities on those operating systems in particular.

Installation Prerequisites

Before installing the BrightStor ARCserve Backup Agent for Lotus Domino, verify the following:

- Verify that your system meets the minimum requirements needed to install the BrightStor ARCserve Backup Agent for Lotus Domino. For a list of requirements, see the readme file.
- An additional 30 MB of hard disk space is available to install BrightStor ARCserve Backup Agent for Lotus Domino.
- You have Superuser privileges or the proper authority to install software on the computers where you will be installing the agent.
- Log files are created on a separate disk or mirrored file system that is different from the location of the Lotus Domino server databases
- The temporary directory (staging area) is larger than the largest Lotus Domino database in the Lotus Domino data directory. The default temporary directory is /tmp. In addition, you can select different temporary directories for GUI backup jobs, GUI restore jobs, and command line jobs.
- Transaction logging is enabled.

When enabling transaction logging, Lotus Domino turns logging on automatically for most of the databases and templates. You can also turn logging on and off individually for each database using the Database Advanced Properties in the Lotus Domino server administrator. The Lotus Domino server administrator can specify the location where these files are created and the size of the transaction log.

- Transaction log style is archived.
- All databases to be handled by BrightStor ARCserve Backup Agent for Lotus Domino are logged.

Install the Agent

The BrightStor ARCserve Backup Agent for Lotus Domino follows the standard installation procedure for the system components, agents, and options of BrightStor ARCserve Backup. For the detailed steps in this procedure, see the *Getting Started*.

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

Important! *If you upgrade from a previous release of BrightStor ARCserve Backup Agent for Lotus Domino, you should immediately schedule a full backup after the upgrade.*

Configure the Agent

Before you start configuring BrightStor ARCserve Backup Agent for Lotus Domino, you must have the following information ready:

- BrightStor ARCserve Backup home directory
- Lotus Domino home directory
- BrightStor ARCserve Backup Agent for Lotus Domino home directory

BrightStor ARCserve Backup Agent for Lotus Domino needs to connect to the Lotus Domino server through the Lotus API. Therefore, for security reasons, users must have the proper authorization and access rights to connect internally to the Lotus Domino server. These rights are dependent on whether the command line or the GUI is being used to submit jobs.

- For users who submit jobs using the **command line**, you must create a caroot equivalent user in the BrightStor ARCserve Backup server for the user who runs lotusacli. If the caroot equivalent user is not created, the BrightStor ARCserve Backup server will reject jobs submitted through lotusacli.
- For users who submit jobs using the **GUI**, the user who can browse the various Lotus Domino objects and start backup and restore jobs must be part of the same user group as the user who owns the names.nsf database on the server that is being browsed.

To configure BrightStor ARCserve Backup Agent for Lotus Domino, you must perform the following tasks:

1. Run the BrightStor ARCserve Backup Agent for Lotus Domino setup script.
2. Add the BrightStor ARCserve Backup user equivalency for Lotus Domino users.
3. Set the environment variables.

Run the Agent Setup Script

As part of the agent configuration, you must run the Lotus Domino setup script (lotussetup) located in the BrightStor ARCserve Backup Agent for Lotus Domino directory. The lotussetup script is used to:

- Specify the Lotus Domino home directory.
- Specify the Lotus Domino executable directory.
- Specify the Lotus Domino data directory.
- Verify if the system path has been updated to contain the Lotus Domino executable, data, and resource directories.
- Verify if the system library path has been updated to contain the Lotus Domino executable directory.
- Choose the temporary backup directory (staging area) for GUI jobs.
- Choose the temporary restore directory (staging area) for GUI jobs.
- Register the agent in the Common Agent configuration file (agent.cfg).
- (Optional) Run the configuration setup script (cfgsetup). For more information about the cfgsetup script, see Configuration Setup Script Options in this chapter.

To run the BrightStor ARCserve Backup Agent for Lotus Domino setup script, perform the following steps:

1. Enter the following command from the BrightStor ARCserve Backup Agent for Lotus Domino home directory:

```
./lotussetup
```

2. Press Enter to use the default BrightStor ARCserve Backup Agent for Lotus Domino home directory (/opt/CA/BABlotusagt) or enter the path name for the appropriate directory.
3. Press Enter to use the default Lotus Domino home directory (/opt/lotus).
4. Press Enter to use the default Lotus Domino executable directory (/opt/lotus/notes/latest/linux).
5. Press Enter to use the default Lotus Domino data directory (/opt/lotus/notesdata).
6. Press Enter to confirm that the Lotus Domino executable, resource, and data directories have all been added to the agent PATH or enter the new values of the agent PATH if it is different.
7. Press Enter to confirm that the Lotus Domino executable directory has been added to the agent LD_LIBRARY_PATH or enter the new value of the agent LD_LIBRARY_PATH if it is different.

8. Enter the backup temporary directory for GUI jobs (the default directory is: /tmp).

9. Enter the restore temporary directory for GUI jobs.

Note: If you have already ran the Lotus Domino setup script (lotussetup), you will be asked if you want to re-register Lotus Domino.

10. Create or modify the lotusacli configuration file that is used to configure the command line interface.

Configuration information is entered by running the cfgsetup script located in the /opt/CA/BABlotusagt directory. Enter y to run the script.

11. Press Enter to use the default path and name of the configuration file (/opt/CA/BABlotusagt/lotusacli.cfg) or enter the complete path name if it is different.

12. Enter the BrightStor ARCserve Backup server host name.

13. If you want to restore data from another server host to this one, enter the original (source) server host name.

14. Enter the destination tape group name or enter n to disable the current setting.

15. Enter the destination tape name or enter n to disable the current setting.

16. Enter the destination media pool name or enter n to disable the current setting.

17. Press Enter to use the default temporary recovery directory path (/tmp) or enter the complete path name if it is different.

18. Enter y to purge the logs automatically, or enter n to disable automatic purging.

19. Enter the user name and password of the user who owns the Lotus Domino files on the client node.

20. Enter the following information or select additional options:

- Priority level
- LOG OPTIONS? (y/n)
If you select y, you will be asked to enter log options.
- Do you want to eject tapes after backups? (y/n)
- Tape timeout period
- Span tape timeout period
- Tape method to use
- Span tape method to use
- Do you want to be able to use different tapes/media pool each day? (y/n)
- Do you want to enable multi-streaming? (y/n)
If you select y, you will need to indicate the number of streams you want to enable.

21. Review the values of the /opt/CA/BABlotusagt/lotusacli.cfg configuration file when they are displayed. Enter y to accept the values.

Configuration Setup Script Options

To configure the command line interface of the agent, you can run the configuration setup script (cfgsetup) automatically from within the lotussetup script or run it manually from the command line prompt. The cfgsetup script is used to:

- Choose the BrightStor ARCserve Backup server host for lotusacli jobs.
- Choose the destination tape group for lotusacli jobs (optional).
- Choose the destination tape for lotusacli jobs (optional).
- Choose the destination media pool for lotusacli jobs (optional).
- Configure the multistream option for lotusacli jobs (optional).
- Choose the temporary recovery directory (staging area) for lotusacli jobs.
- Specify the user name and password of the user who owns the Lotus Domino data. This is also the user who would run the lotusacli program.

Note: To comment out a line, enter # at the beginning of a line.

To set the cfgsetup script parameters, run either the lotussetup script or the cfgsetup script.

Tape, Group Name, and Media Pool Options

Set the following parameters to customize options for tapes, group names, and media pools.

These parameters specify general information:

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

These parameters specify log options:

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

These parameters specify destination options:

```
EJECT=             <True/False>

DETTAPE=           <Tape Name>
DESTGROUP=         <BrightStor ARCserve Backup device group>
MEDIAPOL=          <Media Pool Name>

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

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

Multistreaming Options

To use multistreaming, set the following parameters:

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


Schedule Options

Set the following schedule parameters, which enable you to use a different tape, media pool, or both, following a seven-day cycle:

DAYOFWEEK = <True/False>

Set these parameters if you are not using multistreaming:

DETTAPESUN= <Tape Name to use on Sunday>
DETTAPEMON= <Tape Name to use on Monday>
DETTAPETUE= <Tape Name to use on Tuesday>
DETTAPEWED= <Tape Name to use on Wednesday>
DETTAPETHU= <Tape Name to use on Thursday>
DETTAPEFRI= <Tape Name to use on Friday>
DETTAPESAT= <Tape Name to use on Saturday>

If you do not specify a tape for the current day when you set the schedule parameters, the tape specified for the DETTAPE parameter is used as the default.

Note: Tape names cannot exceed 24 characters.

Set these parameters if you are using multistreaming:

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 media pool for the current day when using multistreaming, the media pool specified for the MEDIAPOOL parameter is used as the default.

Add User Equivalency for Lotus Domino Users

To allow BrightStor ARCserve Backup Agent for Lotus Domino to perform a backup or restore, you must add the user who will submit the job as a BrightStor ARCserve Backup user equivalency. After you have run lotussetup and cfgsetup, a caroot equivalent user must be created in the BrightStor ARCserve Backup server for the user who will run command line jobs with BrightStor ARCserve Backup Agent for Lotus Domino.

To add the BrightStor ARCserve Backup user equivalency, perform the following steps:

1. Make sure BrightStor ARCserve Backup is loaded and running.
2. Using the BrightStor AB command, set the user equivalency as follows:

```
ca_auth [-cahost host] -equiv add unixUser hostName BrightStorABUser  
[BrightStorABCARootUser_username BrightStorABCARootUser_password]
```

where *unixUser* is the user who will submit the job, *hostName* is the client that has BrightStor ARCserve Backup Agent for Lotus Domino installed, and *BrightStorABUser* is the name of the BrightStor ARCserve Backup user and password.

For example:

```
$BAB_HOME/bin/ca_auth -equiv add notes unxaghost1 caroot [caroot""]
```

In this example, \$BAB_HOME is the home directory of the BrightStor ARCserve Backup server, notes is the user name who will run lotuscli on the client host, unxaghost1 is the host name of the client host, caroot is the type of equivalent user, caroot is the user name of the BrightStor ARCserve Backup user who issues the ca_auth command, and "" is the password for the BrightStor ARCserve Backup user who runs the ca_auth command.

The name of the BrightStor ARCserve Backup user must always be caroot. In addition, by default the password for the BrightStor ARCserve Backup user is null; however, if a caroot password has been specified during configuration of the server, the password must be entered here.

Note: If the BrightStor ARCserve Backup server and the Lotus Domino server are installed on two different hosts, then you must add the Lotus Domino server host name to the BrightStor ARCserve Backup database before you perform a backup or restore.

Environment Variables

You must define a set of runtime environment variables for each GUI job or command line job. While the environment variables are the same regardless of which mode you are using, the setup procedure and values vary slightly for each mode.

GUI Environment Variables

The GUI-related environment variables are initialized by the BrightStor ARCserve Backup Agent for Lotus Domino setup script (lotussetup) and are automatically written into the BrightStor ARCserve Backup Common Agent agent.cfg file. As a result, you do not need to manually set up these environment variables.

The following environment variables are automatically defined when running GUI jobs with BrightStor ARCserve Backup Agent for Lotus Domino:

- The \$LOTUS environment variable is set to the Lotus Domino home directory, which is typically /opt/lotus.
- CALOTUS_HOME is set to the home directory of BrightStor ARCserve Backup Agent for Lotus Domino.
- Notes_ExecDirectory is set to the Lotus Domino executable directory, which is typically /opt/lotus/notes/latest/arch, where arch is the platform (sunspa for Sun SPARC, ibmpow for IBM AIX, and hppa for HP-UX).
- NOTES_DATA_DIR is set to the Lotus Domino data directory, which is typically /opt/lotus/local/notesdata.
- LD_LIBRARY_PATH (for Sun SPARC) must include:
\$Notes_ExecDirectory:\$CALOTUS_HOME:
\$CALOTUS_HOME/lib:/opt/CA/CALib:
/opt/CA/BABcmagt:\$LD_LIBRARY_PATH
- LIBPATH (for IBM AIX) must include:
\$Notes_ExecDirectory:\$CALOTUS_HOME:
\$CALOTUS_HOME/lib:/opt/CA/CALib:
/opt/CA/BABcmagt:\$LIBPATH
- SHLIB_PATH (for HP-UX) must include:
\$Notes_ExecDirectory:\$CALOTUS_HOME:
\$CALOTUS_HOME/lib:/opt/CA/CALib:
/opt/CA/BABcmagt:\$SHLIB_PATH
- PATH must include:
\$Notes_ExecDirectory:\$Notes_ExecDirectory/res/C:
\$Notes_ExecDirectory/res/\$LANG:\$NOTES_DATA_DIR:\$PATH

Command Line Environment Variables

The command line related environment variables must be set up in the profile of the user who runs the lotusaccli program. If the BrightStor ARCserve Backup server is installed on the same host as BrightStor ARCserve Backup Agent for Lotus Domino, the \$BAB_HOME environment variable must be undefined in the profile of the user who runs the lotusaccli program. Otherwise, there may be some incompatibilities between the files stored in the \$CALOTUS_HOME/lib and the files stored in the \$BAB_HOME/lib, especially if the release of the BrightStor ARCserve Backup server is different from the release of BrightStor ARCserve Backup Agent for Lotus Domino.

Note: You can use the lotusaccli_env program instead of the lotusaccli program. The lotusaccli_env program automatically initializes the runtime environment before starting lotusaccli. The automatic initialization of the environment is performed by lotusaccli_env using the values that are contained in the BrightStor ARCserve Backup Common Agent agent.cfg file.

You must define the following environment variables when running command line jobs with BrightStor ARCserve Backup Agent for Lotus Domino:

- Set the \$LOTUS environment variable to the Lotus Domino home directory, which is typically /opt/lotus.
- Set CALOTUS_HOME to the home directory of BrightStor ARCserve Backup Agent for Lotus Domino.
- Set Notes_ExecDirectory to the Lotus Domino executable directory, which is typically /opt/lotus/notes/latest/arch, where arch is the platform (sunspa for Sun SPARC, ibmpow for IBM AIX, and hppa for HP-UX).
- Set NOTES_DATA_DIR to the Lotus Domino data directory, which is typically /opt/lotus/local/notesdata.
- LD_LIBRARY_PATH (for Sun SPARC) must include:
\$Notes_ExecDirectory:\$CALOTUS_HOME/lib:
\$LD_LIBRARY_PATH
- LIBPATH (for IBM AIX) must include:
\$Notes_ExecDirectory:\$CALOTUS_HOME/lib:\$LIBPATH
- SHLIB_PATH (for HP-UX) must include:
\$Notes_ExecDirectory:\$CALOTUS_HOME/lib:
\$SHLIB_PATH
- PATH must include:
\$Notes_ExecDirectory:\$Notes_ExecDirectory/res/C:
\$Notes_ExecDirectory/res/\$LANG:\$NOTES_DATA_DIR:\$PATH

Uninstall the Agent

To remove the BrightStor ARCserve Backup Agent for Lotus Domino, follow these steps:

Note: To perform the uninstall, you must have root privileges.

1. At the command line prompt, enter `pkgrm BABlotus` to start the uninstall program.
2. When asked whether you want to remove this package, enter **y** for yes.
3. Reconfirm the removal of the BrightStor ARCserve Backup Agent for Lotus Domino from the machine.

The uninstall process is complete when the following message is displayed:

```
Removal of <BABlotus> was successful
```


Chapter 3: Using the Agent with the GUI

This chapter describes how to perform backups and restores with BrightStor ARCserve Backup Agent for Lotus Domino using the GUI. For an overall description of backup and restore features, see the *Administrator Guide*.

Use the Agent to Perform Backups (GUI)

Using BrightStor ARCserve Backup Agent for Lotus Domino and the Backup Manager, you can configure and submit a backup job, choosing any Lotus Domino server as your source and a tape device connected to either the same Lotus Domino server or another Lotus Domino server as your destination. You can back up a complete Lotus Domino database or individual objects (database files, transaction log files, and configuration files) within the database.

Prepare for a Backup (GUI)

Before you submit a backup job, you should verify the integrity of the data in the database. It is important to verify the consistency of the database occasionally. To verify data integrity, open the database in a Lotus Domino client and review the contents for any discrepancies or errors.

Backup Manager Overview




The Backup Manager lets you easily select the objects that you want to back up and the location where you want them backed up. The Backup Manager also lets you customize your backup jobs using filters, options, and scheduling, and display detailed information about your backup job. For more information about the Backup Manager, see the *Administrator Guide*.

Backup Manager Markers

Each object displayed in the Backup Manager window has a green or gray box to its left called a marker.

- **Green marker**—Lets you control the extent of the backup for an object directly. Click a marker to exclude an object from a backup or to indicate that you want the backup for the object to be full or partial. As you click the marker, you fill or empty the marker of color, indicating the extent of the backup.
- **Gray marker**—These markers are associated with objects that are not real and that you cannot back up. Typically, these items serve as placeholders under which other objects are grouped and displayed. As you click the green markers under a gray marker item, the fill proportion of the gray marker changes automatically from empty to partial to full depending on the proportion of files you have chosen to backup.

The following table describes the different marker configurations and corresponding backup levels.

Marker Configuration	Extent of Backup
 Completely filled center	Full backup
 Partially filled center	Partial backup
 Empty center	Do not backup

Note: Gray marker configurations follow the same pattern as green marker configurations, but reflect the proportion of files under them that are selected for backup.

The fill proportion of a marker at a higher level of the directory tree depends on the fill proportions of the markers of the objects at the lower levels.

- If all the markers at the lower levels are completely filled, then the marker at the higher level is also automatically completely filled.
- If the markers at the lower levels are a mix of completely filled and partially filled, then the marker at the higher level is automatically partially filled.
- If you click a marker at a higher level so that it is completely filled, then all the markers at the lower levels are automatically filled completely.

Lotus Domino Backup Options

The backup options for BrightStor ARCserve Backup Agent for Lotus Domino are displayed in the right pane of the Backup Manager when you are logged on to the Lotus Domino server. When a Lotus Domino server is selected for backup, the available options are:

- **User Name and User Password**—The name and corresponding password of the user running the backup job.
- **Purge logs after archival**—Purges all transaction logs automatically during a backup job. If this option is not selected, the log is archived, but not removed. Archived logs accumulate in the transaction log directory.

Note: BrightStor ARCserve Backup Agent for Lotus Domino notifies Lotus Domino that the log has been archived. The archived logs are then typically reused or removed by Lotus Domino when appropriate.

- **Remove existing "RESTORED" archived log copies**—Removes the .RESTORED logs during a backup job. If this option is not selected, the .RESTORED logs are archived.

Note: The .RESTORED log copies are automatically created for temporary use during a recovery process.

- **Remove existing "OLD" configuration file copies**—Removes the .OLD configuration files during a backup job. If this option is not selected, the .OLD configuration files accumulate in the Lotus Domino directory.

Note: The .OLD configuration files are automatically created during a restore process for safety reasons to ensure that you do not unintentionally overwrite important configuration files.

Backup Manager Tabs

Each backup job requires a source, a destination (media), and schedule or method. The Backup Manager provides three tabs to customize your backup job:

- **Source Tab**—The Source tab displays all UNIX/Linux agent hosts that have been defined in the BrightStor ARCserve Backup database. Expanding a particular UNIX/Linux agent host displays the subordinate file systems on that server. Browsing a particular Lotus Domino server displays the list of objects located on that Lotus Domino server. You can browse through the objects of the Lotus Domino servers just as you would any other BrightStor ARCserve Backup supported host or client.
- **Destination Tab**—The Destination tab displays BrightStor ARCserve Backup device groups as they were defined in the media daemon configuration file (camediad.cfg).
- **Method/Schedule Tab**—The Method/Schedule tab is used to select the schedule and method of the backup process. From this tab, you can either select a predefined backup strategy or customize a backup strategy to meet the needs of your environment.

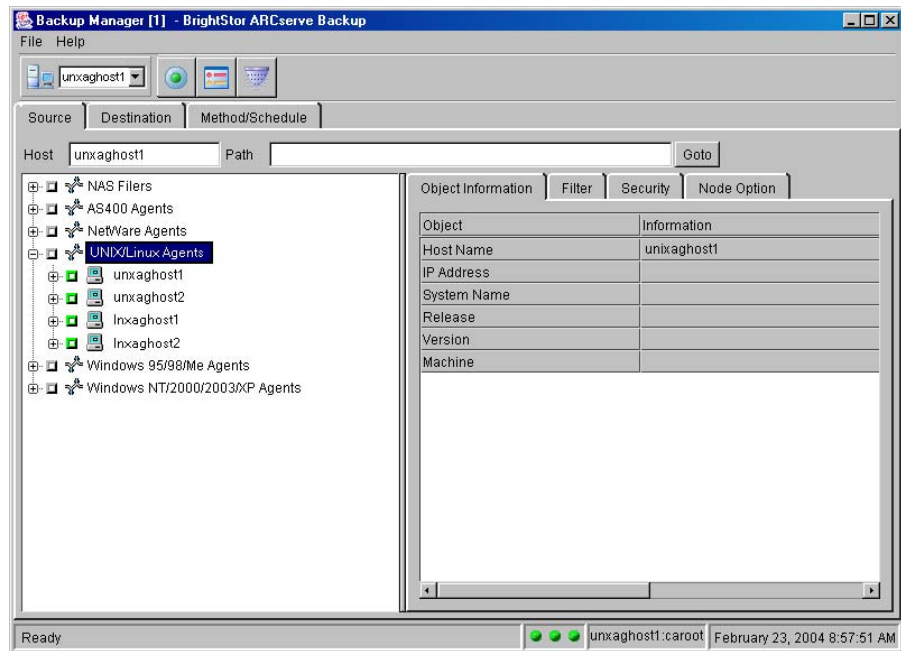
Perform a Backup

A backup job must have a data source (source) from which data is extracted and an archive or storage device (destination) on which to store the extracted data. To back up data from Lotus Domino, you need to configure and submit a backup job using the Backup Manager, choosing the Lotus Domino server objects as the source and the BrightStor ARCserve Backup device as your destination.

To use BrightStor ARCserve Backup Agent for Lotus Domino to back up data, perform the following steps:

1. From the BrightStor ARCserve Backup Home Page, click the Backup Manager icon. The BrightStor ARCserve Backup Domain Login dialog opens.
2. Enter the user name and password for access to the domain and click OK. The Default BrightStor ARCserve Backup Host dialog opens.
3. Select a default host and click OK. The Backup Manager main window opens.

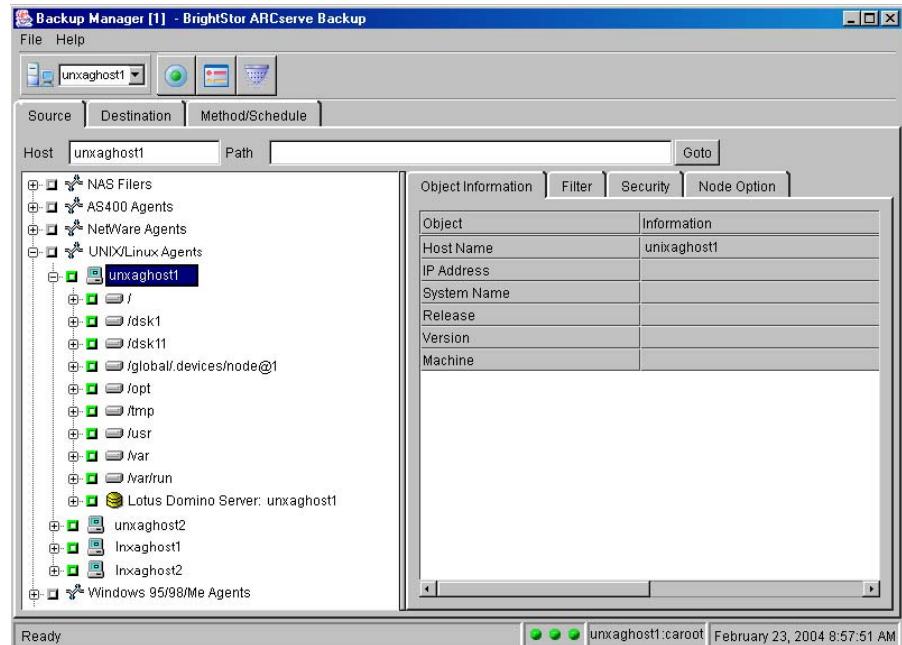
4. From the Source tab, select and expand the UNIX/Linux Agents entry to display a list of available UNIX and Linux agent hosts as shown in the following example.



5. From the list of available UNIX and Linux agent hosts, click the applicable host containing the Lotus Domino server to be backed up. A host Login dialog opens for the host you are trying to expand.

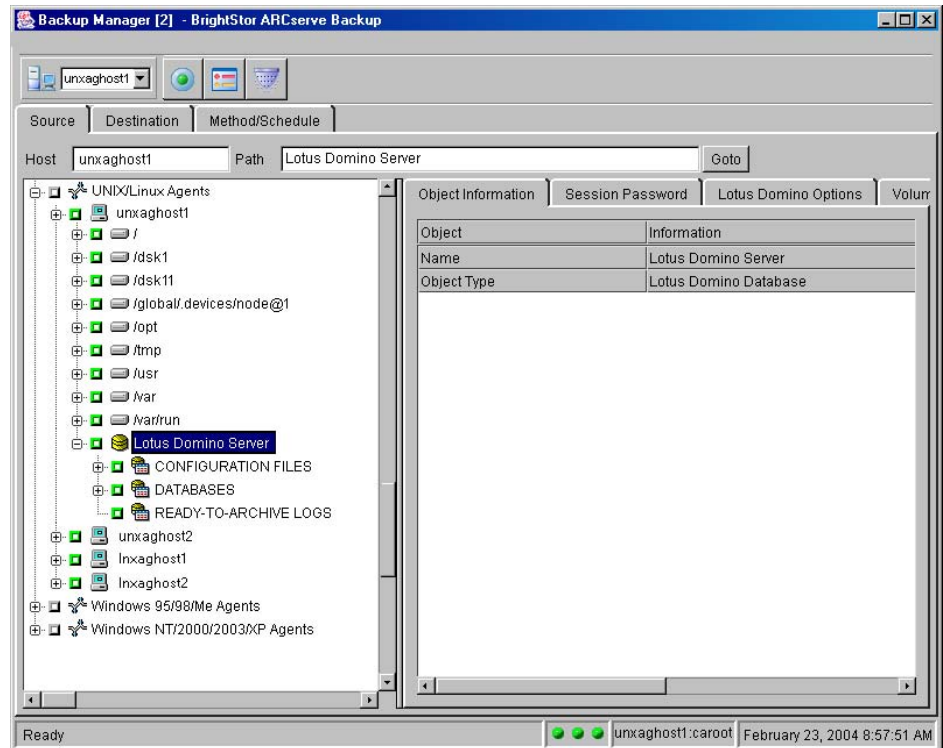
6. Enter the user name and password for access to the host and click OK. The selected host expands to display a list of available file systems, databases, and Lotus Domino servers.

Note: The user name entered must be part of the same group as the user who owns the names.nsf database in the data directory of the Lotus Domino server that is being expanded.



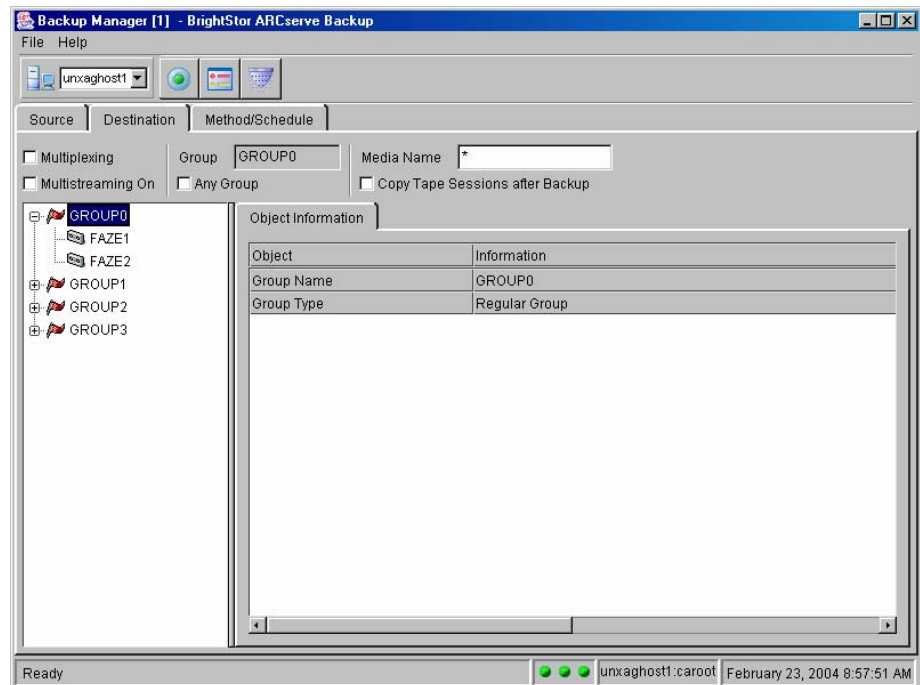
7. From the list of available file systems, databases, and Lotus Domino servers, select the applicable Lotus Domino server and click the + sign.

The selected server expands to display a list of available Lotus Domino object types.



8. After you are successfully logged in to the Lotus Domino server, select the object type to be backed up (configuration files, databases, or ready-to-archive logs) by clicking the corresponding marker until it is solid green (full backup).

- Click the Destination tab to display the destination options, and then select the applicable Backup Group that you want to direct the backup data to.



- Define the schedule and method of the backup job by completing the Method/Schedule tab. For more information about this tab, see the *Administrator Guide*.
- (Optional) Customize the backup job by completing the Option dialog. Click the Option button to display the Option dialog. For more information about these options, see the *Administrator Guide*.
- (Optional) Filter the backup job by completing the Filter dialog. Click the Filter button to display the Filter dialog. For more information about the filter options, see the *Administrator Guide*.
- Click the Submit button to initiate the backup process after all the backup job attributes have been finalized.

Note: After submitting the backup job, you can monitor its progress by opening the Job Status Manager from the BrightStor ARCserve Backup Home Page. For more information about the Job Status Manager, see the *Administrator Guide*

Use the Agent to Perform Restores (GUI)

Using BrightStor ARCserve Backup Agent for Lotus Domino and the Restore Manager, you can configure and submit a restore job. You can restore a complete Lotus Domino database or individual objects (database files, transaction log files, and configuration files) within the database.

Prepare for a Restore

If transaction log files were purged during a backup job, you must restore any transaction log files that were archived between the time of the last database backup and the time of this restore job before restoring the database. If the transaction log files were not purged, then you do not have to restore the transaction log files before restoring the database.

Restore Manager Overview




The Restore Manager lets you easily select the objects that you want to restore and the location where you want them restored to. The Restore Manager also lets you customize your restore jobs using filters, options, and scheduling, and provides detailed information about your restore job. For more information about the Restore Manager, see the *Administrator Guide*.

Restore Manager Markers

Each object displayed in the Restore Manager window has a green or gray box to its left called a marker.

- **Green marker**—Lets you control the extent of the restore for an object directly. Click a marker to exclude an object from a restore or to indicate that you want the restore for the object to be full or partial. As you click the marker, you fill or empty the marker of color, indicating the extent of the restore.
- **Gray marker**—These markers are associated with objects that are not real and that you cannot restore. Typically, these items serve as placeholders under which other objects are grouped and displayed. As you click the green markers under a gray marker item, the fill proportion of the gray marker changes automatically from empty to partial to full depending on the proportion of files you have chosen to restore.

The following table describes the different marker configurations and corresponding restore levels.

Marker Configuration	Extent of Restore
 Completely filled center	Full restore
 Partially filled center	Partial restore
 Empty center	Do not restore

Note: Gray marker configurations follow the same pattern as green marker configurations, but reflect the proportion of files under them that are selected for restore.

The fill proportion of a marker at a higher level of the directory tree depends on the fill proportions of the markers of the objects at the lower levels.

- If all the markers at the lower levels are completely filled, then the marker at the higher level is also automatically completely filled.
- If the markers at the lower levels are a mix of completely filled and partially filled, then the marker at the higher level is automatically partially filled.
- If you click a marker at a higher level so that it is completely filled, then all the markers at the lower levels are automatically filled completely.

Restore Manager Tabs

Each restore job requires a source and a destination. The Restore Manager provides two tabs to customize your restore job:

- **Source Tab**—The Source tab displays all UNIX/Linux agent hosts that have been backed up by the BrightStor ARCserve Backup. Expanding a particular UNIX/linux agent host displays the subordinate file systems on that server. Browsing a Lotus Domino server displays the list of objects that have been backed up on that particular Lotus Domino server. You can browse the objects of the Lotus Domino servers just as you would any other BrightStor ARCserve Backup supported host or client.
- **Destination Tab**—The Destination tab displays the BrightStor ARCserve Backup UNIX/Linux agent destination hosts. Expanding a particular UNIX/Linux agent destination host displays the subordinate file systems on that host. Data from one Lotus Domino server can be restored to either the same or to another Lotus Domino server.

Back Up a Database

To back up a database (online or offline) using BrightStor ARCserve Backup Agent for Lotus Domino, at the command line prompt enter the following command:

```
/opt/CA/BABlotusagt/lotusaccli -f backup -i ifilelist.txt -p  
opt/CA/BABlotusagt/lotusaccli.cfg
```

In this command:

- **f** supports three functions (backup, restore, inquire).
- **i** is the text file containing the list of databases to be backed up.

The following is an example of ifilelist.txt (three databases to be backed up):

```
/opt/notes/local/notesdata/homepage.nsf  
/opt/notes/local/notesdata/reports.nsf  
/opt/notes/local/notesdata/log.nsf
```

- **p** is the command line configuration file.

The following is an example of lotusaccli.cfg:

```
HOST=BrightStor AB server hostname  
USERNAME=user owning the Lotus Domino databases on the client  
PASSWORD=password of the user owning the Lotus Domino databases on the client
```

When performing an **offline database backup**, the Lotus Domino server is shut down. The lotusaccli program is invoked from the command line prompt. For each database file, lotusaccli will notify Lotus Domino that the file is being backed up. There should no transactions pending because the Lotus Domino server is shutdown. As a result, lotusaccli will simply copy the database file to the temporary directory (staging area) and notify the Lotus agent daemon (lotusagentd) that the file is available to be sent to the BrightStor ARCserve Backup server.

When performing an **online database backup**, the Lotus Domino server is running. The lotusaccli program is invoked from the command line prompt. For each database file, lotusaccli will notify Lotus Domino that the file is being backed up. Since the Lotus Domino server is running, there could be transactions pending while the backup is being performed. As a result, the Lotus Domino Recovery Manager will keep track of these transactions and lotusaccli will copy the database to a temporary directory (staging area). After the database is completely copied to the temporary directory, lotusaccli will notify the Lotus Domino Recovery Manager to add the rollback information to the backup file. The lotusaccli program will then notify the Lotus agent daemon (lotusagentd) that the file is available to be sent to the BrightStor ARCserve Backup server.

Lotus Domino Restore Methods

The restore methods for BrightStor ARCserve Backup Agent for Lotus Domino are displayed from a drop-down list available from the Source tab of the Restore Manager. When a Lotus Domino server is selected for restore, the available methods are:

- **Restore By File System method**—This method restores a specific directory or drive from a list of files and directories backed up with BrightStor ARCserve Backup. The Restore By File System method lets you select objects for restore jobs based on the source host from which the data was backed up. Use this method when you do not know which media contains the data you need, but you have a general idea of what you need to restore and which source host it came from. It is the default method for the Restore Manager.
- **Restore By Session method**—This method displays a list of all media used in backups and the files contained on them. The Restore By Session method lets you select objects for restore jobs based on backup sessions. The file information comes directly from the BrightStor ARCserve Backup database, reducing the time it takes to read the information from each media. Use this method when you know which media the data you need to restore is on or if you are not certain about the session you want to restore.

Note: The default for all methods is to restore data to the original database unless an alternate method is specified. For alternate method procedures, refer to Restore Data to a Different Location.

Lotus Domino Restore Options

The restore options for BrightStor ARCserve Backup Agent for Lotus Domino are displayed in the right pane when you select the Destination tab of the Restore Manager. The available options are:

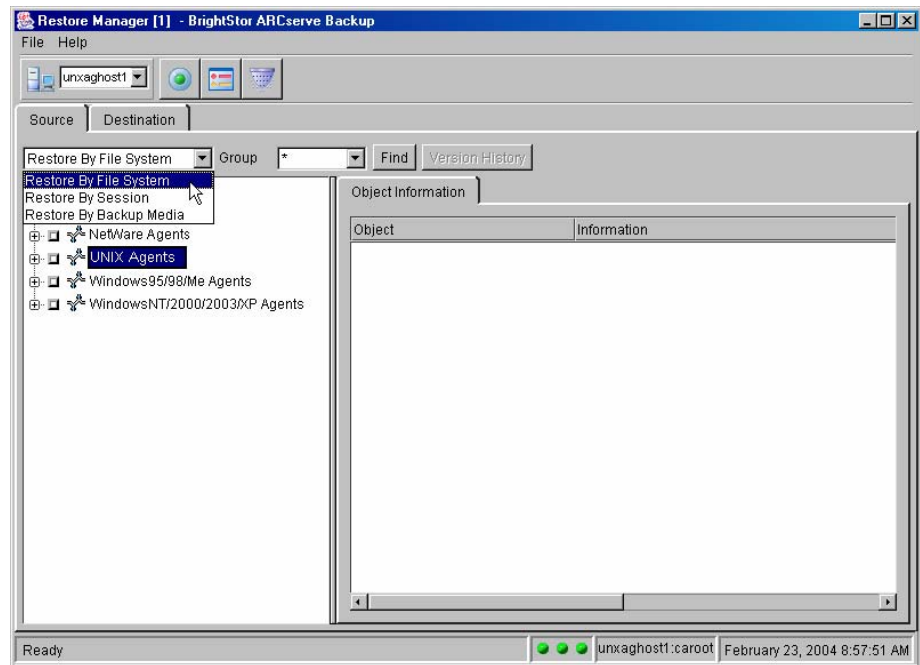
- **User Name and User Password**—The name and corresponding password of the user logging in to the destination servers if there are multiple server selections.
Note: You cannot restore multiple Lotus Domino servers on the same host.
- **Full Automatic Recovery**—Automatically recovers the database to the current date and time.
- **Point in Time Recovery**—Recovers the database up to the specified point in time.
- **No Recovery**—Restores the database, but does not recover it.
- **Overwrite Existing Files**—Overwrites destination files. Configuration files are always saved using a .OLD.timestamp file name extension before being overwritten.

Perform a Restore

A restore job must have a data source from which backup files are extracted and a destination into which the backup files are restored. To restore data from Lotus Domino, you need to configure and submit a restore job using the Restore Manager. Choose the Lotus Domino server as your destination.

To use BrightStor ARCserve Backup Agent for Lotus Domino to restore backed up data, perform the following steps:

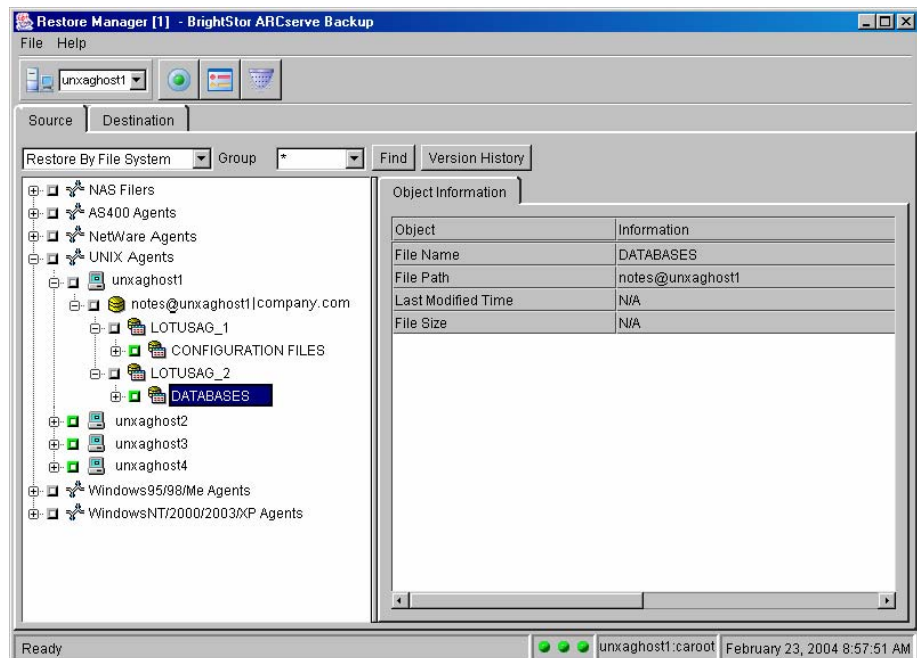
1. From the BrightStor ARCserve Backup Home Page, click the Restore Manager icon. The BrightStor ARCserve Backup Domain Login dialog opens.
2. Enter the user name and password for access to the domain and click OK. The Default BrightStor ARCserve Backup Host dialog opens.
3. Select a default host and click OK. The Restore Manager main window opens.
4. Select the restore method from the drop-down list on the Source tab, as shown in the following example:



Note: The options displayed in the source tree depend on the method selected.

5. Select the objects to be restored from the source tree. You can only restore objects that were backed up using the Backup Manager.
 - a. If you selected the Restore By File System method in step 4, expand the UNIX/Linux Agents entry and continue to expand each level until the applicable Lotus Domino server and Lotus agent folder (identified by backup ID and timestamp) are displayed. Select the subordinate object type to be restored (configuration files, databases, or archived logs) by clicking the corresponding marker until it is solid green (full restore).

The following example shows the Source tab with the Restore by File System method selected:



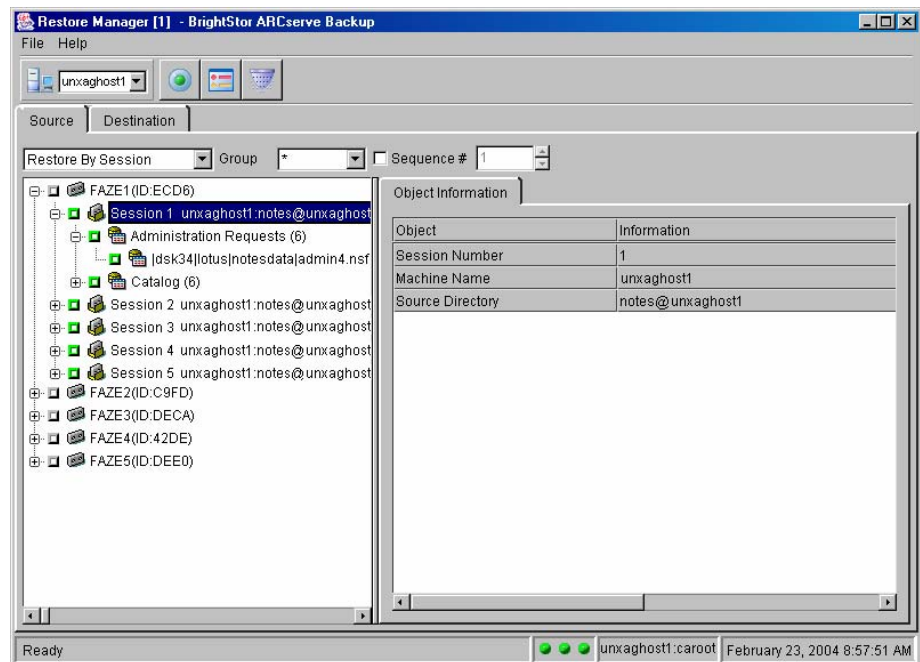
- b. If you selected the Restore By Session method in step 4, expand the applicable media entry and continue to expand each session level until the files to be restored are displayed.

Note: When you select a session, all files backed up in that session are displayed.

Select the subordinate object to be restored by clicking the corresponding marker until it is solid green (full restore).

Note: If you select an object that was backed up in a different session, BrightStor ARCserve Backup clears all previous selections from the other sessions.

The following example shows the Source tab with the Restore by Session method selected:



6. Click the Destination tab on the Restore Manager after you have finished selecting the restore method and objects.

Note: BrightStor ARCserve Backup Agent for Lotus Domino provides two destination options to either restore data to its original locations or to use a corresponding object tree to restore data to different locations.

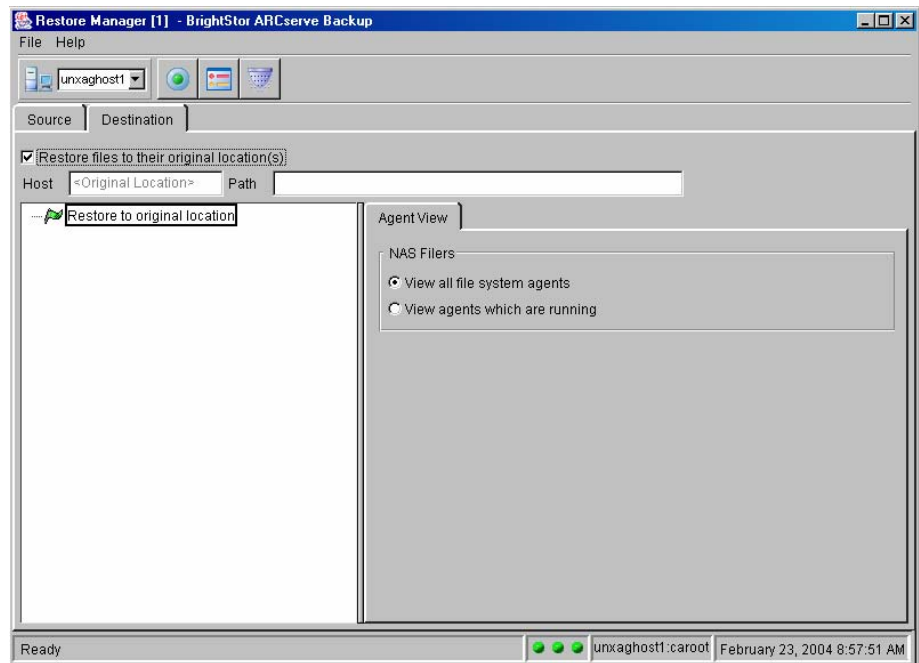
7. Select a destination for the restored data. You can either restore data to its original location or to a different location.
- For the procedure to restore data to its original location, see "Restore Data to its Original Location" in this chapter.
 - For the procedure to restore data to a different location, see "Restore Data to a Different Location" in this chapter.

Restore Data to its Original Location

To restore database files to their original location, perform the following steps:

1. From the Destination tab, click the Restore files to their original location(s) check box. The left pane displays Restore to original location as shown in the following example.

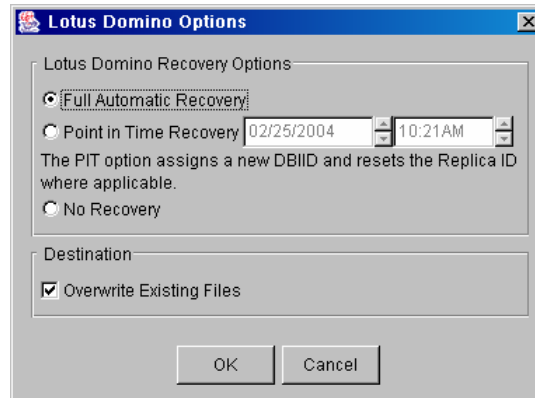
Note: By default, BrightStor ARCserve Backup Agent for Lotus Domino will automatically roll forward to the latest log file, if log files exist for the database.



2. Click the Submit button to start the restore process. A Login dialog opens for the destination host.

3. Enter the user name and password for accessing the destination host and click OK. A Lotus Domino Options dialog opens as shown in the following example:

Note: The user name entered must be part of the same UNIX/Linux user group as the user who owns the names.nsf database in the data directory of the destination Lotus Domino server.



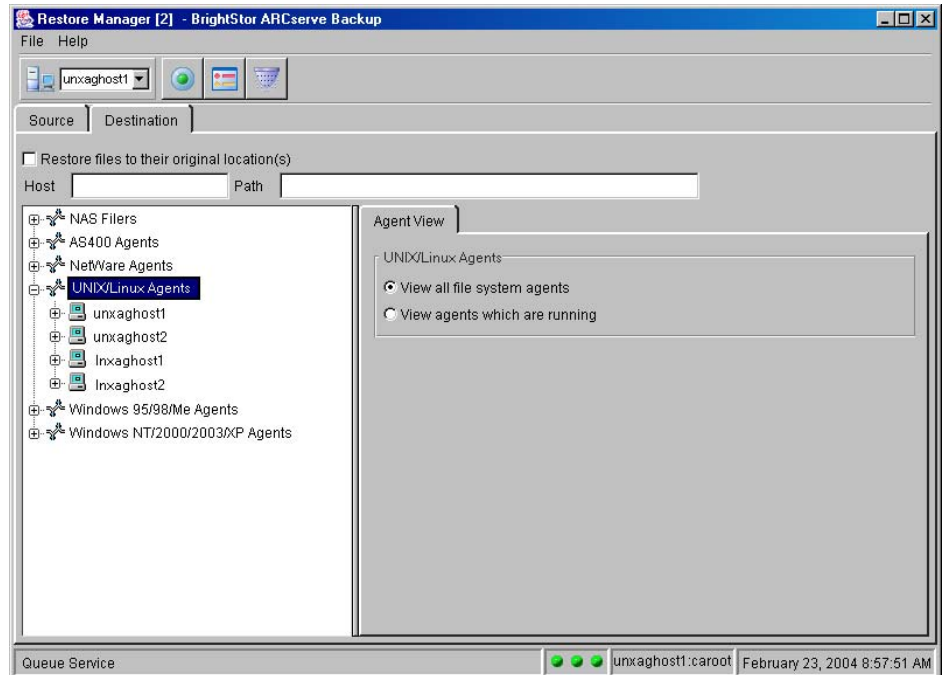
4. Select a recovery option (Full Automatic Recovery, Point in Time Recovery, or No Recovery), indicate whether you want to overwrite the existing files, and click OK. The Session Password dialog opens.
5. Enter the session password. A session password is required only if a session password was specified during the backup process. Click OK. The Submit dialog opens.
6. Select the options for submitting the job, add a brief description of the job, and click OK.

After submitting the restore job, you can monitor its progress by opening the Job Status Manager from the BrightStor ARCserve Backup Home Page. For more information about the Job Status Manager, see the *Administrator Guide*. When the restore process has been completed, a status notification screen is displayed.

Restore Data to a Different Location

To use the destination object tree to restore database files to a different location, perform the following steps:

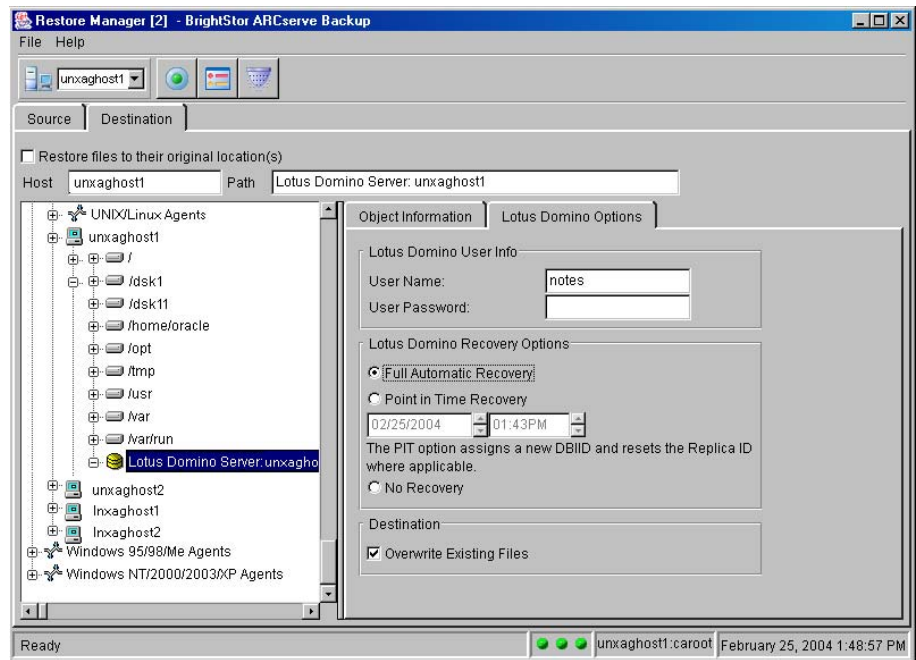
1. From the Destination tab, select and expand the UNIX/Linux Agents entry to display a list of available UNIX and Linux agent hosts as shown in the following example:



2. From the list of available UNIX/Linux agent hosts, click the host containing the Lotus Domino server to which you want to restore the data. A Login dialog opens for the selected host.
3. Enter the user name and password for access to the host and click OK. The selected host expands to display a list of available installations..

Note: The user name entered must be part of the same UNIX/Linux user group as the user who owns the names.nsf database in the data directory of the destination Lotus Domino server.

4. Select the Lotus Domino server that you want to restore the data to and click the + sign. In the right pane of the Destination tab, a Lotus Domino Options tab appears.
5. Click the Lotus Domino Options tab, select a recovery option (Full Automatic Recovery, Point in Time Recovery, or No Recovery), and whether you want to overwrite the existing files. An example is shown next.



6. (Optional) Customize the restore job by completing the Options dialog. Click the Option button to display the Option dialog. For more information about these options, see the *Administrator Guide*.
7. (Optional) Filter the restore job by completing the Filter dialog. Click the Filter button to display the Filter dialog. For more information about the filter options, see the *Administrator Guide*.
8. Click the Submit button to start the restore process after all the restore job attributes have been finalized. The Session Password dialog opens.
9. Enter the session password. A session password is required only if a session password was specified during the backup process. Click OK. The Submit dialog opens.
10. Select the options for submitting the job , add a brief description of the job, and click OK.

After submitting the restore job, you can monitor its progress by opening the Job Status Manager from the BrightStor ARCserve Backup Home Page. For more information about the Job Status Manager, see the *Administrator Guide*. When the restore process has been completed, a status notification screen is displayed.

Chapter 4: Using the Agent with the Command Line

This chapter describes how to perform backups, restores, and inquiries with BrightStor ARCserve Backup Agent for Lotus Domino using the Command Line Interface (CLI). For an overall description of the backup and restore features, see the *Administrator Guide*.

The interaction between the BrightStor ARCserve Backup server and the Lotus Domino server can be processed using the Lotus agent command line interface (lotusaccli) program. To perform backup, restore, and inquire jobs you can run this program on the client host from the command line prompt or from a script.

Use the Agent to Perform Backups (CLI)

Using BrightStor ARCserve Backup Agent for Lotus Domino, you can configure and submit a backup job, choosing any Lotus Domino server as your source and a tape device connected to either the same Lotus Domino server or another Lotus Domino server as your destination. A backup job must have a data source (source) from which data is extracted and an archive or storage device (destination). BrightStor ARCserve Backup provides great flexibility in specifying options, filters, and scheduling information for your jobs.

To perform a back up data from Lotus Domino, you must configure and submit a backup job using the cfgsetup script. The backup parameters defined in the cfgsetup script are written to the configuration file named lotusaccli.cfg. You can back up a complete Lotus Domino database or individual objects (database files and transaction log files) within the database.

Prepare for a Backup (CLI)

Before you submit a backup job, you should verify the integrity of the data in the database. It is important to verify the consistency of the database occasionally. To verify data integrity, open the database in a Lotus Domino client and review the contents for any discrepancies or errors.

Before performing a Lotus Domino backup job, be sure that you have:

- Run the BrightStor ARCserve Backup Agent for Lotus Domino setup script.
- Added a BrightStor ARCserve Backup server equivalency for Lotus Domino users.
- Set CLI environment variables.

For additional information about these backup preparations, see "Configure the Agent" in the chapter Installing the Agent.

Archive Transaction Log Files

To archive a transaction log file using BrightStor ARCserve Backup Agent for Lotus Domino, at the command line prompt, enter the following command:

```
/opt/CA/BABlotusagt/lotusaccli -f backup -i lgfilelst.txt -p  
/opt/CA/BABlotusagt/lotusaccli.cfg
```

In this command:

- **f** supports three functions (backup, restore, inquire).
i is the text file containing the list of log files to be backed up.

The following is an example of logfilelist.txt (three logs to archive):

```
/dsk2/lotus/trlog/S0000000.TXN  
/dsk2/lotus/trlog/S0000001.TXN  
/dsk2/lotus/trlog/S0000002.TXN
```

- **p** is the command line configuration file.

The following is an example of lotusaccli.cfg:

```
HOST=BrightStor AB server hostname  
USERNAME=user owning the Lotus Domino databases on the client  
PASSWORD=password of the user owning the Lotus Domino databases on the client
```

The lotusaccli program is invoked from the command line prompt. When lotusaccli is called with a list of log files to be archived, it in turn invokes the Lotus Domino Recovery Manager to verify which logs are waiting to be archived. When this verification is complete, for each ready-to-archive log, lotusaccli notifies the Lotus agent daemon (lotusagentd) that the file is available to be sent to the BrightStor ARCserve Backup server. After lotusagentd has successfully sent the ready-to-archive log to the BrightStor ARCserve Backup server, lotusaccli then notifies the Lotus Domino server that the log file has been archived. In addition, lotusaccli also notifies the Lotus Domino server that the log file has been archived, if the PURGELOGS option is set to Y in the command line configuration file.

Use the Agent to Perform Restores (CLI)

A restore job must have a data source from which backup files are extracted and a destination into which the backup files are restored. To restore data from Lotus Domino, you need to configure and submit a restore job using the cfgsetup script. The restore parameters defined in the cfgsetup script are written to the configuration file named lotusaccli.cfg. You can then submit a restore job using the lotusaccli program.

Restore a Database

To restore a database (online or offline) using BrightStor ARCserve Backup Agent for Lotus Domino, at the command line prompt enter the following command:

```
/opt/CA/BABlotusagt/lotusaccli -f restore -i ifilelist.txt -p  
/opt/CA/BABlotusagt/lotusaccli.cfg
```

In this command:

- f supports three functions (backup, restore, inquire).
- i is the text file containing the list of databases to be restored.
- p is the command line configuration file.

There are two types of database restores:

The following example shows how to restore specific databases within a specific backup ID:

```
LOTUSAG_20000901165224 /opt/notes/local/notesdata/homepage.nsf  
LOTUSAG_20000901165224 /opt/notes/local/notesdata/reports.nsf  
LOTUSAG_20000901165224 /opt/notes/local/notesdata/log.nsf
```

Where LOTUSAG_datetime is the backup ID (bid) that can be tracked from the Database Manager, the Jobs Manager, and the Restore Manager using the BrightStor ARCserve Backup GUI. The number after LOTUSAG represents the date and time of the backup.

- The following example shows how to restore specific databases from the last backup ID:

```
#NULL /opt/notes/local/notesdata/homepage.nsf  
#NULL /opt/notes/local/notesdata/reports.nsf  
#NULL /opt/notes/local/notesdata/log.nsf
```

When performing an **offline database restore**, the Lotus Domino server is shut down. The lotusaccli program is invoked from the command line prompt. For each database file, lotusaccli will ask the Lotus agent daemon (lotusagentd) to bring each database file from the BrightStor ARCserve Backup server to the temporary directory (staging area). After the database files are available in the temporary directory, lotusaccli will notify the Lotus Domino Recovery Manager that the restored database files should be recovered. The restored database files will then be recovered using the rollback information added to it, the transaction log used during the backup, any transaction logs archived since the backup, and the current transaction log. After the recovery, the restored database files will be an exact up-to-date image of the database. If the transaction logs used during and since the backup have been archived, they must be restored before the database files are restored. If the recovery is successful, the original database will automatically be deleted. Then, lotusaccli copies the recovered database files from the temporary directory back to its original location on the Lotus Domino server. If you do not want the original database files to be deleted, you can define a save database environment variable (SAVEDB_DIR) to locate a directory where lotusaccli will copy the original database files before being overwritten by the recovered backup files.

When performing an **online database restore**, the Lotus Domino server is running. The online database restore process is the same as the offline restore process, with the exception that the original database is also taken offline (if it exists) before being deleted. As a result, there cannot be any users connected to the database when it is taken offline. All users must disconnect from the database before the online database restore process is started.

Restore Archived Logs

To restore an archived transaction log file (online or offline) using BrightStor ARCserve Backup Agent for Lotus Domino, at the command line prompt enter the following command:

```
/opt/CA/BABlotusagt/lotusaccli -f restore -i filelst.txt -p  
/opt/CA/BABlotusagt/lotusaccli.cfg
```

In this command:

- f supports three functions (backup, restore, inquire).
- i is the text file containing the list of log files to be restored.
- p is the command line configuration file.

There are two types of archived logs restores:

The following example shows how to restore specific archived log files within a specific backup ID:

```
LOTUSAG_20000901175224 /dsk2/lotus/trlog/S0000000.TXN
LOTUSAG_20000901175224 /dsk2/lotus/trlog/S0000001.TXN
LOTUSAG_20000901175224 /dsk2/lotus/trlog/S0000002.TXN
```

LOTUSAG_datetime is the backup ID (bid) which can be tracked from the Database Manager, the Jobs Manager, and the Restore Manager in the BrightStor ARCserve Backup GUI. The number after LOTUSAG represents the date and time of the backup.

- The following example shows how to restore specific archived logs from the last backup ID:

```
#NULL /dsk2/lotus/trlog/S0000000.TXN
#NULL /dsk2/lotus/trlog/S0000001.TXN
#NULL /dsk2/lotus/trlog/S0000002.TXN
```

For each log file, lotusacli will ask the Lotus agent daemon (lotusagentd) to bring each archived log file from the BrightStor ARCserve Backup server back to its original location on the Lotus Domino server, overwriting the original log file with the restored archived log file. If you do not want the original log files to be deleted, you can define a save log environment variable (SAVELOG_DIR) to locate a directory where lotusacli will copy the original log files before being overwritten by the restored log files.

The process of restoring an archived log file online is the same as the offline restore process.

Use the Agent to Perform Inquires

You can use BrightStor ARCserve Backup Agent for Lotus Domino to inquire and obtain information about backups which have been performed. You can invoke the `lotusaccli` program with the specific command-line arguments for different types of inquire functions. The BrightStor ARCserve Backup database can also be consulted using the BrightStor ARCserve Backup Database Manager GUI, the Job Manager GUI, and the Restore Manager GUI.

To perform a database inquire using BrightStor ARCserve Backup Agent for Lotus Domino, at the command line prompt enter the following command:

```
/opt/CA/BABlotusagt/lotusaccli -f inquire -i ifilelist.txt -p  
/opt/CA/BABlotusagt/lotusaccli.cfg
```

In this command:

- `f` supports three functions (backup, restore, inquire).
- `i` is the text file containing the list of databases to be inquired.
- `p` is the command line configuration file.

There are four types of inquires:

To see all files that have been backed up (no matter the Backup ID):

```
#NULL
```

- To see all files that have been backed up for a certain Backup ID:

```
LOTUSAG_20000901165224
```

- To see all backups taken for a certain file:

```
#NULL /opt/notes/local/notesdata/reports.nsf
```

- To see a certain file within a certain backup ID:

```
LOTUSAG_20000901165224 /opt/notes/local/notesdata/reports.nsf
```


Appendix A: Troubleshooting

BrightStor ARCserve Backup Agent for Lotus Domino includes an Activity log to list information about the status of each backup or restore job. For the UNIX/Linux platforms, the backup agent log files (`ca_backup.log`, `ca_restore.log`, `lotusabr.log`, `lotusabr_rman.log`, `lotusagentd.log`, and `lotusagentd_rman.log`) are located in the `$CALOTUS_HOME/logs` subdirectory of the BrightStor ARCserve Backup Agent for Lotus Domino home directory. If any errors appear in the BrightStor ARCserve Backup activity logs, you should check the BrightStor ARCserve Backup Agent for Lotus Domino log files for more information about the errors.

You can enable the `lotusagentd` and `lotusabr` components to receive debugging information. This is done by enabling the `CA_ENV_DEBUG_LEVEL = 4` line in the Lotus Domino Agent section of the `/opt/CA/BABcmagt/agent.cfg` file. Activating this line triggers more detailed traces in the corresponding log files.

You can also define the environment variable `ASLOTUS_DEBUG`. When this environment variable is defined, the `lotusacli` program will generate a trace file (`lotusacli.trc`) in the corresponding working directory. You can change the location of the `lotusacli.trc` file by defining the environment variable `ASLOTUS_DESTDIR`, which contains the path of the trace file.

Agent Log File Overview

The BrightStor ARCserve Backup Agent for Lotus Domino provides log files for examining backup and restore activities and enables you to modify settings if any trouble is encountered. The following files are located in the `$CALOTUS_HOME/logs` directory:

- **ca_backup.log**—This file contains the status of the latest command line backup job submitted by `lotusacli` to the BrightStor ARCserve Backup server.
- **ca_restore.log**—This file contains the status of the latest command line restore job submitted by `lotusacli` to the BrightStor ARCserve Backup server.
- **lotusabr.log**—This file contains the log of the client browser component.
- **lotusabr_rman.log**—This file contains the status of the latest Lotus RMAN functions invoked by the client browser component.
- **lotusagentd.log**—This file contains the log of the Lotus agent daemon component.
- **lotusagentd_rman.log**—This file contains the status of the latest Lotus RMAN functions invoked by the Lotus agent daemon component.

Command Line Troubleshooting

This section explains the most common command line errors for BrightStor ARCserve Backup Agent for Lotus Domino on the UNIX/Linux platforms.

Problem

The lotusacli program waits for lotusagentd to start for 20 minutes and exits.

Solution

- Verify the status of the job submission in ca_backup.log.
- Verify if the BrightStor ARCserve Backup server host specified in cfgsetup is reachable.
- Verify if the BrightStor ARCserve Backup server on the host specified in cfgsetup is running by using the \$BAB_HOME/sbin/cstatus command on the BrightStor ARCserve Backup server host.
- Verify if the user profile of the user running lotusacli is correctly set up.
- Verify if a caroot equivalency has been created in the BrightStor ARCserve Backup server on the host specified in cfgsetup for the user that runs lotusacli.
- Verify if BrightStor ARCserve Backup Agent for Lotus Domino is enabled by using the /opt/CA/BABcmagt/caagent list command on the client host.
- Verify if the common agent is running by using the /opt/CA/BABcmagt/caagent status or the /opt/CA/BABcmagt/caagent list command on the client host.
- Verify if lotusacli and lotusagentd can read and write in the temporary staging directory and in /tmp.

Problem

Freezing all server threads message is received by lotusacli or is displayed on the caagentd console or on the Lotus Domino console.

Solution

This message indicates a problem with the Lotus Domino server. Usually, when this message is displayed by Lotus RMAN, the Lotus Domino server is in an unstable state and needs to be restarted.

If the Lotus Domino server was running when the error occurred, check the Lotus Domino server logs and the Lotus Domino server console output for any errors.

- Verify that the transaction logging system is functioning properly. There must be enough disk space for logs, and the user running lotusacli must be authorized to read and write in the logging file system.
- Verify that there are no users connected to the Lotus Domino server.

Next, attempt to shut down the Lotus Domino server. If the shutdown is not successful, a forced shutdown is needed. To force a shutdown, perform the following steps:

1. Change the directory to the Lotus Domino data directory by using the NOTES_DATA_DIR environment variable.
2. Initiate a forced shutdown by running the \$LOTUS/bin/nsd -kill command as root.

Attempt to restart the Lotus Domino server and carefully observe the messages displayed on the Lotus Domino server console.

- If the Lotus Domino server does not start correctly, the cause of the failure to start must be found and corrected.
- If the Lotus Domino server starts correctly, but the freezing all server threads message persists, additional investigation is needed regarding the runtime environment.

Problem

The lotusacli program is not able to submit a job.

Solution

- Verify if the IPC resources are exhausted. If they are exhausted, the IPC resources must be cleaned or the thresholds must be increased at the operating system level.
- Clean up older shared memory and semaphores owned by the user who runs lotusacli (make sure that these IPC resources are not currently used).
- Verify if the user profile of the user running lotusacli is correctly set up.
- Verify if a caroot equivalency has been created in the BrightStor ARCserve Backup server on the host specified in cfgsetup for the user who runs lotusacli.
- Verify the state of the Lotus Domino server. If the Lotus Domino server is running, check the Lotus Domino console and log files for any errors. If the Lotus Domino server is not running, try to start the Lotus Domino server and carefully watch for any errors on the Lotus Domino console.
- Verify if the group, tape, or media pool specified using the cfgsetup script are available.

Problem

Messages starting with catgetserr are displayed.

Solution

Indicates a problem with the localized messages.

- Verify that you are using an international package of the agent.
- Verify that the operation language was set up correctly.
- Verify if all the necessary message files were installed in \$CALOTUS_HOME/nls.

Problem

On IBM AIX, lotusacli reports are unable to map memory.

Solution

The memory mapping of Lotus Domino Release 5.0.9 and subsequent versions on IBM AIX was changed.

Use the dataseg Lotus Domino utility to change the memory mapping of lotusacli, lotusabr, and lotusagentd:

1. Change directory to \$CALOTUS_HOME.
2. Run the command:
`$NotesExecDirectory/dataseg -s lotusacli`
3. Run the command:
`$NotesExecDirectory/dataseg -s lotusabr`
4. Run the command:
`$NotesExecDirectory/dataseg -s lotusagentd`

Problem

Using the command line with Lotus Domino Release 6.0, the following message is displayed after a command line recovery:

```
Recovery Manager: Preserving backups by skipping fixup of logged DB without -j switch.
```

Solution

This problem is related to a Lotus Domino Release 6.0 problem that cannot be resolved unless you upgrade to a later release of Lotus Domino.

Problem

One of the following messages is displayed:

```
glerr 13
permission denied
file not found
```

Solution

With the ASLOTUS_DEBUG and ASLOTUS_DESTDIR environment variables defined, the lotusacli program has trouble reading and writing in the directory pointed to by ASLOTUS_DESTDIR. Verify the file access permissions in the ASLOTUS_DESTDIR trace directory.

Problem

The lotusacli program reports that a database is not currently logged.

Solution

- Verify if the home path specified in the lotussetup script for the Lotus Domino server contains symbolic links. If it does, replace the symbolic link with the actual path.
- Verify if the Lotus Domino database is at least Release 5.0.
- Verify if transaction logging is enabled in the Lotus Domino server.
- Verify if the transaction logging is currently enabled for this particular database.

Problem

The lotusacli program reports that a database is in use when it attempts to take it offline while the Lotus Domino server is online.

Solution

Verify if there are any other users connected to the database and make sure they are disconnected before you start the restore job.

Some databases are continuously used by the Lotus Domino server. These databases cannot be restored and recovered online. The Lotus Domino server must be shut down before attempting to restore these databases. The following databases cannot be restored online:

- busytime.nsf
- events4.nsf
- log.nsf
- names.nsf
- statmail.nsf
- statrep.nsf
- mail.box

If the problem persists, shut down the Lotus Domino server and run the restore offline.

GUI Troubleshooting

This section explains the most common GUI errors for BrightStor ARCserve Backup Agent for Lotus Domino on the UNIX/Linux platforms.

Problem

There is no Lotus Domino server visible in the Backup Manager or there is no Lotus Domino server visible in the Restore Manager Destination view.

Solution

- Verify that the version of the BrightStor ARCserve Backup server is at least r11.1.
- Verify that the version of the BrightStor ARCserve Backup Agent for Lotus Domino is at least r11.1.
- Verify that the host being browsed was added to the hosts list in the BrightStor ARCserve Backup server.
- Verify that the BrightStor ARCserve Backup Agent for Lotus Domino is enabled in `/opt/CA/BABcmagt/agent.cfg`.
- Verify that the BROWSER lotusabr entry in the Lotus Domino agent section in the `/opt/CA/BABcmagt/agent.cfg` file is enabled (not commented out).
- Verify that the value of the HOME entry in the Lotus Domino agent section in the `/opt/CA/BABcmagt/agent.cfg` file points to the home directory of the BrightStor ARCserve Backup Agent for Lotus Domino.
- Verify if the common agent is running by using the `/opt/CA/BABcmagt/caagent status` or the `/opt/CA/BABcmagt/caagent list` command on the client host.
- Check the `lotusabr.log` and `lotusabr_rman.log` files on the client host for any errors.
- Check the Lotus Domino server console and logs on the client host for any errors.
- Check the `caagentd` console on the client host for any errors.

Problem

There is no Lotus Domino server visible in the Restore Manager Source view.

Solution

- Verify that the backups have been taken using the GUI and the BrightStor ARCserve Backup Agent for Lotus Domino running on the host that is browsed.
- Verify that the version of the BrightStor ARCserve Backup server is at least r11.1.
- Verify that the version of the BrightStor ARCserve Backup Agent for Lotus Domino is at least r11.1.

Problem

Unable to log on to the Lotus Domino server in the Backup Manager. (The Login pop-up window shows up continuously and the Lotus Domino server tree does not expand.)

Solution

Verify that the user and password entered are authorized to log on to the Lotus Domino server internally. The user logging on must be part of the same group as the owner of the names.nsf file in the data directory of the Lotus Domino server that is browsed.

If the problem persists and you are sure that the user and password entered are correct, close the Backup Manager, reload it, and expand the Host and the Lotus Domino server tag again.

Problem

Unable to log on to the destination Lotus Domino server in the Restore Manager Destination view. (The corresponding + sign for the Lotus Domino server name does not change to a - sign and the Lotus Domino Restore options are not visible in the right pane.)

Solution

Verify that the user and password entered are authorized to log on to the Lotus Domino server internally. The user logging on must be part of the same group as the owner of the names.nsf file in the data directory of the Lotus Domino server that is browsed.

If the problem persists and you are sure that the user and password entered are correct, close the Restore Manager, reload it, and expand the Host and the Lotus Domino server tag again.

Problem

Freezing all server threads message is displayed in the lotusabr_rman.log or in the lotusagentd_rman.log, or on the caagentd console or on the Lotus Domino console.

Solution

This message indicates a problem with the Lotus Domino server. Usually, when this message is displayed by Lotus RMAN, the Lotus Domino server is in an unstable state and needs to be restarted.

If the Lotus Domino server was running when the error occurred, check the Lotus Domino server logs and the Lotus Domino server console output for any errors.

- Verify that the transaction logging system is functioning properly. There must be enough disk space for logs, and the user running lotusaccli must be authorized to read and write in the logging file system.
- Verify that there are no users connected to the Lotus Domino server.

Next, attempt to shut down the Lotus Domino server. If the shutdown is not successful, a forced shutdown is needed. To force a shutdown, perform the following steps:

1. Change the directory to the Lotus Domino data directory by using the NOTES_DATA_DIR environment variable.
2. Initiate a forced shutdown by running the \$LOTUS/bin/nsd -kill command as root.

Attempt to restart the Lotus Domino server and carefully observe the messages displayed on the Lotus Domino server console.

- If the Lotus Domino server does not start correctly, the cause of the failure to start must be found and corrected.
- If the Lotus Domino server starts correctly, but the freezing all server threads message persists, additional investigation is needed regarding the runtime environment.

Problem

Messages starting with catgetserr are displayed.

Solution

Indicates a problem with the localized messages.

- Verify that you are using an international package of the agent.
- Verify that the operation language was set up correctly.
- Verify if all the necessary message files were installed in \$CALOTUS_HOME/nls.

Problem

On IBM AIX, lotusabr_rman.log, lotusagentd_rman.log, or the caagentd console contain an unable to map memory message.

Solution

The memory mapping of Lotus Domino Release 5.0.9 and subsequent versions on IBM AIX was changed.

Use the dataseg Lotus Domino utility to change the memory mapping of lotusacli, lotusabr, and lotusagentd:

1. Change directory to \$CALOTUS_HOME.
2. Run the command:
\$NotesExecDirectory/dataseg -s lotusacli
3. Run the command:
\$NotesExecDirectory/dataseg -s lotusabr
4. Run the command:
\$NotesExecDirectory/dataseg -s lotusagentd

Problem

The job log in the Job Status Manager reports that a database is in use when it attempts to take it offline while the Lotus Domino server is online.

Solution

Verify if there are any other users connected to the database and make sure they are disconnected before you start the restore job.

Some databases are continuously used by the Lotus Domino server. These databases cannot be restored and recovered online. The Lotus Domino server must be shut down before attempting to restore these databases. The following databases cannot be restored online:

busytime.nsf	statmail.nsf
events4.nsf	statrep.nsf
log.nsf	mail.box
names.nsf	

If the problem persists, shut down the Lotus Domino server and run the restore offline.

Appendix B: Locating Directories and Files

This appendix lists and describes the BrightStor ARCserve Backup Agent for Lotus Domino directories and files used during backup or restore jobs.

Agent Directories

The following agent directories are located under \$CALOTUS_HOME:

- **data**—Directory containing internal data (release-specific information).
- **lib**—Directory containing runtime libraries.
- **logs**—Directory containing log files.
- **nls**—Directory containing messages files.
- **scripts**—Directory containing sample script files.

Agent Files

The following agent files are used during backup or restore jobs.

Files Located Under \$CALOTUS_HOME

The following files are located under \$CALOTUS_HOME:

- **ca_backup**—A program used to submit backup jobs.
- **ca_encr**—A program used to encrypt passwords while performing setup.
- **ca_restore**—A program used to submit restore jobs.
- **cfgsetup**—A script used to create the .cfg file.
- **ckyorn**—A program used to read user information while performing setup.

- **lotusaccli**—A command line interface program between Lotus Domino and the agent.
- **lotusaccli_env**—An automatic runtime environment setup program for lotusaccli.
- **lotusaccli.cfg**—A command line configuration created while performing setup.
- **lotusagentd**—A daemon that is called by the common agent to perform jobs.
- **lotusabr**—A Lotus Domino agent browser client backend program.
- **libdomflscan.so**—A client backend program common API scan functions.
- **libdombapi.so**—A client backend program common API backup functions.
- **libdomrapi.so**—A client backend program common API restore functions.
- **lotussetup**—A script used to set up the agent.

Files Located Under \$CALOTUS_HOME/data

The RELVERSION file is located under \$CALOTUS_HOME/data. This file stores the BrightStor ARCserve Backup build number that the agent was built against.

Files Located Under \$CALOTUS_HOME/logs

The following files are located under \$CALOTUS_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.
- **lotusagentd.log**—Logs the activity of the agent.
- **lotusagentd_rman.log**—Logs the output of the last Lotus RMAN operation invoked by lotusagentd.
- **lotusabr.log**—Logs the activity of the agent browser.
- **lotusabr_rman.log**—Logs the output of the last Lotus RMAN operation invoked by lotusabr.

Files Located Under \$CALOTUS_HOME/scripts

The following files are located under \$CALOTUS_HOME/scripts:

- **archive_logs.sample**—The archive logs sample backup script.
- **backup.sample**—The sample backup script.
- **dbfiles.lst**—The file list used for the sample script.
- **inq_allbackups.lst**—The file list used for the sample script.
- **inq_allbackups.sample**—The script to inquire all the backups on the BrightStor ARCserve Backup server.
- **inq_bid.lst**—The file list used for the sample script.
- **inq_bid.sample**—The script to inquire a specific backup on the BrightStor ARCserve Backup server.
- **inq_bidfile.lst**—The file list used for the sample script.
- **inq_bidfile.sample**—The script to inquire a specific file or backup on the BrightStor ARCserve Backup server.
- **inq_file.lst**—The file list used for the sample script.
- **inq_file.sample**—The script to inquire a specific file on the BrightStor ARCserve Backup server.
- **logfiles.lst**—The file list used for the sample script.
- **restore_db_from_certain_bid.lst**—The file list used for the sample script.
- **restore_db_from_certain_bid.sample**—The script used to restore from a specified backup.
- **restore_db_from_last_bid.lst**—The file list used for the sample script.
- **restore_db_from_last_bid.sample**—The script used to restore from the last backup.
- **restore_log_from_certain_bid.lst**—The file list used for the sample script.
- **restore_log_from_certain_bid.sample**—The script used to restore logs from a specified backup.
- **restore_log_from_last_bid.lst**—The file list used for the sample script.
- **restore_log_from_last_bid.sample**—The script used to restore logs from the last backup.

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