BrightStor® ARCserve® Backup for UNIX

Agent for IBM Informix Guide

r11.5

Computer Associates®

Contents

Chapter 4: Best Practices   35

Appendix A: Troubleshooting   39

Glossary   45

Index   49

Chapter 1: Introducing the Agent

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

Among the agents BrightStor ARCserve Backup offers is the BrightStor® ARCserve® Backup Agent for IBM Informix. This agent provides backup and restore capabilities for the IBM Informix Dynamic Server, referred to as IDS throughout this guide. The types of data that can be backed up include both critical and non-critical dbspaces (primarily chunks, or specific regions of disk space); blobspaces (binary large object spaces); and logical logs (transaction records).

How the Agent Works

The Agent for IBM Informix works in conjunction with ON-Bar, the backup and recovery utility for IDS, to deliver a powerful, easy to use backup and restore solution. The primary job of the agent is to issue requests for the Informix ON-Bar utility on behalf of the Informix Manager. Options set through the Backup Manager interface are translated into ON-Bar command line options, providing an integrated environment. You can also choose to work from the ON-Bar command line to submit jobs directly to the Backup Manager.

The agent connects BrightStor ARCserve Backup and IDS by handling all communication between the two applications, enabling data to be passed back and forth. The agent resides on the same system as IDS.

To perform a database backup, the BrightStor ARCserve Backup Manager converts user entries into one or more requests, which it sends to the agent on the IDS system. The agent communicates this request to ON-Bar, which executes backup and restore requests for IDS. The agent retrieves the specified data objects from IDS and sends them to the Backup Manager, which copies the data to your storage media.

Agent Architecture

The Agent for IBM Informix provides services that allow BrightStor ARCserve Backup to back up and restore databases through either a graphical user interface (GUI) mode or the ON-Bar command line interface (CLI) mode. The following diagram shows the relationship between BrightStor ARCserve Backup and the BrightStor ARCserve Backup Agent for IBM Informix:
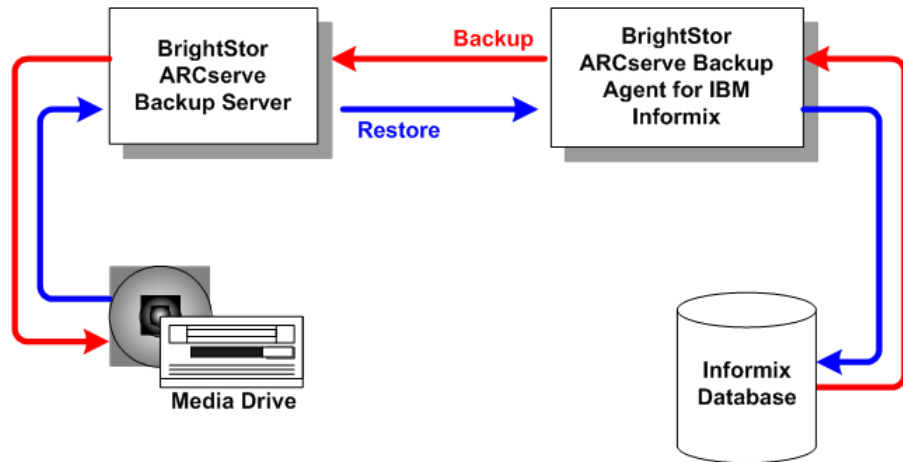
How Informix GUI Backup Works

The following diagram illustrates the backup process from the GUI using the Agent for IBM Informix:
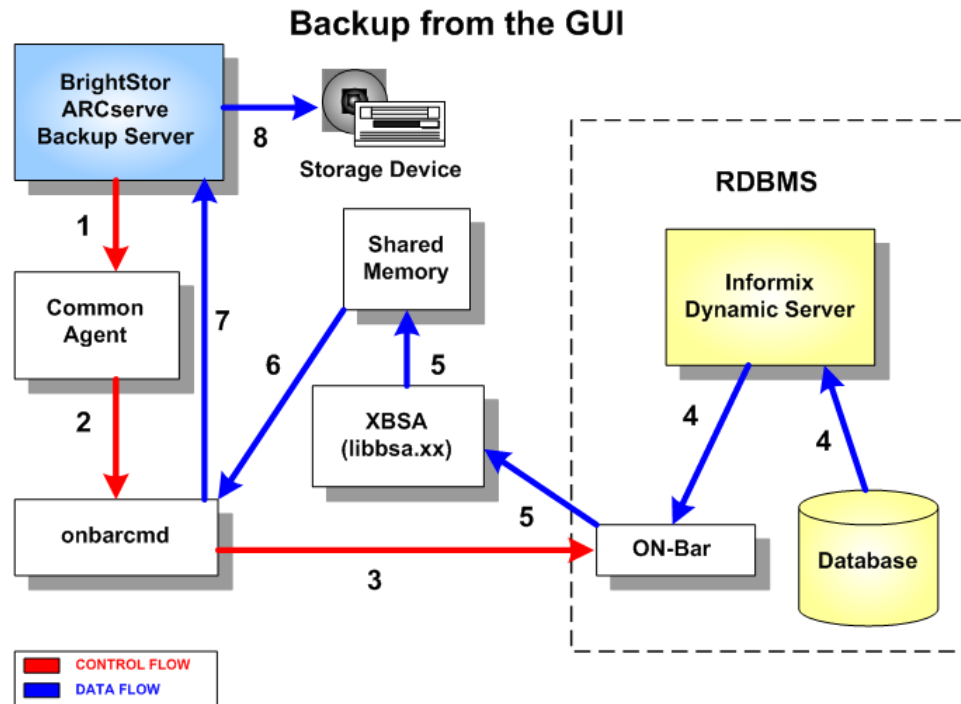
1. You submit a backup job from the GUI.

2. The Common Agent uses onbarcmd to transmit the data.

3. Onbarcmd instructs the ON-Bar utility to start the backup job.

4. ON-Bar uses Archive API to get the data (dbspace/blobspace/logical log) from IDS.

5. The ON-Bar utility uses XBSA to transfer backup data into shared memory.

6. Onbarcmd receives the backup data from shared memory.

7. Onbarcmd transfers the data to the BrightStor ARCserve Backup server.

8. The data is backed up to a storage device.

How Informix GUI Restore Works

The following diagram illustrates the restore process from the GUI using the Agent for IBM Informix:
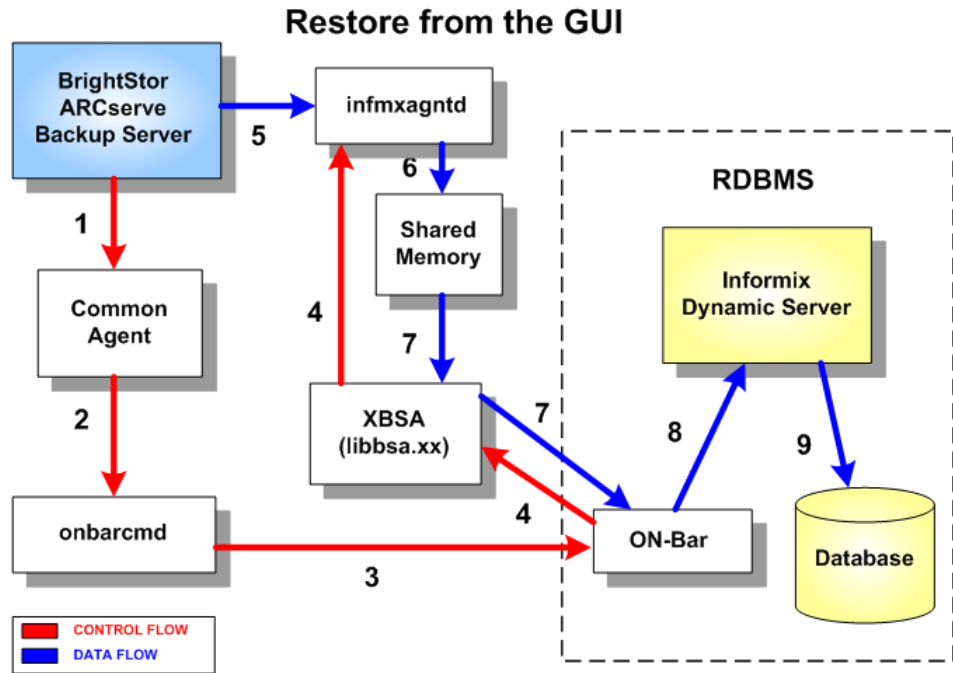
1. You submit a restore job from the GUI.

2. The Common Agent uses onbarcmd to transmit the data.

3. Onbarcmd instructs the ON-Bar utility to start the restore job.

4. The ON-Bar utility uses XBSA to instruct infmxagntd to receive restored data from the BrightStor ARCserve Backup server.

5. Infmxagntd receives restored data from the BrightStor ARCserve Backup server.

6. Infmxagntd transfers the restored data into shared memory.

7. ON-Bar uses XBSA to retrieve restored data from shared memory.

8. ON-Bar uses Archive API to transfer data to IDS.

9. The data is restored to the database.

How Informix Command Line Backup Works

The following diagram illustrates the backup process from the command line using the Agent for IBM Informix:
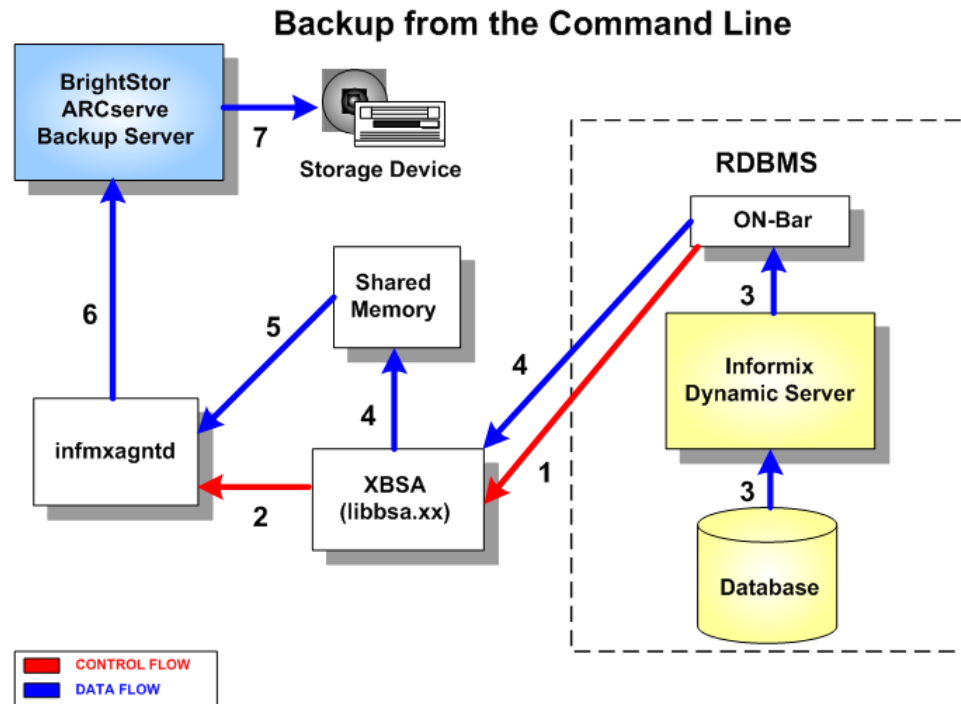
1. You submit a backup job from the command line.

2. ON-Bar uses XBSA to instruct infmxagntd to start the backup job.

3. ON-Bar uses Archive API to retrieve backed up data from IDS.

4. ON-Bar uses XBSA to transfer data into shared memory.

5. Infmxagntd retrieves the data from shared memory.

6. Infmxagntd transfers the data to the BrightStor ARCserve Backup server.

7. The data is backed up to a storage device.

How Informix Command Line Restore Works

The following diagram illustrates the restore process from the command line using Agent for IBM Informix:
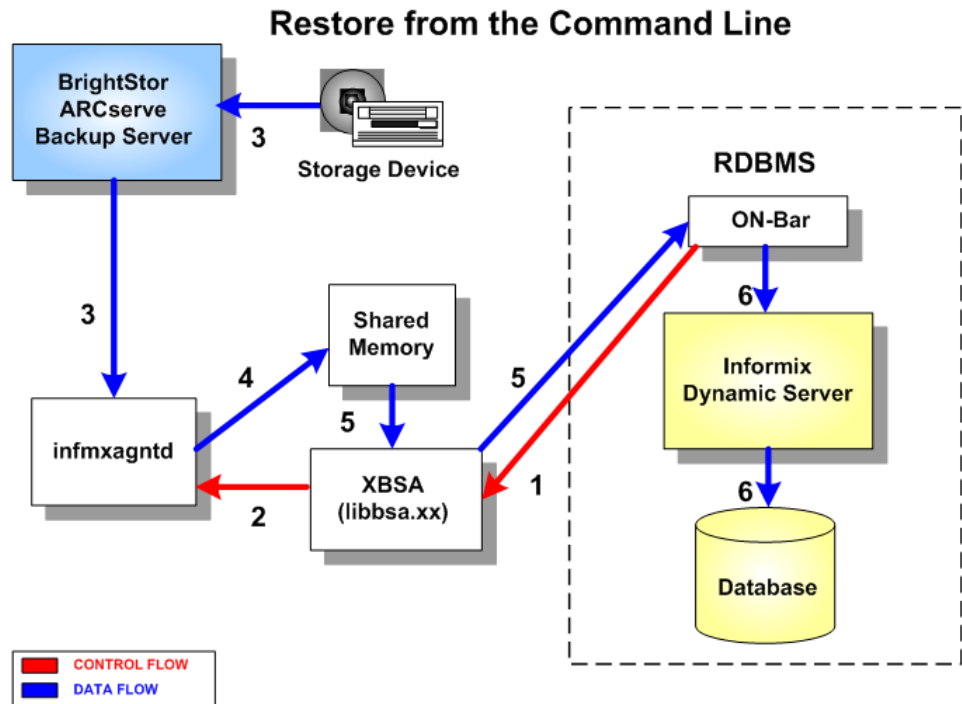
1. You submit a restore job from the command line.

2. ON-Bar uses XBSA to instruct infmxagntd to start the restore job.

3. Infmxagntd retrieves the data from the BrightStor ARCserve Backup server.

4. Infmxagntd transfers the data into shared memory.

5. ON-Bar uses XBSA to retrieve data from shared memory.

6. ON-Bar uses Archive API to transfer data into IDS.

Chapter 2: Installing the Agent

This chapter describes how to install and configure the Agent for IBM Informix. The chapter also explains other steps you must take before performing backup and restore operations after the agent has been installed.

Installation Prerequisites

Before installing the Agent for IBM Informix, verify that:

- Your system meets the minimum hardware and software requirements needed to install the Agent for IBM Informix.

  For a list of requirements, see the readme file.

- BrightStor ARCserve Backup r11.5, including the BABmgr and BABsvr packages, is installed and working properly on your system.

  Note: You can install the Agent for IBM Informix on the same computer as BrightStor ARCserve Backup (the local computer) or on a separate computer (a remote computer).

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

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

- If you do not use the default installation path, make a note of the installation path you use for easy reference.

Install the Agent

Install the Agent for IBM Informix on each Informix database server to be supported by BrightStor ARCserve Backup.

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

Operating Environment

After installation, you must edit the onconfig and onbar files to set up the file and processing locations and properly identify the data to be backed up.

Set Maximum Processes

Edit the onconfig file, located in the $INFORMIXDIR/etc directory, to set the maximum number of processes Informix should use during a backup or restore procedure. To do this, set the BAR_MAX_BACKUP variable to a value of 1.

The syntax is:

```
BAR_MAX_BACKUP 1
```

Set the Device Group

The group_name identifies the device group, which can be one or more disk or tape devices. This device list can be defined during the installation of BrightStor ARCserve Backup or by running the CA media definition script, camediad_setup, alone. The device group is used to tell Informix where to write the Informix salvages or logs during an ON-Bar restore (onbar -r).

Note: Before you edit the onbar file, you must format all the tapes that you will use to complete the backup.

Edit the onbar file, located in the $INFORMIXDIR/bin directory. Begin editing at the # add startup processing here section of the file, and modify the contents to define *group_name* and *pool_name*, as follows:

```
##############################
# add startup processing here
##############################
while getopts :r c
  do
  case $c in
  r) CA_REST_WR_LOGS_GROUP=<group_name>
     export CA_REST_WR_LOGS_GROUP
     CA_REST_WR_LOGS_POOL=<pool_name>
     export CA_REST_WR_LOGS_POOL;;
     esac
     done
##############################
# end startup processing here
##############################
```

If you assign a value to CA_REST_WR_LOGS_GROUP, ON-Bar uses any tape of the group to salvage logs during the restore. If you assign a value to CA_REST_WR_LOGS_POOL, ON-Bar uses any available tape of the pool to salvage logs during the restore.

Where the group_name is a disk or tape device group, which is defined at the installation of BrightStor ARCserve Backup (or by running camediad_setup alone). Be sure to manually format all medias belonging to that group. Do not let any blank media be assigned to that group. That is done in the Device Manager after the mediad is configured and restarted. That device group is used to tell Informix where to write the salvages or logs when doing a restore (onbar -r).

Important! *Manually format all media types belonging to this group. Do not permit any blank media to be assigned to the group. You can define blank media types with the Device Manager tab after the camediad daemon has been configured and restarted.*

Note: On a Tru64 system, update this script to run in Korn shell. Change the first line of the script by inserting the letter k (for Korn) in front of the term for shell (sh), as follows:

Change

```
#!/bin/sh
```

To

```
#!/bin/ksh
```

For more information about how to use ON-Bar, see the chapter "Using the Agent" in this guide and the *IBM Informix ON-Bar* documentation.

Configure the Agent

The following steps describe how to configure BrightStor ARCserve Backup, Informix, and the Agent for IBM Informix under the /disc1 directory.

1. Navigate to the home directory of the BrightStor ARCserve Backup Agent for IBM Informix.

2. Enter the following at the system prompt:

    ```
    ./infmxsetup
    ```

    You are prompted to enter the home directory of the agent. The default setting should be the current directory.

3. Enter the pathname for the appropriate directory at the prompt if it is not specified correctly.

4. Select the version of IDS installed on your machine.

    You are prompted to enter the Informix home directory.

5. At the prompt, press Enter to accept the default (/opt/informix), or enter a different pathname.

    You are prompted to enter a port number.

6. At the prompt, enter a port number.

    You are then requested to register each IDS system to use with BrightStor ARCserve Backup.

    Note: The port number is an optional field. The Informix Database Agent and the BrightStor ARCserve Backup server use this port for data flow. Make no entry if you prefer to let the system choose the port for you at run time.

7. At the prompt, enter the Informix server name to be used by the agent.

8. Enter the Informix ONCONFIG file name for this server.

9. Repeat Steps 7 and 8 until you are finished entering servers.

10. To complete the setup sequence, enter a null value at the prompt.

    The infmxsetup script begins to run. Setup checks to see if the required files exist in the directory containing the Common Module for BrightStor ARCserve Backup agents, /opt/CA/BABcmagt. The infmxsetup script modifies the agent.cfg file with agent-specific information.

    For more information, see the Global Configuration File in this chapter.

Agent Directory Structure

Directories that are located under $CAINFMX_HOME include:

Directory	Description
data	Internal data (version-specific data)
lib	Runtime libraries
logs	Log files
nls	Messages files

Files that are located under $CAINFMX_HOME:

File	Description
caagent	Script used to start and stop and get the status of the agent.
ca_backup	Program used to submit backup jobs
ca_dbmgr	Program used to query the BrightStor ARCserve Backup server
ca_restore	Program used to submit restore jobs
citoxmsg.pam	Informix message file
ckyorn	Program used to read user information while performing setup
dbaccess.log	Log used for debugging purposes during setup
fetch_infmx	Link to appropriate fetch version
fetch_infmx32	Program that fetches all the dbspaces from Informix 32-Bit
fetch_infmx64	Program that fetches all the dbspaces from Informix 64-Bit
infmx_cmd_line_utl.param	Parameter file used by the command line utility
infmxagntd	Daemon that is called by the XBSA library to perform a job
infmxbr	Program used to run the browser
infmxsetup	Script to perform the agent setup

File	Description
installation.cfg	List of Informix servers that are used by the agent
libbsa.so	XBSA interface library 32-Bit
libbsa_64.so	XBSA interface library 64-Bit
onbar filecmd	Program used to perform backup and restore operations with a Relational Database Management System (RDBMS) from the Informix Manager.

Files that are located under $CAINFMX_HOME/logs include:

File	Description
infmxagntd.log	Logs the agent's activity
infmxbr.log	Logs the browser's activity
onbarcmd.log	Logs ON-Bar activity
xbsa.log	Logs the activity of Informix

The relversion file, located under $CAINFMX_HOME/data, stores the Agent for IBM Informix build number.

Global Configuration File

The global configuration file, agent.cfg, keeps track of each agent installed on your system. This file is located in the /opt/CA/BABcmagt directory and is populated with the required agent information during the infmxsetup process.

Each grouping of fields directly corresponds to an installed agent. Except for the agent home directory location, all fields are predetermined. The agent home directory is automatically defined when you configure the agent. If required, the environment variable field (ENV) contents will be determined during agent installation and configuration. You can also enter variables into the file manually. You would use this feature if, for example, you wanted to associate an additional environment field with a particular database.

Note: Modifications to the agent.cfg file made during this session will not take effect until the agent is stopped and then restarted.

The following shows an example of an entry in the agent.cfg file:

```
[32]
# Informix onbar Agent
NAME InfmxAgent
VERSION 11.0.nn
HOME /disc1/BABinfmx
ENV LD_LIBRARY_PATH=
ENV SHLIB_PATH=
ENV LIBPATH=
ENV PATH=
ENV CAINFMX_HOME=
ENV INFORMIXDIR=/disc1/informix
ENV CA_ENV_DEBUG_LEVEL=4
#ENV ARCHIVE__TEST=1
ENV INFMX_AGNT_PORT_NO=
BROWSER infmxbr
AGENT Onbarcmd
```

This configuration file method applies only to jobs submitted from the BrightStor ARCserve Backup Manager interface. To submit jobs from the ON-Bar command line, you must set environment variables elsewhere.

For more information on submitting jobs from the ON-Bar command line, see the chapter "Using the Agent".

Enable Warm Restores of Dbspaces and Blobspaces

To enable warm restores of dbspaces or blobspaces—commands submitted from the BrightStor ARCserve Backup Manager—you must set the ARCHIVE_TEST environment variable. To set the environment variable for use with BrightStor ARCserve Backup, you must modify the agent.cfg file, located in the /opt/CA/BABcmagt directory.

In the Informix onbar Agent section, set the ARCHIVE_TEST variable as shown:

```
ENV ARCHIVE_TEST=1
```

After modifying the agent.cfg file, you must stop and then restart the agent for the changes to take effect.

Specify User Equivalencies

Before running backup and restore jobs, you must specify user equivalencies for system authorization. To perform this function, follow these steps:

1. Log in as **root** to the server on which agent is running.

2. Enter the following command sequence:

   ```
   ca_auth –equiv add informix nodename BABequiv BABuser BABpasswd
   ca_auth –equiv add root nodename BABequiv BABuser BABpasswd
   ```

   - **Nodename—**The machine where the agent is installed.

   - **BABequiv—**The BrightStor ARCserve Backup user equivalency assigned to the specified user.

   - **BABuser and BABpasswd—**The user name and password for the BrightStor ARCserve Backup administrator.

   For example, on the machine where BrightStor ARCserve Backup for Informix is running, enter the following:

   ```
   ca_auth –equiv add informix nodename caroot caroot caroot_passwd
   ca_auth –equiv add root nodename caroot caroot caroot_passwd
   ```

Add a Workstation to the Remote Client Database

You may need to add remote Informix servers to your BrightStor ARCserve Backup network at some time. To add an IDS server, use the procedure described in this section.

Note: This procedure is required only when installing the Agent for IBM Informix on a **remote** workstation. You should not follow these procedures if you are installing the agent on your local BrightStor ARCserve Backup server.

To use the remote agent, you must first use the following steps to add the workstation on which it was installed to the BrightStor ARCserve Backup database:

1. From the BrightStor ARCserve Backup Home Page, click Database Manager.

2. From the Database Manager, click the Clients tab.

3. Click Add.

   The Add Clients dialog appears.

4. On the Add Clients dialog, enter the information of the remote workstation where the agent is installed, and then click OK.

   Note: The hostname of the workstation must be the same as the hostname of the remote machine.

Chapter 3: Using the Agent

You can use the Agent for IBM Informix to back up IDS objects such as dbspaces, blobspaces, and logical logs. Command line options associated with the ON-Bar utility are also available.

For more information about using ON-Bar, see the *Informix ON-Bar* documentation.

Run the Agent

To start, stop, or check the status of the agent, make sure you are logged in as root before performing the following steps.

Enable the Agent

To enable the agent, enter the following command at the system prompt:

```
caagent enable 32
```

When you issue this command, the agent becomes enabled and the system displays the message:

```
BrightStor ARCserve Backup Universal Agent already started.
```

Stop the Agent

To stop the agent, enter the following command at the system prompt:

```
caagent disable 32
```

When you issue this command, the agent stops and the system displays:

```
InfmxAgent is disabled.
```

Check the Status of the Agent

To check the current status of the agent, enter the following command at the system prompt:

```
caagent list
```

If the agent is running when you issue the status command, the system displays:

```
Obj_type    Name        Version    Status
0           BABagntux   nn.nn.nn   ENABLED
32          InfmxAgent  nn.nn.nn   ENABLED
```

If the agent is not running, the system displays:

```
Obj_type    Name        Version    Status
0           BABagntux   nn.nn.nn   DISABLED
32          InfmxAgent  nn.nn.nn   DISABLED
```

View a List of Agents Installed

To see a list of all the agents installed on the server, enter the following command at the system prompt:

```
caagent list all
```

Back Up Informix Objects

When you submit a job from the Backup Manager, BrightStor ARCserve Backup validates the jobs in the queue. The agent then converts the job requests to ON-Bar commands, which appear in the activity log for this agent. ON-Bar then evaluates your backup privileges and IDS status, and submits the backup jobs to BrightStor ARCserve Backup.

For more information about using ON-Bar, see ON-Bar Command Line in this chapter and the *IBM Informix ON-Bar* documentation.

To back up Informix objects, follow these steps:

1. Start the Backup Manager.

    Important! *The agent supports only single, non-concurrent backups and restores. Parallel operations are not supported.*

2. Click the Source tab if it is not already visible, and select the Informix objects you want to back up.

    For more information on selecting Informix objects, see View dbspaces, blobspaces, and Logical logs topic in this chapter.

3. Highlight the server to which you want to apply the desired backup options.

4. Click the Informix Option tab, and select the options you want to apply to the server.

    For more information about the available options, see Informix Backup Options in this chapter.

    Note: By default, the agent performs a level 0 backup.

5. Click the Destination tab, and select the media and the device group for the backup destination.

6. Click the Method/Schedule tab and select the scheduling options. You can run the backup job at this time or schedule the job to run later.

    For more information on scheduling options, see the *Administrator Guide*.

7. After scheduling the backup job, click the Submit toolbar button to run the job or to queue it to start later. When the operation is complete, the following message appears:

    ```
    Backup Operation Successful
    ```

View Workstations and the Informix Server

While the agent is running on a workstation, you can view the icons that represent the file systems and the IDS available on that workstation. To see these icons, expand that workstation's icon on the Backup Manager, as illustrated in this example:
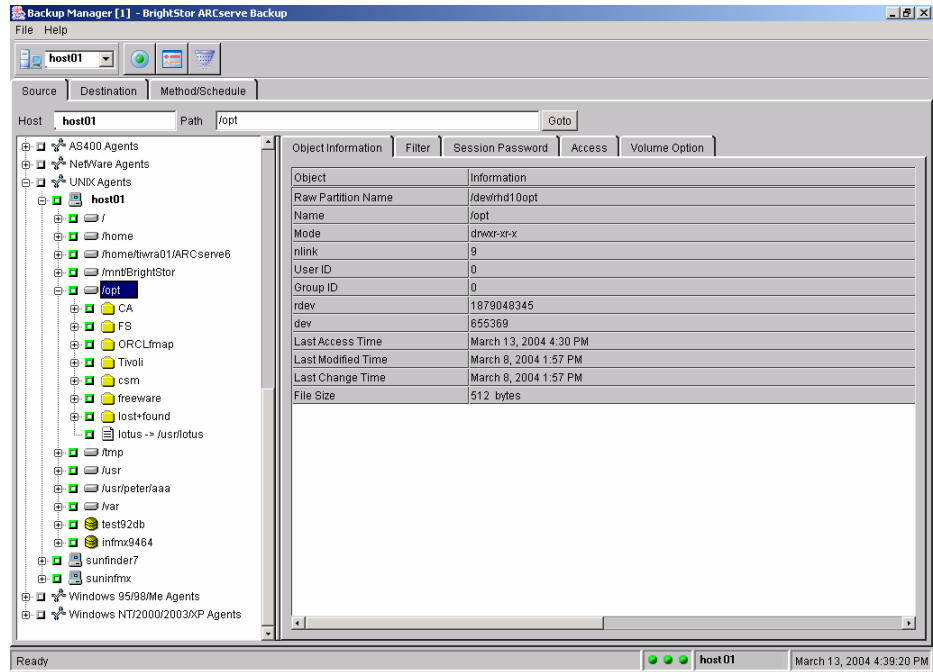
Note: If the server is not online, its icon is still displayed but the contents of the server are not visible. You will be able to select only the hard-coded object #LOGFILE# to salvage the Informix log files.

View Dbspaces, Blobspaces, and Logical Logs

To see the dbspaces, blobspaces, and logical logs, expand the appropriate icons on the Backup Manager, as illustrated in the following example:
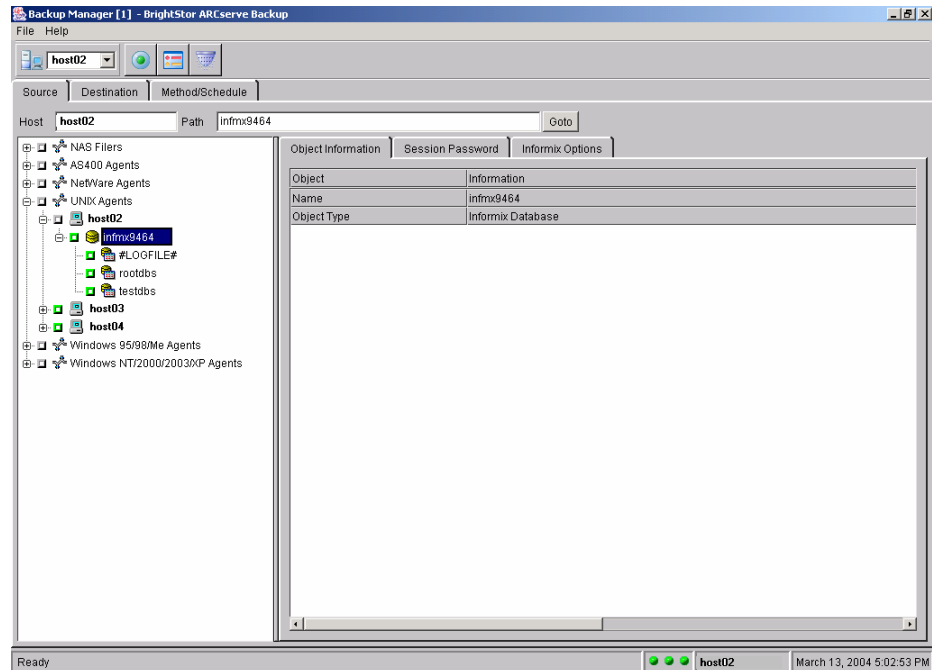
Informix Backup Options

By default, the agent performs a full backup. However, you can change these default settings using the Informix Option tab, which invokes standard ON-Bar functions. The available backup options are:

Informix Options	ON-Bar Command Line Option	Description
Backup Level 0	-L 0	Makes a full backup. This is the default.
Backup Level 1	-L 1	Makes an incremental backup based on the last Level 0 backup.
Backup Level 2	-L 2	Makes an incremental backup based on the last Level 1 backup.

Informix Options	ON-Bar Command Line Option	Description
Backup Current Log Only	-c	Backs up only the current active logical log. All other full logical logs will not be backed up when selecting this option.
Salvage Logs	-s	Backs up any logical logs that have not yet been backed up and are not corrupted or destroyed.

Restore Informix Objects

You can use the Agent for IBM Informix to restore Informix objects, including dbspaces and blobspaces. Command line options associated with the ON-Bar utility are also available for restoring these objects. This section provides information on how to restore your Informix dbspaces, log files, and blobspaces using the base system and the Agent for IBM Informix. Use the Restore Manager to restore the Informix data from its current backup media.

To restore an Informix object from the tree view:

1. Start the Restore Manager.

2. From the Restore Manager, click the Source tab if it is not already visible, and select the objects you want to restore. After you have expanded a local or remote host icon, you see each file system and the Informix server that was backed up on that machine.

   Note: You cannot select a specific log file to be restored. You can select one or more database synchronization (DBS) objects or the entire server.

3. Click the Destination tab, to specify the restore destination where you want the objects to go. The destination must be the same as the selected source; for example, server svrnum0 cannot be restored to svrnum1.

4. Highlight the server to which you want to apply the restore options.

5. Click the Informix Option tab, and then select the options you want to apply to the server that you are restoring.

   For information on the available options, see Informix Restore Options in this chapter.

6. Click the Submit toolbar button to run the job.

    The Restore Manager displays all the objects that you backed up, as shown in the following example.
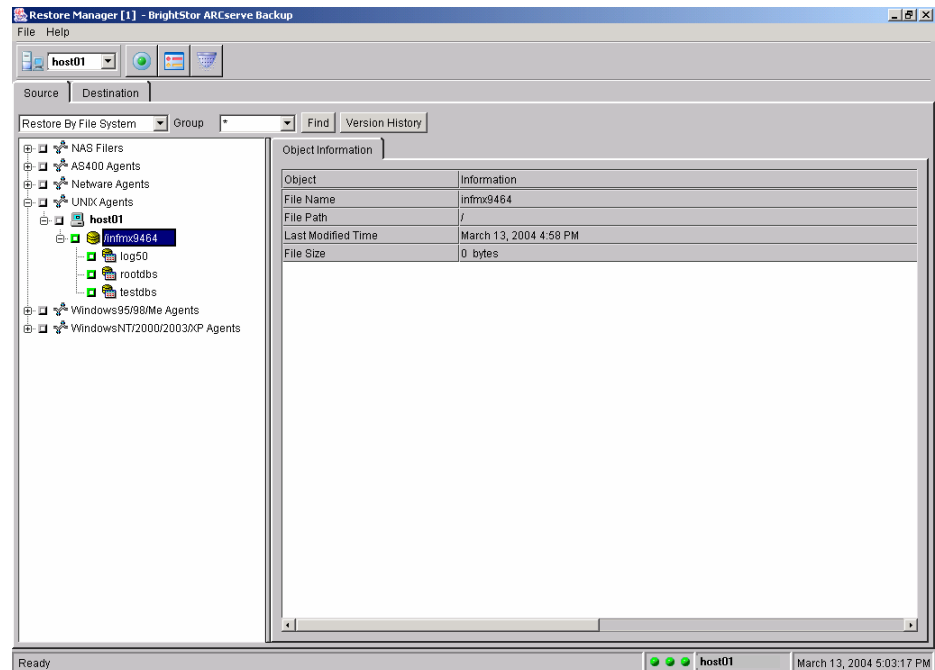
Notes:

■ The actual tape and session information used when restoring Informix objects is supplied by the ON-Bar utility after a job is submitted. Therefore, the restore tape information supplied by the Restore Tape List window may not be accurate. It is possible for ON-Bar to request a tape from the BrightStor ARCserve Backup database that is unavailable.

■ Because of certain functional limitations, ON-Bar may not be in sync with the BrightStor ARCserve Backup database. ON-Bar may request a tape that no longer exists in your tape rotation scheme. As a result, you should carefully plan your tape rotation scheme. The rotation scheme should be designed so that recovery meets the requirements of your data retention period.

■ If you use Restore by Session, you need to expand the session number and select the dbspace before submitting the restore job.

■ The Point in Time Restore option applies only when you restore the entire database.

Informix Restore Options

BrightStor ARCserve Backup Restore options (found in the Volume Options dialog) represent ON-Bar functions.

The following restore methods are available:

Volume Option	ON-Bar Option	Description
None	-r	Specifies a restore.
Physical Only	-p	Specifies a physical restore only. Must be followed by a logical restore before data is accessible. Turns off log salvage during a cold restore.
Logical Only	-l	Specifies a logical restore only. Restores and rolls forward the logical logs.

The following restore options are available:

Volume Option	ON-Bar Option	Description
Last Logical Log	-n <log>	Specifies a logical restore only. Restores and rolls forward the logical logs.
Point in Time	-t <date>	Specifies the time of the last transaction to be restored from the logical logs in a cold restore. Must be used in a cold restore only. You must restore all storage spaces.

Note: See the *Backup and Restore Guide for Informix Dynamic Server* for the different options and requirements available for performing cold restores, warm restores, physical restores, and logical restores.

Disaster Recovery

To recover IDS after a disaster, such as a hard disk failure, you need the latest copy of the emergency boot file ($INFORMIXDIR/etc/ivbar.servernum) in the agent directory. Servernum is the value of the SERVERNUM configuration parameter. To recover IDS you must then perform a full cold restore.

Note: The filesystem agent must back up the emergency boot file.

Restore a Server to Another Machine

When you restore an Informix server to another machine, the same IDS version must be used on the new machine, and the server name and server number must be the same as the original.

1. Perform a full backup of Server_1 on Machine_A.

2. Install a new Informix server on Machine_B by following these steps:

   a. Verify that the physical path of the database server must be the same on Machine_B as it is on Machine_A (for example, /dsk400/informix/rootdbs.chunk).

   b. Initialize the new server identically to Machine_A.

   c. Put Server_1 online. Wait until all processes have finished before going offline.

   d. Put Server_1 offline.

3. Issue the following command sequence:

   ```
   Copy Machine_A:/Informix_home/etc/ixbar.ID
   Machine_B:/Informix_home/etc/ixbar.ID
   ```

4. Do a **full** (cold) Restore from Machine_A:Server_1 to Machine_B:Server_1.

5. Put Server _1 online on Machine_B.

The Informix Server_1 on Machine_B is now the same as it was on Machine_A at the time of the last full backup.

Restore Functions Not Supported

The Agent for IBM Informix does not support the following file system-related functions:

- Global restore options:
  - Create empty path for the root
  - Pre- or post-execution

- Session or tape view for dbspace or blobspace restores

- Filter options

- Destination options
  - Directory structure
  - File conflict resolution
  - Restore to different locations

For additional information about restore functions, see the *BrightStor ARCserve Backup Administrator Guide*.

ON-Bar Command Line

The following section contains information about ON-Bar environment variables that must be set when submitting jobs to BrightStor ARCserve Backup from the ON-Bar command line. As an alternative method to setting these variables from the command line, it is possible to have your system set this variable each time your system is started. This is done by modifying your *.profile* script (Bourne or Korn shell) or your *.cshrc* script (C shell).

Submit Jobs Using the ON-Bar Command Line

To use ON-Bar from the command line as a stand-alone utility, you must first set the following environment variables by entering:

```
CAINFMX_HOME=/disc1/BABinfmx
export CAINFMX_HOME

CAAGENT_HOME=/opt/CA/BABcmagt
export CAAGENT_HOME
```

In this example, /disc1/BABinfmx is the directory where the Agent for IBM Informix is installed, and /opt/CA/BABcmagt is the directory where Common Agent is installed.

You can also define the following variables:

ARCHIVE_TEST

To enable warm restore.

CA_ENV_DEBUG_LEVEL

To enable debug information.

INFMX_AGNT_PORT_NO

To use a specific port number to transfer data between the BrightStor ARCserve Backup Server and the client; if it is not defined, the system chooses one.

The following is an example of an Informix profile file when using the Agent for IBM Informix:

```
INFORMIXDIR=/disc1/informix
export INFORMIXDIR
PATH=$INFORMIXDIR/bin
export PATH
INFORMIXSERVER=svrnum0
export INFORMIXSERVER
ONCONFIG=onconfig.0
export ONCONFIG
CAAGENT_HOME=/opt/CA/BABcmagt
export CAAGENT_HOME
CA_ENV_DEBUG_LEVEL=4
export CA_ENV_DEBUG_LEVEL
ARCHIVE_TEST=1
export ARCHIVE_TEST
INFMX_AGNT_PORT_NO=5050
export INFMX_AGNT_PORT_NO
```

Important! *(For Informix 7.31 users on the Solaris platform.) To enable a root user to submit an ON-Bar job from the command line, add root under informix group in the /etc/group file and temporarily set the root user's primary group to Informix group (by issuing 'newgrp informix' at the operating system prompt). Execute the Informix user profile, and then submit the ON-Bar backup job.*

Utility File for Command Line Initiated Backup and Restore

This parameter file is read when an onbar command is issued by the user. The variables are ca_backup qualifiers, except those under Schedule Options.

The following is the content of the file $CAINFMX_HOME/ infmx_cmd_line_utl.param when you install the BrightStor ARCserve Backup Agent for IBM Informix:

```
-------------------------------------------------------------------
#Parameters for command line. Uncomment to activate the parameter
-------------------------------------------------------------------
#
#Required Options
#
#HOST replaces previous CA_AGENT_HOST
#HOST='BrightStor Hostname'
#Options
#
#PRIORITY=2
#TAPEFORMAT = BAB | TAR | CPIO
TAPEFORMAT=BAB
#
#Log Options
#
#LOGFILE=infmx_options.log
#LOGDETAIL = all | summary
#LOGDETAIL=summary
#SNMP
#EMAIL=email@ext
#TNG
#PRINTER=
#
#Destination Options
#
#EJECT
#MEDIAPOOL replaces previous CA_MEDIAPOOL
#MEDIAPOOL='Poolname'
#DESTTAPE replaces previous CA_TAPE_NAME
#DESTTAPE='Tapename'
#DESTGROUP replaces previous CA_TAPE_GROUP
DESTGROUP=*
TAPETIMEOUT=5
SPANTAPETIMEOUT=10
#TAPEMETHOD Append | Overwrite | Owritesameblank | Owritesameblankany |
Owritesameanyblank
#TAPEMETHOD=
#SPANTAPEMETHOD Overwrite | Owritesameblank | Owritesameblankany |
Owritesameanyblank
```

```
#SPANTAPEMETHOD=
#
#Schedule Options
#
#DAYOFWEEK
DESTTAPESUN=SUNDAY
DESTTAPEMON=MONDAY
DESTTAPETUE=TUESDAY
DESTTAPEWED=WEDNESDAY
DESTTAPETHU=THURSDAY
DESTTAPEFRI=FRIDAY
DESTTAPESAT=SATURDAY

#MULTISTREAM
MEDIAPOOLSUN=SUNDAY
MEDIAPOOLMON=MONDAY
MEDIAPOOLTUE=TUESDAY
MEDIAPOOLWED=WEDNESDAY
MEDIAPOOLTHU=THURSDAY
MEDIAPOOLFRI=FRIDAY
MEDIAPOOLSAT=SATURDAY
######## End of File infmx_cmd_line_utl.param ########
```

Only the variable Host has to be uncommented and set if you are using a remote installation of BrightStor ARCserve Backup Server in order for the command onbar to work. If you run your agent locally, the onbar command will work without changing values from that file. All variables are effective when uncommented.

The variables DAYOFWEEK and MULTISTREAM under Schedule Options are not assigned a value. They are flags (set or not set). These two variables have been implemented to simulate a Rotation Backup Job. The BrightStor ARCserve Backup Rotation Job functionality is not available if you are not using the GUI.

The following logic is used, depending on the setting of these two variables:

```
If (DAYOFWEEK) {
    if (MULTISTREAM)
        -mediapool = value of MEDIAPOOLCurrDay Var(1); MEDIAPOOL Var(2)
    else
        -mediapool = value of MEDIAPOOL Var
-tape = value of DESTTAPECurrDay Var
    }
else {
    -mediapool = value of MEDIAPOOL Var
    if (NOT MULTISTREAM)
        -tape = value of DESTTAPE Var.
}
```

Informix Multistreaming Backup

Informix Multistreaming Backup is supported from the command line. To enable Informix multistreaming, you need to change the BAR_MAX_BACKUP value in the *onconfig* file to the number of streams you want to use (IDs must be restarted when the values in the *onconfig* file have changed). You also must set the flag MULTISTREAM in the *infmx_cmd_line_utl.param* file by uncommenting the line.

BrightStor ARCserve Backup must have multiple devices available to utilize Informix Multistreaming Backup. If multiple devices are not available, all threads will be queued in a serial manner.

Informix Multistreaming Backup works only with the dbspaces specified with the onbar command (onbar –b dbs1 dbs2 dbs3, for example).

Chapter 4: Best Practices

This chapter provides best practices for using the agent to back up and restore an Informix database.

Recommended Backup Procedures

The following backup procedures are recommended:

- When a database is initially created, perform a full offline backup of the entire database using BrightStor ARCserve Backup without the agent. This provides copies of all data files, log files, and control files of your database.

- Perform an online backup of your Informix database and its files.

- Perform a level-0 backup of the root dbspace and modified storage spaces to ensure that you can restore the data after you:
  - add or drop mirroring
  - add, move, drop, or resize a logical-log file
  - change the size or location of the physical log
  - change your storage manager configuration
  - add, move, or drop a dbspace
  - add, move, or drop a chunk to any type of storage space
  - add, move, or drop a blobspace

- Perform a level-0 backup of the modified storage spaces to ensure that you can restore the data when you:
  - convert a nonlogging database to a logging database.
  - convert a raw, static, or operational table to standard. This backup ensures that the unlogged data is restorable before you switch to a logging table type.

- Ensure that you have enough logical-log space, for the following reasons:
  - ON-Bar needs space in the logical log to query and update the sysutils database.
  - If not enough space exists in the logical log, ON-Bar will stop operating.

  Note: If you want to keep one logical log for ON-Bar usage, set the LBU_PRESERVE configuration parameter to 1.

Recommended Backup and Recovery Strategies

Plan your backup and recovery strategies for a database before you create the database, and maintain a regular backup schedule to ensure smooth recovery in case of database or media failure. If you do not create and adhere to a good backup and recovery plan before you create Informix databases, you may have difficulty recovering a database or not be able to recover it at all. When you develop your backup and recovery strategy, plan and perform full database backups on a regular basis. It is easier to recover a database from a full backup.

General Recommendations

The following section provides recommendations that you should follow for using the agent.

Use a Test Environment

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

Do Not Overwrite Logs

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

Initiate Backups After Organizational Changes

Initiate a backup each time that you:

- Rename a tablespace.

- Restore a tablespace that has been renamed, using the new tablespace name.

- Reorganize a table.

- Back up a corresponding tablespace after you reorganize a table.

- Change the tablespace or database configuration.

For other useful information about best practices for using the Agent for IBM Informix, see the *Informix Backup and Restore Guide*.

Appendix A: Troubleshooting

This appendix contains information that you can use to check the status of IDS and to check various log files. This appendix also provides solutions to errors you may encounter when using the Agent for IBM Informix.

Verify IDS Status

You can verify the current status of IDS by using the onstat utility with the following options:

Onstat Option	Definition
-?	Display the definition of command options.
-l	Display the current logical log status.
-d	Display current dbspace or blobspace information.

Agent Logs

The BrightStor ARCserve Backup Agent for IBM Informix provides logs for examining backup activities and enables you to modify settings if any trouble is encountered.

The following log files are located in the $CAINFMX_HOME/logs directory:

- **xbsa.log**—This file contains Informix activity details in the XBSA library. XBSA is used to identify the Open Group Backup Service application programming interface (API).

- **infmxbr.log**—This file contains the browser activity information.

- **onbarcmd.log**—This file contains the actual ON-Bar command line information for each job submitted from the front end. It also contains backup agent activity information for backups (but not for restores) initiated from the GUI.

- **infmxagntd.log**—This file contains backup agent activity information for all backups initiated from the command line and all restores initiated from the GUI or the command line.

For these files to receive debug information when used with BrightStor ARCserve Backup, you must enable debug information by setting the environmental variable CA_ENV_DEBUG_LEVEL.

For more information on enabling debug information, see Enabling Debug Information in this chapter.

Activity Log

The BrightStor ARCserve Backup activity log (BrightStor.log) can be monitored from the $BAB_HOME/logs directory for messages relating to the Informix objects being backed up.

Note: If a backup or restore does not successfully complete, check the bar_act.log and the database agent log files for more information.

Enable Debug Information

To enable debug information when using the backup agent, you must modify the agent.cfg file found in the /opt/CA/BABcmagt directory by entering the following line:

```
ENV CA_ENV_DEBUG_LEVEL=4
```

The following is an example of the modification that is required:

```
[32]
# Informix onbar Agent
NAME InfmxAgent
VERSION 11.0.nn
HOME /disc1/BABinfmx
ENV LD_LIBRARY_PATH=
ENV SHLIB_PATH=
ENV LIBPATH=
ENV PATH=
ENV CAINFMX_HOME=
ENV INFORMIXDIR=/disc1/informix
ENV CA_ENV_DEBUG_LEVEL=4
#ENV ARCHIVE__TEST=1
ENV INFMX_AGNT_PORT_NO=
BROWSER infmxbr
AGENT onbarcmd
```

Notes:

- You should enable debug information only when instructed to do so by a member of the Computer Associates Technical Support team.

- Remember to stop the backup agent before you change the agent.cfg file. After you have changed the file, you must restart the backup agent.

- If you are using the command line, for more details, see the chapter "Using the Agent".

ON-Bar Log

When you encounter problems, Computer Associates recommends that you monitor the ON-Bar activity information file. The complete path of this file is found in the $ONCONFIG file. By default, the pathname is /tmp/bar_act.log.

General Error Messages

This section provides information about general errors you may encounter while using the agent with BrightStor ARCserve Backup.

Only #LOGFILE# can be seen in the Backup Manager

Reason:

This indicates that the IDS server is offline.

Action:

Restart the IDS server.

The error message, ca_backup/ca_restore failed. Cannot add a job, appears

Reason:

This usually indicates that the command ca_auth -equiv … (for informix and root) has not been run on the BrightStor ARCserve Backup server.

Action:

You can find the ca_backup/ca_restore error messages within $CAINFMX_HOME/logs/xbsa.log file.

Cannot do a warm restore for user's dbspaces

Reason:

The variable ARCHIVE_TEST is probably not set properly.

Action:

Define the variable ARCHIVE_TEST=1 and export it if you are using the command line. If you are using the GUI, edit the Common Agent agent.cfg file and uncomment the variable ARCHIVE_TEST=1. Re-start the Common Agent.

A new IDS Server has been created but cannot be browsed

Reason:

The Agent for IBM Informix has not yet been completely configured.

Action:

Edit the file $CAINFMX_HOME/installation.cfg and add a new record for this Informix server.

The Backup Manager options, Backup current log only, and Salvage logs for Informix are grayed and cannot be selected

Reason:

Other entries beside the #LOGFILE# entry in IDS are also selected.

Action:

Select only the entry, #LOGFILE#, under the Informix server, and then select the Informix server.

Unable to backup the logical logs

Reason:

The value of the LTAPEDEV parameter is probably invalid.

Action:

To enable log backups, change the LTAPEDEV parameter to a valid value (the default /dev/null is not valid) within the $ONCONFIG file, and then restart the Informix server.

Cannot allocate the media when restoring

Reason:

The On-Bar script is not configured properly.

Action:

To be able to allocate the media from which you have to restore data, define the variable CA_REST_WR_LOGS_GROUP to a BrightStor ARCserve Backup group different from the one used to restore. This group should be assigned a media on which Informix can salvage the logs before restoring data. This is done by creating the entry within $INFORMIXDIR/bin/onbar script.

XBSA error from the bar_act.log file

Reason:

There is probably a problem with the Storage Manager.

Action:

When you receive an XBSA error in the onbar output file (default is /tmp/bar_act.log), refer to the log files of the agent. These log files can be found the $CAINFMX_HOME/logs directory. If there is not enough information, set the variable CA_ENV_DEBUG_LEVEL=4. If you use the command in the GUI, set it in Common Agent agent.cfg file, and then restart the Common Agent. If you are using the command line, define the variable and export it.

Technical Assistance

For online technical assistance and a complete list of locations, primary service hours, and telephone numbers, contact Customer Support at http://ca.com/support.

Glossary

agent

An agent gathers information and performs services without direct intervention. An agent uses parameters that are set by you, to process information.

archive

An archive is a set of stored files. Archiving is generally done for the purpose of long-term storage.

backup

A backup copies files from one source to another. During a backup, the source is usually copied to a separate storage device.

BAR_MAX_BACKUP

A parameter that specifies the maximum number of parallel processes that are allowed for each ON-Bar command.

BLOB space

All Informix Binary Large Object (BLOB) data is kept inside the database, but there is a special dbspace for BLOB data.

chunk

A chunk is a physical portion of disk on which Informix stores its data. A chunk can be either a raw partition or a file system file. Informix suggests that a chunk's name be a symbolic link to the actual chunk. For example, if you are using /dev/rdsk/c6t0d0s1 as a chunk, you could create a symbolic link named /dev/informix/chunk1 that points to /dev/rdsk/c6t0d0s1. That way, if there are ever any problems with that disk, you could replace the disk with another one and just change the symbolic link.

chunk space

Space allocated for Informix. This space may be a UNIX file, raw space, or dbspace.

configuration

A configuration is the way a system is set up, or the collection of components that make up a system. Configuring your system requires you to define parameter values. The parameter values establish the properties used when performing activities.

database

The architecture of an Informix database is similar to other databases, with one exception: with Informix, a single instance can support multiple databases. Informix cannot recover a single database inside an instance. However, a DBA who isolated a database by putting it into a separate dbspace then could recover that database by recovering that dbspace. This is a very common practice.

dbspace

A dbspace is a storage element that consists of one or more chunks. A dbspace contains one or more tblspaces. Although Informix backups usually are done on the instance level, restores can be done on the dbspace level, and you can restore a single dbspace.

extent

A logical grouping of at least four physically contiguous pages. When you create a table in Informix, you specify the amount of space in kilobytes. Informix then allocates as many contiguous pages as possible to satisfy this request. If it cannot allocate enough space in one contiguous section, other extents are created as necessary. As a table grows, the existing extents that a table is using are used up, and Informix allocates additional pages for that table. It tries to allocate physically contiguous pages if it can. If not, it allocates another extent.

file system

A method by which files are named and where they are logically placed for storage and retrieval. UNIX file systems are hierarchical in structure. File systems specify conventions for naming files such as the maximum name size, allowable characters, and the length of the file.

fragment

A part of a table that is partitioned across multiple dbspaces in a single dbspace.

free extent

Contiguous page from a chunk not yet allocated.

IBM Informix Dynamic Server (IDS)

The IBM Informix Dynamic Server product, version 7.x or 9.2x. Also referred to as IDS.

instance

An Informix instance is a single connection to shared memory. It is represented by one or more oninit processes, which start and stop when Informix is started or stopped.

log file

A file that contains details of events and actions that have occurred.

logical log

This log contains a record of changes made to the database.

media pool

A logical group of media used to identify and maintain the retention of data.

module

An individual part of a program, generally combined with other parts of a program that contain routines.

ON-Bar

The Online Backup and Restore utility for Informix Dynamic Server (IDS) software.

oncheck

A utility that can be used both to look at disk structures within the IBM IDS engine and to repair some structures.

ONCONFIG file

A file containing Informix configuration parameters, such as a partition.

ONINIT command

The command that initiates an IDS instance.

ONSTAT

An IDS utility that can be used to read shared memory structures.

page

An Informix page is a physically contiguous portion of a chunk. A page can be either 2 KB or 4 KB, depending on the operating system.

page space

A minimum unit of I/O, often 2 K in size.

parameter

A parameter is an item of information--such as a name, a number, or a selected option--that is passed to a program by a user or another program. Parameters are used to define operations and actions in a program.

partition

Another name for a table, tablespace, or fragment.

pathname

Identifies the directory where a collection of files or routines are stored.

physical log

A log that contains before images of pages.

recover

To salvage data, log, and other types of Informix files after problems have occurred.

restore

Return a database or files to its original state.

rootdbs

A database that contains metadata about the instance.

sysmaster database

The master database within an Informix instance that keeps track of all databases within that instance and that reads the shared memory structures of an IDS system.

tblspace

A logical grouping of all extents allocated to a table that may span multiple chunks.

transaction

A single event that must complete successfully, like transactions in any other RDBMS. Any partially completed (committed) transactions are rolled back if the instance crashes.

Index

V

Variable
    BAR_MAX_BACKUP • 12
verifying IDS object status • 39